

NASA

Economic Impact Study

2023



Acknowledgments

Per request by PCI (Poarch Creek Indians) Productions, LLC, the Nathalie P. Voorhees Center for Neighborhood and Community Improvement (Voorhees Center) conducted economic impact analysis of the National Aeronautics and Space Administration (NASA), the agency's Moon to Mars (M2M) campaign, and investments in climate change research and technology for the Fiscal Year (FY) 2023.

The Voorhees Center is an applied research and technical assistance unit in the College of Urban Planning and Public Affairs at the University of Illinois Chicago. Its mission is to promote quality of life and wellbeing by assisting and working with local organizations, government entities and other stakeholders in efforts to understand and develop communities.

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Executive Summary

This study is an assessment of the economic impacts of the National Aeronautics and Space Administration (NASA), the agency's Moon to Mars (M2M) campaign, and investments in climate change research and technology for the Fiscal Year (FY) 2023. The assessment consists of three parts. The first part presents the estimation of NASA impacts on the U.S., each of the fifty (50) states, and Washington, D.C. The second and third parts analyze economic impacts attributable to the M2M campaign and the investments in climate change research and technology, respectively, on the same set of regions. The purpose of the economic impact assessment is to quantify the changes in employment, income, levels of business activity, and government revenue throughout the entire economy that result from NASA's activities, the M2M campaign and investments in climate change research and technology expenditures.

National Aeronautics and Space Administration (NASA)

NASA supports hundreds of thousands of jobs and contributes billions of dollars of tax base for states and the nation. The report estimates the economic benefits generated directly by NASA along with the very substantial additional economic activity created through the purchasing actions, labor income, and consumption spending that follow from the operations of the NASA centers and programs.

At the national level, NASA has 17,823 full-time equivalent (FTE) jobs, paying more than \$3.5 billion in annual wages and benefits (Fiscal Year 2023).¹ Yet NASA's economic impact goes well beyond its immediate employment footprint. Wide-ranging benefits are created for local and state economies as well as the U.S. economy as a whole as NASA contracts for goods and services boost activity throughout the economy. The \$23.3 billion in procurement (including P-card transactions) originating from NASA is very diverse, involving varied sets of manufacturing and service production sectors. Total NASA procurement and labor income amounts to \$26.8 billion (including \$3.516 billion of labor income, \$23.218 billion of procurement activity, and \$98 million of P-card spending).²

The impact estimates reported in this study are the sum of three channels of economic impact: (1) the direct contribution of NASA's own activities; (2) indirect (procurement) activities within NASA's U.S. supply chain; and (3) the induced effect that results as federal civil servants at NASA facilities, employees of contractors, and employees within the supply chain of those contractors spend their wages in the wider consumer economy. Some highlights of the economic impacts that occur throughout the national economy due to the activities of NASA include:

¹ The count of civil servants excluding those residing in U.S. territories is 17,821 FTEs. These are the figures used in the national economic impact model.

² NASA also had travel expenditure of \$87.8 million that is not included in the modeling.

- The total employment sustained by NASA across the U.S. is estimated to be 304,803 jobs.³
- At the national level, NASA supports labor income of \$27.6 billion per year and an estimated economic output of \$75.6 billion annually. The approximately \$90,547 in average annual labor income per job is 24% greater than the average across the U.S. economy (\$73,416). The difference between average labor income (including wages and benefits) for a NASA civil servant (\$197,283) and the U.S. average (\$73,416) is much larger (269% of the U.S. average), reflecting the highly skilled and high-paid nature of NASA jobs compared to the average job in the U.S. economy.
- NASA generates an estimated \$9.6 billion in annual federal, state, and local tax revenues throughout the U.S.
- For every FTE job located at a NASA facility, at least 16 additional jobs are supported throughout the U.S. economy.⁴ For each million dollars of labor income earned by NASA civil service employees, an additional \$6.8 million of labor income is generated in the U.S. And for each million dollars' worth of output produced by NASA, an additional \$8 million of output—consisting of both intermediary inputs and consumption goods and services—is produced throughout the national economy. These figures are boosted by the large volume of procurement spending administered through NASA.⁵
- The top ten most impacted sectors account for 47% of total NASA employment impacts. Scientific research and development services is the most affected sector—19% of total NASA impacts are concentrated in this sector.
- NASA impacts are concentrated geographically as well. The top ten most impacted states account for 90% of total NASA employment impacts. These states are California, Texas, Florida, Alabama, Maryland, Virginia, Colorado, Ohio, Mississippi, and Washington. Impacts on Arizona, Massachusetts, Washington, D.C., Louisiana, and Utah are also relatively large. Figures 1 and 2 below illustrate the employment and output impacts of NASA across the states.
- Approximately 32% of overall NASA agency impacts in the U.S. are attributable to the M2M campaign. The M2M campaign-specific employment accounts for 3% of overall

³ Jobs are reported as an annualized combination of full- and part-time positions based on the average output per employee for a given industry. That is part of the reason why we refer to impacts per year or annually occurring.

⁴ “Supports” means partial or full support. We use “supported” instead of “created” to be conservative in our attribution of impacts to NASA. While NASA activities create new positions in some sectors of the economy, in many instances NASA helps sustain existing jobs in the economy.

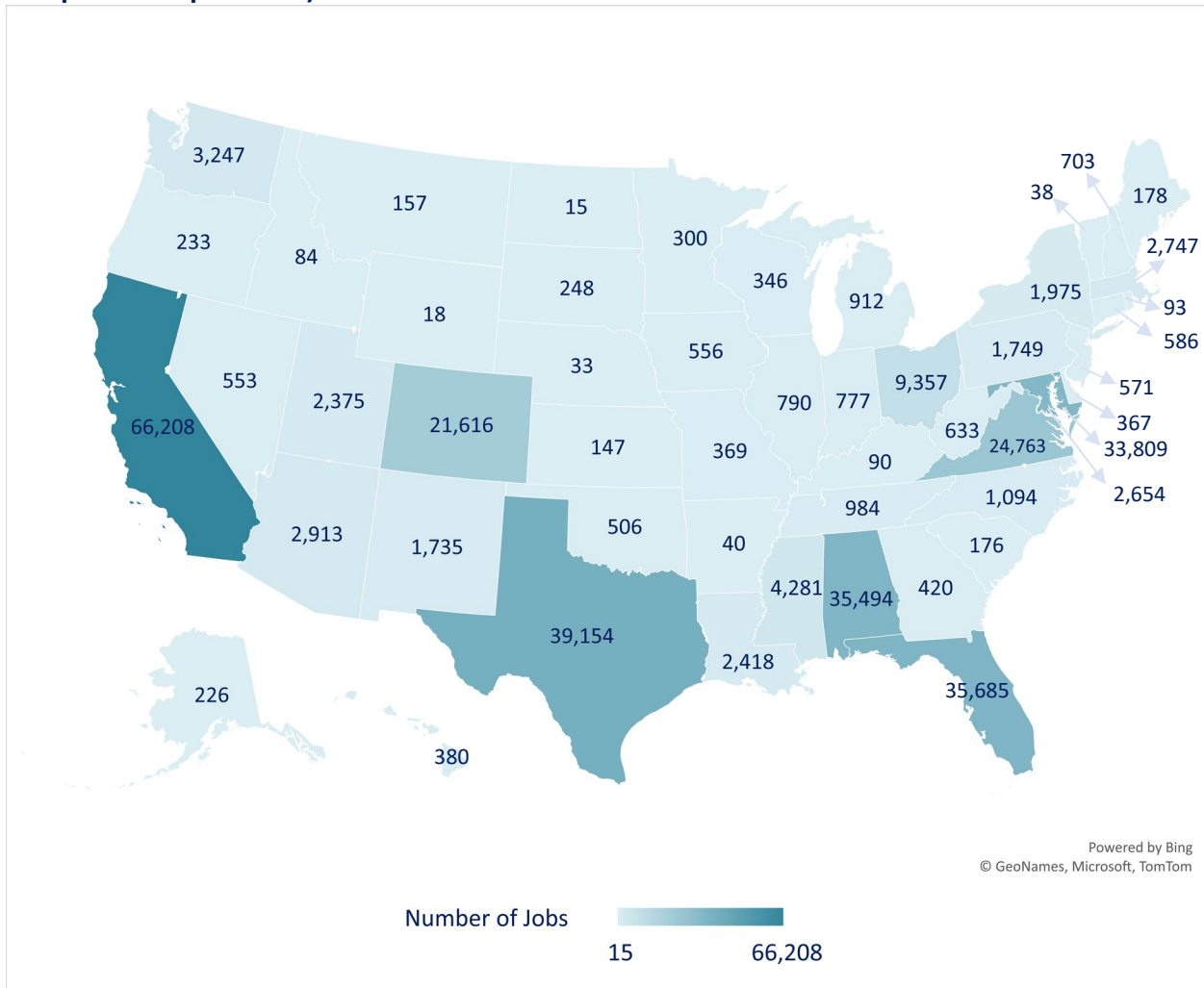
⁵ The multipliers reported here are larger than is typical for this kind of study because of the volume of NASA procurement activity, all of which is classified as indirect impact. Additional multipliers calculated in the “conventional” way are reported in the Appendix. Two sets of multipliers are presented: one for NASA employment and one for NASA procurement spending.

NASA employment impacts while M2M campaign-related procurement accounts for 29% of overall NASA employment impacts.

- Approximately 11% of overall NASA agency impacts in the U.S. are attributable to the investments in climate change research and technology. Climate change research and technology specific employment accounts for 2% of overall NASA employment impacts while climate change research and technology-related procurement accounts for 9% of overall NASA employment impacts.⁶

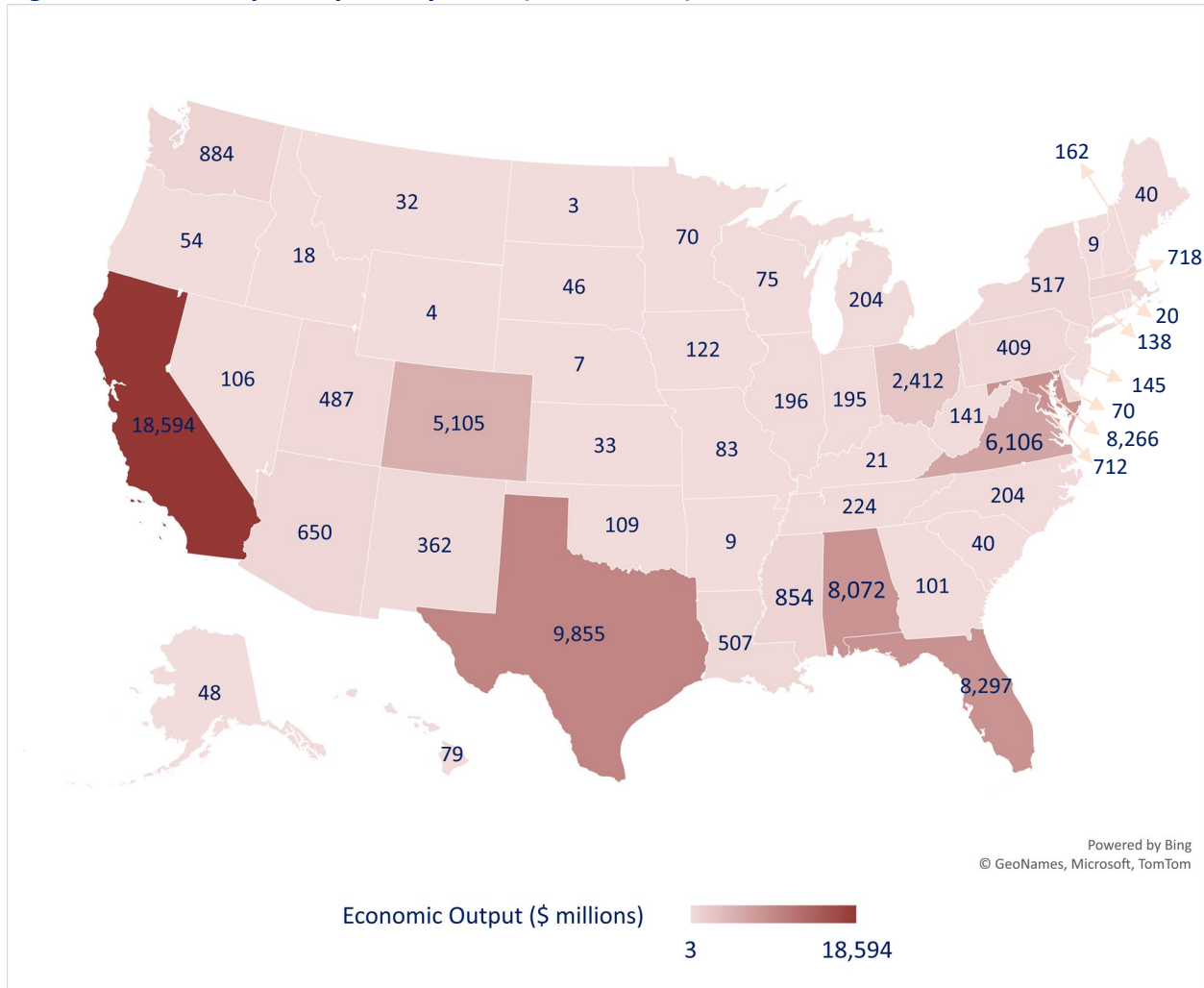
Figures 1 and 2 below illustrate the employment and output impacts of NASA across the states.

Figure 1: NASA Employment Impacts by State (employment consists of combination of full- and part-time positions)



⁶ NASA impacts are inclusive of all M2M and Climate Change impacts discussed in the following pages.

Figure 2: NASA Output Impacts by State (in \$ millions)



Moon to Mars (M2M) Campaign

NASA’s human lunar exploration plans under Artemis include sending the first woman and first person of color to the surface of the Moon and establishing sustainable exploration by the end of the decade. Working with U.S. companies and international partners, NASA will make new scientific discoveries and lay the foundation for long-term lunar exploration and development. The agency will use what it learns on the Moon to prepare for humanity’s next giant leap – sending astronauts to Mars.

It all starts with U.S companies delivering scientific instruments and technology demonstrations to the lunar surface, followed by a spaceship, called the Gateway, in orbit around the Moon that will support human and scientific missions, and human landers that will take astronauts to the surface of the Moon. The agency’s powerful Space Launch System rocket and Orion spacecraft are the backbone to building the Gateway and transporting astronauts to and from Earth.⁷

⁷ Information obtained from: <https://www.nasa.gov/topics/moon-to-mars>

NASA's Moon to Mars (M2M) campaign employs thousands of highly paid skilled professionals, and the U.S. government channels billions of dollars of federal spending on M2M into the states in the form of contracts. At the national level, NASA has 2,749 FTEs to support the M2M campaign, paying more than \$712 million in annual wages and benefits. The M2M campaign's economic impact goes well beyond its immediate economic footprint represented by the employment of NASA civil servants. Wide-ranging benefits are created for the local and state economies as well as the U.S. economy as NASA's procurement for goods and services boosts economic activity elsewhere in the country. \$7.7 billion in M2M procurement activity originating from NASA headquarters and centers involves almost every major category of manufacturing or service production. M2M contracts to firms, government agencies, and academic institutions not only support the U.S. aerospace industry but also result in advanced development and innovative solutions in areas including materials, structures, avionics, software, and analysis techniques.

Some highlights of the economic impacts that occur throughout the national economy from M2M activities include:

- The estimated amount of employment generated by M2M activities across the U.S. is 96,479 jobs.^{8,9}
- The M2M campaign supports labor income of \$8.6 billion per year and an estimated economic output of \$23.8 billion annually.
- The M2M campaign generates an estimated \$2.9 billion in federal, state, and local tax revenues throughout the U.S. each year.
- For every (FTE) civil service job located at NASA centers related to M2M, nearly 25 additional jobs are supported throughout the U.S. economy. For each million dollars of labor income earned by M2M-assigned NASA employees, an additional estimated \$11.1 million of labor income is generated in the U.S. And for each \$1 million worth of output produced by the M2M campaign, an additional \$12.5 million worth of output—consisting of both intermediary inputs and consumption goods and services—is produced throughout the national economy. These figures are exceptionally large because of the extremely high volume of procurement spending relative to civil service employment involved in the M2M campaign.
- Figures 3 and 4 below illustrate the employment and output impacts of the M2M campaign across the states. Alabama, California, Texas, Colorado, Florida, Virginia, Washington, Utah, Maryland, and Ohio are the most impacted states, respectively. Ten states account for approximately 95% of all M2M-related employment impacts. As a share of overall NASA impacts, M2M campaign impacts are heavily concentrated in some states.

⁸ The M2M impacts are completely a subset of the NASA impacts discussed in the previous page.

⁹ Jobs are reported as an annualized combination of full- and part-time positions based on the average output per employee for a given industry.

Among the top-ten most impacted states (by the M2M campaign), more than half of overall NASA impacts in Washington, Utah, Colorado, and Alabama are attributable to the M2M campaign (Figure 5).

Figure 3: M2M Employment Impacts by State (employment consists of combination of full- and part-time positions)

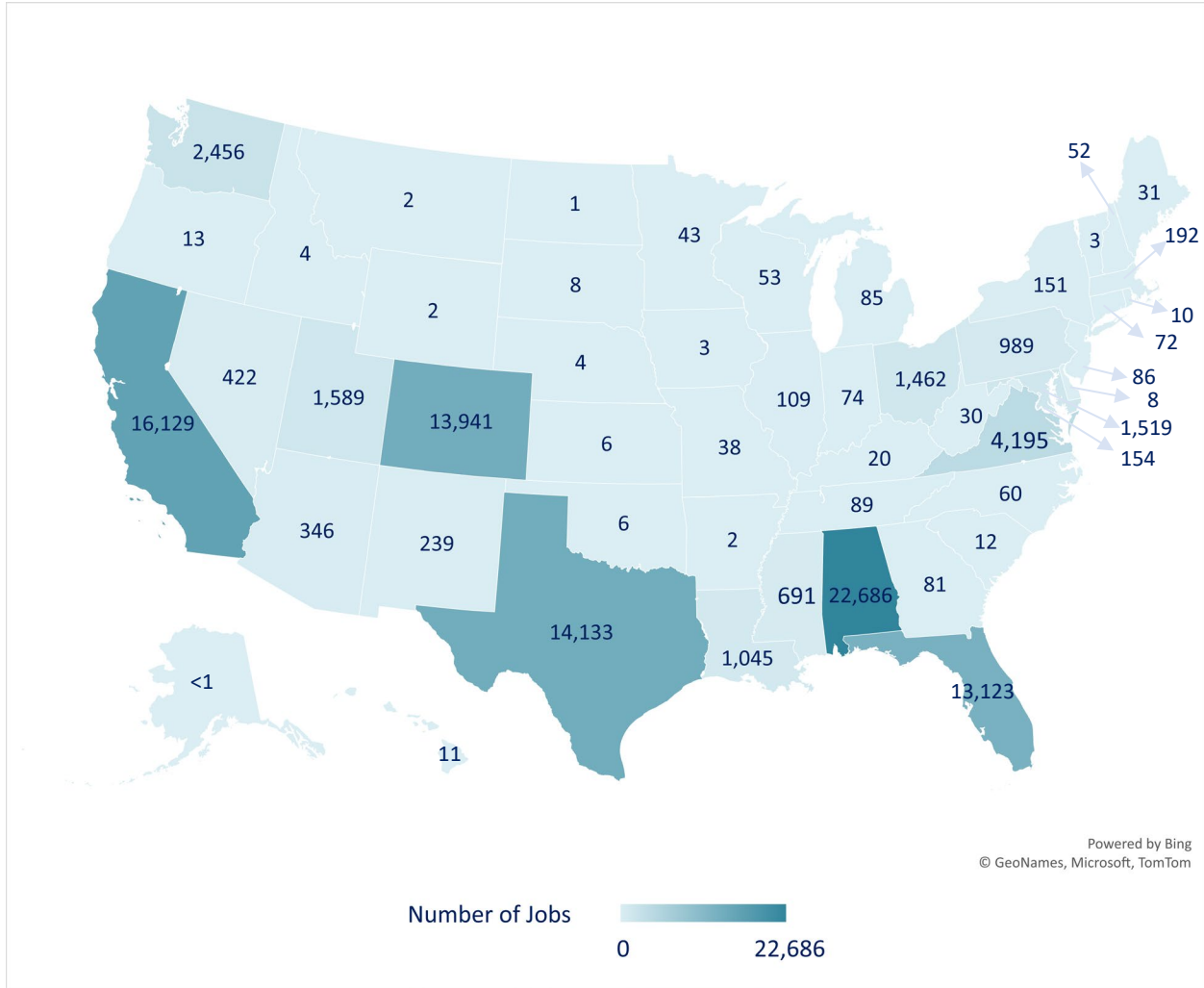


Figure 4: M2M Output Impacts by State (in \$ millions)

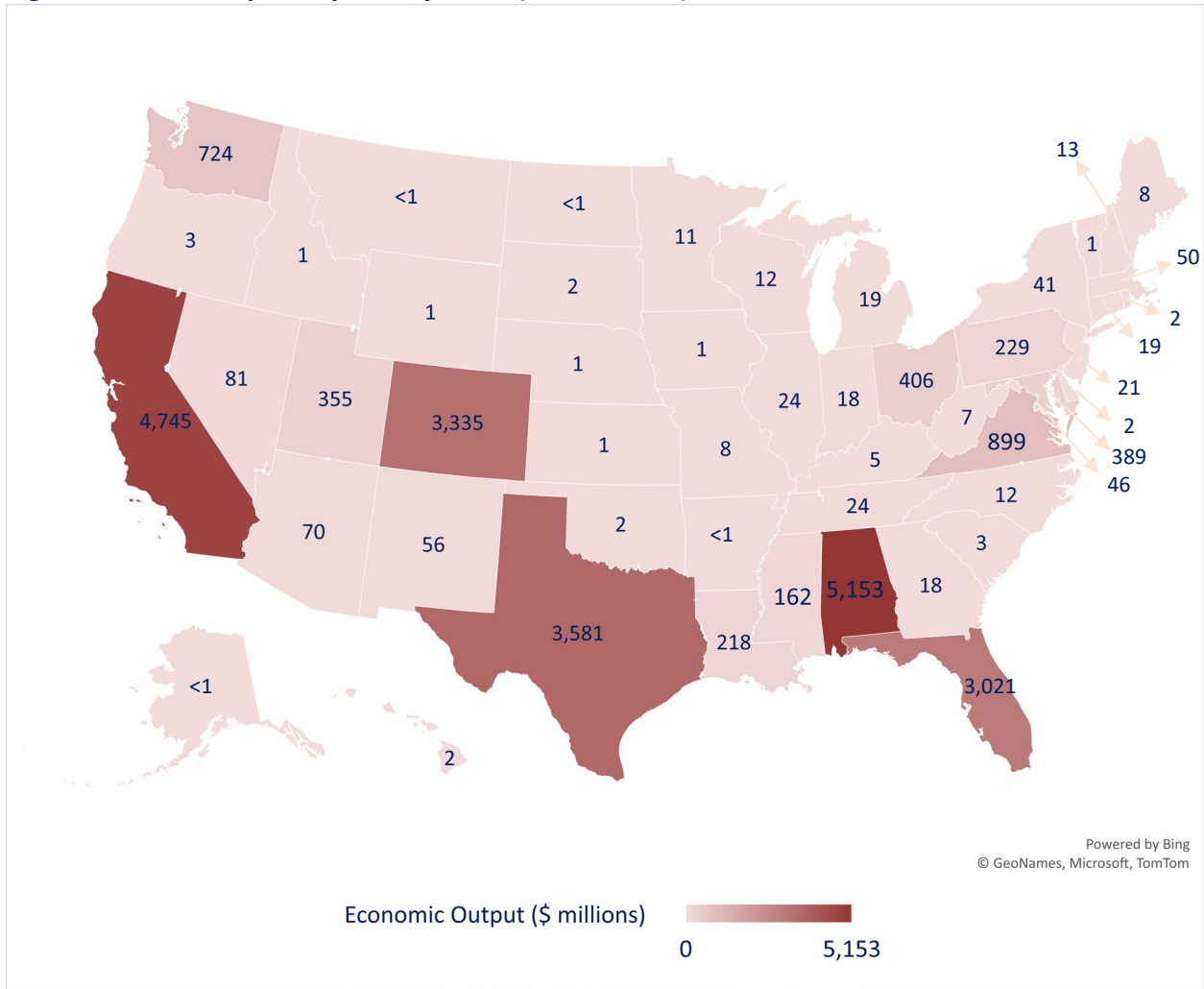
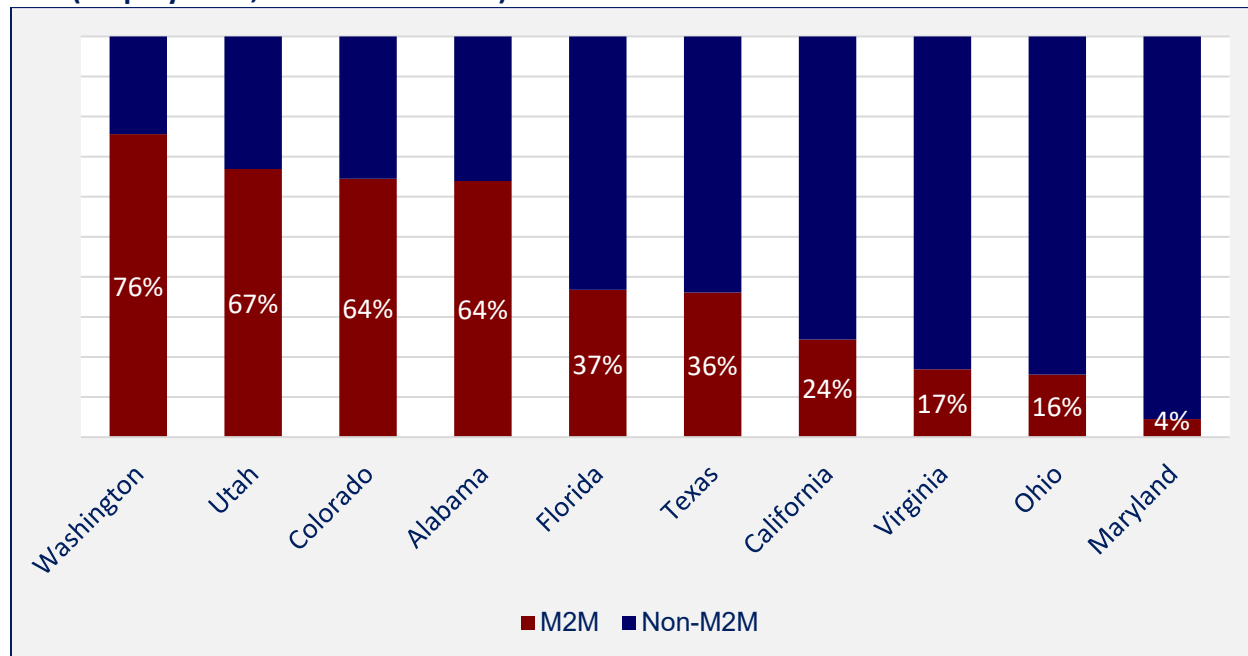


Figure 5: Share of M2M Campaign Impacts in Overall NASA Impacts for Top Ten States and U.S. (employment, based on FY 2023)



Investments in Climate Change Research and Technology

NASA is a global leader in studying Earth’s changing climate. The agency’s observations of Earth from space, the air, and on the ground provide information on how the interconnected systems of the planet interact.

NASA has a broad climate research program. Among the many areas NASA studies are greenhouse gases, temperature change, changes in sea ice and land ice, sea level rise, clouds and precipitation, and air pollution. NASA also develops technologies that can be used to mitigate or adapt to climate change, like sustainable aviation technologies.

In addition to providing the nation and world with unique climate observations, analysis, and modeling, this research helps NASA better assess the impacts of climate change on its mission and ensure the resiliency of its facilities and assets. NASA’s capabilities in researching Earth and its atmosphere will continue to be critical in understanding causes and effects of temperature changes, sea level rise, and other major climate changes.¹⁰

NASA’s investments in climate change research and technology employs thousands of highly paid skilled professionals, and the U.S. government channels billions of dollars of federal spending into the states in the form of contracts. At the national level, NASA has 2,009 FTEs to support the investments in climate change research and technology, paying more than \$382 million in annual wages and benefits. The agency’s investments in climate change research and technology go well beyond its immediate economic footprint represented by the employment of NASA civil servants.

¹⁰ Information obtained from: https://climate.nasa.gov/nasa_science/history/

Wide-ranging benefits are created for local, state, and national economies as NASA's procurement for goods and services boosts economic activity elsewhere in the country. \$2.4 billion in procurement originating from NASA headquarters and centers involve many different categories of manufacturing or service production. The agency's investments in climate change research and technology contracts to firms, government entities, and academic institutions help the U.S. maintain its global leadership role in collecting and disseminating systematic climate data that are increasingly critical to many aspects of life on Earth, from agriculture, to energy, and national security.

Some highlights of the economic impacts that occur throughout the national economy from NASA climate change research and technology investments include:

- The estimated amount of employment generated through NASA's investments in climate change research and technology across the U.S. is 32,900 jobs.^{11,12}
- The agency's investments in climate change research and technology support labor income of \$2.9 billion per year and an estimated economic output of \$7.9 billion annually.
- NASA's investments in climate change research and technology generate an estimated \$1 billion in federal, state, and local tax revenues throughout the U.S. each year.
- For every (FTE) civil service job located at NASA centers related to investments in climate change research and technology, at least 15 additional jobs are supported throughout the U.S. economy. For each million dollars of labor income earned by investments in climate change research and technology-assigned NASA employees, an additional \$6.7 million of labor income is generated in the U.S. And for each \$1 million worth of output produced by NASA's investments in climate change research and technology, an additional \$7.4 million of output—consisting of both intermediary inputs and consumption goods and services—is produced throughout the national economy.
- Figures 6 and 7 below illustrate the employment and output impacts of the agency's investments in climate change research and technology across the states. California, Maryland, Virginia, Colorado, Florida, Ohio, Alabama, Texas, Massachusetts, and New Mexico are the most impacted states, respectively. Ten states account for 81% of all climate change research and technology-related employment impacts. As a share of overall NASA impacts, investments in climate change research and technology impacts are heavily concentrated in some states. Among the top-ten most impacted states (by NASA investments in climate change research and technology), considerable portion of overall NASA impacts (10% or over) in New Mexico, Massachusetts, Ohio, Maryland,

¹¹ Climate change research and technology impacts are completely a subset of the NASA impacts discussed earlier.

¹² Jobs are reported as an annualized combination of full- and part-time positions based on the average output per employee for a given industry.

Virginia, Colorado, and California are attributable to the investments in climate change research and technology (Figure 8).

Figure 6: NASA's Investments in Climate Change Research and Technology Employment Impacts by State (employment consists of combination of full- and part-time positions)

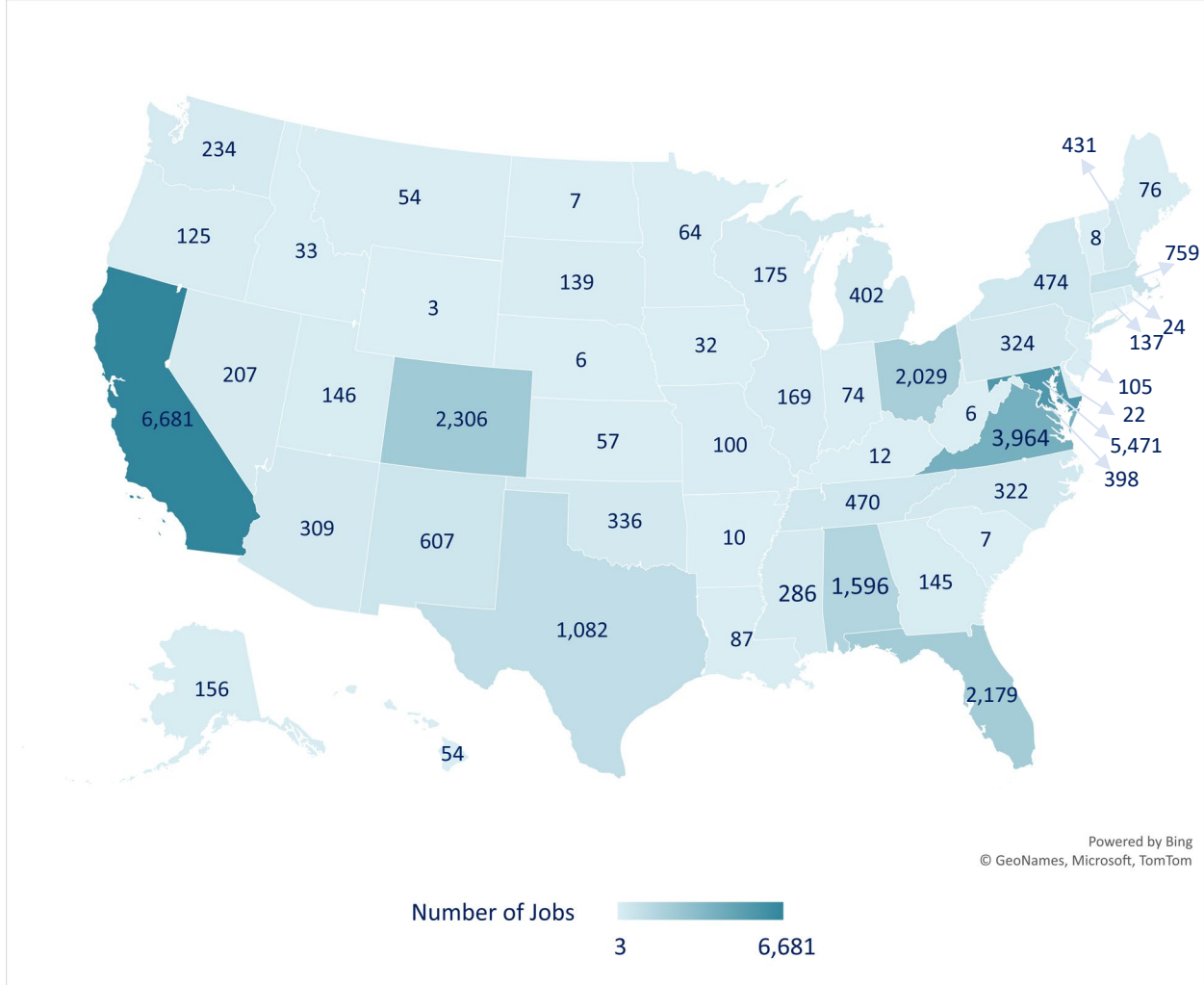


Figure 7: NASA's Investments in Climate Change Research and Technology Output Impacts by State (in \$ millions)

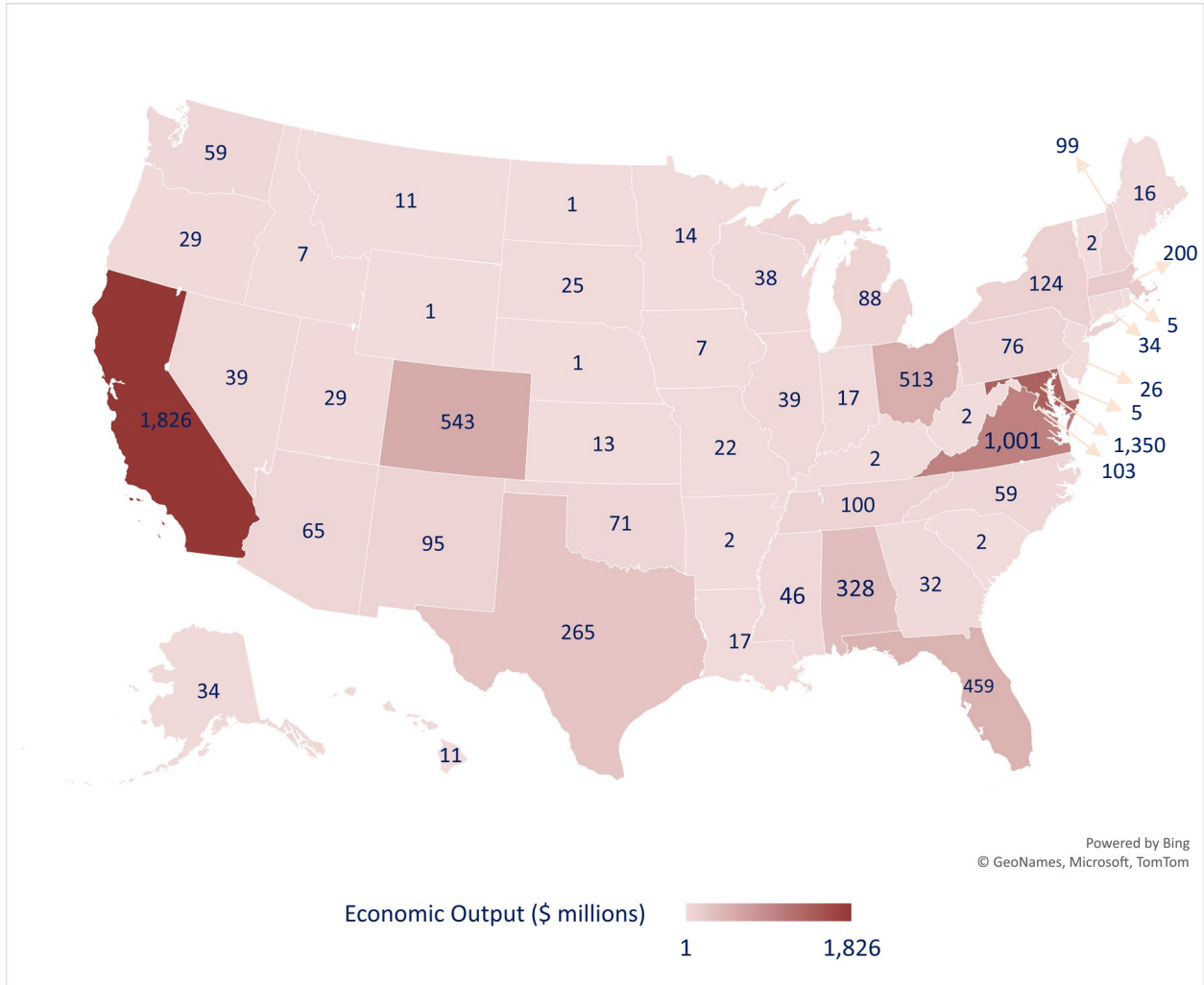


Figure 8: The Share of NASA’s Investments in Climate Change Research and Technology Impacts in Overall NASA Impacts for Top Ten States and U.S. (employment, based on FY 2023)

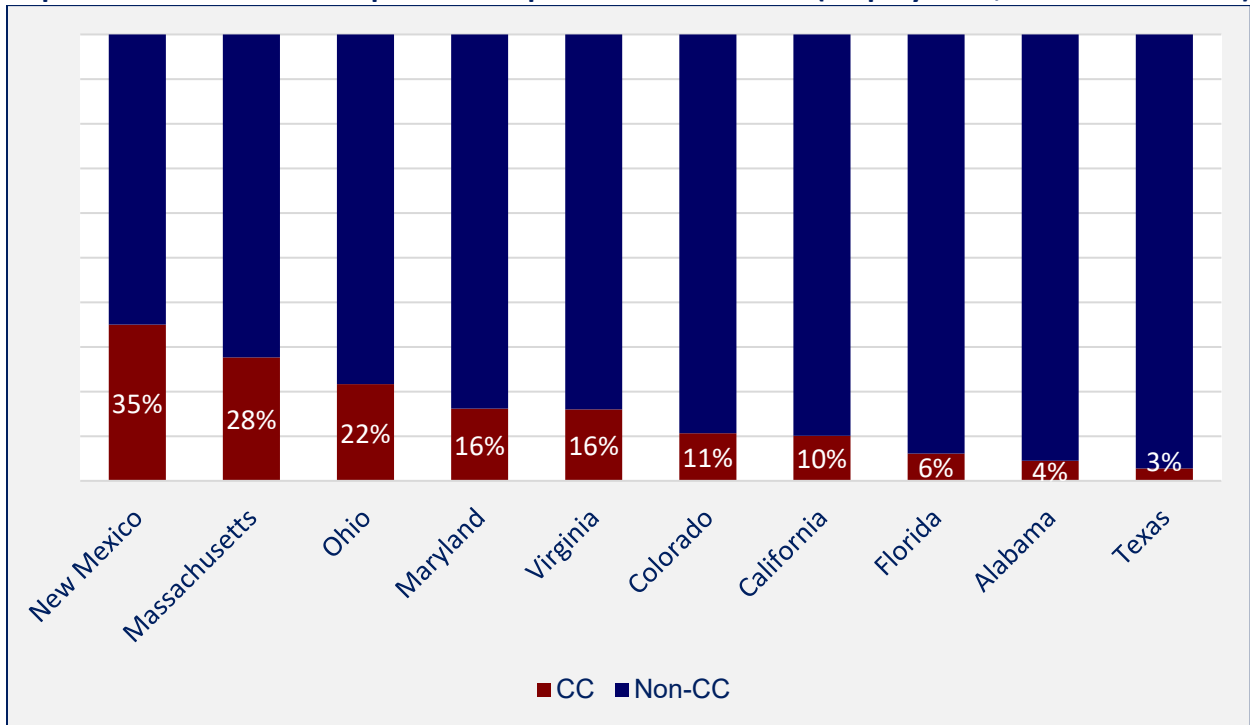


Table of Contents

INTRODUCTION	1
National Aeronautics and Space Administration (NASA).....	4
Moon to Mars (M2M) Campaign	6
Investments in Climate Change Research and Technology	6
Report Organization.....	8
LITERATURE SURVEY	9
The Conceptual Bases of Economic Impact Analysis	9
The Principles of Economic Impact Analysis	10
The Importance of Economic Impact Analysis to Public Policy Making.....	11
DATA ANALYSIS	12
Description of NASA Data	12
NASA Activities.....	12
NASA Employment	12
NASA Procurement	15
Moon-to-Mars (M2M) Campaign	18
NASA Employment for the M2M Campaign	18
NASA Procurement for the M2M Campaign.....	20
Investments in Climate Change Research and Technology	23
NASA Employment for Climate Change Research and Technology.....	23
NASA Procurement for Climate Change Research and Technology	25
MODEL DEVELOPMENT	29
Scenario-Building	29
Study Area Designation and Local Expenditures	31
Degree of Precision in Job Values in IMPLAN Output.....	32
Leakage of Economic Activity in State Models	33
Economic Modeling	34
IMPACT ESTIMATION DECISIONS	38
RESULTS ANALYSIS.....	40
Economic Impacts on the United States	40
NASA Impacts.....	40
M2M Campaign Impacts.....	47
The M2M Campaign’s Share of NASA Impacts	49

Investments in Climate Change Research and Technology Impacts.....	50
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	52
Economic Impacts on the State of Alabama	54
NASA Impacts.....	54
M2M Campaign Impacts.....	59
The M2M Campaign’s Share of NASA Impacts	60
Investments in Climate Change Research and Technology Impacts.....	61
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	63
Economic Impacts on the State of Alaska.....	65
NASA Impacts.....	65
M2M Campaign Impacts.....	65
The M2M Campaign’s Share of NASA Impacts	65
Investments in Climate Change Research and Technology Impacts.....	66
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	66
Economic Impacts on the State of Arizona.....	68
NASA Impacts.....	68
M2M Campaign Impacts.....	69
The M2M Campaign’s Share of NASA Impacts	70
Investments in Climate Change Research and Technology Impacts.....	71
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	72
Economic Impacts on the State of Arkansas.....	74
NASA Impacts.....	74
M2M Campaign Impacts.....	75
The M2M Campaign’s Share of NASA Impacts	75
Investments in Climate Change Research and Technology Impacts.....	76
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	78
Economic Impacts on the State of California.....	80
NASA Impacts.....	80
M2M Campaign Impacts.....	85
The M2M Campaign’s Share of NASA Impacts	86
Investments in Climate Change Research and Technology Impacts.....	87
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	89
Economic Impacts on the State of Colorado	91

NASA Impacts.....	91
M2M Campaign Impacts.....	96
The M2M Campaign’s Share of NASA Impacts	97
Investments in Climate Change Research and Technology Impacts.....	98
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	100
Economic Impacts on the State of Connecticut.....	102
NASA Impacts.....	102
M2M Campaign Impacts.....	103
The M2M Campaign’s Share of NASA Impacts	104
Investments in Climate Change Research and Technology Impacts.....	105
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	106
Economic Impacts on the State of Delaware	108
NASA Impacts.....	108
Moon to Mars (M2M) Campaign Impacts	109
The Moon to Mars Campaign’s Share of NASA Impacts.....	110
Investments in Climate Change Research and Technology Impacts.....	111
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	113
Economic Impacts on the State of Florida	115
NASA Impacts.....	115
M2M Campaign Impacts.....	120
The M2M Campaign’s Share of NASA Impacts	121
Investments in Climate Change Research and Technology Impacts.....	122
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	124
Economic Impacts on the State of Georgia.....	126
NASA Impacts.....	126
M2M Campaign Impacts.....	127
The M2M Campaign’s Share of NASA Impacts	128
Investments in Climate Change Research and Technology Impacts.....	129
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	130
Economic Impacts on the State of Hawaii	132
NASA Impacts.....	132
M2M Campaign Impacts.....	133
The M2M Campaign’s Share of NASA Impacts	134

Investments in Climate Change Research and Technology Impacts.....	135
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	136
Economic Impacts on the State of Idaho	138
NASA Impacts.....	138
M2M Campaign Impacts.....	139
The M2M Campaign’s Share of NASA Impacts	140
Investments in Climate Change Research and Technology Impacts.....	141
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	142
Economic Impacts on the State of Illinois.....	144
NASA Impacts.....	144
M2M Campaign Impacts.....	145
The M2M Campaign’s Share of NASA Impacts	146
Investments in Climate Change Research and Technology Impacts.....	147
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	149
Economic Impacts on the State of Indiana	151
NASA Impacts.....	151
M2M Campaign Impacts.....	152
The M2M Campaign’s Share of NASA Impacts	153
Investments in Climate Change Research and Technology Impacts.....	154
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	155
Economic Impacts on the State of Iowa	157
NASA Impacts.....	157
M2M Campaign Impacts.....	158
The M2M Campaign’s Share of NASA Impacts	159
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	161
Economic Impacts on the State of Kansas	163
NASA Impacts.....	163
M2M Campaign Impacts.....	164
The M2M Campaign’s Share of NASA Impacts	165
Investments in Climate Change Research and Technology Impacts.....	166
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	167
Economic Impacts on the State of Kentucky	169
NASA Impacts.....	169

M2M Campaign Impacts.....	170
The M2M Campaign’s Share of NASA Impacts	171
Investments in Climate Change Research and Technology Impacts.....	172
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	173
Economic Impacts on the State of Louisiana	175
NASA Impacts.....	175
M2M Campaign Impacts.....	176
The M2M Campaign’s Share of NASA Impacts	177
Investments in Climate Change Research and Technology Impacts.....	178
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	179
Economic Impacts on the State of Maine	181
NASA Impacts.....	181
M2M Campaign Impacts.....	182
The M2M Campaign’s Share of NASA Impacts	183
Investments in Climate Change Research and Technology Impacts.....	184
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	185
Economic Impacts on the State of Maryland.....	187
NASA Impacts.....	187
M2M Campaign Impacts.....	192
The M2M Campaign’s Share of NASA Impacts	193
Investments in Climate Change Research and Technology Impacts.....	194
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	196
Economic Impacts on the State of Massachusetts	198
NASA Impacts.....	198
M2M Campaign Impacts.....	199
The M2M Campaign’s Share of NASA Impacts	200
Investments in Climate Change Research and Technology Impacts.....	201
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	202
Economic Impacts on the State of Michigan	204
NASA Impacts.....	204
M2M Campaign Impacts.....	205
The M2M Campaign’s Share of NASA Impacts	206
Investments in Climate Change Research and Technology Impacts.....	207

The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	208
Economic Impacts on the State of Minnesota	210
NASA Impacts.....	210
M2M Campaign Impacts.....	211
The M2M Campaign’s Share of NASA Impacts	212
Investments in Climate Change Research and Technology Impacts.....	213
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	214
Economic Impacts on the State of Mississippi.....	216
NASA Impacts.....	216
M2M Campaign Impacts.....	217
The M2M Campaign’s Share of NASA Impacts	219
Investments in Climate Change Research and Technology Impacts.....	219
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	221
Economic Impacts on the State of Missouri	223
NASA Impacts.....	223
M2M Campaign Impacts.....	224
The M2M Campaign’s Share of NASA Impacts	225
Investments in Climate Change Research and Technology Impacts.....	226
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	227
Economic Impacts on the State of Montana	229
NASA Impacts.....	229
M2M Campaign Impacts.....	230
The M2M Campaign’s Share of NASA Impacts	230
Investments in Climate Change Research and Technology Impacts.....	231
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	232
Economic Impacts on the State of Nebraska	234
NASA Impacts.....	234
M2M Campaign Impacts.....	235
The M2M Campaign’s Share of NASA Impacts	236
Investments in Climate Change Research and Technology Impacts.....	237
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	238
Economic Impacts on the State of Nevada.....	240
NASA Impacts.....	240

M2M Campaign Impacts.....	241
The M2M Campaign’s Share of NASA Impacts	242
Investments in Climate Change Research and Technology Impacts.....	243
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	244
Economic Impacts on the State of New Hampshire	246
NASA Impacts.....	246
M2M Campaign Impacts.....	247
The M2M Campaign’s Share of NASA Impacts	248
Investments in Climate Change Research and Technology Impacts.....	249
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	250
Economic Impacts on the State of New Jersey	252
NASA Impacts.....	252
M2M Campaign Impacts.....	253
The M2M Campaign’s Share of NASA Impacts	254
Investments in Climate Change Research and Technology Impacts.....	255
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	256
Economic Impacts on the State of New Mexico	258
NASA Impacts.....	258
M2M Campaign Impacts.....	259
The M2M Campaign’s Share of NASA Impacts	260
Investments in Climate Change Research and Technology Impacts.....	261
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	262
Economic Impacts on the State of New York.....	264
NASA Impacts.....	264
M2M Campaign Impacts.....	265
The M2M Campaign’s Share of NASA Impacts	266
Investments in Climate Change Research and Technology Impacts.....	267
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	268
Economic Impacts on the State of North Carolina	270
NASA Impacts.....	270
M2M Campaign Impacts.....	271
The M2M Campaign’s Share of NASA Impacts	272
Investments in Climate Change Research and Technology Impacts.....	273

The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	274
Economic Impacts on the State of North Dakota	276
NASA Impacts.....	276
M2M Campaign Impacts.....	277
The M2M Campaign’s Share of NASA Impacts	278
Investments in Climate Change Research and Technology Impacts.....	279
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	279
Economic Impacts on the State of Ohio	281
NASA Impacts.....	281
M2M Campaign Impacts.....	282
The M2M Campaign’s Share of NASA Impacts	284
Investments in Climate Change Research and Technology Impacts.....	284
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	286
Economic Impacts on the State of Oklahoma.....	288
NASA Impacts.....	288
M2M Campaign Impacts.....	289
The M2M Campaign’s Share of NASA Impacts	290
Investments in Climate Change Research and Technology Impacts.....	291
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	292
Economic Impacts on the State of Oregon	294
NASA Impacts.....	294
M2M Campaign Impacts.....	295
The M2M Campaign’s Share of NASA Impacts	296
Investments in Climate Change Research and Technology Impacts.....	297
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	298
Economic Impacts on the State of Pennsylvania	300
NASA Impacts.....	300
M2M Campaign Impacts.....	301
The M2M Campaign’s Share of NASA Impacts	302
Investments in Climate Change Research and Technology Impacts.....	303
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	304
Economic Impacts on the State of Rhode Island	306
NASA Impacts.....	306

M2M Campaign Impacts.....	307
The M2M Campaign’s Share of NASA Impacts	308
Investments in Climate Change Research and Technology Impacts.....	309
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	310
Economic Impacts on the State of South Carolina.....	312
NASA Impacts.....	312
M2M Campaign Impacts.....	313
The M2M Campaign’s Share of NASA Impacts	314
Investments in Climate Change Research and Technology Impacts.....	315
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	316
Economic Impacts on the State of South Dakota	318
NASA Impacts.....	318
M2M Campaign Impacts.....	319
The M2M Campaign’s Share of NASA Impacts	320
Investments in Climate Change Research and Technology Impacts.....	321
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	321
Economic Impacts on the State of Tennessee	323
NASA Impacts.....	323
M2M Campaign Impacts.....	324
The M2M Campaign’s Share of NASA Impacts	325
Investments in Climate Change Research and Technology Impacts.....	326
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	327
Economic Impacts on the State of Texas	329
NASA Impacts.....	329
M2M Campaign Impacts.....	334
The M2M Campaign’s Share of NASA Impacts	335
Investments in Climate Change Research and Technology Impacts.....	336
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	338
Economic Impacts on the State of Utah	340
NASA Impacts.....	340
M2M Campaign Impacts.....	341
The M2M Campaign’s Share of NASA Impacts	342
Investments in Climate Change Research and Technology Impacts.....	343

The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	344
Economic Impacts on the State of Vermont.....	346
NASA Impacts.....	346
M2M Campaign Impacts.....	347
The M2M Campaign’s Share of NASA Impacts.....	348
Investments in Climate Change Research and Technology Impacts.....	349
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	349
Economic Impacts on the State of Virginia.....	351
NASA Impacts.....	351
M2M Campaign Impacts.....	356
The M2M Campaign’s Share of NASA Impacts.....	357
Investments in Climate Change Research and Technology Impacts.....	358
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	360
Economic Impacts on the State of Washington.....	362
NASA Impacts.....	362
M2M Campaign Impacts.....	363
The M2M Campaign’s Share of NASA Impacts.....	364
Investments in Climate Change Research and Technology Impacts.....	365
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	367
Economic Impacts on Washington, D.C. (District of Columbia).....	369
NASA Impacts.....	369
M2M Campaign Impacts.....	370
The M2M Campaign’s Share of NASA Impacts.....	372
Investments in Climate Change Research and Technology Impacts.....	372
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	374
Economic Impacts on the State of West Virginia.....	376
NASA Impacts.....	376
M2M Campaign Impacts.....	377
The M2M Campaign’s Share of NASA Impacts.....	378
Investments in Climate Change Research and Technology Impacts.....	379
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	380
Economic Impacts on the State of Wisconsin.....	382
NASA Impacts.....	382

M2M Campaign Impacts.....	383
The M2M Campaign’s Share of NASA Impacts	384
Investments in Climate Change Research and Technology Impacts.....	385
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	386
Economic Impacts on the State of Wyoming.....	388
NASA Impacts.....	388
M2M Campaign Impacts.....	389
The M2M Campaign’s Share of NASA Impacts	390
Investments in Climate Change Research and Technology Impacts.....	391
The Investments in Climate Change Research and Technology’s Share of NASA Impacts.....	391
CONCLUSION	393
REFERENCES.....	397
About the Authors	399
APPENDIX	400

List of Tables

Table 1: NASA’s Labor Force and Associated Labor Income	13
Table 2: NASA Procurement	16
Table 3: NASA’s M2M Campaign Labor Force and Associated Labor Income	18
Table 4: NASA Procurement for the M2M Campaign	21
Table 5: NASA’s Climate Change Research and Technology Labor Force and Associated Labor Income ..	23
Table 6: NASA Procurement for Climate Change Research and Technology	26
Table 7: Summary of NASA Impacts by Types of Impact, the United States	41
Table 8: NASA Employment Impacts by Sources of Impact, the United States.....	42
Table 9: NASA Output Impacts by Sources of Impact, the United States.....	43
Table 10: Summary of M2M Campaign Impacts by Types of Impact, the United States	48
Table 11: M2M Campaign Employment Impacts by Sources of Impact, the United States	48
Table 12: M2M Campaign Output Impacts by Sources of Impact, the United States	49
Table 13: The M2M Campaign Portion of Overall NASA Impacts, the United States.....	49
Table 14: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, the United States	51
Table 15: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, the United States	51
Table 16: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, the United States	52
Table 17: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, the United States	52
Table 18: Summary of NASA Impacts by Types of Impact, Alabama	54
Table 19: NASA Employment Impacts by Sources of Impact, Alabama.....	55
Table 20: NASA Output Impacts by Sources of Impact, Alabama.....	55
Table 21: Summary of M2M Campaign Impacts by Types of Impact, Alabama	59
Table 22: M2M Campaign Employment Impacts by Sources of Impact, Alabama	60
Table 23: M2M Campaign Output Impacts by Sources of Impact, Alabama	60
Table 24: The M2M Campaign Portion of Overall NASA Impacts, Alabama.....	61
Table 25: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Alabama	62
Table 26: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Alabama	62
Table 27: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Alabama	63
Table 28: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alabama	63
Table 29: Summary of NASA Impacts by Types of Impact, Alaska.....	65
Table 30: Summary of M2M Campaign Impacts by Types of Impact, Alaska.....	65
Table 31: The M2M Campaign Portion of Overall NASA Impacts, Alaska	65

Table 32: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Alaska	66
Table 33: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alaska	67
Table 34: Summary of NASA Impacts by Types of Impact, Arizona	68
Table 35: NASA Employment Impacts by Sources of Impact, Arizona.....	68
Table 36: NASA Output Impacts by Sources of Impact, Arizona.....	69
Table 37: Summary of M2M Campaign Impacts by Types of Impact, Arizona	69
Table 38: M2M Campaign Employment Impacts by Sources of Impact, Arizona.....	70
Table 39:M2M Campaign Output Impacts by Sources of Impact, Arizona.....	70
Table 40: The M2M Campaign Portion of Overall NASA Impacts, Arizona.....	70
Table 41: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Arizona	71
Table 42: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Arizona	72
Table 43: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Arizona	72
Table 44: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arizona	73
Table 45: Summary of NASA Impacts by Types of Impact, Arkansas.....	74
Table 46: NASA Employment Impacts by Sources of Impact, Arkansas	74
Table 47: NASA Output Impacts by Sources of Impact, Arkansas	75
Table 48: Summary of M2M Campaign Impacts by Types of Impact, Arkansas.....	75
Table 49: The M2M Campaign Portion of Overall NASA Impacts, Arkansas	76
Table 50: Investments in Summary of Climate Change Research and Technology Impacts by Types of Impact, Arkansas.....	77
Table 51: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Arkansas.....	77
Table 52: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Arkansas.....	78
Table 53: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arkansas.....	78
Table 54: Summary of NASA Impacts by Types of Impact, California.....	80
Table 55: NASA Employment Impacts by Sources of Impact, California	81
Table 56: NASA Output Impacts by Sources of Impact, California	81
Table 57: Summary of M2M Campaign Impacts by Types of Impact, California	85
Table 58: M2M Campaign Employment Impacts by Sources of Impact, California.....	86
Table 59: M2M Campaign Output Impacts by Sources of Impact, California.....	86
Table 60: The M2M Campaign Portion of Overall NASA Impacts, California	87
Table 61: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, California	88

Table 62: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, California	88
Table 63: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, California	89
Table 64: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, California	89
Table 65: Summary of NASA Impacts by Types of Impact, Colorado	91
Table 66: NASA Employment Impacts by Sources of Impact, Colorado	91
Table 67: NASA Output Impacts by Sources of Impact, Colorado	92
Table 68: Summary of M2M Campaign Impacts by Types of Impact, Colorado.....	96
Table 69: M2M Campaign Employment Impacts by Sources of Impact, Colorado	97
Table 70: M2M Campaign Output Impacts by Sources of Impact, Colorado	97
Table 71: The M2M Campaign Portion of Overall NASA Impacts, Colorado	98
Table 72: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Colorado.....	99
Table 73: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Colorado.....	99
Table 74: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Colorado.....	100
Table 75: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Colorado.....	100
Table 76: Summary of NASA Impacts by Types of Impact, Connecticut.....	102
Table 77: NASA Employment Impacts by Sources of Impact, Connecticut	102
Table 78: NASA Output Impacts by Sources of Impact, Connecticut	103
Table 79: Summary of M2M Campaign Impacts by Types of Impact, Connecticut	103
Table 80: M2M Campaign Employment Impacts by Sources of Impact, Connecticut.....	104
Table 81: M2M Campaign Output Impacts by Sources of Impact, Connecticut.....	104
Table 82: The M2M Campaign Portion of Overall NASA Impacts, Connecticut	104
Table 83: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Connecticut.....	105
Table 84: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Connecticut.....	106
Table 85: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Connecticut.....	106
Table 86: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Connecticut	107
Table 87: Summary of NASA Impacts by Types of Impact, Delaware.....	108
Table 88: NASA Employment Impacts by Sources of Impact, Delaware	108
Table 89: NASA Output Impacts by Sources of Impact, Delaware.....	109
Table 90: Summary of M2M Campaign Impacts by Types of Impact, Delaware	109
Table 91: M2M Campaign Employment Impacts by Sources of Impact, Delaware.....	110
Table 92: M2M Campaign Output Impacts by Sources of Impact, Delaware.....	110

Table 93: The M2M Campaign Portion of Overall NASA Impacts, Delaware	111
Table 94: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Delaware	112
Table 95: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Delaware	112
Table 96: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Delaware	113
Table 97: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Delaware	113
Table 98: Summary of NASA Impacts by Types of Impact, Florida	115
Table 99: NASA Employment Impacts by Sources of Impact, Florida.....	116
Table 100: NASA Output Impacts by Sources of Impact, Florida.....	116
Table 101: Summary of M2M Campaign Impacts by Types of Impact, Florida	120
Table 102: M2M Campaign Employment Impacts by Sources of Impact, Florida	121
Table 103: M2M Campaign Output Impacts by Sources of Impact, Florida	121
Table 104: The M2M Campaign Portion of Overall NASA Impacts, Florida.....	122
Table 105: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Florida	123
Table 106: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Florida	123
Table 107: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Florida	124
Table 108: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Florida.....	124
Table 109: Summary of NASA Impacts by Types of Impact, Georgia	126
Table 110: NASA Employment Impacts by Sources of Impact, Georgia	126
Table 111: NASA Output Impacts by Sources of Impact, Georgia	127
Table 112: Summary of M2M Campaign Impacts by Types of Impact, Georgia.....	127
Table 113: M2M Campaign Employment Impacts by Sources of Impact, Georgia	128
Table 114: M2M Campaign Output Impacts by Sources of Impact, Georgia	128
Table 115: The M2M Campaign Portion of Overall NASA Impacts, Georgia	128
Table 116: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Georgia.....	129
Table 117: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Georgia.....	130
Table 118: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Georgia.....	130
Table 119: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Georgia	131
Table 120: Summary of NASA Impacts by Types of Impact, Hawaii	132
Table 121: NASA Employment Impacts by Sources of Impact, Hawaii.....	132
Table 122: NASA Output Impacts by Sources of Impact, Hawaii	133

Table 123: Summary of M2M Campaign Impacts by Types of Impact, Hawaii	133
Table 124: M2M Campaign Employment Impacts by Sources of Impact, Hawaii	134
Table 125: M2M Campaign Output Impacts by Sources of Impact, Hawaii	134
Table 126: The M2M Campaign Portion of Overall NASA Impacts, Hawaii	134
Table 127: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Hawaii	135
Table 128: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Hawaii	136
Table 129: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Hawaii	136
Table 130: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Hawaii.....	137
Table 131: Summary of NASA Impacts by Types of Impact, Idaho	138
Table 132: NASA Employment Impacts by Sources of Impact, Idaho.....	138
Table 133: NASA Output Impacts by Sources of Impact, Idaho.....	139
Table 134: Summary of M2M Campaign Impacts by Types of Impact, Idaho	139
Table 135: M2M Campaign Employment Impacts by Sources of Impact, Idaho	140
Table 136: M2M Campaign Output Impacts by Sources of Impact, Idaho	140
Table 137: The M2M Campaign Portion of Overall NASA Impacts, Idaho.....	140
Table 138: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Idaho	141
Table 139: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Idaho	142
Table 140: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Idaho	142
Table 141: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Idaho.....	143
Table 142: Summary of NASA Impacts by Types of Impact, Illinois.....	144
Table 143: NASA Employment Impacts by Sources of Impact, Illinois	144
Table 144: NASA Output Impacts by Sources of Impact, Illinois	145
Table 145: Summary of M2M Campaign Impacts by Types of Impact, Illinois.....	145
Table 146: M2M Campaign Employment Impacts by Sources of Impact, Illinois.....	146
Table 147: M2M Campaign Output Impacts by Sources of Impact, Illinois.....	146
Table 148: The M2M Campaign Portion of Overall NASA Impacts, Illinois	147
Table 149: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Illinois.....	148
Table 150: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Illinois.....	148
Table 151: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Illinois.....	149
Table 152: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Illinois	149

Table 153: Summary of NASA Impacts by Types of Impact, Indiana	151
Table 154: NASA Employment Impacts by Sources of Impact, Indiana	151
Table 155: NASA Output Impacts by Sources of Impact, Indiana	152
Table 156: Summary of M2M Campaign Impacts by Types of Impact, Indiana	152
Table 157: M2M Campaign Employment Impacts by Sources of Impact, Indiana	153
Table 158: M2M Campaign Output Impacts by Sources of Impact, Indiana	153
Table 159: The M2M Campaign Portion of Overall NASA Impacts, Indiana	153
Table 160: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Indiana	154
Table 161: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Indiana	155
Table 162: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Indiana	155
Table 163: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Indiana	156
Table 164: Summary of NASA Impacts by Types of Impact, Iowa	157
Table 165: NASA Employment Impacts by Sources of Impact, Iowa	157
Table 166: NASA Output Impacts by Sources of Impact, Iowa	158
Table 167: Summary of M2M Campaign Impacts by Types of Impact, Iowa	158
Table 168: M2M Campaign Employment Impacts by Sources of Impact, Iowa	159
Table 169: M2M Campaign Output Impacts by Sources of Impact, Iowa	159
Table 170: The M2M Campaign Portion of Overall NASA Impacts, Iowa	159
Table 171: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Iowa	160
Table 172: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Iowa	161
Table 173: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Iowa	161
Table 174: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Iowa	162
Table 175: Summary of NASA Impacts by Types of Impact, Kansas	163
Table 176: NASA Employment Impacts by Sources of Impact, Kansas	163
Table 177: NASA Output Impacts by Sources of Impact, Kansas	164
Table 178: Summary of M2M Campaign Impacts by Types of Impact, Kansas	164
Table 179: M2M Campaign Employment Impacts by Sources of Impact, Kansas	165
Table 180: M2M Campaign Output Impacts by Sources of Impact, Kansas	165
Table 181: The M2M Campaign Portion of Overall NASA Impacts, Kansas	165
Table 182: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Kansas	166
Table 183: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Kansas	167

Table 184: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Kansas	167
Table 185: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kansas.....	168
Table 186: Summary of NASA Impacts by Types of Impact, Kentucky	169
Table 187: NASA Employment Impacts by Sources of Impact, Kentucky	169
Table 188: NASA Output Impacts by Sources of Impact, Kentucky	170
Table 189: Summary of M2M Campaign Impacts by Types of Impact, Kentucky	170
Table 190: M2M Campaign Employment Impacts by Sources of Impact, Kentucky	171
Table 191: M2M Campaign Output Impacts by Sources of Impact, Kentucky	171
Table 192: The M2M Campaign Portion of Overall NASA Impacts, Kentucky	171
Table 193: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Kentucky	172
Table 194: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Kentucky	173
Table 195: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Kentucky	173
Table 196: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kentucky	174
Table 197: Summary of NASA Impacts by Types of Impact, Louisiana	175
Table 198: NASA Employment Impacts by Sources of Impact, Louisiana.....	175
Table 199: NASA Output Impacts by Sources of Impact, Louisiana.....	176
Table 200: Summary of M2M Campaign Impacts by Types of Impact, Louisiana	176
Table 201: M2M Campaign Employment Impacts by Sources of Impact, Louisiana.....	177
Table 202: M2M Campaign Output Impacts by Sources of Impact, Louisiana.....	177
Table 203: The M2M Campaign Portion of Overall NASA Impacts, Louisiana.....	177
Table 204: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Louisiana	178
Table 205: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Louisiana	179
Table 206: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Louisiana	179
Table 207: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Louisiana.....	180
Table 208: Summary of NASA Impacts by Types of Impact, Maine	181
Table 209: NASA Employment Impacts by Sources of Impact, Maine.....	181
Table 210: NASA Output Impacts by Sources of Impact, Maine.....	182
Table 211: Summary of M2M Campaign Impacts by Types of Impact, Maine	182
Table 212: M2M Campaign Employment Impacts by Sources of Impact, Maine.....	183
Table 213:M2M Campaign Output Impacts by Sources of Impact, Maine.....	183
Table 214: The M2M Campaign Portion of Overall NASA Impacts, Maine.....	183

Table 215: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Maine	184
Table 216: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Maine	185
Table 217: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Maine	185
Table 218: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maine	186
Table 219: Summary of NASA Impacts by Types of Impact, Maryland.....	187
Table 220: NASA Employment Impacts by Sources of Impact, Maryland	188
Table 221: NASA Output Impacts by Sources of Impact, Maryland	188
Table 222: Summary of M2M Campaign Impacts by Types of Impact, Maryland.....	192
Table 223: M2M Campaign Employment Impacts by Sources of Impact, Maryland.....	193
Table 224: M2M Campaign Output Impacts by Sources of Impact, Maryland.....	193
Table 225: The M2M Campaign Portion of Overall NASA Impacts, Maryland	194
Table 226: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Maryland.....	195
Table 227: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Maryland.....	195
Table 228: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Maryland.....	196
Table 229: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maryland	196
Table 230: Summary of NASA Impacts by Types of Impact, Massachusetts	198
Table 231: NASA Employment Impacts by Sources of Impact, Massachusetts.....	198
Table 232: NASA Output Impacts by Sources of Impact, Massachusetts.....	199
Table 233: Summary of M2M Campaign Impacts by Types of Impact, Massachusetts	199
Table 234: M2M Campaign Employment Impacts by Sources of Impact, Massachusetts	200
Table 235: M2M Campaign Output Impacts by Sources of Impact, Massachusetts	200
Table 236: The M2M Campaign Portion of Overall NASA Impacts, Massachusetts.....	200
Table 237: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Massachusetts	201
Table 238: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Massachusetts	202
Table 239: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Massachusetts	202
Table 240: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Massachusetts.....	203
Table 241: Summary of NASA Impacts by Types of Impact, Michigan	204
Table 242: NASA Employment Impacts by Sources of Impact, Michigan	204
Table 243: NASA Output Impacts by Sources of Impact, Michigan	205
Table 244: Summary of M2M Campaign Impacts by Types of Impact, Michigan	205

Table 245: M2M Campaign Employment Impacts by Sources of Impact, Michigan	206
Table 246: M2M Campaign Output Impacts by Sources of Impact, Michigan	206
Table 247: The M2M Campaign Portion of Overall NASA Impacts, Michigan	206
Table 248: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Michigan	207
Table 249: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Michigan	208
Table 250: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Michigan	208
Table 251: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Michigan	209
Table 252: Summary of NASA Impacts by Types of Impact, Minnesota	210
Table 253: NASA Employment Impacts by Sources of Impact, Minnesota	210
Table 254: NASA Output Impacts by Sources of Impact, Minnesota	211
Table 255: Summary of M2M Campaign Impacts by Types of Impact, Minnesota	211
Table 256: M2M Campaign Employment Impacts by Sources of Impact, Minnesota.....	212
Table 257: M2M Campaign Output Impacts by Sources of Impact, Minnesota.....	212
Table 258: The M2M Campaign Portion of Overall NASA Impacts, Minnesota	212
Table 259: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Minnesota	213
Table 260: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Minnesota	214
Table 261: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Minnesota	214
Table 262: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Minnesota	215
Table 263: Summary of NASA Impacts by Types of Impact, Mississippi.....	216
Table 264: NASA Employment Impacts by Sources of Impact, Mississippi	217
Table 265: NASA Output Impacts by Sources of Impact, Mississippi	217
Table 266: Summary of M2M Campaign Impacts by Types of Impact, Mississippi.....	218
Table 267: M2M Campaign Employment Impacts by Sources of Impact, Mississippi.....	218
Table 268: M2M Campaign Output Impacts by Sources of Impact, Mississippi.....	218
Table 269: The M2M Campaign Portion of Overall NASA Impacts, Mississippi	219
Table 270: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Mississippi.....	220
Table 271: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Mississippi.....	220
Table 272: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Mississippi.....	221
Table 273: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Mississippi	221
Table 274: Summary of NASA Impacts by Types of Impact, Missouri	223

Table 275: NASA Employment Impacts by Sources of Impact, Missouri	223
Table 276: NASA Output Impacts by Sources of Impact, Missouri	224
Table 277: Summary of M2M Campaign Impacts by Types of Impact, Missouri	224
Table 278: M2M Campaign Employment Impacts by Sources of Impact, Missouri	225
Table 279: M2M Campaign Output Impacts by Sources of Impact, Missouri	225
Table 280: The M2M Campaign Portion of Overall NASA Impacts, Missouri	225
Table 281: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Missouri	226
Table 282: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Missouri	227
Table 283: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Missouri	227
Table 284: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Missouri	228
Table 285: Summary of NASA Impacts by Types of Impact, Montana	229
Table 286: NASA Employment Impacts by Sources of Impact, Montana	229
Table 287: NASA Output Impacts by Sources of Impact, Montana	230
Table 288: Summary of M2M Campaign Impacts by Types of Impact, Montana	230
Table 289: The M2M Campaign Portion of Overall NASA Impacts, Montana	231
Table 290: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Montana	232
Table 291: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Montana	232
Table 292: Summary of NASA Impacts by Types of Impact, Nebraska	234
Table 293: NASA Employment Impacts by Sources of Impact, Nebraska	234
Table 294: NASA Output Impacts by Sources of Impact, Nebraska	235
Table 295: Summary of M2M Campaign Impacts by Types of Impact, Nebraska	235
Table 296: M2M Campaign Employment Impacts by Sources of Impact, Nebraska	236
Table 297: M2M Campaign Output Impacts by Sources of Impact, Nebraska	236
Table 298: The M2M Campaign Portion of Overall NASA Impacts, Nebraska	237
Table 299: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Nebraska	238
Table 300: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nebraska	238
Table 301: Summary of NASA Impacts by Types of Impact, Nevada	240
Table 302: NASA Employment Impacts by Sources of Impact, Nevada	240
Table 303: NASA Output Impacts by Sources of Impact, Nevada	241
Table 304: Summary of M2M Campaign Impacts by Types of Impact, Nevada	241
Table 305: M2M Campaign Employment Impacts by Sources of Impact, Nevada	242
Table 306: M2M Campaign Output Impacts by Sources of Impact, Nevada	242
Table 307: The M2M Campaign Portion of Overall NASA Impacts, Nevada	242

Table 308: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Nevada	243
Table 309: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Nevada	244
Table 310: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Nevada	244
Table 311: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nevada	245
Table 312: Summary of NASA Impacts by Types of Impact, New Hampshire	246
Table 313: NASA Employment Impacts by Sources of Impact, New Hampshire	246
Table 314: NASA Output Impacts by Sources of Impact, New Hampshire	247
Table 315: Summary of M2M Campaign Impacts by Types of Impact, New Hampshire	247
Table 316: M2M Campaign Employment Impacts by Sources of Impact, New Hampshire	248
Table 317: M2M Campaign Output Impacts by Sources of Impact, New Hampshire	248
Table 318: The M2M Campaign Portion of Overall NASA Impacts, New Hampshire	248
Table 319: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Hampshire	249
Table 320: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Hampshire	250
Table 321: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Hampshire	250
Table 322: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Hampshire	251
Table 323: Summary of NASA Impacts by Types of Impact, New Jersey	252
Table 324: NASA Employment Impacts by Sources of Impact, New Jersey	252
Table 325: NASA Output Impacts by Sources of Impact, New Jersey	253
Table 326: Summary of M2M Campaign Impacts by Types of Impact, New Jersey	253
Table 327: M2M Campaign Employment Impacts by Sources of Impact, New Jersey	254
Table 328: M2M Campaign Output Impacts by Sources of Impact, New Jersey	254
Table 329: The M2M Campaign Portion of Overall NASA Impacts, New Jersey	254
Table 330: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Jersey	255
Table 331: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Jersey	256
Table 332: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Jersey	256
Table 333: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Jersey	257
Table 334: Summary of NASA Impacts by Types of Impact, New Mexico	258
Table 335: NASA Employment Impacts by Sources of Impact, New Mexico	258
Table 336: NASA Output Impacts by Sources of Impact, New Mexico	259
Table 337: Summary of M2M Campaign Impacts by Types of Impact, New Mexico	259

Table 338: M2M Campaign Employment Impacts by Sources of Impact, New Mexico	260
Table 339: M2M Campaign Output Impacts by Sources of Impact, New Mexico	260
Table 340: The M2M Campaign Portion of Overall NASA Impacts, New Mexico	260
Table 341: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Mexico	261
Table 342: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Mexico	262
Table 343: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Mexico	262
Table 344: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Mexico	263
Table 345: Summary of NASA Impacts by Types of Impact, New York.....	264
Table 346: NASA Employment Impacts by Sources of Impact, New York	264
Table 347: NASA Output Impacts by Sources of Impact, New York	265
Table 348: Summary of M2M Campaign Impacts by Types of Impact, New York.....	265
Table 349: M2M Campaign Employment Impacts by Sources of Impact, New York	266
Table 350: M2M Campaign Output Impacts by Sources of Impact, New York.....	266
Table 351: The M2M Campaign Portion of Overall NASA Impacts, New York	266
Table 352: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New York.....	267
Table 353: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New York.....	268
Table 354: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New York.....	268
Table 355: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New York	269
Table 356: Summary of NASA Impacts by Types of Impact, North Carolina	270
Table 357: NASA Employment Impacts by Sources of Impact, North Carolina	270
Table 358: NASA Output Impacts by Sources of Impact, North Carolina	271
Table 359: Summary of M2M Campaign Impacts by Types of Impact, North Carolina.....	271
Table 360: M2M Campaign Employment Impacts by Sources of Impact, North Carolina	272
Table 361: M2M Campaign Output Impacts by Sources of Impact, North Carolina	272
Table 362: The M2M Campaign Portion of Overall NASA Impacts, North Carolina	272
Table 363: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, North Carolina.....	273
Table 364: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, North Carolina.....	274
Table 365: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, North Carolina.....	274
Table 366: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Carolina	275
Table 367: Summary of NASA Impacts by Types of Impact, North Dakota	276

Table 368: NASA Employment Impacts by Sources of Impact, North Dakota	276
Table 369: NASA Output Impacts by Sources of Impact, North Dakota	277
Table 370: Summary of M2M Campaign Impacts by Types of Impact, North Dakota	277
Table 371: M2M Campaign Employment Impacts by Sources of Impact, North Dakota	278
Table 372: M2M Campaign Output Impacts by Sources of Impact, North Dakota	278
Table 373: The M2M Campaign Portion of Overall NASA Impacts, North Dakota	278
Table 374: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, North Dakota	279
Table 375: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Dakota	280
Table 376: Summary of NASA Impacts by Types of Impact, Ohio	281
Table 377: NASA Employment Impacts by Sources of Impact, Ohio	282
Table 378: NASA Output Impacts by Sources of Impact, Ohio	282
Table 379: Summary of M2M Campaign Impacts by Types of Impact, Ohio.....	283
Table 380: M2M Campaign Employment Impacts by Sources of Impact, Ohio	283
Table 381: M2M Campaign Output Impacts by Sources of Impact, Ohio	283
Table 382: The M2M Campaign Portion of Overall NASA Impacts, Ohio	284
Table 383: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Ohio.....	285
Table 384: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Ohio.....	285
Table 385: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Ohio.....	286
Table 386: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Ohio	286
Table 387: Summary of NASA Impacts by Types of Impact, Oklahoma.....	288
Table 388: NASA Employment Impacts by Sources of Impact, Oklahoma	288
Table 389: NASA Output Impacts by Sources of Impact, Oklahoma	289
Table 390: Summary of M2M Campaign Impacts by Types of Impact, Oklahoma	289
Table 391: M2M Campaign Employment Impacts by Sources of Impact, Oklahoma	290
Table 392: M2M Campaign Output Impacts by Sources of Impact, Oklahoma.....	290
Table 393: The M2M Campaign Portion of Overall NASA Impacts, Oklahoma	290
Table 394: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Oklahoma.....	291
Table 395: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Oklahoma.....	292
Table 396: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Oklahoma.....	292
Table 397: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oklahoma	293
Table 398: Summary of NASA Impacts by Types of Impact, Oregon	294
Table 399: NASA Employment Impacts by Sources of Impact, Oregon.....	294

Table 400: NASA Output Impacts by Sources of Impact, Oregon	295
Table 401: Summary of M2M Campaign Impacts by Types of Impact, Oregon	295
Table 402: M2M Campaign Employment Impacts by Sources of Impact, Oregon	296
Table 403: M2M Campaign Output Impacts by Sources of Impact, Oregon	296
Table 404: The M2M Campaign Portion of Overall NASA Impacts, Oregon	296
Table 405: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Oregon	297
Table 406: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Oregon	298
Table 407: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Oregon	298
Table 408: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oregon.....	299
Table 409: Summary of NASA Impacts by Types of Impact, Pennsylvania	300
Table 410: NASA Employment Impacts by Sources of Impact, Pennsylvania.....	300
Table 411: NASA Output Impacts by Sources of Impact, Pennsylvania.....	301
Table 412: Summary of M2M Campaign Impacts by Types of Impact, Pennsylvania	301
Table 413: M2M Campaign Employment Impacts by Sources of Impact, Pennsylvania	302
Table 414: M2M Campaign Output Impacts by Sources of Impact, Pennsylvania	302
Table 415: The M2M Campaign Portion of Overall NASA Impacts, Pennsylvania.....	302
Table 416: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Pennsylvania	303
Table 417: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Pennsylvania	304
Table 418: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Pennsylvania	304
Table 419: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Pennsylvania.....	305
Table 420: Summary of NASA Impacts by Types of Impact, Rhode Island	306
Table 421: NASA Employment Impacts by Sources of Impact, Rhode Island.....	306
Table 422: NASA Output Impacts by Sources of Impact, Rhode Island	307
Table 423: Summary of M2M Campaign Impacts by Types of Impact, Rhode Island	307
Table 424: M2M Campaign Employment Impacts by Sources of Impact, Rhode Island	308
Table 425:M2M Campaign Output Impacts by Sources of Impact, Rhode Island	308
Table 426: The M2M Campaign Portion of Overall NASA Impacts, Rhode Island	308
Table 427: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Rhode Island	309
Table 428: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Rhode Island	310
Table 429: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Rhode Island	310

Table 430: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Rhode Island	311
Table 431: Summary of NASA Impacts by Types of Impact, South Carolina	312
Table 432: NASA Employment Impacts by Sources of Impact, South Carolina	312
Table 433: NASA Output Impacts by Sources of Impact, South Carolina	313
Table 434: Summary of M2M Campaign Impacts by Types of Impact, South Carolina.....	313
Table 435: M2M Campaign Employment Impacts by Sources of Impact, South Carolina	314
Table 436:M2M Campaign Output Impacts by Sources of Impact, South Carolina	314
Table 437: The M2M Campaign Portion of Overall NASA Impacts, South Carolina	314
Table 438: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, South Carolina.....	315
Table 439: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, South Carolina.....	316
Table 440: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, South Carolina.....	316
Table 441: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Carolina	317
Table 442: Summary of NASA Impacts by Types of Impact, South Dakota	318
Table 443: NASA Employment Impacts by Sources of Impact, South Dakota	318
Table 444: NASA Output Impacts by Sources of Impact, South Dakota	319
Table 445: Summary of M2M Campaign Impacts by Types of Impact, South Dakota	319
Table 446: M2M Campaign Employment Impacts by Sources of Impact, South Dakota	320
Table 447: M2M Campaign Output Impacts by Sources of Impact, South Dakota	320
Table 448: The M2M Campaign Portion of Overall NASA Impacts, South Dakota	320
Table 449: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, South Dakota	321
Table 450: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Dakota	322
Table 451: Summary of NASA Impacts by Types of Impact, Tennessee	323
Table 452: NASA Employment Impacts by Sources of Impact, Tennessee.....	323
Table 453: NASA Output Impacts by Sources of Impact, Tennessee.....	324
Table 454: Summary of M2M Campaign Impacts by Types of Impact, Tennessee	324
Table 455: M2M Campaign Employment Impacts by Sources of Impact, Tennessee.....	325
Table 456: M2M Campaign Output Impacts by Sources of Impact, Tennessee.....	325
Table 457: The M2M Campaign Portion of Overall NASA Impacts, Tennessee.....	325
Table 458: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Tennessee	326
Table 459: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Tennessee	327
Table 460: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Tennessee	327

Table 461: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Tennessee.....	328
Table 462: Summary of NASA Impacts by Types of Impact, Texas	329
Table 463: NASA Employment Impacts by Sources of Impact, Texas.....	330
Table 464: NASA Output Impacts by Sources of Impact, Texas.....	330
Table 465: Summary of M2M Campaign Impacts by Types of Impact, Texas	334
Table 466: M2M Campaign Employment Impacts by Sources of Impact, Texas	335
Table 467: M2M Campaign Output Impacts by Sources of Impact, Texas	335
Table 468: The M2M Campaign Portion of Overall NASA Impacts, Texas.....	336
Table 469: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Texas	337
Table 470: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Texas	337
Table 471: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Texas	338
Table 472: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Texas.....	338
Table 473: Summary of NASA Impacts by Types of Impact, Utah	340
Table 474: NASA Employment Impacts by Sources of Impact, Utah	340
Table 475: NASA Output Impacts by Sources of Impact, Utah	341
Table 476: Summary of M2M Campaign Impacts by Types of Impact, Utah	341
Table 477: M2M Campaign Employment Impacts by Sources of Impact, Utah	342
Table 478: M2M Campaign Output Impacts by Sources of Impact, Utah	342
Table 479: The M2M Campaign Portion of Overall NASA Impacts, Utah	343
Table 480: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Utah	344
Table 481: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Utah.....	344
Table 482: Summary of NASA Impacts by Types of Impact, Vermont.....	346
Table 483: NASA Employment Impacts by Sources of Impact, Vermont	346
Table 484: NASA Output Impacts by Sources of Impact, Vermont.....	347
Table 485: Summary of M2M Program Impacts by Types of Impact, Vermont	347
Table 486: M2M Campaign Employment Impacts by Sources of Impact, Vermont.....	348
Table 487:M2M Campaign Output Impacts by Sources of Impact, Vermont.....	348
Table 488: The M2M Campaign Portion of Overall NASA Impacts, Vermont.....	348
Table 489: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Vermont	349
Table 490: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Vermont	350
Table 491: Summary of NASA Impacts by Types of Impact, Virginia	351
Table 492: NASA Employment Impacts by Sources of Impact, Virginia.....	352
Table 493: NASA Output Impacts by Sources of Impact, Virginia.....	352

Table 494: Summary of M2M Campaign Impacts by Types of Impact, Virginia	356
Table 495: M2M Campaign Employment Impacts by Sources of Impact, Virginia.....	357
Table 496: M2M Campaign Output Impacts by Sources of Impact, Virginia.....	357
Table 497: The M2M Campaign Portion of Overall NASA Impacts, Virginia.....	358
Table 498: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Virginia	359
Table 499: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Virginia	359
Table 500: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Virginia	360
Table 501: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Virginia	360
Table 502: Summary of NASA Impacts by Types of Impact, Washington.....	362
Table 503: NASA Employment Impacts by Sources of Impact, Washington	362
Table 504: NASA Output Impacts by Sources of Impact, Washington	363
Table 505: Summary of M2M Campaign Impacts by Types of Impact, Washington.....	363
Table 506: M2M Campaign Employment Impacts by Sources of Impact, Washington.....	364
Table 507: M2M Campaign Output Impacts by Sources of Impact, Washington.....	364
Table 508: The M2M Campaign Portion of Overall NASA Impacts, Washington	365
Table 509: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Washington.....	366
Table 510: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Washington.....	366
Table 511: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Washington.....	367
Table 512: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington	367
Table 513: Summary of NASA Impacts by Types of Impact, Washington, D.C.	369
Table 514: NASA Employment Impacts by Sources of Impact, Washington, D.C.....	370
Table 515: NASA Output Impacts by Sources of Impact, Washington, D.C.....	370
Table 516: Summary of M2M Campaign Impacts by Types of Impact, Washington, D.C.	371
Table 517: M2M Campaign Employment Impacts by Sources of Impact, Washington, D.C.	371
Table 518: M2M Campaign Output Impacts by Sources of Impact, Washington, D.C.	371
Table 519: The M2M Campaign Portion of Overall NASA Impacts, Washington, D.C.....	372
Table 520: Investments in Summary of Climate Change Research and Technology Impacts by Types of Impact, Washington, D.C.	373
Table 521: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Washington, D.C.	373
Table 522: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Washington, D.C.	374
Table 523: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington, D.C.....	374

Table 524: Summary of NASA Impacts by Types of Impact, West Virginia.....	376
Table 525: NASA Employment Impacts by Sources of Impact, West Virginia	376
Table 526: NASA Output Impacts by Sources of Impact, West Virginia	377
Table 527: Summary of M2M Campaign Impacts by Types of Impact, West Virginia.....	377
Table 528: M2M Campaign Employment Impacts by Sources of Impact, West Virginia	378
Table 529: M2M Campaign Output Impacts by Sources of Impact, West Virginia.....	378
Table 530: The M2M Campaign Portion of Overall NASA Impacts, West Virginia	378
Table 531: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, West Virginia.....	379
Table 532: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, West Virginia.....	380
Table 533: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, West Virginia.....	380
Table 534: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, West Virginia	381
Table 535: Summary of NASA Impacts by Types of Impact, Wisconsin.....	382
Table 536: NASA Employment Impacts by Sources of Impact, Wisconsin	382
Table 537: NASA Output Impacts by Sources of Impact, Wisconsin	383
Table 538: Summary of M2M Campaign Impacts by Types of Impact, Wisconsin	383
Table 539: M2M Campaign Employment Impacts by Sources of Impact, Wisconsin.....	384
Table 540: M2M Campaign Output Impacts by Sources of Impact, Wisconsin.....	384
Table 541: The M2M Campaign Portion of Overall NASA Impacts, Wisconsin	384
Table 542: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Wisconsin	385
Table 543: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Wisconsin	386
Table 544: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Wisconsin	386
Table 545: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wisconsin	387
Table 546: Summary of NASA Impacts by Types of Impact, Wyoming.....	388
Table 547: NASA Employment Impacts by Sources of Impact, Wyoming	388
Table 548: NASA Output Impacts by Sources of Impact, Wyoming	389
Table 549: Summary of M2M Program Impacts by Types of Impact, Wyoming	389
Table 550: M2M Campaign Employment Impacts by Sources of Impact, Wyoming.....	390
Table 551: M2M Campaign Output Impacts by Sources of Impact, Wyoming.....	390
Table 552: The M2M Campaign Portion of Overall NASA Impacts, Wyoming	390
Table 553: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Wyoming.....	391
Table 554: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wyoming	392

List of Figures

Figure 1: Direct, Indirect, Induced, and Total Economic Impacts	2
Figure 2: Shares of NASA Labor Force and Labor Income in Top Ten States (based on FTEs).....	15
Figure 3: Share of NASA Procurement Spending by Top Ten States	18
Figure 4: Shares of NASA M2M Labor Force and Labor Income in Top Ten States (based on FTEs)	20
Figure 5: Share of M2M Procurement Spending by Top Ten States.....	23
Figure 6: Shares of NASA Climate Change Research and Technology Labor Force and Labor Income in Top Ten States (based on FTEs)	25
Figure 7: Share of Climate Change Research and Technology Procurement by Top Ten States.....	28
Figure 8: Economic Impact of NASA on a State Economy	30
Figure 9: Impact Organization.....	37
Figure 10: Top Ten Most Impacted Industries by Employment, the United States (NASA)	44
Figure 11: Top Ten Most Impacted Industries by Labor Income, the United States (NASA).....	45
Figure 12: Top Ten Most Impacted Industries by Value-added, the United States (NASA)	46
Figure 13: Top Ten Most Impacted Industries by Output, the United States (NASA)	47
Figure 14: The M2M Campaign Portion of Overall NASA Impacts, the United States	50
Figure 15: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, the United States.....	53
Figure 16: Top Ten Most Impacted Industries by Employment, Alabama (NASA)	56
Figure 17: Top Ten Most Impacted Industries by Labor Income, Alabama (NASA).....	57
Figure 18: Top Ten Most Impacted Industries by Value-added, Alabama (NASA)	58
Figure 19: Top Ten Most Impacted Industries by Output, Alabama (NASA)	59
Figure 20: The M2M Campaign Portion of Overall NASA Impacts, Alabama	61
Figure 21: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alabama.....	64
Figure 22: The M2M Campaign Portion of Overall NASA Impacts, Alaska	66
Figure 23: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alaska	67
Figure 24: The M2M Campaign Portion of Overall NASA Impacts, Arizona	71
Figure 25: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arizona	73
Figure 26: The M2M Campaign Portion of Overall NASA Impacts, Arkansas	76
Figure 27: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arkansas	79
Figure 28: Top Ten Most Impacted Industries by Employment, California (NASA)	82
Figure 29: Top Ten Most Impacted Industries by Labor Income, California (NASA)	83
Figure 30: Top Ten Most Impacted Industries by Value-added, California (NASA)	84
Figure 31: Top Ten Most Impacted Industries by Output, California (NASA)	85
Figure 32: The M2M Campaign Portion of Overall NASA Impacts, California	87
Figure 33: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, California	90

Figure 34: Top Ten Most Impacted Industries by Employment, Colorado (NASA).....	93
Figure 35: Top Ten Most Impacted Industries by Labor Income, Colorado (NASA)	94
Figure 36: Top Ten Most Impacted Industries by Value-added, Colorado (NASA).....	95
Figure 37: Top Ten Most Impacted Industries by Output, Colorado (NASA).....	96
Figure 38: The M2M Campaign Portion of Overall NASA Impacts, Colorado.....	98
Figure 39: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Colorado	101
Figure 40: The M2M Campaign Portion of Overall NASA Impacts, Connecticut	105
Figure 41: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Connecticut	107
Figure 42: The Moon to Mars Campaign Portion of Overall NASA Impacts, Delaware.....	111
Figure 43: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Delaware	114
Figure 44: Top Ten Most Impacted Industries by Employment, Florida (NASA)	117
Figure 45: Top Ten Most Impacted Industries by Labor Income, Florida (NASA).....	118
Figure 46: Top Ten Most Impacted Industries by Value-added, Florida (NASA)	119
Figure 47: Top Ten Most Impacted Industries by Output, Florida (NASA)	120
Figure 48: The M2M Campaign Portion of Overall NASA Impacts, Florida	122
Figure 49: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Florida.....	125
Figure 50: The M2M Campaign Portion of Overall NASA Impacts, Georgia.....	129
Figure 51: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Georgia	131
Figure 52: The M2M Campaign Portion of Overall NASA Impacts, Hawaii.....	135
Figure 53: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Hawaii.....	137
Figure 54: The M2M Campaign Portion of Overall NASA Impacts, Idaho	141
Figure 55: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Idaho.....	143
Figure 56: The M2M Campaign Portion of Overall NASA Impacts, Illinois	147
Figure 57: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Illinois	150
Figure 58: The M2M Campaign Portion of Overall NASA Impacts, Indiana.....	154
Figure 59: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Indiana.....	156
Figure 60: The M2M Campaign Portion of Overall NASA Impacts, Iowa.....	160
Figure 61: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Iowa	162
Figure 62: The M2M Campaign Portion of Overall NASA Impacts, Kansas.....	166
Figure 63: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kansas.....	168
Figure 64: The M2M Campaign Portion of Overall NASA Impacts, Kentucky.....	172

Figure 65: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kentucky	174
Figure 66: The M2M Campaign Portion of Overall NASA Impacts, Louisiana	178
Figure 67: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Louisiana.....	180
Figure 68: The M2M Campaign Portion of Overall NASA Impacts, Maine	184
Figure 69: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maine	186
Figure 70: Top Ten Most Impacted Industries by Employment, Maryland (NASA)	189
Figure 71: Top Ten Most Impacted Industries by Labor Income, Maryland (NASA)	190
Figure 72: Top Ten Most Impacted Industries by Value-added, Maryland (NASA)	191
Figure 73: Top Ten Most Impacted Industries by Output, Maryland (NASA).....	192
Figure 74: The M2M Campaign Portion of Overall NASA Impacts, Maryland	194
Figure 75: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maryland	197
Figure 76: The M2M Campaign Portion of Overall NASA Impacts, Massachusetts.....	201
Figure 77: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Massachusetts.....	203
Figure 78: The M2M Campaign Portion of Overall NASA Impacts, Michigan.....	207
Figure 79: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Michigan.....	209
Figure 80: The M2M Campaign Portion of Overall NASA Impacts, Minnesota	213
Figure 81: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Minnesota	215
Figure 82: The M2M Campaign Portion of Overall NASA Impacts, Mississippi	219
Figure 83: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Mississippi	222
Figure 84: The M2M Campaign Portion of Overall NASA Impacts, Missouri.....	226
Figure 85: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Missouri.....	228
Figure 86: The M2M Campaign Portion of Overall NASA Impacts, Montana.....	231
Figure 87: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Montana	233
Figure 88: The M2M Campaign Portion of Overall NASA Impacts, Nebraska	237
Figure 89: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nebraska.....	239
Figure 90: The M2M Campaign Portion of Overall NASA Impacts, Nevada	243
Figure 91: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nevada	245
Figure 92: The M2M Campaign Portion of Overall NASA Impacts, New Hampshire.....	249
Figure 93: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Hampshire	251

Figure 94: The M2M Campaign Portion of Overall NASA Impacts, New Jersey	255
Figure 95: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Jersey	257
Figure 96: The M2M Campaign Portion of Overall NASA Impacts, New Mexico.....	261
Figure 97: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Mexico.....	263
Figure 98: The M2M Campaign Portion of Overall NASA Impacts, New York	267
Figure 99: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New York	269
Figure 100: The M2M Campaign Portion of Overall NASA Impacts, North Carolina.....	273
Figure 101: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Carolina	275
Figure 102: The M2M Campaign Portion of Overall NASA Impacts, North Dakota.....	279
Figure 103: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Dakota.....	280
Figure 104: The M2M Campaign Portion of Overall NASA Impacts, Ohio.....	284
Figure 105: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Ohio	287
Figure 106: The M2M Campaign Portion of Overall NASA Impacts, Oklahoma	291
Figure 107: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oklahoma	293
Figure 108: The M2M Campaign Portion of Overall NASA Impacts, Oregon.....	297
Figure 109: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oregon.....	299
Figure 110: The M2M Campaign Portion of Overall NASA Impacts, Pennsylvania	303
Figure 111: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Pennsylvania.....	305
Figure 112: The M2M Campaign Portion of Overall NASA Impacts, Rhode Island.....	309
Figure 113: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Rhode Island.....	311
Figure 114: The M2M Campaign Portion of Overall NASA Impacts, South Carolina.....	315
Figure 115: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Carolina	317
Figure 116: The M2M Campaign Portion of Overall NASA Impacts, South Dakota.....	321
Figure 117: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Dakota.....	322
Figure 118: The M2M Campaign Portion of Overall NASA Impacts, Tennessee	326
Figure 119: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Tennessee.....	328
Figure 120: Top Ten Most Impacted Industries by Employment, Texas (NASA)	331
Figure 121: Top Ten Most Impacted Industries by Labor Income, Texas (NASA).....	332
Figure 122: Top Ten Most Impacted Industries by Value-added, Texas (NASA)	333

Figure 123: Top Ten Most Impacted Industries by Output, Texas (NASA)	334
Figure 124: The M2M Campaign Portion of Overall NASA Impacts, Texas	336
Figure 125: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Texas.....	339
Figure 126: The M2M Campaign Portion of Overall NASA Impacts, Utah.....	343
Figure 127: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Utah.....	345
Figure 128: The M2M Campaign Portion of Overall NASA Impacts, Vermont	349
Figure 129: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Vermont	350
Figure 130: Top Ten Most Impacted Industries by Employment, Virginia (NASA)	353
Figure 131: Top Ten Most Impacted Industries by Labor Income, Virginia (NASA).....	354
Figure 132: Top Ten Most Impacted Industries by Value-added, Virginia (NASA)	355
Figure 133: Top Ten Most Impacted Industries by Output, Virginia (NASA)	356
Figure 134: The M2M Campaign Portion of Overall NASA Impacts, Virginia	358
Figure 135: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Virginia	361
Figure 136: The M2M Campaign Portion of Overall NASA Impacts, Washington	365
Figure 137: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington	368
Figure 138: The M2M Campaign Portion of Overall NASA Impacts, Washington, D.C.....	372
Figure 139: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington, D.C.....	375
Figure 140: The M2M Campaign Portion of Overall NASA Impacts, West Virginia	379
Figure 141: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, West Virginia	381
Figure 142: The M2M Campaign Portion of Overall NASA Impacts, Wisconsin	385
Figure 143: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wisconsin	387
Figure 144: The M2M Campaign Portion of Overall NASA Impacts, Wyoming	391
Figure 145: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wyoming	392

List of Boxes

Box 1: Types of Economic Impact	1
Box 2: Types of Economic Activity	2
Box 3: Multipliers	3
Box 4: IMPLAN Industry Data.....	4
Box 5: Civil Servant Employee Counts versus Full-time Equivalent (FTEs).....	13
Box 6: Potential Sources for Over- or Under-estimation of Economic Impacts	39
Box 7: Multiplier Considerations	41
Box 8: Overlap between Labor Income, Value-added, and Output.....	45

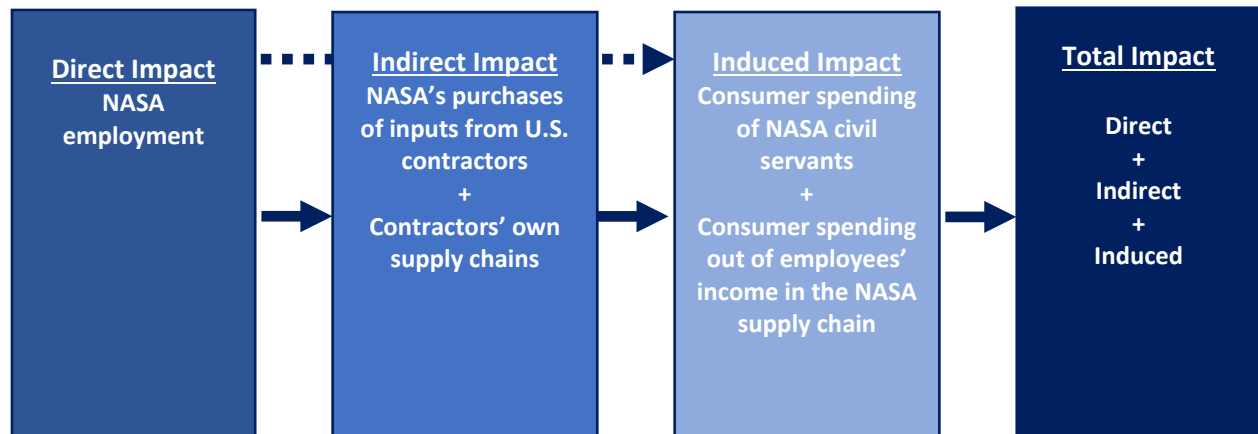
INTRODUCTION

This study is an assessment of the economic impacts of the National Aeronautics and Space Administration (NASA), the Moon to Mars (M2M) campaign, and the investments in climate change research and technology for the Fiscal Year 2023. The assessment consists of three parts. The first part presents the estimation of NASA impacts on the U.S. as a whole, each of the fifty (50) states, and Washington, D.C. The second part analyzes economic impacts attributable to the M2M campaign in the same set of regions. The third part analyzes economic impacts attributable to the investments in climate change research and technology in the same set of regions. The purpose of the economic impact assessment is to quantify the changes in employment, income, levels of business activity, and government revenue throughout the economy that result from NASA's activities, the M2M campaign, and from investments in climate change research and technology.

We present direct, indirect, and induced employment impacts (see Box 1) along with output, labor income, and tax revenue impacts for each of the geographic regions (see Box 2).

Box 1: Types of Economic Impact

- **Direct impacts** – the activity or event to be assessed, typically specified as a change in demand for the output of an industry or a change in an industry's employment.
- **Indirect impacts** – economic activity resulting from the increase or decrease in input purchases within the region by the industry directly impacted in response to the change in demand or employment. In the context of this study, indirect effects are the purchases of goods and services by government agencies and private sector contractors as well as by the industries that supply them. Examples include an aerospace firm carrying out contract work for NASA and that aerospace firm's purchases of electronic components and engineering consulting services from other firms to enable its own production.
- **Induced impacts** – economic activity resulting from all affected industries paying wages and benefits to their employees and allocating profit to their owners, some portion of which is spent within the region on consumer goods and services.
- **Total impacts** – the sum of direct, indirect, and induced impacts (see Figure 1).

Figure 1: Direct, Indirect, Induced, and Total Economic Impacts

Note: This figure is adapted from Oxford Economics (2015).

Box 2: Types of Economic Activity

- **Employment** – the annual average of monthly jobs in the economy/industry. The number consists of both *full-time and part-time* jobs.
- **Labor Income** – total of all forms of employment income for a year, including employee compensation (wages and benefits) and proprietor income.
- **Value Added** – the difference between an industry's, or an establishment's, total output, and the cost of its intermediate inputs for a year. Value added is, equivalently, payment to labor (employee compensation) and rent to capital (profit) plus business taxes. Value added is a measure of the contribution to gross domestic product (at the national, state, or local scale) made by an individual producer, industry, or sector. Direct value added is calculated using the estimated ratios of value added-to-employee in the following industries: (i) guided missile and space vehicle manufacturing, (ii) propulsion units and parts for space vehicles and guided missiles.
- **Output** – the value of annual industry production. Output is reported in producer prices, separating margins such as for wholesale distribution, transportation, and retail into those respective industries. Production at NASA facilities has three components: (1) The direct output component represents the value of all activities at NASA (research and development, production, and management), including both those outputs that are sold to consumers (final consumption) and those that are inputs into further production (intermediary products and services). Direct output is calculated using the estimated ratios of output-to-employee in the following industries: (i) guided missile and space vehicle manufacturing, (ii) propulsion units and parts for space vehicles and guided missiles (2) The indirect component is the value of the goods and services produced in industries that supply the activities at NASA facilities, and the value of the goods and services that are in the supply chain of those industries. (3) The induced component is the value of goods and services, both intermediary and final consumption, that are produced in response to labor income spending of employees in all affected industries. Please note that the term production as used here is not equivalent to product as used Gross Domestic Product (GDP) for Value Added (see above).
- **Tax Revenues** – the annual taxes collected by federal, state, and local governments through income, payroll, import, corporate, and property taxes, as well as some forms of licenses. Tax revenue estimates are generated from the application of average (per capita and per employee) tax rates and license fees averaged across multiple jurisdictions within a study region and should be treated as only rough approximations.

The modeling approach adopted in this study is designed to represent outcomes of complex economic relations in aggregate form to enable ready connections between impact-generating event categories and their impacts. Accordingly, beside estimates of the total economic impacts, the report provides impact multiplier factors (or multipliers for short) for different types of outcomes (see Box 3) that can be used to quickly assess the total scope and sectoral impact of relatively small employment and procurement changes in the future. The shift in the triggering or direct event—such as an increase in employment or a decrease in procurement amount—can simply be multiplied by the relevant outcome multiplier to produce an estimate of the total effect magnitude (direct, indirect, and induced). This procedure is appropriate for situations in which major economic features and relationships, such as employee location patterns and industry purchasing linkages, are not expected to change. Small shifts are generally tolerated, but large changes in the economy may alter inter-industry relationships and require model reevaluation. (The threshold where changes shift from small to large is determined by analyst judgment.)

Box 3: Multipliers

- **Employment multiplier** – the estimated ratio of the change in total local employment to the change in direct employment. For example, an employment multiplier of 3.00 indicates that the creation of 1 direct new job is expected to support 2 additional jobs in the local economy, for a total impact of 3 new jobs.
- **Income multiplier** – the estimated ratio of the change in total income throughout the local economy to the change in income from direct employment. It is calculated analogously to the employment multiplier. For example, an income multiplier of 2.75 indicates that a \$1.00 change in income in the industry directly affected by the events being considered is expected to result in an additional income of \$1.75 throughout the local economy, for a total income impact of \$2.75.
- **Value added multiplier** – the estimated ratio of the change in total value added throughout the local economy to the change in value added from direct employment. The value-added multiplier is calculated analogously to the employment, income, and output multipliers.
- **Output multiplier** – the estimated ratio of the change in total output (i.e., gross sales and additions to inventory) throughout the economy to the change in output from direct employment. The output multiplier is calculated analogously to the employment, income, and value added multipliers.

An input-output modeling framework is used to estimate the impacts. We utilize IMPLAN (IMPact analysis for PLANning) software and 2022 industry data, the most current dataset available at the initiation of the study (see Box 4).

Box 4: IMPLAN Industry Data

We used 2022 industry data (economic modeling data from IMPLAN), FY2023 NASA procurement data (provided by NASA), and FY2023 NASA labor income data (provided by NASA). The economic modeling data are the national and regional estimates of industry-to-industry purchasing and spending interactions that are produced by IMPLAN.

If we had used 2023 rather than 2022 industry data, the results of the impact analysis would be unlikely to be significantly different. IMPLAN model data updates are relatively minor except for every five years when the company makes substantial changes to its database based on the benchmark input-output (I-O) accounts developed and released by the Bureau of Economic Analysis (BEA). (Even then, most industry supply and purchasing relationships are quite consistent over time, only a few industries change substantially more rapidly.) The 2022 data we used in this study incorporate the latest updated industry statistics and benchmark I-O accounts of BEA. Therefore using 2023 data would not impact the estimates provided in this study significantly.

The benchmark I-O accounts are one of the major elements of the U.S. national and industry economic accounts. They provide detailed statistics on economic processes and relationships, and they provide essential information for other economic accounts. They are used to set the level of Gross Domestic Product (GDP) in the NIPAs (national income and product accounts), and they provide commodity detail on the composition of the final-use categories. In addition, they provide information on which inputs industries use to produce their output and which commodities are produced by each industry. The benchmark I-O accounts consist of make tables, use tables, and direct and total requirements tables. They are prepared at 5-year intervals, primarily based on Economic Census data.

pre-pandemic (i.e., 2019). Specifically, labor productivity in some industries is substantially greater in the 2022 economy. This increased productivity leads to reduced employment impacts in some industry sectors that are key to the analysis and also to smaller estimated employment multipliers. As a result, jobs estimates resulting from IMPLAN 2022 will likely be less than from previous versions of IMPLAN given the same inputs. The productivity growth was most likely driven by two actions. First, federal investments made through the Biden Administration's Build Back Better Framework and related programs boosted productivity across various sectors of the economy. Second, many companies eliminated redundant and low-performing positions to improve efficiency between 2019 and 2022.

National Aeronautics and Space Administration (NASA)¹³

The National Aeronautics and Space Administration (NASA) is responsible for unique scientific and technological achievements in human spaceflight, aeronautics, space science, and space applications that have had widespread national and global impacts. Established in 1958, NASA has been the center of U.S. civil aerospace research and development.

In addition to agency leadership (Headquarters), NASA has research and flight centers and facilities with unique capabilities:

¹³ Information is obtained from <https://www.nasa.gov/content/nasa-history-overview> and https://www.nasa.gov/about/org_index.html.

NASA Research and Flight Centers

- Ames Research Center (IT, fundamental aeronautics, bio, and space science technologies)
- Armstrong Flight Research Center (Flight research)
- Glenn Research Center (Aeropropulsion and communications technologies)
- Goddard Space Flight Center (Earth, the solar system, universe observations, and space communications and navigation)
- Johnson Space Center (Human space exploration)
- Kennedy Space Center (Prepare and launch missions around the Earth and beyond)
- Langley Research Center (Aviation, space technology, and Earth science)
- Marshall Space Flight Center (Space transportation and propulsion technologies)
- Stennis Space Center (Rocket propulsion testing and remote sensing technology)
- Goddard Institute for Space Studies (Broad study of global climate change)

NASA Facilities and Labs

- Jet Propulsion Laboratory (Robotic exploration of the solar system)
- Katherine Johnson Independent Verification and Validation Facility (Provides safety and cost-effectiveness for mission critical software)
- Michoud Assembly Facility (Manufacture and assembly of critical hardware for exploration vehicles)
- NASA Engineering and Safety Center (Independent testing, analysis, and assessments of NASA's high-risk projects)
- NASA Safety Center (Development of personnel, processes and tools needed for the safe and successful achievement of strategic goals)
- NASA Shared Services Center (Financial management, human resources, information technology, and procurement)
- Wallops Flight Facility (Suborbital Research Programs)
- NASA Goddard Institute for Space Studies (Broad study of global climate change)
- NASA White Sands Test Facility (Engine and hazardous materials, components and systems testing and analysis)

Results from NASA's research and development activities ripple throughout the national economy, supporting high-tech industries and creating or sustaining tens of thousands of knowledge-intensive jobs. In addition, NASA invests in economically valuable technologies that help the nation maintain its competitive advantage. NASA develops hundreds of new technologies each year and transfers thousands of products, services, and processes to private businesses. These transfers improve U.S. businesses productivity and global competitiveness. Given the multidimensional nature of the benefits originating from NASA facilities, no single metric can capture the returns from its activities. This report focuses on NASA's economic impacts that can be reliably and precisely quantified through economic input-output models.

Moon to Mars (M2M) Campaign¹⁴

NASA's human lunar exploration plans under Artemis call for sending the first woman and first person of color to the surface of the Moon and establishing sustainable exploration by the end of the decade. Working with U.S. companies and international partners, NASA will uncover new scientific discoveries and lay the foundation for long-term lunar exploration and development. The agency will use what it learns on the Moon to prepare for humanity's next giant leap – sending astronauts to Mars.

It all starts with U.S. companies delivering scientific instruments and technology demonstrations to the lunar surface, followed by a spaceship, called the Gateway, in orbit around the Moon that will support human and scientific missions, and human landers that will take astronauts to the surface of the Moon. The agency's powerful Space Launch System rocket and Orion spacecraft are the backbone to build the Gateway and transport astronauts to and from Earth. The following represents the variety of programs and projects of the M2M campaign:

- The Space Launch System
- Orion spacecraft
- All ground support equipment for development, testing, and launch of SLS/Orion
- Gateway
- Human Landing System
- Space suits for lunar surface operations
- In situ resource utilization, surface power systems, life support, and other advanced technology developments for a sustained lunar presence
- Mars 2020 & Sample Return
- Commercial Lunar Payload Services

For additional information about NASA's Moon to Mars campaign, please visit [EXPLORE MOON to MARS](https://www.nasa.gov/topics/moon-to-mars).¹⁵

Investments in Climate Change Research and Technology¹⁶

NASA is a global leader in studying Earth's changing climate. The agency's observations of Earth from space, the air, and on the ground are helping humans learn how the interconnected systems of the planet interact.

NASA has a broad climate research program. Among the many areas NASA studies are greenhouse gases, temperature change, changes in sea ice and land ice, sea level rise, clouds and

¹⁴ Information is obtained from <https://www.nasa.gov/topics/moon-to-mars>

¹⁵ The EXPLORE MOON to MARS website address is <https://www.nasa.gov/topics/moon-to-mars>.

¹⁶ Information is obtained from https://climate.nasa.gov/nasa_science/history/

precipitation, and air pollution. NASA also develops technologies that can be used to mitigate or adapt to climate change, like sustainable aviation technologies.

In addition to providing the nation and world with unique climate observations, analysis, and modeling, this research helps NASA better assess the impacts of climate change on its mission and ensure the resiliency of its facilities and assets. NASA’s capabilities in researching Earth and its atmosphere will continue to be critical in understanding causes and effects of temperature changes, sea level rise, and other major climate changes. The following represents the variety of programs and projects included in NASA’s investments in climate change research and technology:

- Earth Science Activities
 - *Earth Science Research*
 - *Earth Systematic Mission*
 - *Earth System Science Pathfinder Applied Science (Pathways, including SERVIR)*
 - *Earth System Explorers*
 - *Earth Science Technology*
- Aeronautics Activities
 - *Advanced Air Transport Tech*
 - *Advanced Composites Project*
 - *Advanced Air Mobility*
 - *Air Traffic Management Exploration*
 - *Airspace Technology Demonstration*
 - *Convergent Aeronautics Solutions*
 - *Cross Program Operations*
 - *Environmentally Responsible Aviation*
 - *Hi-Rate Composite Aircraft Manufacturing*
 - *Hybrid Thermally Efficient Core*
 - *SMART-NAS Test Bed for Safe TBO*
 - *Transformational Tools and Technologies*
- Space Technology Activities
 - *Portions of Space Technology Research Grants; Technology Transfer; Small Business Technology Transfer*
 - *TDM Fission Surface Power*
 - *GCD Nuclear Systems*
- Portions of EPSCoR
- Construction and environmental compliance and remediation efforts at NASA facilities

For more information about NASA’s investments in climate change research and technology, please visit [GLOBAL CLIMATE CHANGE, Vital Signs of the Planet](#).¹⁷

¹⁷ The GLOBAL CLIMATE CHANGE website address is <https://climate.nasa.gov>.

Report Organization

The extensive activities of NASA and the unique capabilities of the Moon-to-Mars campaign and the investments in climate change research and technology encompass significant research and development (R&D), as well as manufacturing in aerospace and related industries that require the hiring of thousands of highly skilled scientists and engineers. NASA expends millions of dollars in many states in the form of direct employment and contracts with private sector vendors. This infusion of federal spending in the form of labor income and procurement in turn supports thousands of additional jobs and millions of dollars of state and local government tax revenues across the country. This study quantifies these economic impacts and analyzes their significance for the economies involved.

The report is organized as follows. Immediately following this introduction, Section 2 surveys the pertinent literature and provides a brief theoretical background for the modeling process, describing the steps taken to conduct the economic impact analysis. Section 3 describes the data used in the study, examining NASA employment at various research and flight centers (including information related to labor income and employee residences) along with contract awards originating from NASA and those related to the M2M campaign and the investments in climate change research and technology (including the geographic distribution of these contracts). Understanding the data is key to understanding the approach and for interpreting the results of the economic impact analysis. Section 4 discusses the modeling approach, employing data and software from IMPLAN. Section 5 examines additional issues surrounding the impact estimates, focusing largely on the geographic designation of impact regions and the specification of economic activities and events—the inputs into the models. These two sections (4 and 5) detail the modifications we made to the basic IMPLAN model and the most important assumptions that underlie the impact estimates, as well as the rationales behind them. Finally, Section 6 provides estimates of the economic impacts generated by NASA, the M2M campaign, the investments in climate change research and technology, and analyzes the meaning of these impacts for the economies involved.

LITERATURE SURVEY

The Conceptual Bases of Economic Impact Analysis

Economic impact analysis involves applying a change in final demand to a descriptive economic model and then analyzing the resulting changes in the economy. A concise definition of impact analysis is that it is an assessment of the overall changes in an economy that occur as a result of one or more changes in specific economic activities (IMPLAN, 2004).

Export base theory (also termed economic base theory) provides the conceptual foundation for input-output economic impact assessment models. The first of two fundamental concepts that undergird export base theory is that an area's economy can be divided into two types of economic units: (1) basic and (2) non-basic. The **basic sector** is defined as those firms that sell goods and services to markets outside the local area. The revenue received by basic sector firms for their exports of goods and services is termed basic income. The remainder of the area's economy consists of those firms that supply goods and services to customers within the area. These firms are referred to as the **non-basic sector** or sometimes as **residential or local trade and service** activities.

The second key concept of export base theory is that the level of non-basic activity in an area is determined by the level of basic activity, and a given change in the level of basic activity brings about a predictable change in the level of non-basic activities. This relationship is known as the **multiplier** effect. Thus, export base theory emphasizes external demand for the products of the basic sector as the principal force determining change in an area's level of economic activity (Leistritz, 1994).

The basis for the multiplier effect is the interdependence of (or linkages between) the basic and non-basic sectors within an area's economy. As the basic sector expands, it requires more inputs (for example, labor and supplies). Some of these inputs are purchased from local firms and households. As the firms in the non-basic sector expand their sales to the basic sector, they too must purchase more inputs, their suppliers in turn must increase their own input purchases, and so on. Increased wages and salaries paid to labor and management in the basic sector, together with similar increases in the non-basic sector, lead to increases in the incomes of area households. Some of this additional income is spent locally for goods and services, some is saved, and some leaves the area economy as payments for imported goods and services (or as additional tax payments to government). To the extent that additional income is spent locally for goods and services, the output of local firms increases further, resulting in additional cycles of input purchases, income increases and consumption expenditures. This cycle of spending and re-spending within the local economy is the basis of the multiplier effect (Leistritz & Murdock, 1981). The magnitude of the multiplier effect is determined by the proportions of a given dollar of additional input purchases and a given dollar of income spent locally. High multiplier values are associated with high levels of local purchases and spending, which typically reflect a diversified, relatively self-sufficient economy. Larger regions tend to have higher multiplier values.

The Principles of Economic Impact Analysis

To begin the process of estimating economic impacts, it is important to identify the counterfactual scenario against which the specific changes in economic activity are contrasted (Drucker, 2015). For example, if local industries are expected to increase their activity due to a rise in demand for their products or services, the source of that demand—the economic agent or agents seeking the additional products or services—could be considered to have made a choice versus seeking a different set of products or services or obtaining them instead from industries in a different location. In this study, wherein the federal employees' labor income at NASA facilities and the procurement originating from NASA constitute the changes in economic activity that are examined, we consider these changes relative to a hypothetical situation of zero NASA employment and procurement activity. Although this counterfactual of no activity is unrealistic on a nationwide basis in that the federal government resources currently applied to NASA would likely be expended for other tasks or through different federal agencies, a hypothetical baseline scenario of zero replacement activity is a common strategy for impact analyses seeking to obtain measures of the entire economic impact of a particular institution and its associated activities. For smaller geographic regions, such as a state, the counterfactual scenario of zero activity is more realistic because there is no reason to suppose that the allocation of federal resources in the absence of the NASA would concentrate in that specific state. This principle applies to the M2M campaign and the investments in climate change research and technology as well.

After determining the counterfactual scenario, the next step is to identify the topic or topics of concern as a set of economic events defined by expenditures. These expenditures constitute the initial changes that stimulate further activity throughout the economy. The actions and the economic activity they stimulate together comprise the impacts. Although impact modeling software (such as IMPLAN) provides a framework to conduct an analysis of economic impacts, each stage of an analysis should be carefully scrutinized to make sure it is logical. Procedures and assumptions ought to be validated prior to entry into the model (IMPLAN, 2004). Furthermore, understanding how an industry and the various parts of its supply chain respond to changes in demand and judging the validity of the assumptions made as part of operationalizing a regional input-output model are essential to usefully interpreting the outputs of an economic impact model (Drucker, 2015; Low & Isserman, 2009). The key assumptions and their implications are detailed in the following sections of the report.

Economic impact analysis is a projection process, and the figures generated should be regarded as reasonable approximations and estimates rather than as accurate predictions. There are several points in the conduct of an economic impact analysis where modeling choices and underlying assumptions substantially affect the final results. To avoid inadvertent errors or misapplications, economic impact analyses should include clear documentation of the procedures applied to obtain the initial events modeled, key underlying assumptions, and the rationales for both (Crompton *et al.*, 2001).

The Importance of Economic Impact Analysis to Public Policy Making

Economic impact assessment has developed as a pragmatic approach that attempts to bring appropriate concepts and tools from regional economics and public finance to bear on problems of concern to policy makers (Leistritz, 1994). Practitioners use impact analysis for different purposes. For example, it might be used to measure the impact of a new factory moving into an area. Governments use impact analysis to inform and guide policy decisions and planning. Researchers use impact analysis to study relationships among different elements in an economy (IMPLAN, 2004).

The increasing demand for economic impact analyses by public agencies can be explained in two ways. First, economic impact assessments are sought by policy makers and resource managers because they address issues that are key to a wide variety of decisions. For example, in determining whether to designate certain public lands as wilderness areas, land managers may need to consider the economic and fiscal impacts of alternative land uses (e.g., wilderness versus ranching or mining). When large-scale mining and resource development projects have been proposed, the local economic and fiscal impacts often have been one of the principal topics of debate.

Second, as state and local governments become more heavily involved in economic development efforts, economic impact analysis tools can be useful in establishing priorities for incentive programs. While a number of states are now using selected measures of direct economic impact (most commonly the number of jobs created) as criteria in awarding financial support, the total economic impact (including secondary effects) is probably a more meaningful criterion (Leistritz, 1994). This also explains why a key purpose of economic impact studies is to measure the economic return to residents (Crompton *et al.*, 2001). Public interest in economic impacts is ultimately a concern about people and their standard of living (Siegfried *et al.*, 2007).

DATA ANALYSIS

Description of NASA Data

NASA supplied information about activities at NASA headquarters and research and flight centers including salary, benefits, and total labor income in all 50 states as well as in Washington, D.C. The data contain places of residence for NASA employees living in different states (with all individual identifiers removed). Procurement data for NASA list contract amounts awarded to vendors located in different parts of the country with a brief description of activities or services that vendors were awarded to carry. NASA provides funding not only to private sector firms, but also to colleges and universities, federal government agencies, and civic organizations in the form of research and development contracts as well as grants. Both the recipients and the types of activities contracted by NASA are diverse; the latter involves most of the categories of manufacturing or service industries contained within the IMPLAN model.

NASA provided M2M-specific procurement data, listing suppliers and corresponding dollar amounts for the campaign's contractors. In addition to the geographical location of each of these suppliers including overseas vendors, the items purchased, and services provided by these vendors were detailed. Similar to total NASA procurements, the procurement activities attributable to the M2M campaign are diverse in terms of the types of economic activities and vendor locations. The M2M-specific procurement activities originating from NASA is related mostly to scientific research and development services, facilities support services, professional and technical services, software development, and electronic and precision equipment repair and maintenance.

NASA provided climate change research and technology-specific procurement data, listing suppliers and corresponding dollar amounts for the contractors. In addition to the geographical location of each of these suppliers including overseas vendors, the items purchased, and services provided by these vendors were detailed. Climate change research and technology-specific procurement activities originating from NASA are related mostly to scientific research and development services, professional and technical services, and grants and contributions.

All data and outputs of this economic impact analysis pertain to Fiscal Year 2023 (October 1, 2022, through September 30, 2023).

NASA Activities

NASA Employment

NASA had 19,758 civil servants on its payroll (17,824 FTEs, see Box 5).¹⁸ Most of the NASA labor force is concentrated in Maryland, Texas, Virginia, Alabama, Florida, California, and Ohio (Table

¹⁸ Throughout this report, NASA employment refers only to federal civil servants, and does not include on-site contractors. It is also worth noting that the civil servant figure represents the number of employees who NASA

1 and Figure 2). According to full-time equivalent (FTE) counts, those seven states account for 91% of total NASA employment. Because impact estimates are based on expenditures, it is important to examine the labor income shares that correspond to the employment figures in each region.¹⁹ The same set of states accounts for the largest portion of labor income earned. As we present in the results (Section 6), the concentration of NASA employment and labor income in the states listed above translates into greater estimated household spending and larger economic impacts relative to the other regions examined.

Box 5: Civil Servant Employee Counts versus Full-time Equivalent (FTEs)

We used FTEs instead of the count of civil servants in the analysis for two reasons. First, given that there are different labor hours/labor income associated with different headcounts in different states, using FTEs provides a more accurate way to compare the share of NASA employment across states. Second, because economic impacts are a function of labor income, and changes in labor income are more directly related to FTEs, we used FTEs rather than headcounts. For example, it is possible for labor income to remain the same while the number of employees (civil servant headcounts) decreases. However, changes in FTEs would reflect those changes in labor income and thus will allow the analyst and the reader to more accurately assess the anticipated changes in associated economic impacts.

Table 1: NASA’s Labor Force and Associated Labor Income²⁰

State	Employment		Labor Income	
	Jobs (FTE ²¹)	%	Income (\$ thousands)	%
Alabama	2,224	12.5	422,863	12.0
Alaska	0	0	0	0
Arizona	20	0.1	3,745	0.1
Arkansas	3	<0.1	499	<0.1
California	1,805	10.1	377,059	10.7
Colorado	56	0.3	10,742	0.3
Connecticut	9	<0.1	1,429	<0.1
Delaware	5	<0.1	857	<0.1
Florida	2,162	12.1	393,525	11.2
Georgia	27	0.1	3,815	0.1
Hawaii	7	<0.1	1,277	<0.1
Idaho	5	<0.1	877	<0.1

paid or collected payments from in FY 2023. For example, this figure includes individuals who retired in FY 2022 but received their lump sum payment in FY 2023. Thus, it does not exactly represent the number of civil servants directly employed in FY 2023.

¹⁹ Unless otherwise mentioned, all monetary values correspond to 2023 dollars.

²⁰ Due to rounding decimals, column and row totals may not exactly equal the sums of the printed cell values. This caveat applies to all tables with numerical values throughout the report.

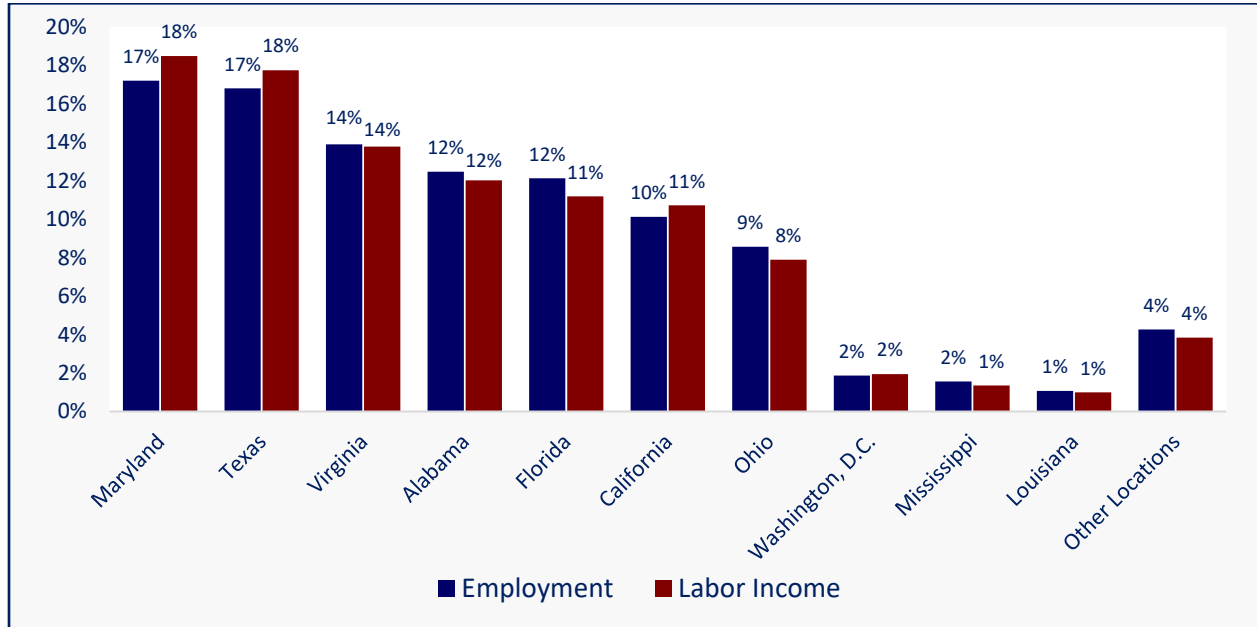
²¹ The acronym FTE stands for “full-time equivalent”.

Illinois	21	0.1	2,742	<0.1
Indiana	14	<0.1	2,079	<0.1
Iowa	6	<0.1	1,139	<0.1
Kansas	9	<0.1	1,356	<0.1
Kentucky	8	<0.1	1,226	<0.1
Louisiana	191	1.1	34,987	1.0
Maine	4	<0.1	657	<0.1
Maryland	3,067	17.2	650,169	18.5
Massachusetts	20	0.1	3,903	0.1
Michigan	21	0.1	2,901	<0.1
Minnesota	14	<0.1	2,051	<0.1
Mississippi	279	1.6	47,585	1.4
Missouri	13	<0.1	1,996	<0.1
Montana	3	<0.1	383	<0.1
Nebraska	2	<0.1	301	<0.1
Nevada	6	<0.1	1,016	<0.1
New Hampshire	5	<0.1	1,014	<0.1
New Jersey	23	0.1	3,895	0.1
New Mexico	85	0.5	15,422	0.4
New York	54	0.3	9,841	0.3
North Carolina	42	0.2	8,057	0.2
North Dakota	<1	<0.1	13	<0.1
Ohio	1,527	8.6	277,627	7.9
Oklahoma	13	<0.1	1,798	<0.1
Oregon	10	<0.1	1,791	<0.1
Pennsylvania	42	0.2	7,941	0.2
Rhode Island	3	<0.1	518	<0.1
South Carolina	17	<0.1	3,059	<0.1
South Dakota	4	<0.1	820	<0.1
Tennessee	71	0.4	13,514	0.4
Texas	2,997	16.8	624,309	17.8
Utah	11	<0.1	2,037	<0.1
Vermont	6	<0.1	962	<0.1
Virginia	2,478	13.9	484,604	13.8
Washington	30	0.2	5,806	0.2
Washington, D.C.	334	1.9	68,523	1.9
West Virginia	62	0.3	11,710	0.3
Wisconsin	4	<0.1	647	<0.1
Wyoming	3	<0.1	431	<0.1
Other Places	2	<0.1	414	<0.1
United States	17,821	100.0	3,515,929	100.0

U.S. Territories	2	<0.1	391	<0.1
Other Countries	0	0	0	0
Total	17,824	100.0	3,516,320	100.0

Notes: Labor income includes regular salary, over-time payments, holiday payments, OPC (Other Personnel Costs: awards, lump sum payments, bonuses, and permanent change-of-station costs), and benefits. Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 2: Shares of NASA Labor Force and Labor Income in Top Ten States (based on FTEs)



NASA Procurement

NASA procurement refers to contracts for goods and/or services and the P-card purchases originating from NASA headquarters and individual NASA space and flight centers. In Fiscal Year 2023, NASA incurred \$23.3 billion in expenditures to vendors in 50 states, the District of Columbia, and Guam, Puerto Rico, the United States Virgin Islands, and some foreign countries. Of this amount, \$7.7 billion is specific to the M2M campaign, accounting for 33.1% of total NASA procurement spending. Of the same amount (NASA procurement), \$2.4 billion is specific to the investments in climate change research and technology, accounting for 10.3% of total NASA procurement spending. California is the largest recipient state, accounting for \$5.8 billion, or 25% of NASA’s total procurement spending.

One primary feature differentiates NASA procurement spending from NASA employment: NASA procurement expenditures are more geographically dispersed. Whereas ten states account for 96% of NASA employment, a slightly smaller share of 88% of NASA procurement is sourced from the top ten states. These different concentrations have implications for the magnitude of the

impact estimates attributable to NASA employment and procurement. (Note that on-site contractor employees are not considered directly; the impacts of these contractors are captured through procurement expenditures.)

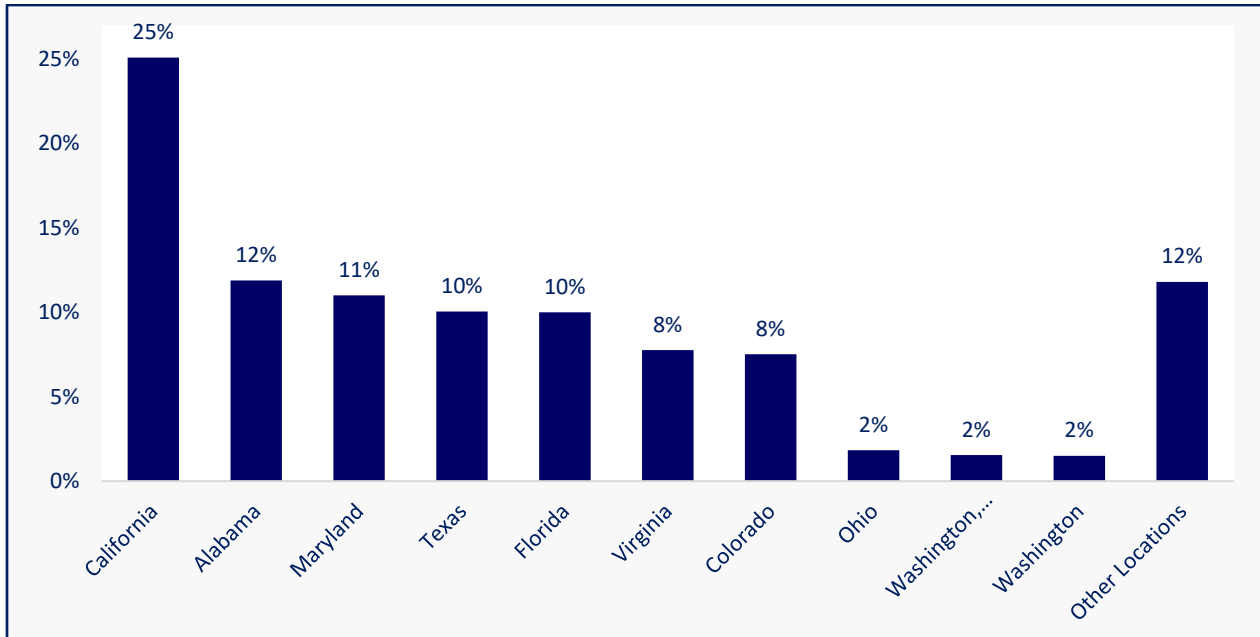
Table 2: NASA Procurement

State	Procurement		P-card Purchases		Total	
	Amount (\$thousands)	%	Amount (\$thousands)	%	Amount (\$thousands)	%
Alabama	2,769,570	11.9	2,586	2.6	2,772,156	11.9
Alaska	23,519	0.1	17	<0.1	23,535	0.1
Arizona	221,834	1.0	2,382	2.4	224,216	1.0
Arkansas	2,762	<0.1	73	<0.1	2,834	<0.1
California	5,837,122	25.1	12,619	12.9	5,849,741	25.1
Colorado	1,750,155	7.5	2,231	2.3	1,752,386	7.5
Connecticut	56,193	0.2	1,339	1.4	57,532	0.2
Delaware	34,231	0.1	352	0.4	34,582	0.1
Florida	2,328,313	10.0	2,905	3.0	2,331,218	10.0
Georgia	27,324	0.1	1,159	1.2	28,484	0.1
Hawaii	30,377	0.1	40	<0.1	30,417	0.1
Idaho	5,333	<0.1	76	<0.1	5,409	<0.1
Illinois	53,343	0.2	9,248	9.5	62,591	0.3
Indiana	80,950	0.3	652	0.7	81,602	0.3
Iowa	52,244	0.2	92	<0.1	52,336	0.2
Kansas	11,266	<0.1	245	0.3	11,511	<0.1
Kentucky	6,673	<0.1	227	0.2	6,900	<0.1
Louisiana	147,016	0.6	216	0.2	147,233	0.6
Maine	17,025	<0.1	41	<0.1	17,066	<0.1
Maryland	2,561,718	11.0	4,341	4.4	2,566,060	11.0
Massachusetts	256,731	1.1	3,781	3.9	260,513	1.1
Michigan	62,192	0.3	1,193	1.2	63,385	0.3
Minnesota	15,648	<0.1	4,129	4.2	19,777	<0.1
Mississippi	303,193	1.3	134	0.1	303,327	1.3
Missouri	27,268	0.1	932	1.0	28,200	0.1
Montana	12,320	<0.1	165	0.2	12,485	<0.1
Nebraska	2,480	<0.1	110	0.1	2,590	<0.1
Nevada	47,902	0.2	253	0.3	48,155	0.2
New Hampshire	61,350	0.3	932	1.0	62,282	0.3
New Jersey	45,673	0.2	3,574	3.7	49,248	0.2
New Mexico	145,988	0.6	535	0.5	146,523	0.6
New York	176,694	0.8	6,249	6.4	182,942	0.8
North Carolina	61,982	0.3	1,431	1.5	63,413	0.3

North Dakota	1,470	<0.1	44	<0.1	1,514	<0.1
Ohio	423,843	1.8	3,727	3.8	427,570	1.8
Oklahoma	42,057	0.2	96	<0.1	42,153	0.2
Oregon	17,773	<0.1	789	0.8	18,563	<0.1
Pennsylvania	128,479	0.6	3,120	3.2	131,600	0.6
Rhode Island	7,378	<0.1	338	0.3	7,715	<0.1
South Carolina	10,298	<0.1	421	0.4	10,719	<0.1
South Dakota	21,544	<0.1	243	0.2	21,787	<0.1
Tennessee	63,878	0.3	1,272	1.3	65,151	0.3
Texas	2,335,271	10.1	7,448	7.6	2,342,718	10.0
Utah	159,112	0.7	1,002	1.0	160,113	0.7
Vermont	1,876	<0.1	230	0.2	2,106	<0.1
Virginia	1,803,168	7.8	7,541	7.7	1,810,709	7.8
Washington	348,564	1.5	1,527	1.6	350,091	1.5
Washington, D.C.	359,071	1.5	2,168	2.2	361,239	1.5
West Virginia	49,223	0.2	126	0.1	49,350	0.2
Wisconsin	25,454	0.1	1,222	1.3	26,677	0.1
Wyoming	1,414	<0.1	46	<0.1	1,459	<0.1
Other Places	0	0	0	0	0	0
United States	23,036,262	99.2	95,619	97.9	23,131,881	99.2
U.S. Territories	6,547	<0.1	0	0	6,547	<0.1
Other Countries	175,343	0.8	2,066	2.1	177,409	0.8
Total	23,218,152	100.0	97,685	100.0	23,315,837	100.0

Note: Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 3: Share of NASA Procurement Spending by Top Ten States



Moon-to-Mars (M2M) Campaign

NASA Employment for the M2M Campaign

NASA had 6,649 civil servants on its payroll (3,749 FTEs) to support the M2M campaign.²² The majority of employees who work on the campaign reside in Texas, Alabama, and Florida; these three states account for 70% of the FTE jobs for the M2M campaign. Relatively small but notable numbers of employees live in Ohio, Virginia, Maryland, and California - other states' shares of the M2M labor force are minimal (Table 3 and Figure 4).

Table 3: NASA’s M2M Campaign Labor Force and Associated Labor Income

State	Employment		Labor Income	
	Jobs (FTE)	%	Income (\$ thousands)	%
Alabama	939	25.0	171,980	24.1
Alaska	0	0	0	0
Arizona	<1	<0.1	30	<0.1
Arkansas	0	0	0	0

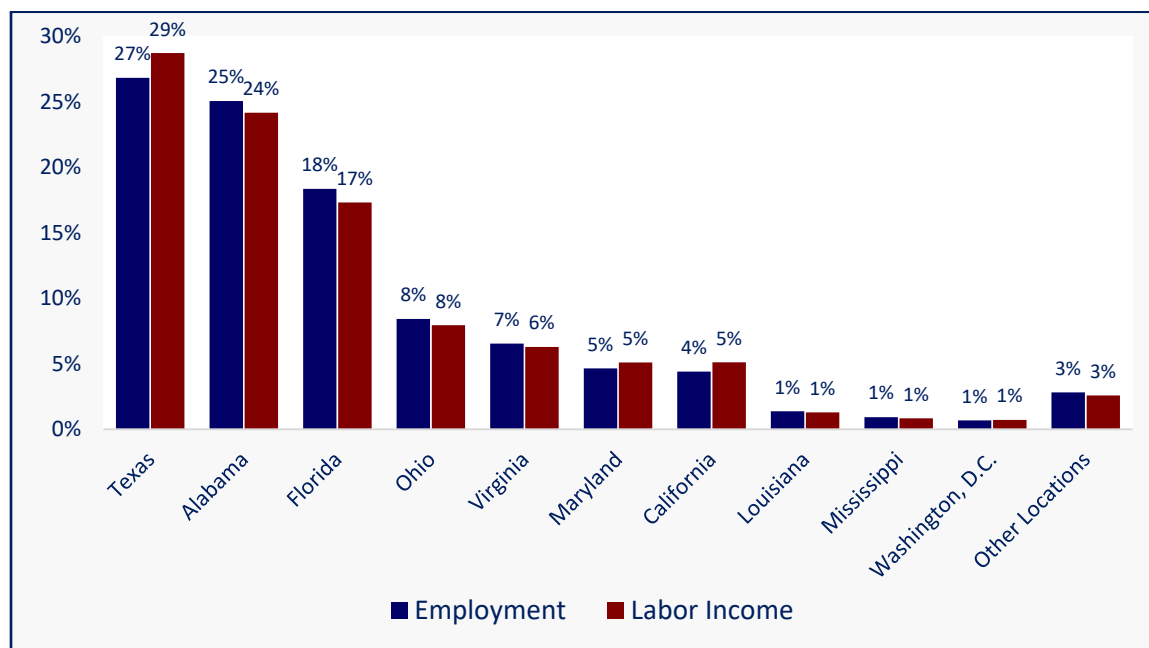
²² Throughout this report, the M2M campaign-specific labor force figures refer only to federal civil servants, and do not include on-site contractors. It is also worth noting that the civil servant figure represents the number of employees who NASA paid or collected payments from in FY 2023. For example, this figure includes individuals who retired in FY 2022 but received their lump sum payment in FY 2023. Thus, it does not exactly represent the number of civil servants directly employed in FY 2023.

California	165	4.4	36,403	5.1
Colorado	10	0.3	1,994	0.3
Connecticut	1	<0.1	135	<0.1
Delaware	<1	<0.1	41	<0.1
Florida	688	18.3	123,197	17.3
Georgia	3	<0.1	518	<0.1
Hawaii	1	<0.1	279	<0.1
Idaho	<1	<0.1	142	<0.1
Illinois	3	<0.1	408	<0.1
Indiana	3	<0.1	386	<0.1
Iowa	<1	<0.1	16	<0.1
Kansas	1	<0.1	164	<0.1
Kentucky	3	<0.1	374	<0.1
Louisiana	52	1.4	9,148	1.3
Maine	1	<0.1	236	<0.1
Maryland	174	4.6	36,291	5.1
Massachusetts	5	0.1	951	0.1
Michigan	5	0.1	640	<0.1
Minnesota	4	<0.1	592	<0.1
Mississippi	35	0.9	6,007	0.8
Missouri	2	<0.1	344	<0.1
Montana	0	0	0	0
Nebraska	1	<0.1	119	<0.1
Nevada	<1	<0.1	10	<0.1
New Hampshire	1	<0.1	99	<0.1
New Jersey	3	<0.1	455	<0.1
New Mexico	9	0.2	1,544	0.2
New York	3	<0.1	443	<0.1
North Carolina	6	0.2	1,087	0.2
North Dakota	<1	<0.1	13	<0.1
Ohio	316	8.4	56,516	7.9
Oklahoma	1	<0.1	188	<0.1
Oregon	1	<0.1	124	<0.1
Pennsylvania	2	<0.1	361	<0.1
Rhode Island	<1	<0.1	6	<0.1
South Carolina	1	<0.1	212	<0.1
South Dakota	1	<0.1	169	<0.1
Tennessee	20	0.5	3,841	0.5
Texas	1,005	26.8	204,390	28.7
Utah	5	0.1	933	0.1
Vermont	1	<0.1	81	<0.1

Virginia	245	6.5	44,750	6.3
Washington	4	<0.1	510	<0.1
Washington, D.C.	25	0.7	5,098	0.7
West Virginia	2	<0.1	231	<0.1
Wisconsin	1	<0.1	274	<0.1
Wyoming	1	<0.1	207	<0.1
Other Places	1	<0.1	202	<0.1
United States	3,749	100.0	712,139	100.0
U.S. Territories	0	0	0	0
Other Countries	0	0	0	0
Total	3,749	100.0	712,139	100.0

Note: Labor income includes regular salary, over-time payments, holiday payments, OPC (Other Personnel Costs: awards, lump sum payments, bonuses, and permanent change-of-station costs), and benefits. Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 4: Shares of NASA M2M Labor Force and Labor Income in Top Ten States (based on FTEs)



NASA Procurement for the M2M Campaign

M2M procurement refers to contracts for goods and/or services and the P-card purchases originating from the different NASA Centers that support the M2M campaign. In Fiscal Year 2023, NASA incurred \$7.7 billion in expenditures to vendors in 49 states, the District of Columbia, and

some foreign countries.²³ Alabama is the largest recipient state, accounting for \$1.9 billion, or 25% of NASA's M2M procurement spending (Table 4 and Figure 5).

After Alabama, California is the second largest recipient state, accounting for approximately \$1.6 billion, or 21% of NASA's total procurement spending for the M2M campaign. Colorado is the third largest state recipient of M2M procurement. Procurement performed in this state accounts for approximately \$1.2 billion, or 15% of NASA's total procurement spending for the M2M campaign. Texas is the fourth largest recipient of M2M procurement. Procurement performed in this state accounts for approximately \$894 million, or 12% of NASA's total procurement spending for the M2M campaign. Florida is the fifth largest recipient of M2M procurement. Procurement performed in this state accounts for \$834 million, or 11% of NASA's total procurement spending for the M2M campaign. Several other states' shares of M2M procurement are smaller but still sizeable. Washington, Virginia, and Utah are in this group.

Table 4: NASA Procurement for the M2M Campaign

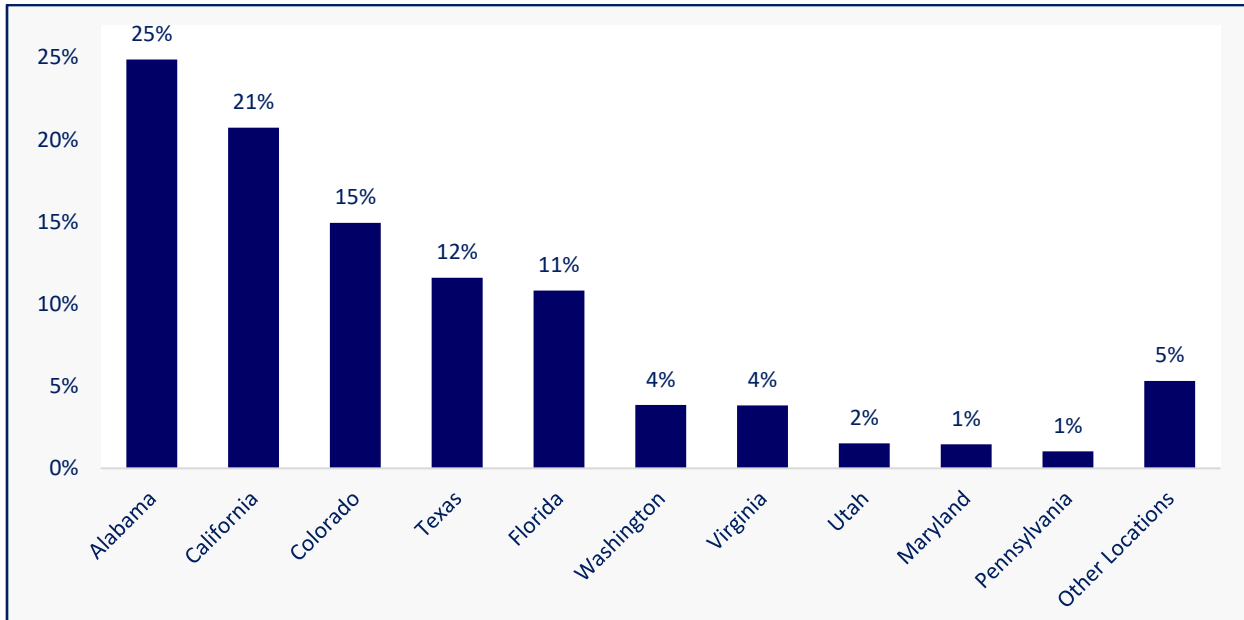
State	Procurement		P-card Purchases		Total	
	Amount (\$thousands)	%	Amount (\$thousands)	%	Amount (\$thousands)	%
Alabama	1,917,534	25.0	640	2.6	1,918,174	24.9
Alaska	12	<0.1	4	<0.1	16	<0.1
Arizona	24,821	0.3	589	2.4	25,411	0.3
Arkansas	139	<0.1	18	<0.1	157	<0.1
California	1,595,002	20.8	3,122	12.9	1,598,124	20.7
Colorado	1,151,539	15.0	552	2.3	1,152,091	14.9
Connecticut	6,674	<0.1	331	1.4	7,005	<0.1
Delaware	835	<0.1	87	0.4	922	<0.1
Florida	833,213	10.8	719	3.0	833,932	10.8
Georgia	5,238	<0.1	287	1.2	5,524	<0.1
Hawaii	335	<0.1	10	<0.1	345	<0.1
Idaho	174	<0.1	19	<0.1	193	<0.1
Illinois	5,175	<0.1	2,288	9.5	7,463	<0.1
Indiana	6,734	<0.1	161	0.7	6,896	<0.1
Iowa	185	<0.1	23	<0.1	208	<0.1
Kansas	142	<0.1	61	0.3	202	<0.1
Kentucky	1,127	<0.1	56	0.2	1,183	<0.1
Louisiana	73,307	1.0	53	0.2	73,360	1.0
Maine	3,794	<0.1	10	<0.1	3,804	<0.1
Maryland	111,937	1.5	1,074	4.4	113,011	1.5
Massachusetts	16,649	0.2	935	3.9	17,584	0.2
Michigan	5,079	<0.1	295	1.2	5,374	<0.1

²³ Wyoming is the only state that did not have M2M-campaign specific contracts in FY 2023.

Minnesota	1,661	<0.1	1,022	4.2	2,682	<0.1
Mississippi	61,355	0.8	33	0.1	61,388	0.8
Missouri	2,400	<0.1	231	1.0	2,631	<0.1
Montana	125	<0.1	41	0.2	166	<0.1
Nebraska	109	<0.1	27	0.1	137	<0.1
Nevada	39,929	0.5	63	0.3	39,992	0.5
New Hampshire	4,613	<0.1	231	1.0	4,844	<0.1
New Jersey	6,593	<0.1	884	3.7	7,478	<0.1
New Mexico	25,528	0.3	132	0.5	25,661	0.3
New York	14,229	0.2	1,546	6.4	15,775	0.2
North Carolina	2,385	<0.1	354	1.5	2,739	<0.1
North Dakota	97	<0.1	11	<0.1	108	<0.1
Ohio	56,221	0.7	922	3.8	57,143	0.7
Oklahoma	372	<0.1	24	<0.1	396	<0.1
Oregon	846	<0.1	195	0.8	1,041	<0.1
Pennsylvania	78,806	1.0	772	3.2	79,578	1.0
Rhode Island	806	<0.1	84	0.3	890	<0.1
South Carolina	772	<0.1	104	0.4	876	<0.1
South Dakota	447	<0.1	60	0.2	507	<0.1
Tennessee	2,898	<0.1	315	1.3	3,213	<0.1
Texas	892,129	11.6	1,843	7.6	893,972	11.6
Utah	117,273	1.5	248	1.0	117,520	1.5
Vermont	110	<0.1	57	0.2	167	<0.1
Virginia	293,409	3.8	1,866	7.7	295,275	3.8
Washington	296,811	3.9	378	1.6	297,189	3.9
Washington, D.C.	18,892	0.2	536	2.2	19,428	0.3
West Virginia	2,743	<0.1	31	0.1	2,774	<0.1
Wisconsin	3,670	<0.1	302	1.3	3,972	<0.1
Wyoming	0	0	11	<0.1	11	<0.1
Other Places	0	0	0	0	0	0
United States	7,684,873	100.0	23,656	97.9	7,708,530	100.0
U.S. Territories	0	0	0	0	0	0
Other Countries	0	0	511	2.1	511	<0.1
Total	7,684,873	100.0	24,167	100.0	7,709,041	100.0

Note: The P-card expenditure data we received identified the share for the M2M campaign at the national level only (24.74%). States' shares of the P-card expenditure for the M2M campaign are not known. We assumed that the share of P-card expenditure made for the M2M campaign in a state is the same as the share of P-card expenditure made for NASA as a whole. For example, Alabama accounts for 2.6% of the NASA P-card expenditure. Therefore, Alabama also accounts for 2.6% of the M2M-specific P-card expenditure. Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 5: Share of M2M Procurement Spending by Top Ten States



Investments in Climate Change Research and Technology

NASA Employment for Climate Change Research and Technology

NASA had 4,156 civil servants on its payroll (2,009 FTEs) to support investments in climate change research and technology.²⁴ The majority of employees who work on investments in climate change research and technology reside in Virginia, California, Maryland, Ohio; the four states account for 87% of the FTE jobs for investments in climate change research and technology. Relatively small but notable numbers of employees live in Alabama, Washington, D.C., and Texas whereas other states’ shares of investments in climate change research and technology labor force are minimal (Table 3 and Figure 4).

Table 5: NASA’s Climate Change Research and Technology Labor Force and Associated Labor Income

State	Employment		Labor Income	
	Jobs (FTE)	%	Income (\$ thousands)	%
Alabama	60	3.0	10,904	2.9
Alaska	0	0	0	0

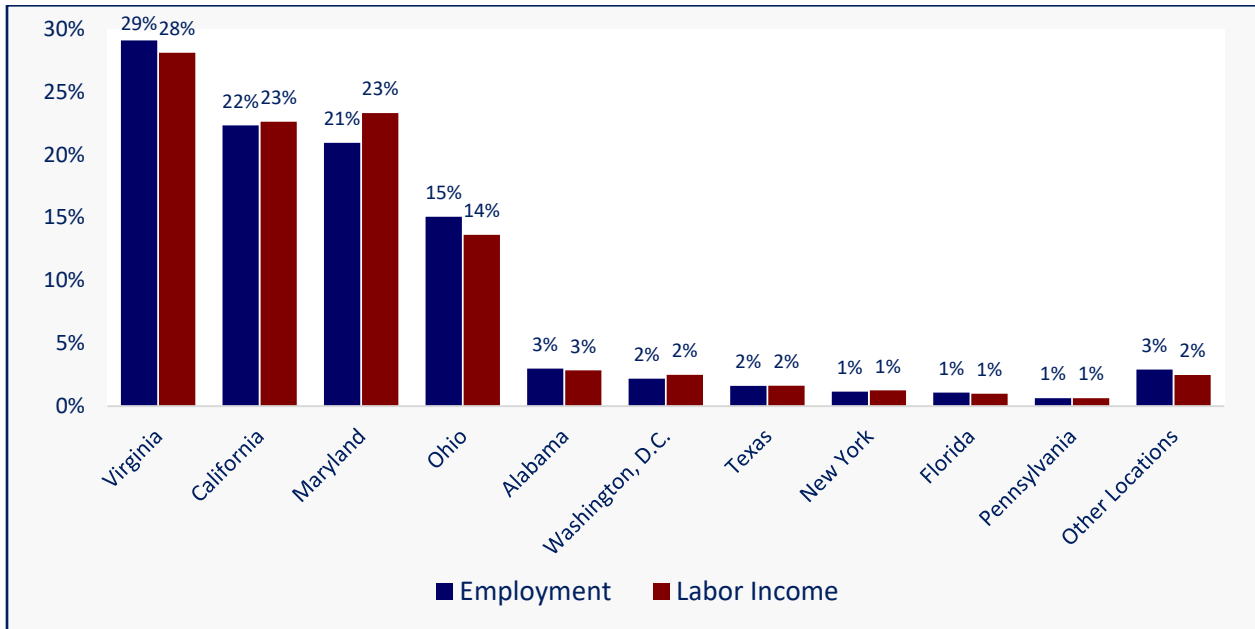
²⁴ Throughout this report, the Climate Change Research and Technology-specific labor force figures refer only to federal civil servants, and do not include on-site contractors. It is also worth noting that the civil servant figure represents the number of employees who NASA paid or collected payments from in FY 2023. For example, this figure includes individuals who retired in FY 2022 but received their lump sum payment in FY 2023. Thus, it does not exactly represent the number of civil servants directly employed in FY 2023.

Arizona	5	0.2	768	0.2
Arkansas	1	<0.1	61	<0.1
California	449	22.3	86,504	22.6
Colorado	9	0.4	1,469	0.4
Connecticut	2	0.1	230	<0.1
Delaware	<1	<0.1	8	<0.1
Florida	22	1.1	3,755	1.0
Georgia	2	<0.1	150	<0.1
Hawaii	1	<0.1	178	<0.1
Idaho	1	<0.1	120	<0.1
Illinois	1	<0.1	78	<0.1
Indiana	1	<0.1	103	<0.1
Iowa	1	<0.1	180	<0.1
Kansas	3	0.2	496	0.1
Kentucky	1	<0.1	201	<0.1
Louisiana	3	0.1	481	0.1
Maine	1	<0.1	74	<0.1
Maryland	421	21.0	89,107	23.3
Massachusetts	3	0.2	568	0.1
Michigan	1	<0.1	289	<0.1
Minnesota	2	<0.1	220	<0.1
Mississippi	2	0.1	415	0.1
Missouri	1	<0.1	95	<0.1
Montana	0	0	0	0
Nebraska	0	0	0	0
Nevada	2	<0.1	415	0.1
New Hampshire	<1	<0.1	30	<0.1
New Jersey	2	<0.1	328	<0.1
New Mexico	1	<0.1	226	<0.1
New York	23	1.2	4,792	1.3
North Carolina	2	<0.1	357	<0.1
North Dakota	0	0	0	0
Ohio	303	15.1	52,078	13.6
Oklahoma	2	0.1	233	<0.1
Oregon	2	0.1	361	<0.1
Pennsylvania	13	0.6	2,438	0.6
Rhode Island	<1	<0.1	9	<0.1
South Carolina	1	<0.1	249	<0.1
South Dakota	0	0	0	0
Tennessee	3	0.1	490	0.1
Texas	32	1.6	6,188	1.6

Utah	0	0	0	0
Vermont	0	0	0	0
Virginia	585	29.1	107,478	28.1
Washington	2	<0.1	314	<0.1
Washington, D.C.	44	2.2	9,516	2.5
West Virginia	1	<0.1	253	<0.1
Wisconsin	<1	<0.1	10	<0.1
Wyoming	0	0	0	0
Other Places	0	0	0	0
United States	2,009	100.0	382,218	100.0
U.S. Territories	0	0	0	0
Other Countries	0	0	0	0
Total	2,009	100.0	382,218	100.0

Note: Labor income includes regular salary, over-time payments, holiday payments, OPC (Other Personnel Costs: awards, lump sum payments, bonuses, and permanent change-of-station costs), and benefits. Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 6: Shares of NASA Climate Change Research and Technology Labor Force and Labor Income in Top Ten States (based on FTEs)



NASA Procurement for Climate Change Research and Technology

Procurement refers to contracts for goods and/or services and the P-card purchases originating from the different NASA Centers that support investments in climate change research and technology. In Fiscal Year 2023, NASA incurred \$2.4 billion in expenditures to vendors in the 50

states, the District of Columbia, Puerto Rico, the United States Virgin Islands, and some foreign countries. California is the largest recipient state, accounting for \$485 million, or 20% of NASA's total procurement spending for investments in climate change research and technology (Table 4 and Figure 5).

After California, Maryland is the second largest state recipient of NASA procurement for investments in climate change research and technology. Procurement performed in this state accounts for \$439 million, or 18% of NASA's total procurement spending for investments in climate change research and technology. Virginia is the third largest state recipient of NASA procurement for investments in climate change research and technology. Procurement performed in this state accounts for \$239 million, or 10% of NASA's total procurement spending for investments in climate change research and technology. Several other states' shares of Climate Change procurement are smaller but still sizeable. Colorado, Florida, Alabama, Ohio, Massachusetts, Texas, and Washington, D.C. are in this group.

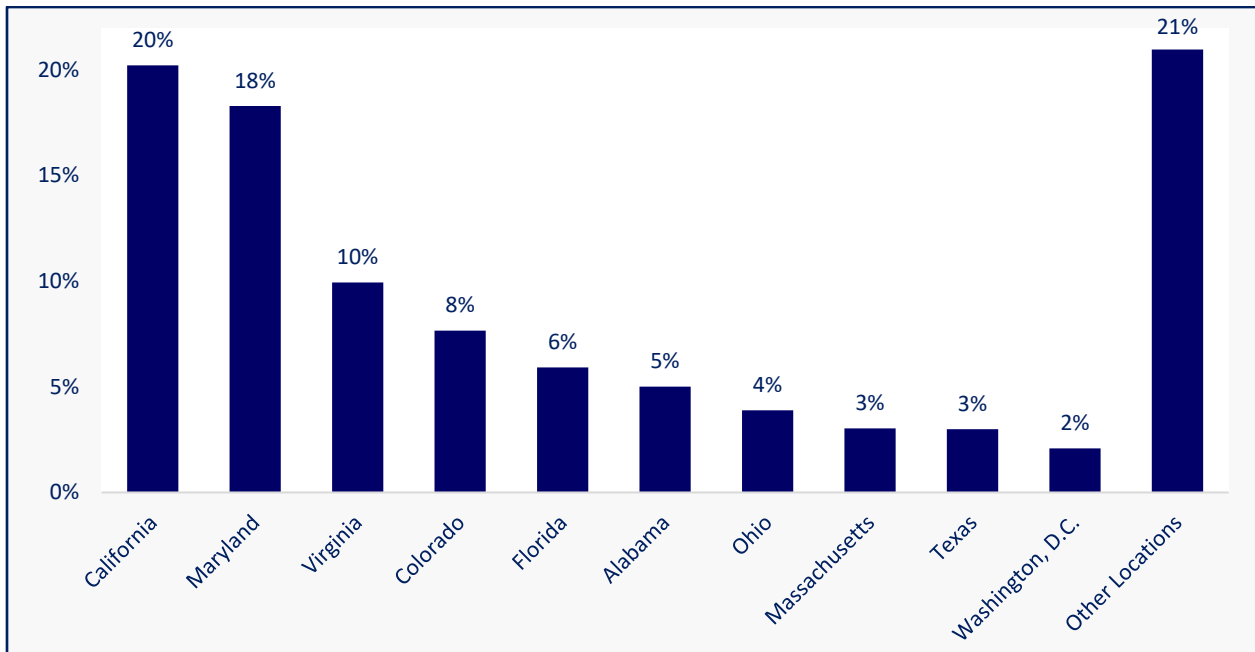
Table 6: NASA Procurement for Climate Change Research and Technology

State	Procurement		P-card Purchases		Total	
	Amount (\$thousands)	%	Amount (\$thousands)	%	Amount (\$thousands)	%
Alabama	119,829	5.0	403	2.6	120,232	5.0
Alaska	16,331	0.7	3	<0.1	16,333	0.7
Arizona	20,410	0.9	371	2.4	20,781	0.9
Arkansas	713	<0.1	11	<0.1	724	<0.1
California	483,315	20.3	1,967	12.9	485,283	20.2
Colorado	183,509	7.7	348	2.3	183,856	7.7
Connecticut	12,133	0.5	209	1.4	12,341	0.5
Delaware	2,104	<0.1	55	0.4	2,159	<0.1
Florida	141,578	5.9	453	3.0	142,031	5.9
Georgia	10,114	0.4	181	1.2	10,295	0.4
Hawaii	4,056	0.2	6	<0.1	4,063	0.2
Idaho	2,250	<0.1	12	<0.1	2,262	<0.1
Illinois	11,987	0.5	1,442	9.5	13,429	0.6
Indiana	7,128	0.3	102	0.7	7,230	0.3
Iowa	2,580	0.1	14	<0.1	2,594	0.1
Kansas	4,388	0.2	38	0.3	4,426	0.2
Kentucky	538	<0.1	35	0.2	573	<0.1
Louisiana	5,697	0.2	34	0.2	5,731	0.2
Maine	6,561	0.3	6	<0.1	6,568	0.3
Maryland	438,441	18.4	677	4.4	439,118	18.3
Massachusetts	72,178	3.0	590	3.9	72,768	3.0
Michigan	27,745	1.2	186	1.2	27,931	1.2

Minnesota	3,592	0.2	644	4.2	4,236	0.2
Mississippi	19,764	0.8	21	0.1	19,785	0.8
Missouri	7,702	0.3	145	1.0	7,847	0.3
Montana	4,498	0.2	26	0.2	4,524	0.2
Nebraska	461	<0.1	17	0.1	479	<0.1
Nevada	17,695	0.7	39	0.3	17,735	0.7
New Hampshire	38,210	1.6	145	1.0	38,355	1.6
New Jersey	8,568	0.4	557	3.7	9,125	0.4
New Mexico	43,607	1.8	83	0.5	43,690	1.8
New York	39,038	1.6	974	6.4	40,012	1.7
North Carolina	19,967	0.8	223	1.5	20,190	0.8
North Dakota	709	<0.1	7	<0.1	716	<0.1
Ohio	92,666	3.9	581	3.8	93,247	3.9
Oklahoma	27,889	1.2	15	<0.1	27,904	1.2
Oregon	10,424	0.4	123	0.8	10,547	0.4
Pennsylvania	21,963	0.9	486	3.2	22,449	0.9
Rhode Island	2,066	<0.1	53	0.3	2,119	<0.1
South Carolina	267	<0.1	66	0.4	332	<0.1
South Dakota	12,662	0.5	38	0.2	12,699	0.5
Tennessee	34,469	1.4	198	1.3	34,667	1.4
Texas	70,620	3.0	1,161	7.6	71,781	3.0
Utah	9,573	0.4	156	1.0	9,729	0.4
Vermont	592	<0.1	36	0.2	628	<0.1
Virginia	237,470	10.0	1,176	7.7	238,645	9.9
Washington	22,651	0.9	238	1.6	22,889	1.0
Washington, D.C.	49,729	2.1	338	2.2	50,067	2.1
West Virginia	346	<0.1	20	0.1	366	<0.1
Wisconsin	13,455	0.6	191	1.3	13,646	0.6
Wyoming	316	<0.1	7	<0.1	323	<0.1
Other Places	0	0	0	0	0	0
United States	2,384,557	100.0	14,907	97.9	2,399,464	100.0
U.S. Territories	445	<0.1	0	0	445	<0.1
Other Countries	0	0	322	2.1	322	<0.1
Total	2,385,002	100.0	15,229	100.0	2,400,231	100.0

Note: The P-card expenditure data we received identified the share for the investments in climate change research and technology at the national level only (15.59%). States' shares of the P-card expenditure for the investments in climate change research and technology are not known. We assumed that the share of P-card expenditure made for the investments in climate change research and technology in a state is the same as the share of P-card expenditure made for NASA as a whole. For example, Alabama accounts for 2.6% of the NASA P-card expenditure. Therefore, Alabama also accounts for 2.6% of the investments in climate change research and technology-specific P-card expenditure. Other places correspond to U.S. overseas military address. U.S. Territories correspond to Guam, Puerto Rico, and U.S. Virgin Islands. Values may not sum exactly due to rounding to the nearest whole number.

Figure 7: Share of Climate Change Research and Technology Procurement by Top Ten States



MODEL DEVELOPMENT

The model development process consists of scenario building and economic modeling stages that involve considerable judgment regarding how to translate the known information describing NASA economic activity (employment and procurement) into model entries, how to set the values of key parameters, and how to generate estimates for missing or incomplete data.

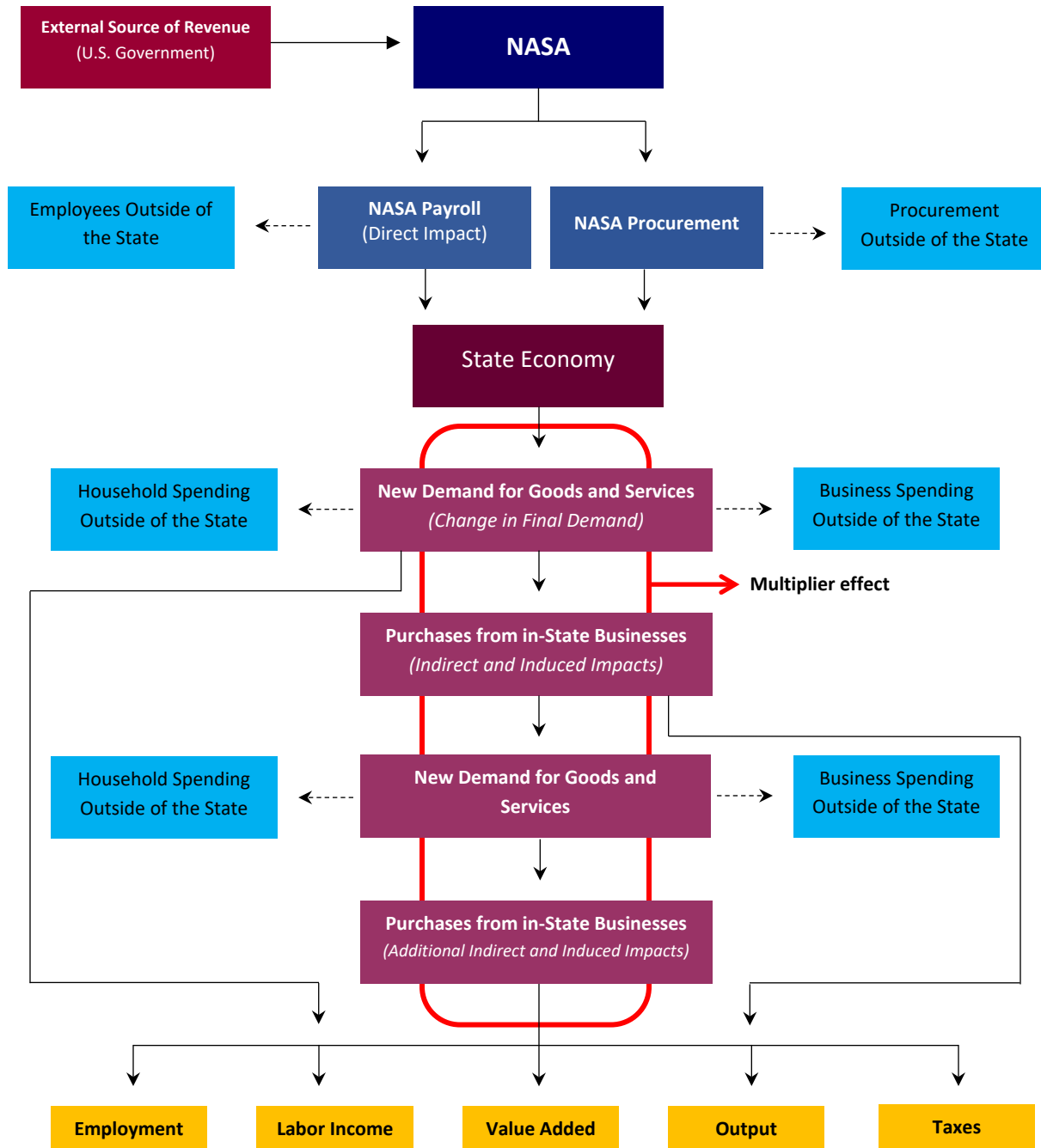
The scenario-building stage involves careful allocation of employment and procurement activities to the most appropriate industry sectors in the model and determining the geographic location of each of the economic activities to be modeled. This process appears straightforward initially but is more complicated, as it involves questions such as whether a contractor is a manufacturer or a distributor, whether foreign contractors engage with U.S.-based subcontractors, and whether contractors that have a presence in the local area site their main research or organizational units in close proximity or otherwise.

The economic modeling stage consists of building a descriptive input-output model in IMPLAN that can be applied to estimate the effects of the direct employment of NASA, procurement activities, and other aspects of the scenario on all of the sectors of the economy. This stage is where analysts may adjust the default input-output model constructed by the software to represent better the known features of the local economy and match the model assumptions to the particular scenarios being evaluated.

Scenario-Building

The premise of this economic impact assessment is that spending at and through NASA, the M2M campaign, and the investment in climate change research and technology represents an injection of resources into state economies by an external source: the federal government. As described in Section 2, the originator of the event (the source of the resources) determines the counterfactual scenario against which the economic impact analysis is measured. Federal employees' labor income at NASA constitutes an extra-local infusion of resources into the economies examined in this study. According to our scenario, the activities of NASA trigger a cascading series of economic activities in state economies by increasing demand for certain products and services (Figure 8).

Figure 8: Economic Impact of NASA on a State Economy



Note: This figure is adapted from Lendel and Park (2012). Payroll refers to the government agency (NASA). Procurement is only associated with government contracting.

In this process:

- **Direct effects** are comprised of NASA employment.
- **Indirect effects** are purchases of goods and services by NASA as well as by the industries that supply NASA. For example, an aerospace firm carrying out contract work for NASA may purchase electronic components and engineering consulting services from other firms to enable its own production.
- **Induced effects** are the impacts of the consumption spending by employees and business proprietors that is engendered by the direct and indirect effects. In other words, induced impacts result from the household spending of employees and owners of business establishments that supply NASA (indirect) and that earn income from employment at NASA facilities (direct). While direct and indirect impacts vary based on the types of goods and services being produced and purchased, induced impacts typically vary much less in type because they support general consumption. Because the average labor income of NASA employees exceeds the per capita income in the local economies examined, on a per capita basis, the induced impacts resulting from the expenditures of NASA employees are anticipated to exceed the induced impacts resulting from expenditures of employees of the industries that supply NASA.²⁵

This complex web of industrial relations and market transactions is represented by the input-output model in the IMPLAN software. The resulting mathematical formulae allows examination of the effects of change in one or several economic activities on an entire economy.

Study Area Designation and Local Expenditures

Defining the study area affects the extent of estimated impacts. The idea is to cover enough area to include the most important aspects of the impact, yet not too much area, or the effects will be swamped by extraneous economic activity. As impact regions become larger, estimated impact figures rise, and the meaning of a specific economic impact finding for a jurisdiction (e.g., a county or a state) becomes ambiguous in terms of its policy implications. A typical approach is to approximate a functional economic area—a reasonably self-contained economic unit. A functional economic area includes the places where a majority of people live, work, and shop, and sometimes can be identified by physical characteristics or resident behavior.

²⁵ The IMPLAN model accounts for local commuting patterns. For example, if 20% of the workers in a particular industry (e.g., retail) who work in the region live outside of the region, the model will allocate 80% of labor's disposable income into the model to generate induced impacts. The model excludes payments to federal and state taxes and savings based on the locality's average local tax and savings rates. Thus, only the disposable incomes of local workers are included in the model.

There are 52 distinct geographic areas examined in this study.²⁶ As described in Section 3, NASA employee residences are concentrated in certain states. Procurement activity, however, is spread across the U.S.

Every impact analysis starts with local expenditures. Local expenditures are the changes in demand (events) that occur within the study region and constitute the direct impacts. Below, we describe how local expenditure figures were derived for each of the impact regions.

NASA Impacts:

1. Fifty (50) states and Washington, D.C.: We estimated the portion of employment and procurement activity using state locations of employee residences and vendors.
2. U.S.: All employment and procurement activities are included in the national model except for contractors.

M2M Impacts:

1. Fifty (50) states and Washington, D.C.: We estimated the portion of M2M-specific employment and procurement activity using state locations of employee residences and vendors.
2. U.S.: All employment and procurement activities attributable to the M2M campaign are included in the national model.

Investments in Climate Change Research and Technology Impacts:

3. Fifty (50) states and Washington, D.C.: We estimated the portion of climate change research and technology-specific employment and procurement activity using state locations of employee residences and vendors.
4. U.S.: All employment and procurement activities attributable to the investments in climate change research and technology are included in the national model.

Degree of Precision in Job Values in IMPLAN Output

IMPLAN rounds job values that are smaller than 0.01 to zero in model outputs. Using these values directly would cause a slight underreporting of employment impacts. We applied the following two steps to retain fuller precision in the estimates of job impacts.

First, using industry level employment and output data from IMPLAN, we calculated the economic output per employee for states (our IMPLAN model data include detailed industry statistics describing the structures of state economies). Second, using these values and the

²⁶ The U.S. as a whole, each of the 50 states, and Washington, D.C. 2) [The Bureau of Economic Analysis's National Economic and Product Accounts](#), which underlie the IMPLAN models, define the domestic economy of the U.S. as the 50 states, the District of Columbia, U.S. military installations, embassies, and consulates abroad. The national (U.S.) model consists of all these jurisdictions but excludes U.S. territories. Based on this definition, procurement and employment in "U.S. Territories" and "Other Countries" are excluded from the national model.

output results from the state models, we manually estimated the job impacts that are smaller than 0.01. For example, NASA procurement creates \$638 worth of economic output indirectly in the “Iron Ore Mining” sector and \$141 worth of economic output in the same industry through induced channels in Alabama for a total of \$779 worth of output. Given the average economic output of \$397,739 per employee in this industry in Alabama, we estimated the indirect job impact to be 0.001605 (i.e., $\$638/\$397,739$) and the induced job impact to be 0.000355 (i.e., $\$141/\$397,739$) for a total of 0.001960 (i.e., $0.001605 + 0.000355$) jobs. We repeated this process for all industries in all states for NASA/M2M/Climate Change models. This method ensures that we capture employment impacts fully regardless of their size.

Although IMPLAN also rounds dollar values smaller than \$0.01, the imprecision is negligible with respect to the magnitude of impact types measured in currency values. Therefore, we do not use the procedure described above for impact types other than jobs.

Leakage of Economic Activity in State Models

Leakage of economic activity from a region occurs because local industries are not able to supply all of the intermediate inputs required to produce the change in final demand. In the short run, this may be due to constraints on supply (i.e., producers cannot quickly produce larger quantities of inputs); in both the short and long run, suppliers that produce the required inputs may not exist within the region.

Because of the leakage of economic activity, initial NASA labor income and procurement spending leads to successive rounds of new spending in the impact area (i.e., states) that diminish in size as some economic activity leaves the region in the form of spending outside the local economy (Bess and Ambargis, 2011). (Savings activity also causes later rounds of spending to decrease in size compared to initial spending.) The higher the level of leakage, the smaller the total economic impact due to the initial change in the economy.

Typically, economic impact analyses assume that economic activity that leaks out of the impact area has no further effect on the local economy. This assumption may yield an underestimate of local economic impact to the extent that some portion of the leakage “returns”. For instance, a non-local input supplier may itself purchase some of its inputs from within the region being analyzed. In most cases it is not possible to model such return leakage. In conducting an analysis of a single region that is relatively small in comparison to the nation (e.g., a state or a county), however, this return leakage normally is negligible relative to other uncertainties in the impact modeling process.

Economic activity leakage represents a more significant challenge when modeling impacts for a group of regions that substantially trade goods and services among one another. In such a case, it becomes important to account for leakage in the modeling process or impacts for each region would be underestimated. To clarify this concept, consider the example of manufacturing a jet engine. If the production of the engine in state A requires the purchase of turbine blades from

state B, then this purchase is a leakage from state A. That means the purchases of goods and services associated with the production of the blades are also excluded from the multiplier of state A. That is to say, if the blade manufacturer in state B purchases quality control services from state A, then the impact of the increase in demand for engineering services from state A is also excluded from the multiplier of state A because the multiplier does not include such feedback effects (return leakage). This is a simple example of unaccounted leakage between two states with three rounds of spending.²⁷ The challenge in the current study is much greater as we are dealing with leakage occurring among fifty (50) states plus D.C. with thousands of rounds of spending.

In order to account for the leakage of economic activities from state models, ideally, we might estimate a multi-regional input-output model that includes estimates of the supply and purchase interactions among fifty-one regions (50 states plus D.C.) simultaneously. This is (currently) not feasible due to data and computational limitations. Instead, we follow a three-step, post-modeling approach to capture inter-regional leakage effects. First, we run each state model independently to obtain estimates of the indirect and induced effects occurring in states due to initial NASA spending. Second, we sum these indirect and induced effect estimates across the fifty states and D.C. and subtract this cumulative total from the national total. Third, we allocate the difference found in Step 2 (i.e., the amount un-apportioned due to leakage across state boundaries) to states in proportion to their shares of indirect and induced effects calculated in Step 1. This approach forces the national model and the state-level models to be consistent in terms of the magnitude of impacts.

Although the approach generates total national impact figures that are as accurate as possible, it does retain uncertainty at the state level, reflecting the assignment of the un-apportioned impacts to particular states. Because we do not have information on the destination of leakages, we probably overestimate the impact in some states and underestimate it in others. Overestimation would occur if a given state in reality captures a smaller share of the un-apportioned amount than what we allocate. Underestimation would occur if a given state in reality captures a larger share of the un-apportioned amount than what we allocate. Based on the share of the un-apportioned amount in the national total and the state-level industry information available from IMPLAN, we judge that the typical error is likely approximately 14% for NASA model and 15% for M2M model and investments in climate change research and technology model.

Economic Modeling

In this section, we describe how various data items discussed in the previous section are translated into economic events and activities. This step enters the inputs into the impact model, and the economic impact figures (discussed in Section 6) derive from the numbers generated in

²⁷ As noted by Coughlin and Mandelbaum (1991), the inability to fully capture interregional feedback effects is one of the biggest limitations of input-output models.

this step. Before we provide details of the model specification, we briefly review the modeling software, IMPLAN.

IMPLAN is a widely used impact analysis program based on a regional input-output model. At the heart of the model is a matrix of dollar flows called the social accounting matrix (SAM) that is estimated from a combination of national benchmark input-output data and regional information. This matrix accounts for all the dollar flows among different sectors of the regional economy. Unlike some other input-output models, which represent only the purchasing relationships between industry and household sectors, the SAM in IMPLAN includes the economic relationships among government, industry, and household sectors, allowing the modeling of transfer payments such as unemployment insurance.

Using this information, the IMPLAN software models the way a dollar injected into one sector is spent and then circulated through other sectors of the economy, generating waves of economic activity, or so-called “economic multiplier” effects. The model generates a series of multipliers that, in aggregate, describe the economic repercussions of the original activity. For direct events entered in the form of employment, IMPLAN applies estimates of the average output and compensation per worker to translate the direct effects into monetary value figures. It then applies the value of an event to local and national sector-specific production functions and traces these values through subsequent cycles of transactions and payments to estimate the indirect and induced impacts. During each of these cycles, the procedure removes expenditures to government, savings, and extra-local purchases, so that the results reflect only those transactions that impact the local economy.

The process of model development and impact estimation consists of the following steps:

1. Identify new events (direct impacts) to be introduced into the model.
The labor income of employees at NASA facilities and the procurement spending originating from NASA are the direct impacts.
2. Identify the industry sectors affected.
For all NASA activity, we allocated vendors and corresponding procurement totals to industry sectors based on NASA’s descriptions of what the contract entails. Descriptions of many of the manufactured items and services rendered were provided, and we used this information to allocate corresponding procurement totals to appropriate industries. In cases where a description was not available or was not explicit enough to allow us to select an industry, we conducted additional web searches visiting vendor companies’ web sites and made a selection accordingly. We followed the same procedure for activities related to the M2M campaign and the investments in climate change research and technology.
3. Enter the transaction value dollars based on the year of the model.

Each dollar value must be specified as either purchaser or producer prices. Producer prices are those paid at the factory door, the amount that a producing firm receives for its output. Input-output models in IMPLAN are specified in producer prices.

4. Customize IMPLAN coefficients as appropriate.

We utilized 2022 IMPLAN data to construct the input-output model.²⁸ 2022 was the most current dataset available at the initiation of the study. The NASA employment and procurement figures are for Fiscal Year 2023. Because input-output relationships among industries usually do not change substantially over relatively short periods of time, the relationships that existed among industries in 2023 are reasonable approximations to those that existed in 2022. The 2022 IMPLAN dataset does, however, contain substantial changes in worker productivity compared to data compiled before the COVID-19 pandemic (see Box 4 on page 4).

Other than the figures entered to signify new events, the ratio of locally purchased to imported goods is perhaps the most significant numerical figure that affects the multipliers and impact estimates derived from an input-output model. The greater the fraction of goods and services purchased locally, the more local economic activity will be stimulated, and hence the larger the resulting multiplier. For all regional models other than the national model, we retained the default model estimates, termed Regional Purchase Coefficients (RPCs). RPCs are derived from an econometric equation that predicts local purchase proportions based on the region's characteristics. In the absence of specific information to justify a different approach, the default RPCs typically are the most appropriate choice.

For the national model, no econometric model exists within IMPLAN, and the supply/demand pooling method was used to estimate the RPCs. This method takes into account the national situation where there is no need to estimate interregional (domestic) trade flows, but rather the proportion of demand that is met by the U.S. as opposed to foreign suppliers. The supply/demand pooling method applies data on U.S. foreign exports to estimate the retained portion of each commodity as satisfying domestic demand and assumes that each commodity is sourced domestically first until production is exhausted.²⁹ In comparison with the regional RPCs, the supply/demand pooling method yields maximum estimates; that is, no more local commodity can be purchased than is locally produced (IMPLAN, 2004). Consequently, we anticipate greater impacts per employee and per dollar of procurement spending nationally than individual states.

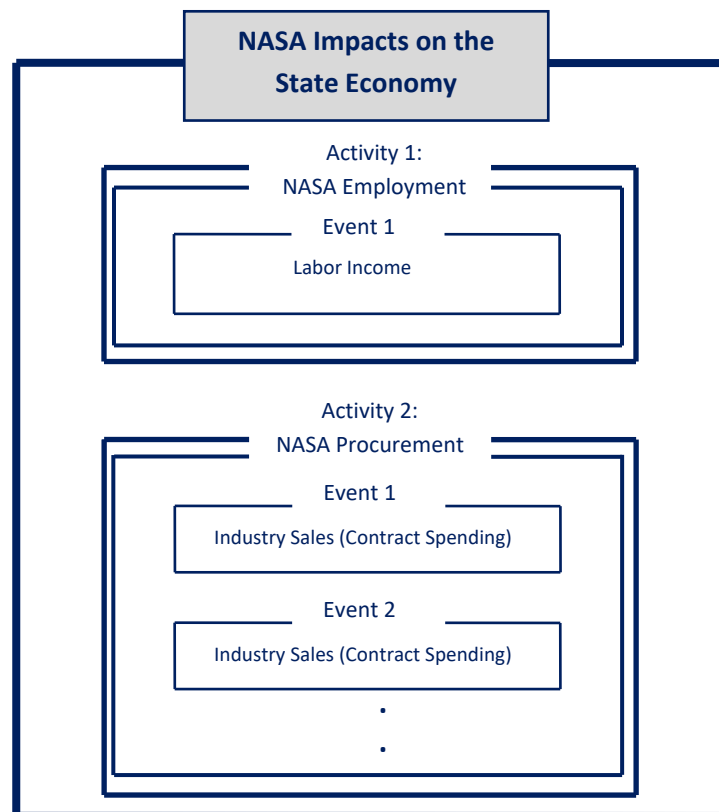
²⁸ Economic impact modeling data are available at <https://www.implan.com/data/>.

²⁹ The designers of the IMPLAN software suggest that this assumption is appropriate for the national context, in which typically there is little advantage to procuring substitutable commodities from foreign rather than domestic suppliers, and it makes even more sense for the specialized portions of the supply chains following from NASA procurement.

5. Operate the software to generate estimates of the impact of the events on the study area economy.

For this study, we generated six separate categories of activities: (1) NASA employment, (2) NASA procurement, (3) M2M employment, (4) M2M procurement, (5) climate change research and technology employment, (6) climate change research and technology procurement. Each of these activities is in turn a collection of events (changes in labor income or industrial sales in particular industry sectors—see Figure 9 below) and is replicated as necessary for the different geographic regions studied (52).

Figure 9: Impact Organization



Note: This figure is adapted from IMPLAN (2004).

IMPACT ESTIMATION DECISIONS

The types of employment and procurement data and the assumptions made in the scenario development and model building stages have implications for impact estimates presented in the following section (see Box 6).

First, there may be slight overestimation involved in our results for certain states where businesses engage in subcontracting activity that deviates from the model assumptions. Contractors whose main research or organizational units are located elsewhere but have a presence in a certain state might engage in subcontracting relations with businesses near the location of their headquarters rather than their remote location. Because we assumed that institutions in these conditions would procure locally (according to the RPCs as estimated in the model) and that the resulting household income/spending would occur locally as well, the impacts of such institutions on certain states may be overestimated.

Second, we chose not to include travel expenditures related to business trips by employees at NASA facilities. The rationale behind this decision is lack of evidence indicating that business transactions related to operations of NASA lead to more-than-average travel (as is modeled automatically). That is, the economic impact model estimates travel-related expenditure impacts as a standard byproduct of business transactions occurring in the economy. If such travel is more frequent than average, the impact results are likely to be underestimated slightly.

Third, our impact modeling, like any other estimation approach using IMPLAN, captures only traceable business transactions occurring in the economic system. Not all positive economic impacts are traceable via input-output transactions. Research and development (R&D) conducted at NASA centers and by its suppliers in the aerospace industry may benefit businesses in related industrial fields, either through NASA activities augmenting those businesses' own research and development efforts, or by making it possible for those firms to employ more efficient production technologies. Either case will result in increases in productivity for the economy as a whole (Jaffe *et al.*, 1993; Shapiro, 2015). These effects are termed externalities or spillovers and cannot be captured in economic impact analyses based on input-output models. Given that the industries deriving the most benefit from direct NASA spending are scientific research³⁰ and development services (accounting for 67% of NASA procurement spending), the total economic impacts of NASA activities might exceed the estimates reported in this study.

Finally, tourism activity related to the presence of NASA facilities and associated space museums may generate additional economic impacts for states. This impact analysis does not include these

³⁰ Basic research provides larger spillover benefits than that of development research because development spillovers are largely internalized by patent policy that provides monopoly power to firms with innovative products. Intellectual property rights do not as thoroughly internalize more general and theoretical basic research externalities.

tourism effects. Specific data quantifying visitor volume, origin, and expenditure patterns could be used to incorporate tourism impacts in future analysis.

Box 6: Potential Sources for Over- or Under-estimation of Economic Impacts

Subcontracting activity: Impacts are calculated based on a combination of the industry-specific subcontracting relationships that exist nationwide and in the model area. To the extent that businesses engage in subcontracting activity that deviates from the national and regional averages, impacts could be over- or underestimated depending on the direction of deviation. There is likely slight overestimation for states with NASA contractors whose location is different from their parent companies' location (i.e., subsidiaries or branch plants). On the other hand, there is likely slight underestimation for states with NASA contractors whose location is the same as the company's headquarters. Unfortunately, we are not able to quantify the magnitude of the over- or underestimation for different states without specific subcontracting information for NASA contractors.

Business travel: To the extent that NASA's business travel is more frequent than the average for the related industry in the model, the impact results are underestimated slightly for states that are the destinations of trips are that host commercial airline headquarters. If NASA's business travel is less frequent than the model industry average, the impact results are overestimated slightly for the same states.

NASA center and museum visitors: Due to lack of data on visitor numbers and associated spending, we are not able to model the economic impacts of visitors to NASA facilities. Therefore, impact estimates for states that attract substantial visitors (particularly those hailing from outside of the state) are likely underestimated. Specific data quantifying visitor volume, origin, and expenditure patterns could be used to incorporate tourism impacts in future analyses.

RESULTS ANALYSIS

In this section, we present estimates of NASA, M2M, and the investments in climate change research and technology impacts on the U.S. as a whole, the fifty (50) states, and Washington, D.C. For each region, we first analyze overall NASA impacts and then examine M2M and the investments in climate change research and technology impacts. Finally, we specify the portion of NASA impacts attributable to the M2M campaign and the investments in climate change research and technology, respectively, to highlight the relative contribution of activities in every state.

The economic impact is examined through a detailed analysis of the changes in employment, output (gross sales), labor income, value-added³¹, and taxes³² due to NASA's activities.³³ First, summary impacts are presented, organized by the type of impact. Second, for employment and output, two of the most important impact categories, results are examined by NASA employment and procurement components.³⁴ The detailed disaggregation of economic impacts by their sources highlights the relative contributions of NASA's employment and procurement activities to the overall NASA impacts. Third, for each of the impact categories, the ten most heavily impacted industries are described.³⁵

Economic Impacts on the United States

NASA Impacts

At the national level, NASA directly employs 19,752 civil servants (17,821 FTE jobs)³⁶, with annual compensation of more than \$3.5 billion in wages and benefits. The procurement activity originating from NASA (\$23.3 billion) is both large in volume and very diverse—involving most categories of manufacturing or service industry. There are indirect effects from purchases of goods and services by NASA as well as by the firms that supply NASA. Consumption expenditures made by employees of NASA, NASA's suppliers, and suppliers further up the production chain, create induced effects. Taking the domestic portions of these spending streams into account, the total employment impact of NASA across the U.S. is 304,803 jobs (including direct, indirect, and induced impacts—see Box 1 in Section 1). The labor income and economic output associated with this total amount of employment are, respectively, \$27.6 billion, and \$75.6 billion. Procurement activities along with NASA's direct employment generated \$9.6 billion in federal, state, and local tax revenues in 2023 (Table 7).

³¹ Please refer to Box 2 in the introduction (Section 1) for the definition of value added.

³² Unless otherwise mentioned, all monetary values correspond to 2023 dollars.

³³ Please note that due to rounding column and row totals may not be exactly equal to the sum of columns or rows throughout the report.

³⁴ Separate impacts for NASA employment and procurement components are presented in the Appendix.

³⁵ This analysis includes only those states in which the total employment impact is greater than 10,000 jobs.

³⁶ These are the figures used in the national economic impact model. The number of civil servants including those residing in U.S. territories is 19,758 (17,823 FTEs).

Multipliers give additional insight as to how the economy is affected by an initial economic change (see Box 7 below and Box 3 in Section 1). For every civil service FTE job located at NASA, an additional 16.1 jobs are supported throughout the U.S. economy.³⁷ The income multiplier is 7.8: for each \$1 million of labor income earned by NASA employees, an additional \$6.8 million in labor income is generated in the U.S. economy. The output multiplier is 9. For each \$1 million's worth of output generated at NASA, an additional \$8 million of output (intermediary and final goods and services) is generated throughout the U.S. economy.

Box 7: Multiplier Considerations

The multipliers referenced in this section, and in particular the employment multiplier, are larger than is typical for this kind of impact study due to the volume of NASA's contracting activity, all of which is classified as indirect impact. Please note that if additional (or reduced) civil service employees are not associated with additional (or reduced) contracting activity at a comparable scale, then it may be inappropriate to use the employment multiplier to estimate future economic impacts of changes in civil service employment at NASA centers. Multipliers calculated in the conventional way are provided in the Appendix and they are comparable to multipliers found in similar studies.

Multipliers are calculated for only those states with direct NASA employment. Every state has different multipliers, and state multipliers normally are smaller than national multipliers. The size of the multiplier changes depending on the size and diversity of the economy analyzed. Large and sectorally diverse economies such as those of the states of Texas or California tend to have larger multipliers than smaller or less diverse economies such as in the states of Rhode Island or Wyoming.

Multiplier magnitudes are determined by the quantity of supply chain linkages and range of consumer goods and services available within the economy. Therefore, states in which firms often procure inputs locally and consumers generally spend a larger portion of their income locally tend to have larger multipliers than states that do not have strong supply chain linkages and fewer options for consumers.

Table 7: Summary of NASA Impacts by Types of Impact, the United States

Impact Type	Employment ³⁸	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	17,821	3,515,929	4,575,175	8,372,461	888,381
Indirect	154,892	15,452,256	22,080,263	39,409,878	4,907,378
Induced	132,090	8,630,679	15,709,096	27,840,726	3,755,626
Total	304,803	27,598,864	42,364,534	75,623,064	9,551,386
<i>Multiplier</i>	<i>17.1</i>	<i>7.8</i>	<i>9.3</i>	<i>9.0</i>	<i>n.a.</i>

³⁷ "Supports" means partial or full support. We use "supported" instead of "created" to be conservative in our attribution of impacts to NASA. While NASA activities create new positions in some sectors of the economy, in many instances NASA helps sustain existing jobs in the economy.

³⁸ While direct employment component refers to full-time equivalent (FTE) positions at NASA centers, indirect and induced employment components refer to a combination of full-time and part-time positions.

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

Beside overall impact figures, it is useful to examine the source of impacts to better understand the contribution of different NASA activities to the U.S. economy.³⁹ Table 8 examines the sources of the employment figures presented in the second column of Table 7. Procurement spending originating from NASA is responsible for the largest portion of overall NASA employment impacts. More than 86% of the jobs supported throughout the U.S. economy by NASA are due to procurement spending, leaving the share of NASA’s direct employment in the overall employment impact at approximately 14%.

Table 8: NASA Employment Impacts by Sources of Impact, the United States

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	17,821	42.1	0	0.0	17,821	5.8	100.0	0.0
Indirect	0	0.0	154,892	59.0	154,892	50.8	0.0	100.0
Induced	24,500	57.9	107,590	41.0	132,090	43.3	18.5	81.5
Total	42,321	100	262,482	100	304,803	100	13.9	86.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 9 examines the sources of the output figures in the fifth column of Table 7. Similar to employment impact, procurement spending originating from NASA is responsible for the lion’s share of overall NASA output impacts (82%). NASA employment’s share of the overall output impact is approximately 18%. The reason that NASA employment’s share of the output impact exceeds its share of employment impact is that employees at NASA produce more output per worker than the average for employees in the supply chain of NASA procurement.

³⁹ Here, the focus is on the two most important categories of the economic impact analysis: employment and output. Analogous tables for labor income and value-added categories are contained in the Appendix.

Table 9: NASA Output Impacts by Sources of Impact, the United States

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	8,372,461	61.8	0	0.0	8,372,461	11.1	100.0	0.0
Indirect	0	0.0	39,409,878	63.5	39,409,878	52.1	0.0	100.0
Induced	5,167,727	38.2	22,672,998	36.5	27,840,726	36.8	18.6	81.4
Total	13,540,188	100	62,082,876	100	75,623,064	100	17.9	82.1

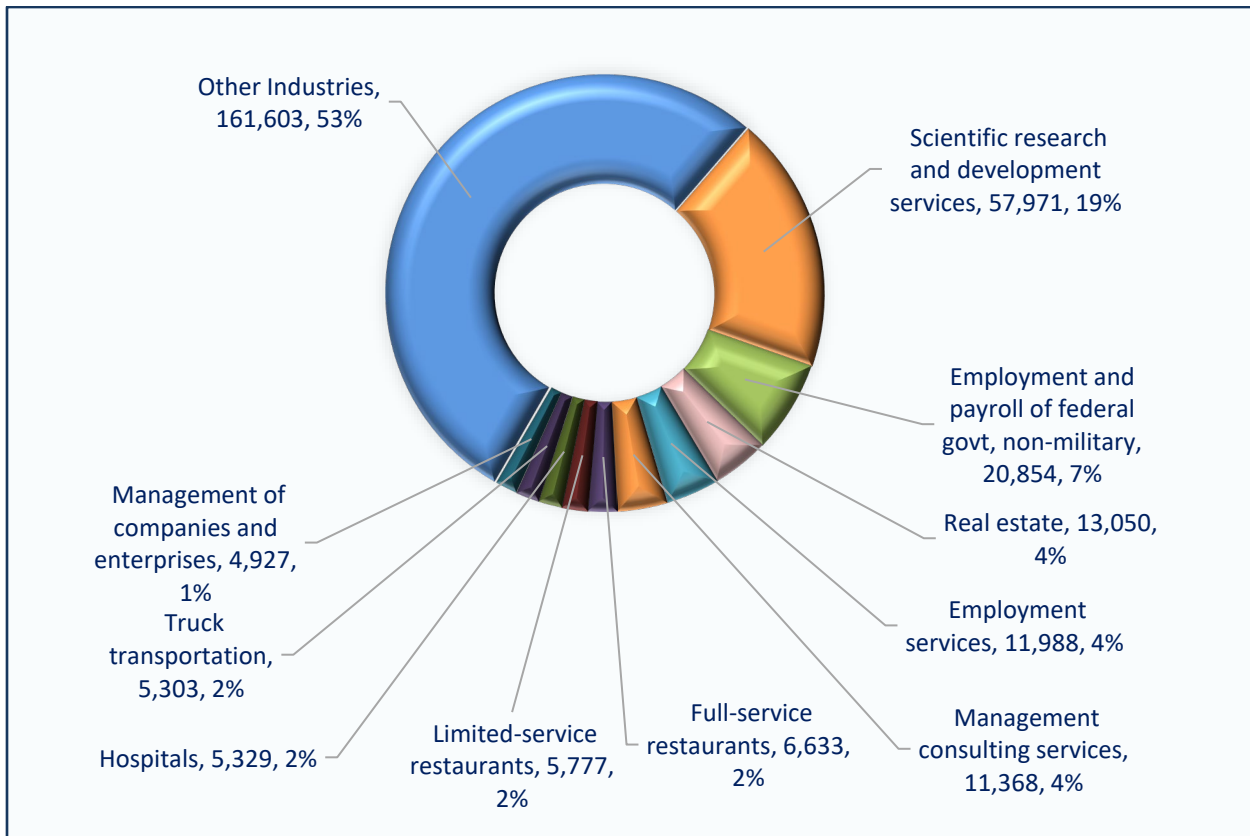
Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

304,803 jobs in the U.S. economy were supported by NASA activities in Fiscal Year 2023. Of these, 17,821 (6%) were directly located at NASA centers. As a result of the procurement of goods and services in the U.S. economy, 154,892 additional jobs (51%) were created. The remaining employment—132,090 jobs (43%)—was in the form of induced impacts as labor income and proprietor earnings were spent in the wider consumer economy.

Figure 10 depicts the ten most impacted industries by employment. Scientific research and development services and federal government⁴⁰ are the most impacted industries, respectively. These two industries together account for 26% of the jobs created. The employment in scientific research and development services is driven largely by NASA procurement spending. This industry accounted for 62% of NASA procurement spending in Fiscal Year 2023. The impact in the federal government sector represents mainly civil service employees working for NASA.

⁴⁰ Employment and payroll of federal government (non-military) is only included as an industry in supply chain analysis via employment. We only consider impacts to this industry from employment, not from contracting or indirect purchases.

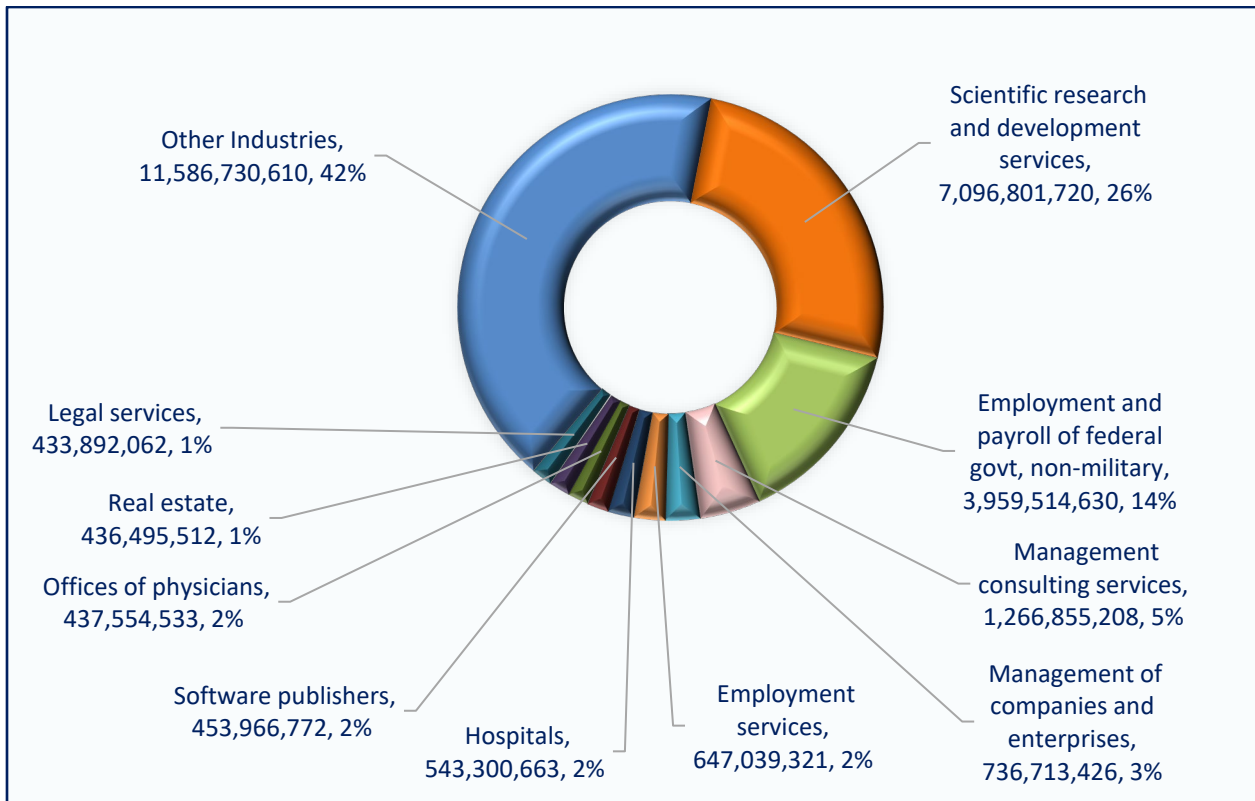
Figure 10: Top Ten Most Impacted Industries by Employment, the United States (NASA)



The total income impact of NASA in the U.S. was \$27.6 billion in Fiscal Year 2023. Of this amount, \$3.5 billion (13%) represented wages and benefits paid to NASA employees (direct impact). Payments to employees of private firms and organizations across the nation that supplied goods and services to NASA (indirect impact) represented \$15.5 billion (56%). The remaining income (induced impact), estimated to be \$8.6 billion (31%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 11 depicts the ten most impacted industries by labor income. Scientific research and development and management consulting services are the most impacted industries by income (along with the federal government sector). The three industries together account for 45% of the total labor income earned. The reason that these industries’ share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the national average. As of 2022, the average employee compensation in the scientific research and development services industry was \$122,419 (including benefits), compared to an average of \$73,416 across the country.

Figure 11: Top Ten Most Impacted Industries by Labor Income, the United States (NASA)



Box 8: Overlap between Labor Income, Value Added, and Output

These categories are not mutually exclusive—they overlap significantly (i.e., labor income is a subset of value added, and value added in turn is a subset of output). Therefore, adding these values is double counting of impacts.

Labor Income = Employee Compensation + Proprietor Income – Taxes

Value Added = Labor Income + Taxes + Other Property Type Income (Profit)

Output = Value Added + Intermediate Purchases (Business to Business)

Labor income equals employee compensation (wages and benefits) and proprietor income.

Proprietor income consists of payments received by self-employed individuals and unincorporated business owners.

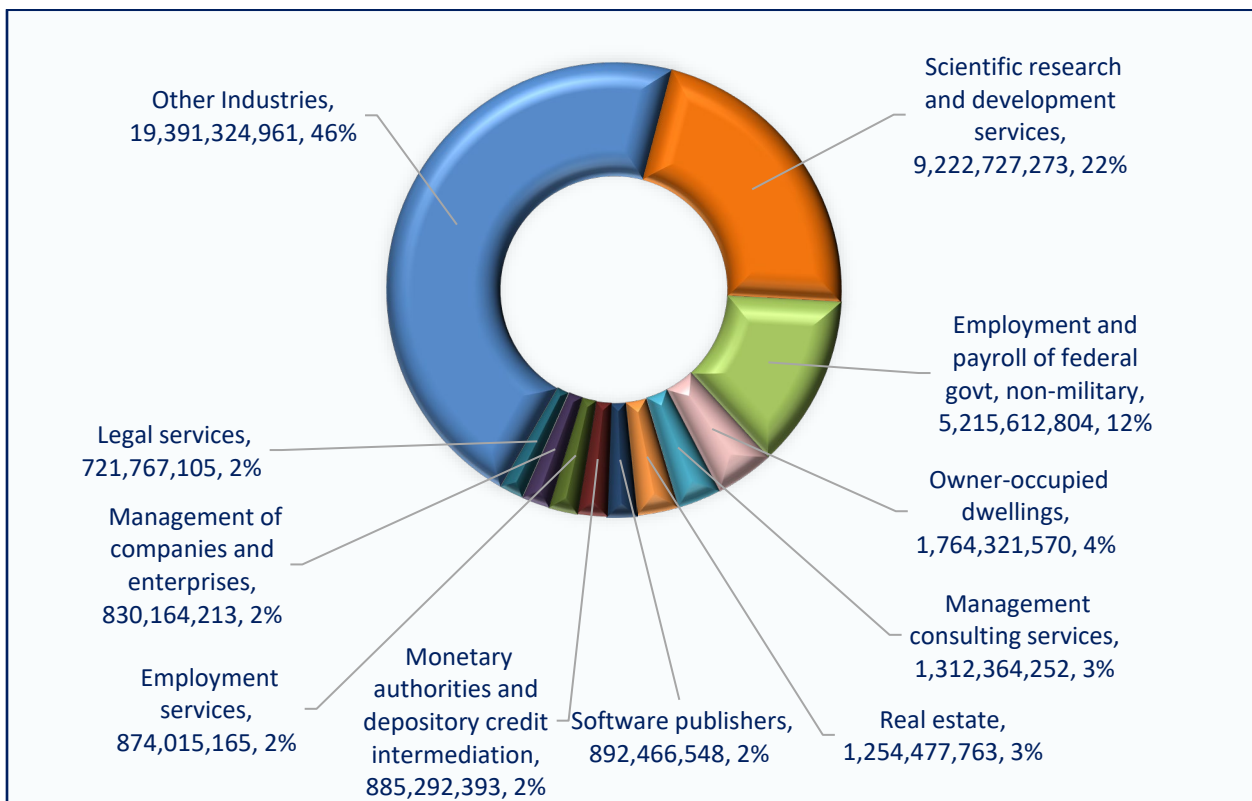
Profits (net of taxes), also referred as other property type income, include corporate profits, capital consumption allowance, payments for rent, dividends, royalties, and interest income.

Intermediate purchases (Business to Business) are purchases of goods and services such as energy and materials that are used for the production of other goods and services rather for final consumption.

The total value-added impact of NASA in the U.S. was \$42.4 billion in Fiscal Year 2023. Of this amount, approximately \$4.6 billion (11%) was created by civil service employees and \$22.1 billion (52%) was created indirectly by the \$23.3 billion in procurement spending across all industry sectors in the country. Around \$15.7 billion (37%) was generated by increased consumption spending supported by increased earnings.

Figure 12 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development services are the most impacted industry (along with the federal government sector). The two industries together account for 34% of the total value-added created. NASA activities accounted for an increase of \$9.2 billion in value-added in scientific research and development services. Around \$5.2 billion dollars in the federal government non-military sector corresponds mainly to value-added by NASA employees.

Figure 12: Top Ten Most Impacted Industries by Value-added, the United States (NASA)

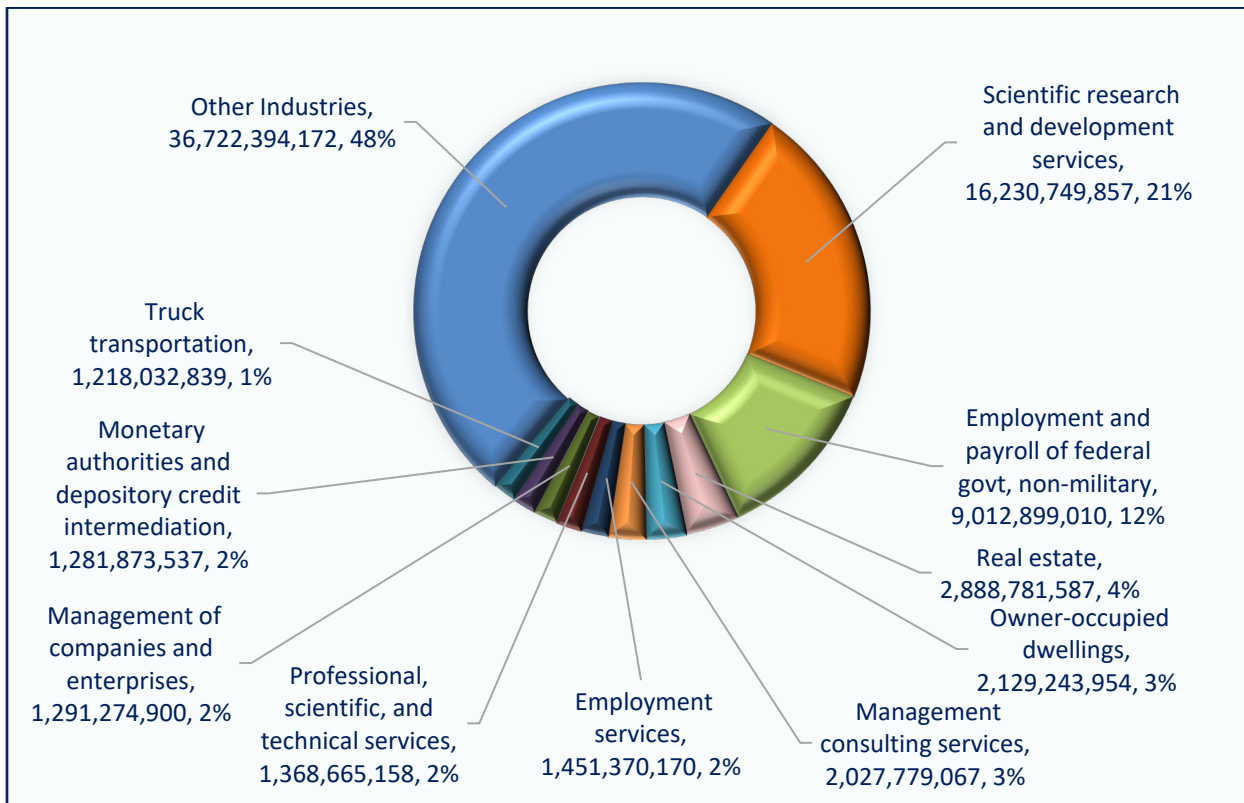


The total output impact of NASA in the U.S. was \$75.6 billion in Fiscal Year 2023. The direct impact of \$8.4 billion constitutes the value of production by NASA employees, accounting for around 11% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$23.3 billion resulted in an additional increase in output (gross sales) of \$16.1 billion across all industry sectors (adding up to the indirect total of \$39.4 billion in Table

7). \$27.8 billion (37%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of more than \$16 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 13). Similar to employment, impacts in this industry are largely driven by NASA procurement spending; scientific research and development services accounted for 62% of NASA procurement spending in Fiscal Year 2023.

Figure 13: Top Ten Most Impacted Industries by Output, the United States (NASA)



M2M Campaign Impacts

At the national level, NASA directly employs 4,649 civil servants (3,749 FTEs) for the M2M campaign, with annual compensation of \$712.1 million in wages and benefits. The M2M-related contracting originating from NASA (\$7.7 billion) is both large in volume and very diverse—involving almost every major category of manufacturing or service activity. There are indirect effects from the purchases of goods and services by NASA Centers as well as by the firms that supply those centers. Consumption expenditures made by the M2M labor force, by suppliers to the M2M campaign, and by suppliers further upstream within the production chain, create induced effects. Taking the domestic portions of these spending streams into account, the total employment impact of the M2M campaign across the U.S. is 96,479 jobs (including direct,

indirect, and induced impacts—see Box 1 in Section 1). The labor income and economic output associated with this total amount of employment are, respectively, \$8.6 billion, and \$23.8 billion. M2M procurement activities along with NASA’s direct employment for the M2M campaign generated an estimated \$2.9 billion in federal, state, and local tax revenues in 2023 (Table 10).

Table 10: Summary of M2M Campaign Impacts by Types of Impact, the United States

Impact Type	Employment ⁴¹	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3,749	712,139	962,385	1,761,141	179,938
Indirect	51,524	5,205,198	7,369,951	13,354,483	1,613,926
Induced	41,206	2,692,368	4,900,447	8,684,866	1,171,187
Total	96,479	8,609,704	13,232,783	23,800,491	2,965,050
<i>Multiplier</i>	<i>25.7</i>	<i>12.1</i>	<i>13.7</i>	<i>13.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different M2M-specific NASA activities to the U.S. economy. 91% of the employment impacts and 88% of the output impacts are due to M2M procurement.

Table 11: M2M Campaign Employment Impacts by Sources of Impact, the United States

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3,749	43.0	0	0.0	3,749	3.9	100.0	0.0
Indirect	0	0.0	51,524	58.7	51,524	53.4	0.0	100.0
Induced	4,962	57.0	36,244	41.3	41,206	42.7	12.0	88.0
Total	8,711	100	87,768	100	96,479	100	9.0	91.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

⁴¹ While direct employment component refers to full-time equivalent (FTE) positions at NASA centers, indirect and direct employment components refer to a combination of full-time and part-time positions.

Table 12: M2M Campaign Output Impacts by Sources of Impact, the United States

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,761,141	62.7	0	0.0	1,761,141	7.4	100.0	0.0
Indirect	0	0.0	13,354,483	63.6	13,354,483	56.1	0.0	100.0
Induced	1,046,704	37.3	7,638,162	36.4	8,684,866	36.5	12.1	87.9
Total	2,807,845	100	20,992,646	100	23,800,491	100	11.8	88.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

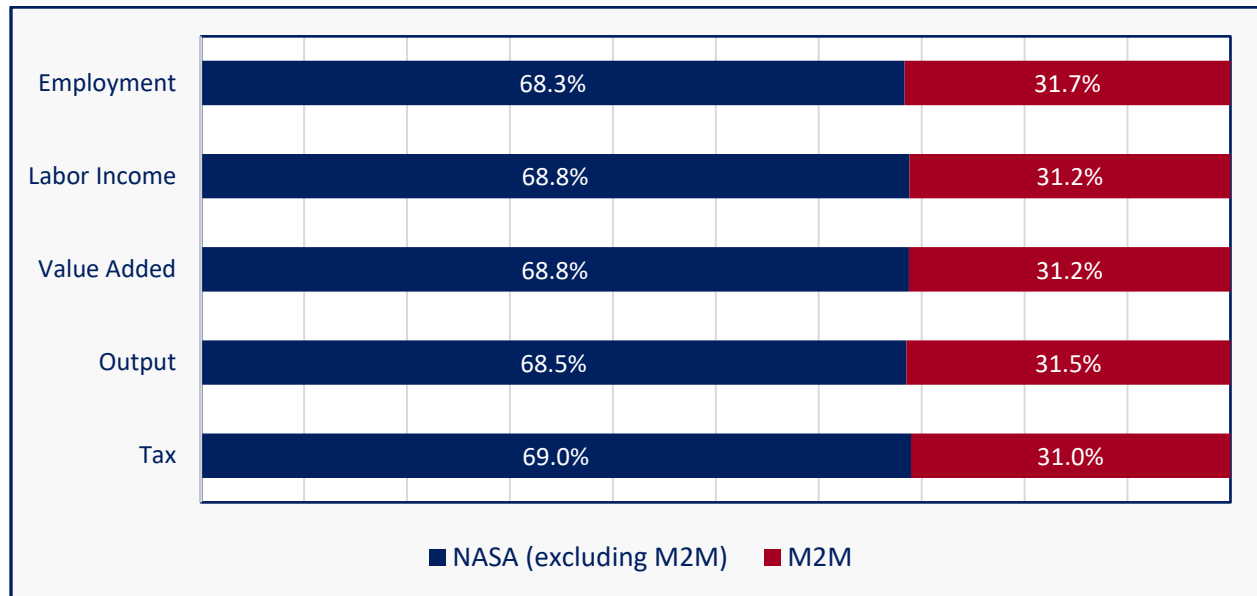
The M2M Campaign's Share of NASA Impacts

Around 31% of overall NASA agency impacts in the U.S. are attributable to the M2M campaign (Table 13 and Figure 14). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for M2M is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 13: The M2M Campaign Portion of Overall NASA Impacts, the United States

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	304,803	27,598,864	42,364,534	75,623,064	9,551,386
M2M Portion	96,479	8,609,704	13,232,783	23,800,491	2,965,050
M2M Share	31.7%	31.2%	31.2%	31.5%	31.0%

Figure 14: The M2M Campaign Portion of Overall NASA Impacts, the United States



Investments in Climate Change Research and Technology Impacts

At the national level, NASA directly employs 4,156 civil servants (2,009 FTEs) for climate change research and technology, with annual compensation of \$382 million in wages and benefits. Investments in climate change research and technology procurement originating from NASA (\$2.4 billion) are both large in volume and very diverse—involving almost every major category of manufacturing or service activity. There are indirect effects from the purchases of goods and services by NASA Centers as well as by the firms that supply those centers. Consumption expenditures made by the climate change research and technology labor force, by suppliers to the investments in climate change research and technology, and by suppliers further upstream within the production chain, create induced effects. Taking the domestic portions of these spending streams into account, the total employment impact of the investments in climate change research and technology across the U.S. is 32,900 jobs (including direct, indirect, and induced impacts—see Box 1 in Section 1). The labor income and economic output associated with this total amount of employment are, respectively, \$2.9 billion, and \$7.9 billion. The investments in climate change research and technology along with NASA’s direct employment for climate change research and technology generated an estimated \$1 billion in federal, state, and local tax revenues in 2023 (Table 14).

Table 14: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, the United States

Impact Type	Employment ⁴²	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2,009	382,218	515,831	943,959	96,576
Indirect	16,775	1,644,659	2,299,633	4,030,812	510,993
Induced	14,115	922,300	1,678,754	2,975,223	401,352
Total	32,900	2,949,177	4,494,218	7,949,994	1,008,921
<i>Multiplier</i>	<i>16.4</i>	<i>7.7</i>	<i>8.7</i>	<i>8.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different climate change research and technology-specific NASA activities to the U.S. economy. Nearly 86% of the employment impacts and 81% of the output impacts are due to NASA procurement for climate change research and technology.

Table 15: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, the United States

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2,009	43.0	0	0.0	2,009	6.1	100.0	0.0
Indirect	0	0.0	16,775	59.4	16,775	51.0	0.0	100.0
Induced	2,664	57.0	11,452	40.6	14,115	42.9	18.9	81.1
Total	4,673	100	28,227	100	32,900	100	14.2	85.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

⁴² While direct employment component refers to full-time equivalent (FTE) positions at NASA centers, indirect and direct employment components refer to a combination of full-time and part-time positions.

Table 16: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, the United States

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	943,959	62.7	0	0.0	943,959	11.9	100.0	0.0
Indirect	0	0.0	4,030,812	62.5	4,030,812	50.7	0.0	100.0
Induced	561,785	37.3	2,413,437	37.5	2,975,223	37.4	18.9	81.1
Total	1,505,745	100	6,444,249	100	7,949,994	100	18.9	81.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

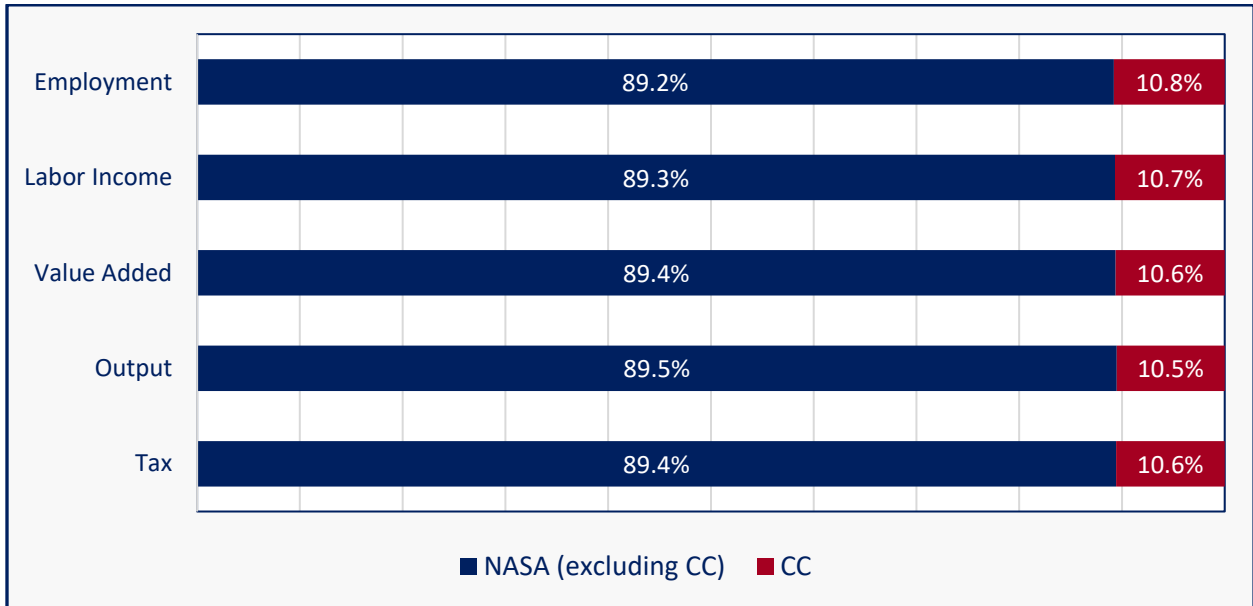
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 11% of overall NASA agency impacts in the U.S. are attributable to the investments in climate change research and technology (Table 17 and Figure 15). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 17: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, the United States

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	304,803	27,598,864	42,364,534	75,623,064	9,551,386
CC Portion	32,900	2,949,177	4,494,218	7,949,994	1,008,921
CC Share	10.8%	10.7%	10.6%	10.5%	10.6%

Figure 15: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, the United States



Economic Impacts on the State of Alabama

NASA Impacts

In 2023, 2,468 NASA civil service employees (2,224 FTEs) residing in Alabama earned \$423 million in labor income. NASA procurement sourced in Alabama in the same year totaled \$2.8 billion. The total economic impact resulting from these activities is 35,494 jobs, \$2.7 billion in labor income, and \$8.1 billion in economic output. These economic activities generate \$265.2 million in tax revenues for the state and local governments in Alabama (Table 18).

The employment multiplier is 16, meaning that for every NASA job located in Alabama, an additional 15 jobs are supported in the state economy. The output multiplier of 7.7 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$6.7 million worth of output is sustained throughout the state economy.

Table 18: Summary of NASA Impacts by Types of Impact, Alabama

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2,224	422,863	570,849	1,044,639	10,200
Indirect	20,023	1,605,057	2,282,116	4,524,754	93,443
Induced	13,248	704,412	1,331,195	2,502,936	161,589
Total	35,494	2,732,332	4,184,160	8,072,329	265,231
<i>Multiplier</i>	<i>16.0</i>	<i>6.5</i>	<i>7.3</i>	<i>7.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Alabama economy. Table 19 examines the sources of the employment figures in the second column of Table 18. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 86% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 14%.

Table 19: NASA Employment Impacts by Sources of Impact, Alabama

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	2,224	45.2	0	0.0	2,224	6.3	100.0	0.0
Indirect	0	0.0	20,023	65.5	20,023	56.4	0.0	100.0
Induced	2,698	54.8	10,550	34.5	13,248	37.3	20.4	79.6
Total	4,922	100	30,573	100	35,494	100	13.9	86.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 20 examines the sources of the output figures in the fifth column of Table 18. Procurement spending is responsible for nearly 81% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 19%. The reason that NASA employment's share of the overall output impact is larger than its share of the overall employment impact is that NASA employees produce more output per worker than the average employee in the NASA procurement supply chain. Because NASA's labor force is more concentrated in the state than its procurement (compared to the nationwide impacts), a slightly larger proportion of NASA impacts in Alabama are attributable to the employment of NASA civil service workers.

Table 20: NASA Output Impacts by Sources of Impact, Alabama

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,044,639	66.9	0	0.0	1,044,639	12.9	100.0	0.0
Indirect	0	0.0	4,524,754	69.5	4,524,754	56.1	0.0	100.0
Induced	517,961	33.1	1,984,975	30.5	2,502,936	31.0	20.7	79.3
Total	1,562,600	100	6,509,728	100	8,072,329	100	19.4	80.6

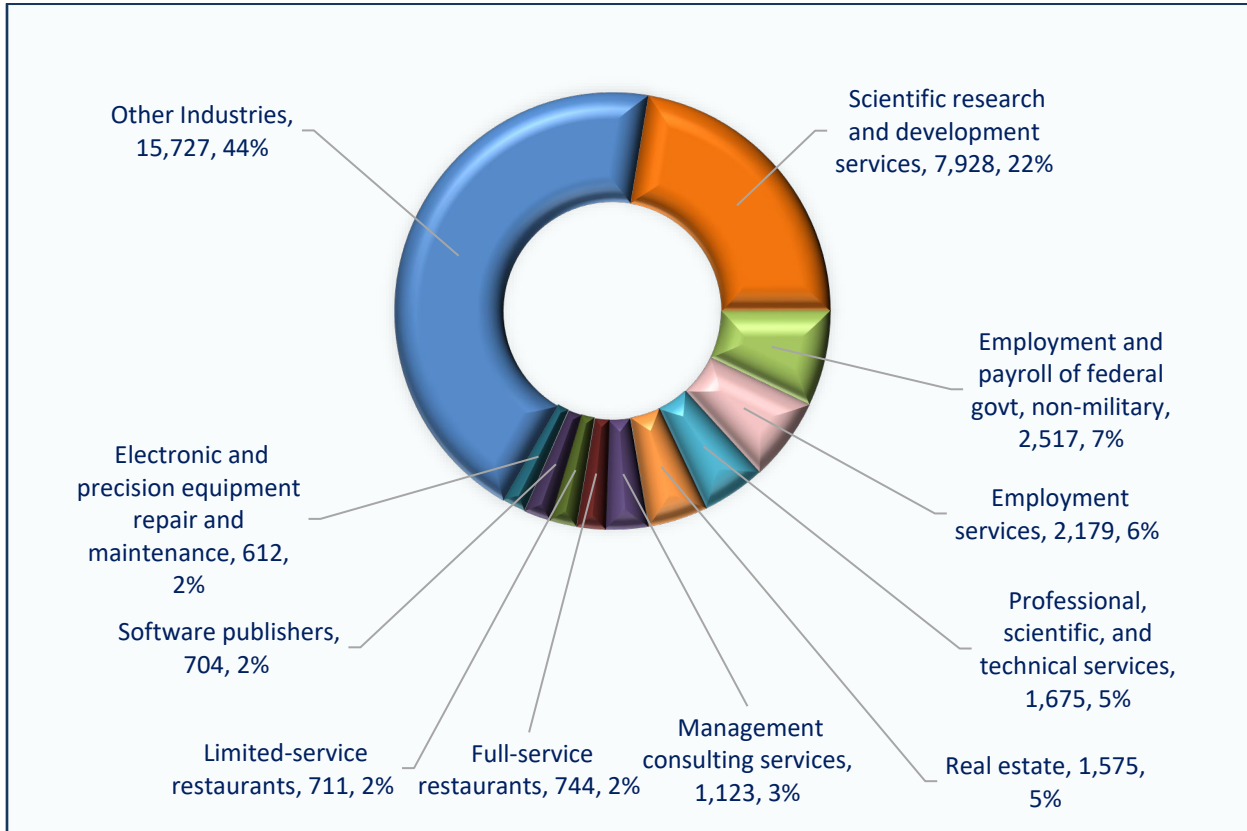
Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

35,494 jobs in the Alabama economy were supported by NASA activities in Fiscal Year 2023. Of these, 2,224 (6%) were directly located at NASA centers. As a result of the procurement of goods and services in the Alabama economy, 20,023 additional jobs (57%) were created. The remaining employment—13,248 jobs (37%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 16 depicts the ten most impacted industries by employment. Scientific research and development services is the most impacted industry. This industry accounts for 22% of the jobs created. Employment in this sector is driven largely by NASA procurement spending; scientific

research and development services accounted for 61% of NASA procurement spending in Fiscal Year 2023. The impact in the federal government sector represents mainly civil service employees working for NASA.

Figure 16: Top Ten Most Impacted Industries by Employment, Alabama (NASA)

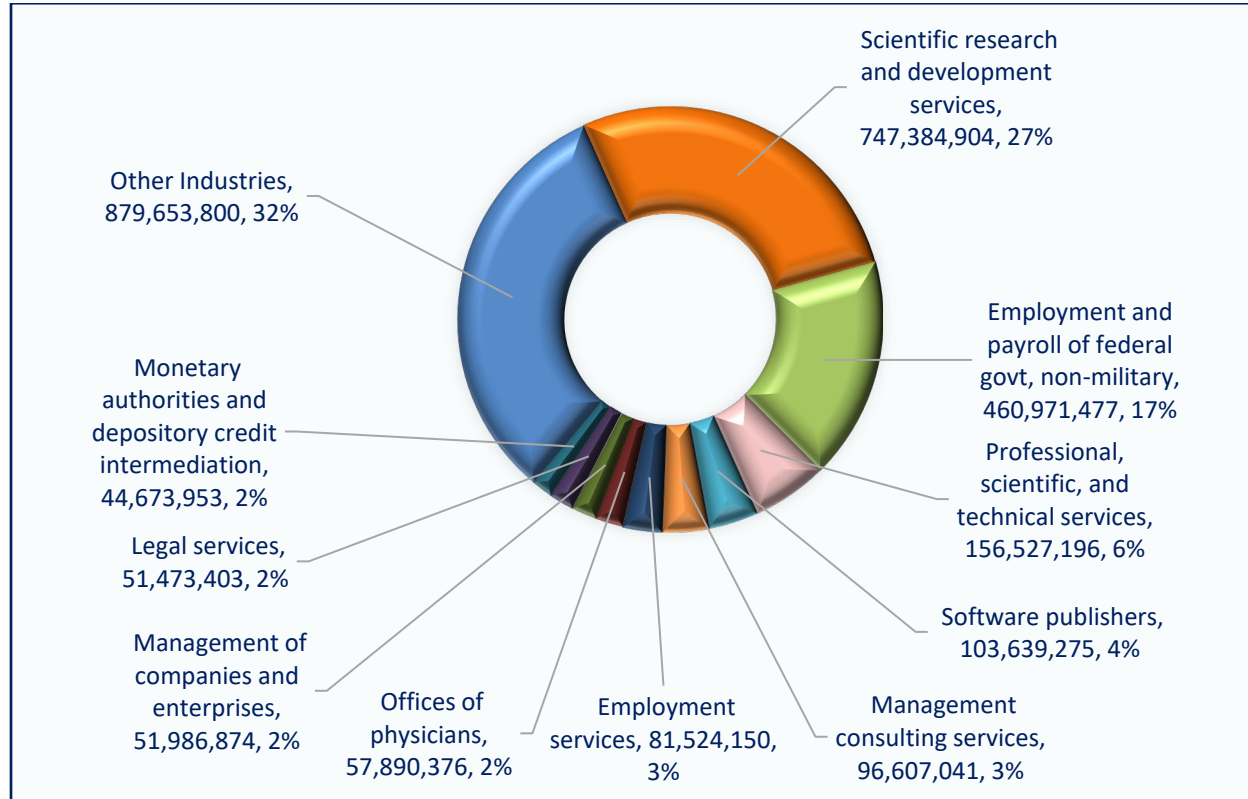


The total income impact of NASA in Alabama was \$2.7 billion in Fiscal Year 2023. Of this amount, \$422.9 million (15%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.6 billion (59%). The remaining income (induced impact), estimated to be \$704.4 million (26%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 17 depicts the ten most impacted industries by labor income. As a consequence of their share of total employment, scientific research and development, and professional and technical services are the most impacted industries by income (along with the federal government sector). The three industries together account for half of the total labor income earned. The reason that these industries’ share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average

employee compensation in the scientific research and development services industry was \$91,771 (including benefits), compared to an average of \$60,670 across Alabama.

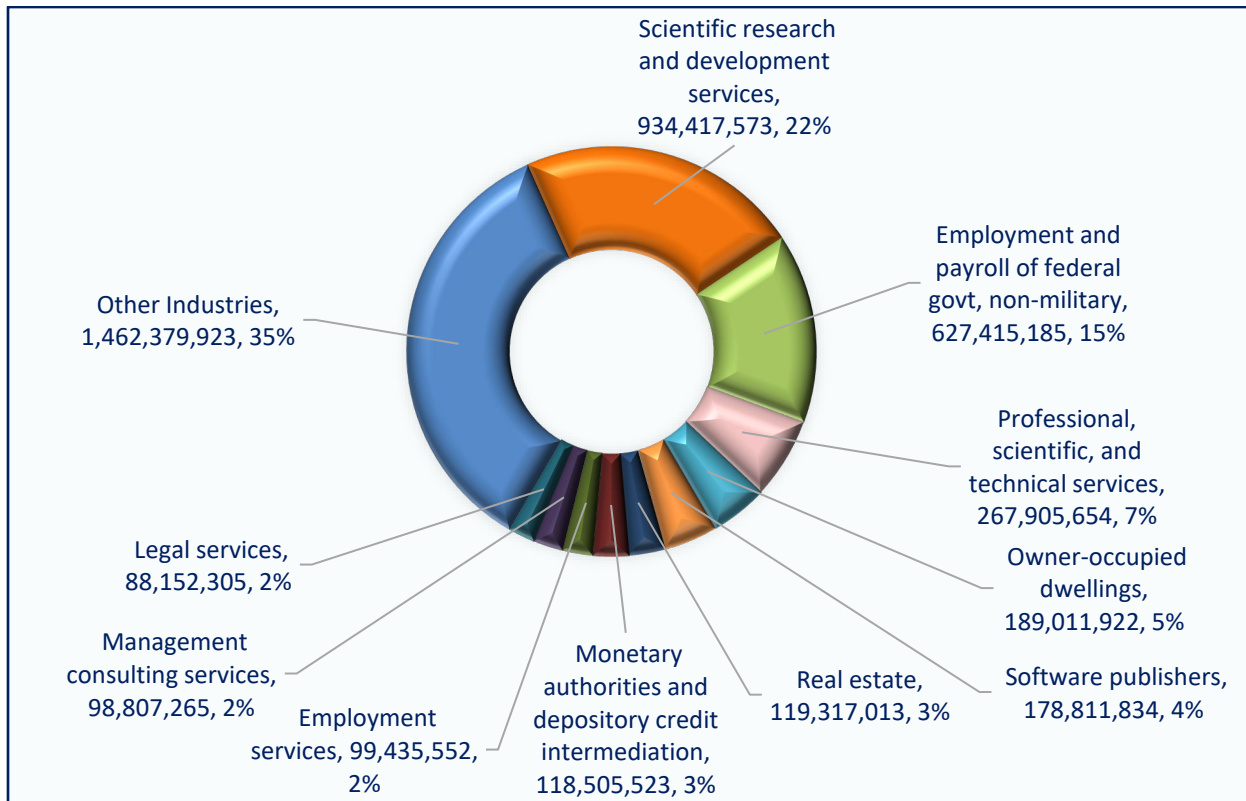
Figure 17: Top Ten Most Impacted Industries by Labor Income, Alabama (NASA)



The total value-added impact of NASA in Alabama was \$4.2 billion in Fiscal Year 2023. Of this amount, \$570.8 million (14%) was created by civil service employees and \$2.3 billion (54%) was created indirectly by the \$2.8 billion in procurement spending across all industry sectors in Alabama. \$1.3 billion (32%) was generated by increased consumption spending supported by increased earnings.

Figure 18 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development services is the most impacted industry (along with the federal government sector). The two industries together account for 37% of the total value-added created. NASA activities accounted for an increase of more than \$934 million in value-added in scientific research and development services. Six hundred and twenty-seven (627) million dollars in the federal government non-military sector corresponds mainly to value-added by NASA employees.

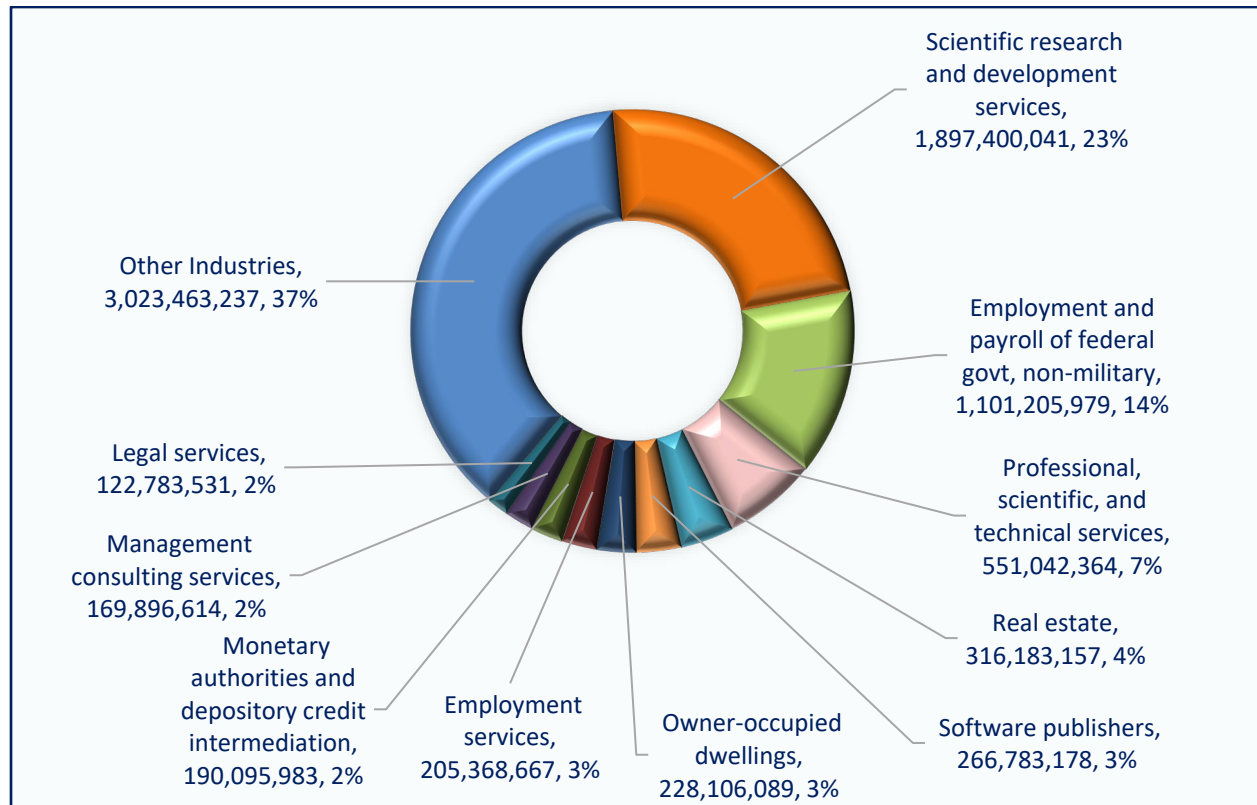
Figure 18: Top Ten Most Impacted Industries by Value-added, Alabama (NASA)



The total output impact of NASA in Alabama was \$8.1 billion in Fiscal Year 2023. The direct impact of nearly \$1.1 billion constitutes the value of production by NASA employees, accounting for 13% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$2.8 billion resulted in an additional increase in output (gross sales) of \$1.7 billion across all industry sectors (adding up to the indirect total of \$4.5 billion in Table 18). \$1.9 billion (31%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of nearly \$1.9 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services, and a \$551 million increase in sales in professional and technical services (Figure 19). Impacts in these industries are largely driven by NASA procurement spending; these two industries accounted for 81% of NASA procurement spending in Fiscal Year 2023. Aside from management consulting services and software publishers, the output impacts reported in other industries mainly result from increases in consumption spending (induced impacts). The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 19: Top Ten Most Impacted Industries by Output, Alabama (NASA)



M2M Campaign Impacts

In 2023, Alabama had 1,372 M2M-related civil service employees (939 FTEs) jobs with a corresponding labor income of \$171.9 million. M2M campaign procurement sourced in Alabama in the same year totaled \$1.9 billion. The total Alabama employment impact is 22,686 jobs (including direct, indirect, and induced impacts—see Box 1, Section 1), meaning that for every M2M-related job located in the state, an additional 23.2 jobs are created in the state economy. The labor income and economic output impacts are \$1.7 billion and \$5.2 billion, respectively. These economic activities, along with the M2M campaign labor force, generate \$164.3 million in tax revenues for the state and local governments in Alabama (Table 21).

Table 21: Summary of M2M Campaign Impacts by Types of Impact, Alabama

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	939	171,980	240,994	441,013	4,148
Indirect	13,587	1,131,386	1,593,771	3,173,001	60,855
Induced	8,160	441,799	831,809	1,539,213	99,332
Total	22,686	1,745,165	2,666,574	5,153,228	164,335
<i>Multiplier</i>	<i>24.2</i>	<i>10.1</i>	<i>11.1</i>	<i>11.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Alabama economy. More than 91% of the employment impacts and nearly 88% of the output impacts are due to NASA procurement sourced within the state.

Table 22: M2M Campaign Employment Impacts by Sources of Impact, Alabama

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	939	47.9	0	0.0	939	4.1	100.0	0.0
Indirect	0	0.0	13,587	65.6	13,587	59.9	0.0	100.0
Induced	1,020	52.1	7,140	34.4	8,160	36.0	12.5	87.5
Total	1,959	100	20,727	100	22,686	100	8.6	91.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 23: M2M Campaign Output Impacts by Sources of Impact, Alabama

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	441,013	69.2	0	0.0	441,013	8.6	100.0	0.0
Indirect	0	0.0	3,173,001	70.3	3,173,001	61.6	0.0	100.0
Induced	195,915	30.8	1,343,299	29.7	1,539,213	29.9	12.7	87.3
Total	636,928	100	4,516,300	100	5,153,228	100	12.4	87.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

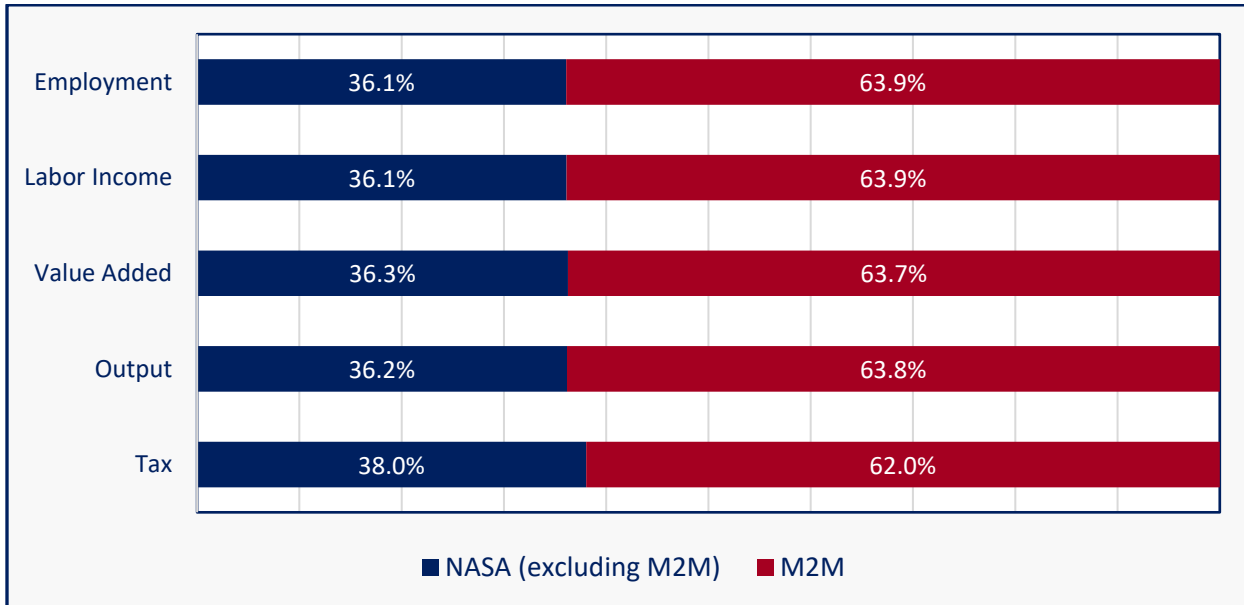
The M2M Campaign’s Share of NASA Impacts

Around 64% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 24 and Figure 20). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 24: The M2M Campaign Portion of Overall NASA Impacts, Alabama

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	35,494	2,732,332	4,184,160	8,072,329	265,231
M2M Portion	22,686	1,745,165	2,666,574	5,153,228	164,335
M2M Share	63.9%	63.9%	63.7%	63.8%	62.0%

Figure 20: The M2M Campaign Portion of Overall NASA Impacts, Alabama



Investments in Climate Change Research and Technology Impacts

In 2023, Alabama had 220 climate change research and technology-related civil service employees (60 FTEs) jobs with a corresponding labor income of \$10.9 million. Investments in climate change research and technology procurement sourced in Alabama in the same year totaled \$120.2 million. The total Alabama employment impact is 1,596 jobs (including direct, indirect, and induced impacts—see Box 1, Section 1), meaning that for every climate change research and technology-related job located in the state, an additional 23.4 jobs are created in the state economy. The labor income and economic output impacts are \$112.6 million and \$327.6 million, respectively. These economic activities, along with the climate change research and technology labor force, generate \$12.4 million in tax revenues for the state and local governments in Alabama (Table 25).

Table 25: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Alabama

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	60	10,904	15,399	28,179	263
Indirect	959	71,695	96,327	188,864	5,014
Induced	577	29,995	57,017	110,513	7,132
Total	1,596	112,594	168,742	327,556	12,409
<i>Multiplier</i>	<i>24.4</i>	<i>9.4</i>	<i>9.9</i>	<i>10.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Alabama economy. Approximately 92% of the employment impacts and 87% of the output impacts are due to NASA procurement sourced within the state.

Table 26: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Alabama

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	60	44.0	0	0.0	60	3.8	100.0	0.0
Indirect	0	0.0	959	65.7	959	60.1	0.0	100.0
Induced	76	56.0	500	34.3	577	36.1	13.2	86.8
Total	136	100	1,460	100	1,596	100	8.5	91.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 27: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Alabama

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	28,179	65.7	0	0.0	28,179	8.6	100.0	0.0
Indirect	0	0.0	188,864	66.3	188,864	57.7	0.0	100.0
Induced	14,718	34.3	95,795	33.7	110,513	33.7	13.3	86.7
Total	42,897	100	284,659	100	327,556	100	13.1	86.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

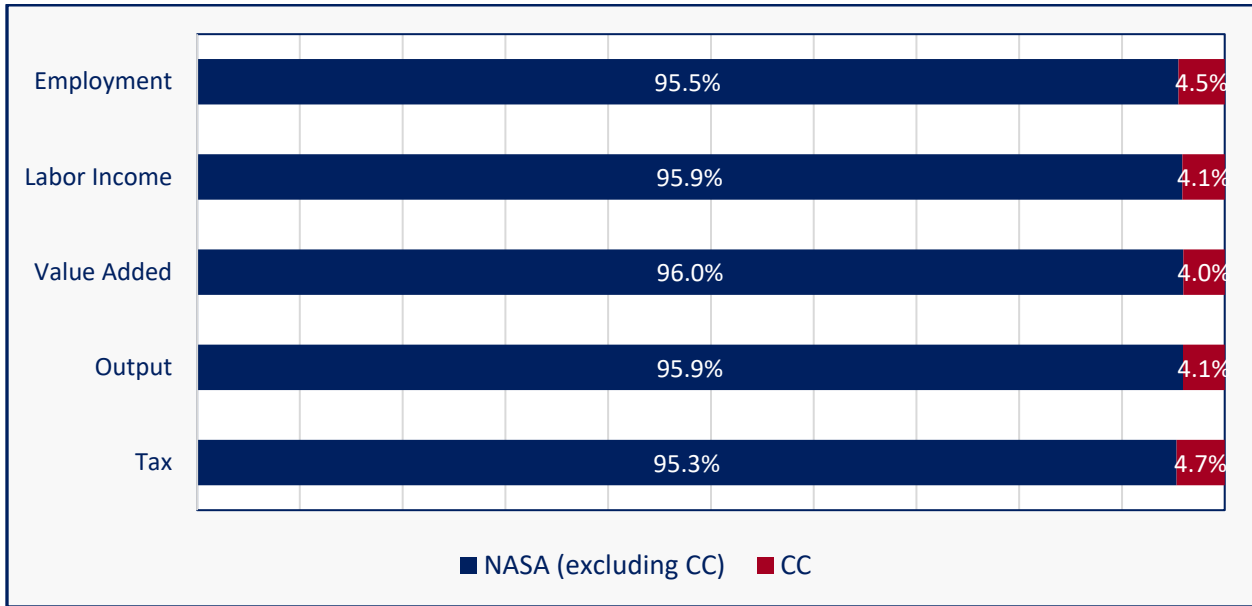
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 4% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 28 and Figure 21). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 28: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alabama

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	35,494	2,732,332	4,184,160	8,072,329	265,231
CC Portion	1,596	112,594	168,742	327,556	12,409
CC Share	4.5%	4.1%	4.0%	4.1%	4.7%

Figure 21: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alabama



Economic Impacts on the State of Alaska

NASA Impacts

There were no NASA employees in Alaska in FY 2023, but \$23.5 million in NASA procurement was sourced in the state. The total economic impact resulting from these activities is 226 jobs, \$20 million in labor income, and \$47.9 million in economic output. These economic activities generate \$1 million in tax revenues for the state and local governments in Alaska (Table 29).

Table 29: Summary of NASA Impacts by Types of Impact, Alaska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	151	13,172	16,720	33,434	405
Induced	75	4,788	8,472	14,478	600
Total	226	17,961	25,192	47,913	1,005
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

M2M Campaign Impacts

There were no M2M-specific NASA employees in Alaska in FY 2023, but \$16,000 in M2M-related NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is minimal (Table 30).

Table 30: Summary of M2M Campaign Impacts by Types of Impact, Alaska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	<1	9	11	23	<1
Induced	<1	3	6	10	<1
Total	<1	12	17	32	1
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

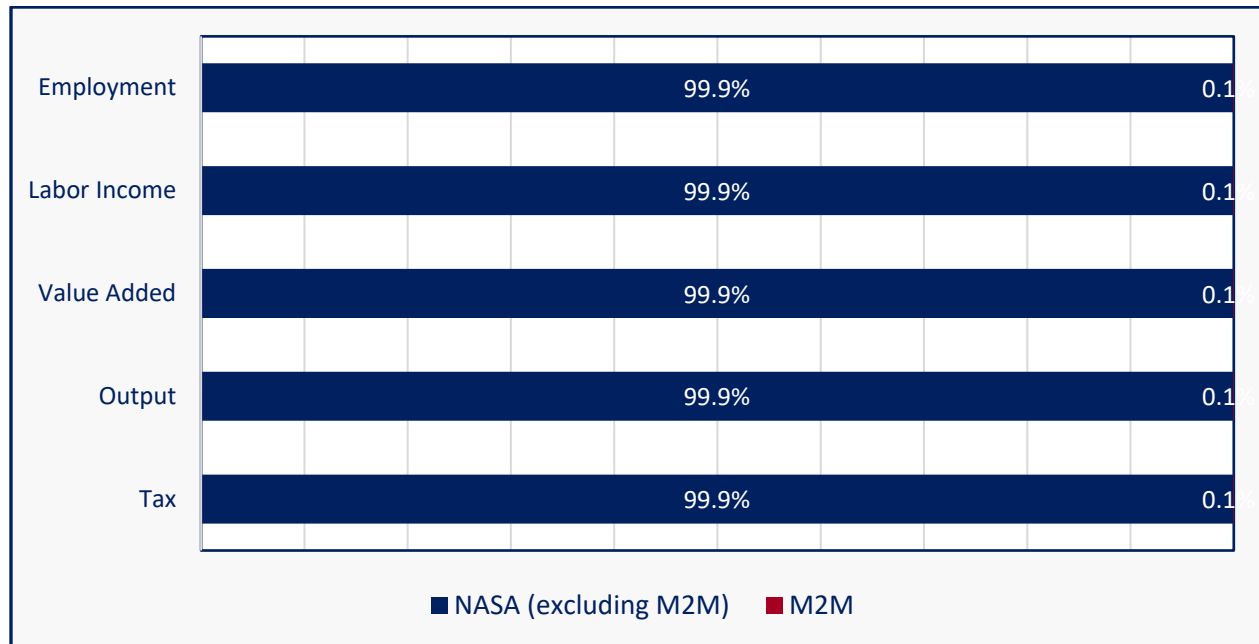
The M2M Campaign's Share of NASA Impacts

Less than 1% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 31 and Figure 22).

Table 31: The M2M Campaign Portion of Overall NASA Impacts, Alaska

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	226	17,961	25,192	47,913	1,005
M2M Portion	<1	12	17	32	1
M2M Share	0.1%	0.1%	0.1%	0.1%	0.1%

Figure 22: The M2M Campaign Portion of Overall NASA Impacts, Alaska



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Alaska in FY 2023, but \$16.3 million in climate change research and technology-related NASA procurement was sourced in the state. The total economic impact attributable to this labor force and procurement activity is 156 jobs, \$12.4 million in labor income, and \$33.6 million worth of output. These economic activities generate \$709,000 in tax revenues for the state and local governments in Alaska (Table 32).

Table 32: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Alaska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	103	9,112	11,667	23,271	281
Induced	53	3,300	5,985	10,335	428
Total	156	12,412	17,652	33,606	709
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

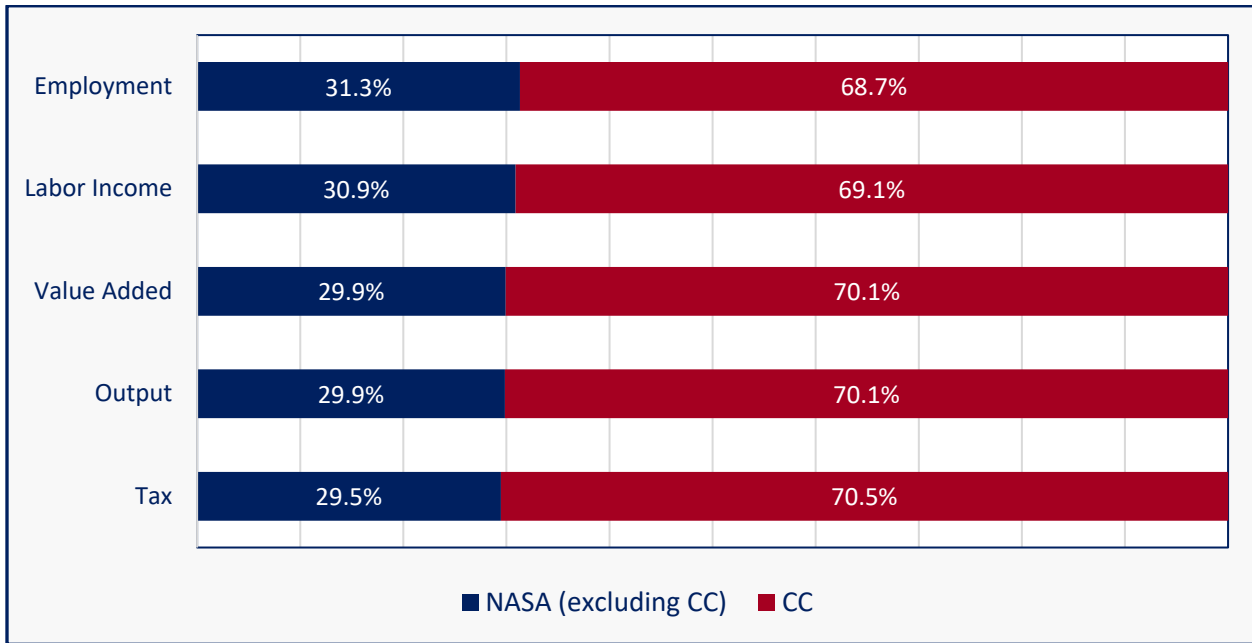
Around 70% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 33 and Figure 23). The primary reason the shares

are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 33: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alaska

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	226	17,961	25,192	47,913	1,005
CC Portion	156	12,412	17,652	33,606	709
CC Share	68.7%	69.1%	70.1%	70.1%	70.5%

Figure 23: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Alaska



Economic Impacts on the State of Arizona

NASA Impacts

In 2023, 27 NASA civil service employees (20 FTEs) residing in Arizona earned \$3.7 million in labor income. NASA procurement sourced in Arizona in the same year totaled \$224.2 million. The total economic impact resulting from these activities is 2,913 jobs, \$226.4 million in labor income, and \$649.9 million in economic output. These economic activities generate \$23.3 million in tax revenues for the state and local governments in Arizona (Table 34).

Table 34: Summary of NASA Impacts by Types of Impact, Arizona

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	20	3,745	5,222	9,556	67
Indirect	1,653	146,495	215,282	393,235	8,999
Induced	1,239	76,148	138,922	247,129	14,267
Total	2,913	226,388	359,426	649,920	23,333
<i>Multiplier</i>	<i>143.2</i>	<i>60.4</i>	<i>68.8</i>	<i>68.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Arizona economy. Table 35 examines the sources of the employment figures in the second column of Table 34. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 2%.

Table 35: NASA Employment Impacts by Sources of Impact, Arizona

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	20	39.7	0	0.0	20	0.7	100.0	0.0
Indirect	0	0.0	1,653	57.8	1,653	56.8	0.0	100.0
Induced	31	60.3	1,208	42.2	1,239	42.5	2.5	97.5
Total	51	100	2,862	100	2,913	100	1.8	98.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 36 examines the sources of the output figures in the fifth column of Table 34. Procurement spending is responsible for more than 97% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is nearly 3%.

Table 36: NASA Output Impacts by Sources of Impact, Arizona

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	9,556	59.9	0	0.0	9,556	1.5	100.0	0.0
Indirect	0	0.0	393,235	62.0	393,235	60.5	0.0	100.0
Induced	6,404	40.1	240,725	38.0	247,129	38.0	2.6	97.4
Total	15,960	100	633,960	100	649,920	100	2.5	97.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Arizona had one M2M-related civil service employees (<1 FTE) with a corresponding labor income of \$30,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$25.4 million. The total economic impact attributable to this procurement activity 346 jobs, \$25.7 million in labor income and \$70.3 million in economic output. The M2M campaign generates \$2.7 million in tax revenues for the state and local governments in Arizona (Table 37).

Table 37: Summary of M2M Campaign Impacts by Types of Impact, Arizona

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	30	47	86	1
Indirect	207	16,967	24,784	42,318	1,050
Induced	139	8,749	15,846	27,867	1,609
Total	346	25,746	40,678	70,272	2,659
<i>Multiplier</i>	<i>1887.5</i>	<i>871.7</i>	<i>863.3</i>	<i>815.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Arizona economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 38: M2M Campaign Employment Impacts by Sources of Impact, Arizona

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	42.5	0	0.0	<1	0.1	100.0	0.0
Indirect	0	0.0	207	59.8	207	59.7	0.0	100.0
Induced	<1	57.5	139	40.2	139	40.2	0.2	99.8
Total	<1	100	346	100	346	100	0.1	99.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 39: M2M Campaign Output Impacts by Sources of Impact, Arizona

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	86	64.3	0	0.0	86	0.1	100.0	0.0
Indirect	0	0.0	42,318	60.3	42,318	60.2	0.0	100.0
Induced	48	35.7	27,819	39.7	27,867	39.7	0.2	99.8
Total	134	100	70,137	100	70,272	100	0.2	99.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

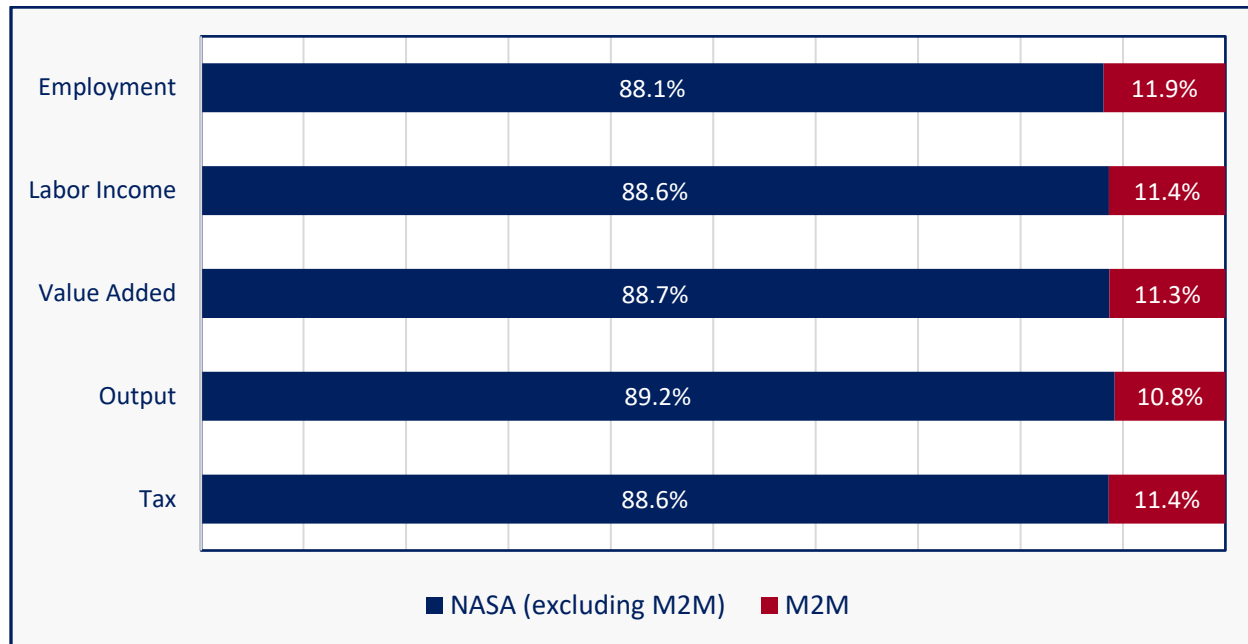
The M2M Campaign’s Share of NASA Impacts

Around 11% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 40 and Figure 24). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 40: The M2M Campaign Portion of Overall NASA Impacts, Arizona

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,913	226,388	359,426	649,920	23,333
M2M Portion	346	25,746	40,678	70,272	2,659
M2M Share	11.9%	11.4%	11.3%	10.8%	11.4%

Figure 24: The M2M Campaign Portion of Overall NASA Impacts, Arizona



Investments in Climate Change Research and Technology Impacts

In 2023, Arizona had seven climate change research and technology-related civil service employees (5 FTEs) with a corresponding labor income of \$768,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$20.8 million. The total Arizona employment impact is 309 jobs. The labor income and economic output associated with this employment are \$22.3 million and \$64.7 million, respectively. Investments in climate change research and technology generate \$2.3 million in tax revenues for the state and local governments in Arizona (Table 41).

Table 41: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Arizona

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	768	1,272	2,328	14
Indirect	178	13,975	20,312	37,029	872
Induced	126	7,606	13,955	25,331	1,463
Total	309	22,349	35,539	64,687	2,348
<i>Multiplier</i>	<i>62.3</i>	<i>29.1</i>	<i>27.9</i>	<i>27.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Arizona economy. More than 96% of the employment impacts and 94% of the output impacts are due to NASA procurement sourced within the state.

Table 42: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Arizona

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	5	41.5	0	0.0	5	1.6	100.0	0.0
Indirect	0	0.0	178	59.8	178	57.5	0.0	100.0
Induced	7	58.5	119	40.2	126	40.9	5.5	94.5
Total	12	100	297	100	309	100	3.9	96.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 43: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Arizona

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	2,328	62.3	0	0.0	2,328	3.6	100.0	0.0
Indirect	0	0.0	37,029	60.7	37,029	57.2	0.0	100.0
Induced	1,406	37.7	23,925	39.3	25,331	39.2	5.6	94.4
Total	3,734	100	60,954	100	64,687	100	5.8	94.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

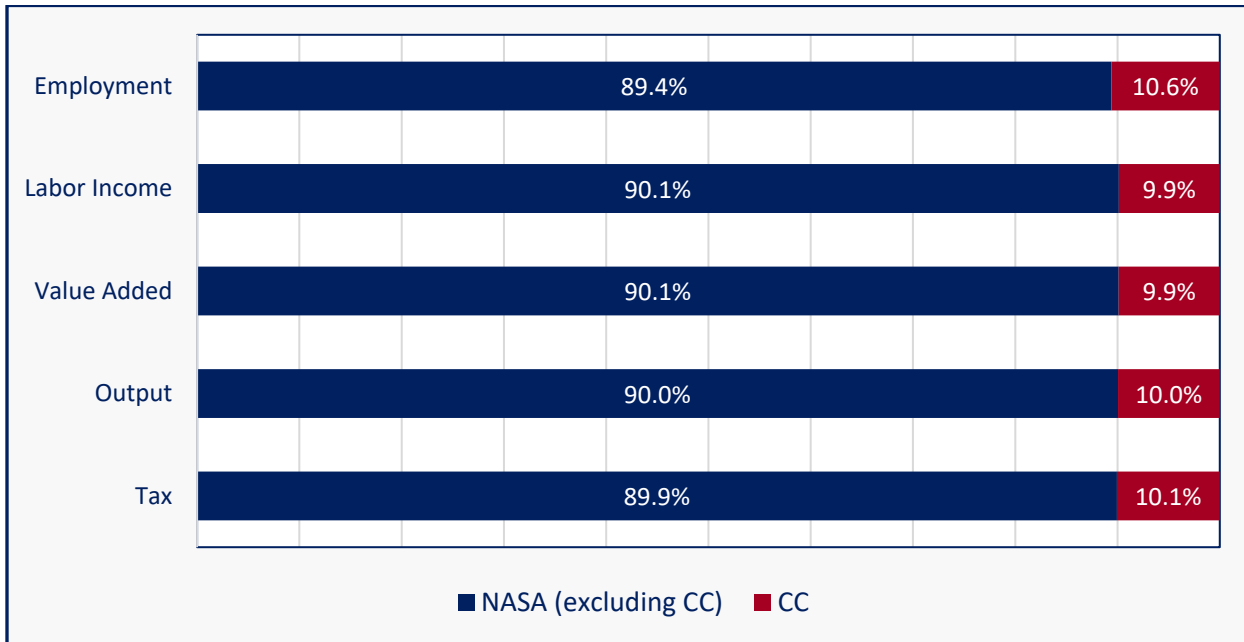
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 10% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 44 and Figure 25). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 44: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arizona

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,913	226,388	359,426	649,920	23,333
CC Portion	309	22,349	35,539	64,687	2,348
CC Share	10.6%	9.9%	9.9%	10.0%	10.1%

Figure 25: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arizona



Economic Impacts on the State of Arkansas

NASA Impacts

In 2023, seven NASA civil service employees (3 FTEs) residing in Arkansas earned \$499,000 in labor income. NASA procurement sourced in Arkansas in the same year totaled \$2.8 million. The total economic impact resulting from these activities is 40 jobs, \$2.8 million in labor income, and \$8.7 million in economic output. These economic activities generate \$275,000 in tax revenues for the state and local governments in Arkansas (Table 45).

Table 45: Summary of NASA Impacts by Types of Impact, Arkansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	499	725	1,326	12
Indirect	23	1,585	2,223	4,779	100
Induced	14	707	1,340	2,551	163
Total	40	2,791	4,288	8,656	275
<i>Multiplier</i>	<i>14.0</i>	<i>5.6</i>	<i>5.9</i>	<i>6.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Arkansas economy. Table 46 examines the sources of the employment figures in the second column of Table 45. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 85% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 15%.

Table 46: NASA Employment Impacts by Sources of Impact, Arkansas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	3	46.4	0	0.0	3	7.1	100.0	0.0
Indirect	0	0.0	23	68.3	23	57.8	0.0	100.0
Induced	3	53.6	11	31.7	14	35.1	23.5	76.5
Total	6	100	34	100	40	100	15.4	84.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 47 examines the sources of the output figures in the fifth column of Table 45. Procurement spending is responsible for approximately 78% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 22%.

Table 47: NASA Output Impacts by Sources of Impact, Arkansas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,326	68.6	0	0.0	1,326	15.3	100.0	0.0
Indirect	0	0.0	4,779	71.1	4,779	55.2	0.0	100.0
Induced	606	31.4	1,945	28.9	2,551	29.5	23.7	76.3
Total	1,932	100	6,724	100	8,656	100	22.3	77.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

There were no M2M-specific NASA employees in Arkansas in FY 2023, but \$157,000 in M2M-related NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 2 jobs, \$118,000 in labor income, and \$370,000 worth of output. These economic activities generate \$12,000 in tax revenues for the state and local governments in Arkansas (Table 48).

Table 48: Summary of M2M Campaign Impacts by Types of Impact, Arkansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	1	88	126	265	6
Induced	1	30	56	105	7
Total	2	118	182	370	12
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

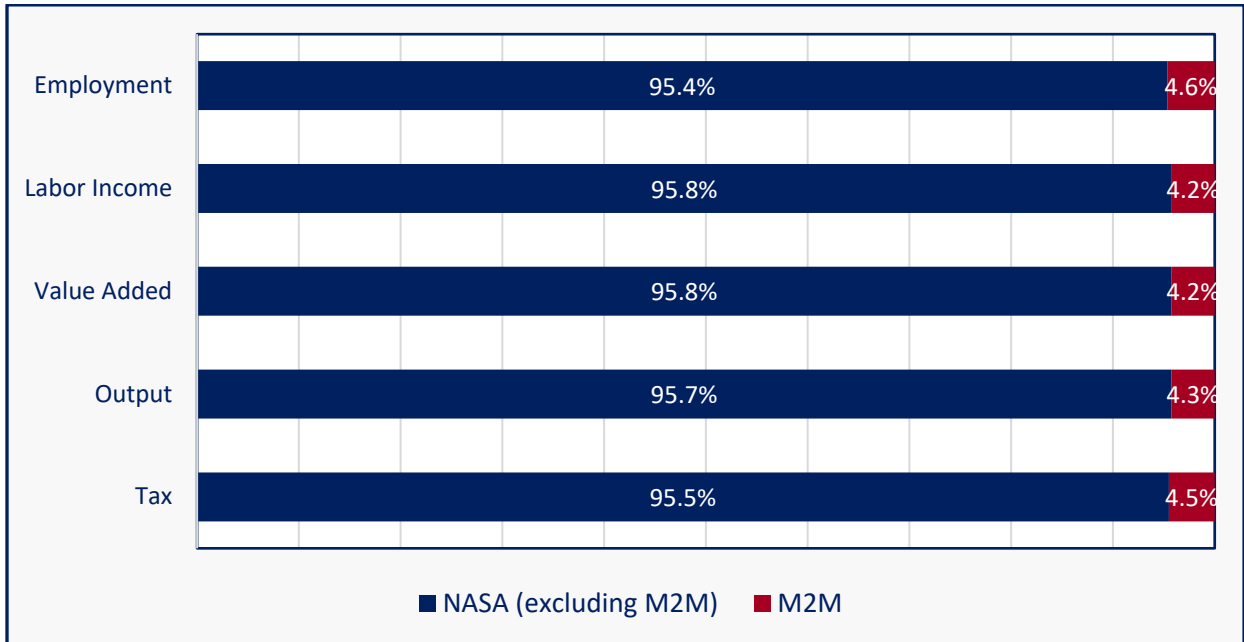
The M2M Campaign's Share of NASA Impacts

Around 4% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 49 and Figure 26). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 49: The M2M Campaign Portion of Overall NASA Impacts, Arkansas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	40	2,791	4,288	8,656	275
M2M Portion	2	118	182	370	12
M2M Share	4.6%	4.2%	4.2%	4.3%	4.5%

Figure 26: The M2M Campaign Portion of Overall NASA Impacts, Arkansas



Investments in Climate Change Research and Technology Impacts

In 2023, Arkansas had one climate change research and technology-related civil service employee (<1 FTE) with a corresponding labor income of \$61,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$747,000. The total Arkansas employment impact is 10 jobs. The labor income and economic output associated with this employment are \$619,000 and \$2.1 million, respectively. Investments in climate change research and technology generate \$65,000 in tax revenues for the state and local governments in Arkansas (Table 50).

Table 50: Investments in Summary of Climate Change Research and Technology Impacts by Types of Impact, Arkansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	61	178	325	1
Indirect	6	400	575	1,235	26
Induced	3	158	300	587	37
Total	10	619	1,053	2,148	65
<i>Multiplier</i>	<i>14.1</i>	<i>10.2</i>	<i>5.9</i>	<i>6.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Arkansas economy. More than 88% of the employment impacts and 81% of the output impacts are due to NASA procurement sourced within the state.

Table 51: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Arkansas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	59.5	0	0.0	1	7.1	100.0	0.0
Indirect	0	0.0	6	67.7	6	59.7	0.0	100.0
Induced	<1	40.5	3	32.3	3	33.3	14.5	85.5
Total	1	100	9	100	10	100	11.9	88.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 52: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Arkansas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	325	80.4	0	0.0	325	15.1	100.0	0.0
Indirect	0	0.0	1,235	70.9	1,235	57.5	0.0	100.0
Induced	79	19.6	508	29.1	587	27.3	13.5	86.5
Total	404	100	1,743	100	2,148	100	18.8	81.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

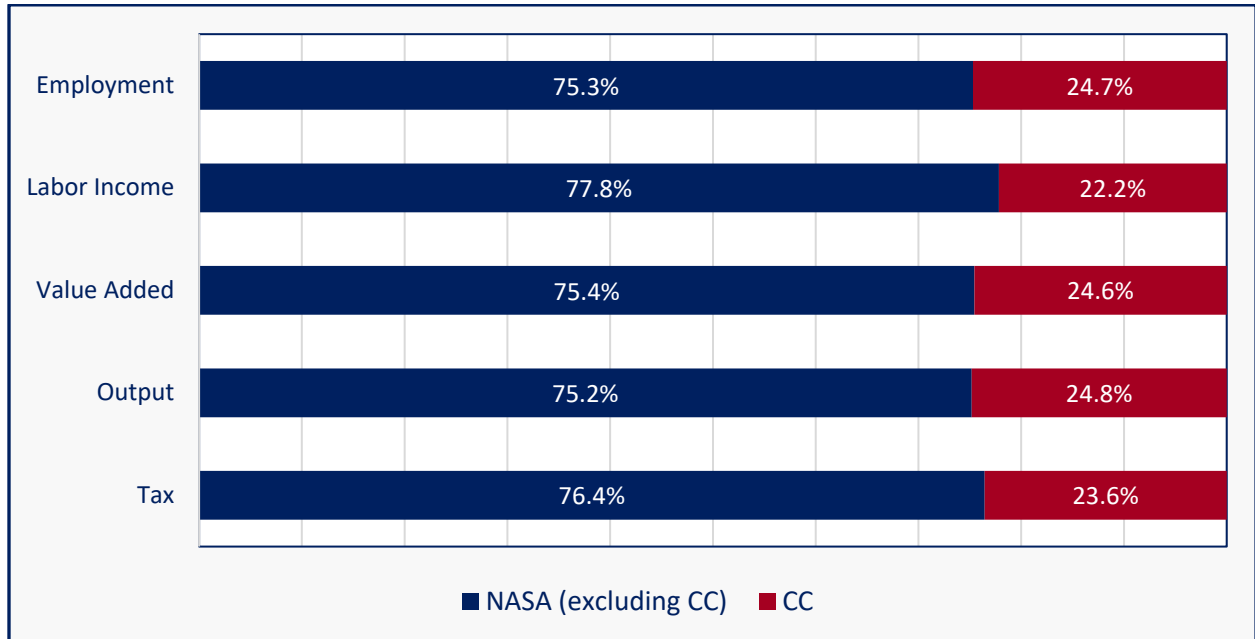
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 24% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 53 and Figure 27). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 53: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arkansas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	40	2,791	4,288	8,656	275
CC Portion	10	619	1,053	2,148	65
CC Share	24.7%	22.2%	24.6%	24.8%	23.6%

Figure 27: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Arkansas



Economic Impacts on the State of California

NASA Impacts

In 2023, 2,011 NASA civil service employees (1,805 FTEs) residing in California earned \$377.1 million in labor income. NASA procurement sourced in California in the same year totaled \$5.8 billion. The total economic impact resulting from these activities is 66,208 jobs, \$6.9 billion in labor income, and \$18.6 billion in economic output. These economic activities generate \$1.1 billion in tax revenues for the state and local governments in California (Table 54).

The employment multiplier is 36.7, meaning that for every NASA job located in California, an additional 35.7 jobs are supported in the state economy. The output multiplier of 21.9 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$20.9 million worth of output is sustained throughout the state economy.

Table 54: Summary of NASA Impacts by Types of Impact, California

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1,805	377,059	463,428	848,062	18,377
Indirect	32,593	4,133,137	6,131,458	10,176,769	485,143
Induced	31,809	2,438,472	4,390,159	7,568,760	593,371
Total	66,208	6,948,668	10,985,044	18,593,591	1,096,891
<i>Multiplier</i>	<i>36.7</i>	<i>18.4</i>	<i>23.7</i>	<i>21.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the California economy. Table 55 examines the sources of the employment figures in the second column of Table 54. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 93% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 7%.

Table 55: NASA Employment Impacts by Sources of Impact, California

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	1,805	39.4	0	0.0	1,805	2.7	100.0	0.0
Indirect	0	0.0	32,593	52.9	32,593	49.2	0.0	100.0
Induced	2,782	60.6	29,027	47.1	31,809	48.0	8.7	91.3
Total	4,587	100	61,621	100	66,208	100	6.9	93.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 56 examines the sources of the output figures in the fifth column of Table 54. Procurement spending is responsible for nearly 92% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 8%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 56: NASA Output Impacts by Sources of Impact, California

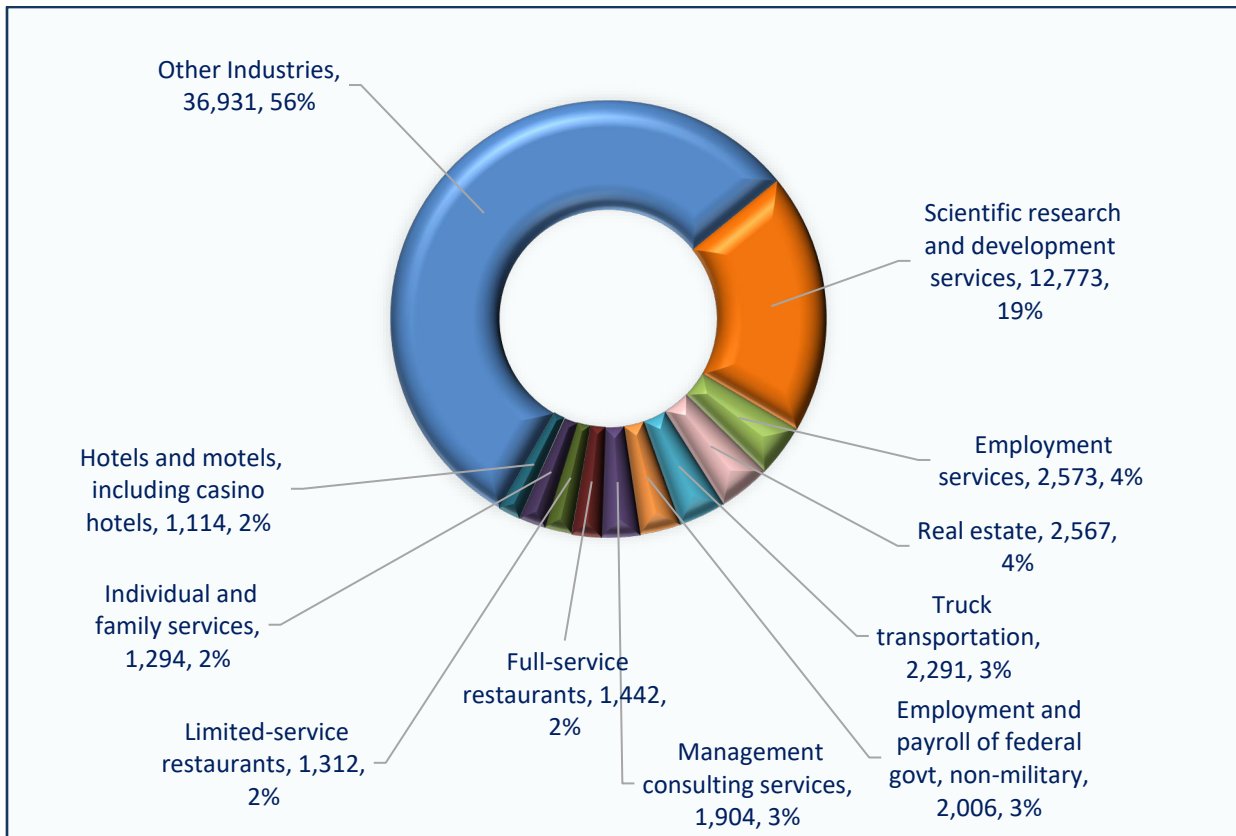
Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	848,062	54.9	0	0.0	848,062	4.6	100.0	0.0
Indirect	0	0.0	10,176,769	59.7	10,176,769	54.7	0.0	100.0
Induced	696,914	45.1	6,871,847	40.3	7,568,760	40.7	9.2	90.8
Total	1,544,976	100	17,048,616	100	18,593,591	100	8.3	91.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

66,208 jobs in the California economy were supported by NASA activities in Fiscal Year 2023. Of these, 1,805 (3%) were directly located at NASA centers. As a result of the procurement of goods and services in the California economy, 32,593 additional jobs (49%) were created. The remaining employment—31,809 jobs (48%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 28 depicts the ten most impacted industries by employment. Scientific research and development services is the most impacted industry, accounting for 19% of the jobs created. Employment in this industry is driven largely by NASA procurement spending; scientific research and development services accounted for 67% of NASA procurement spending in the state in Fiscal Year 2023.

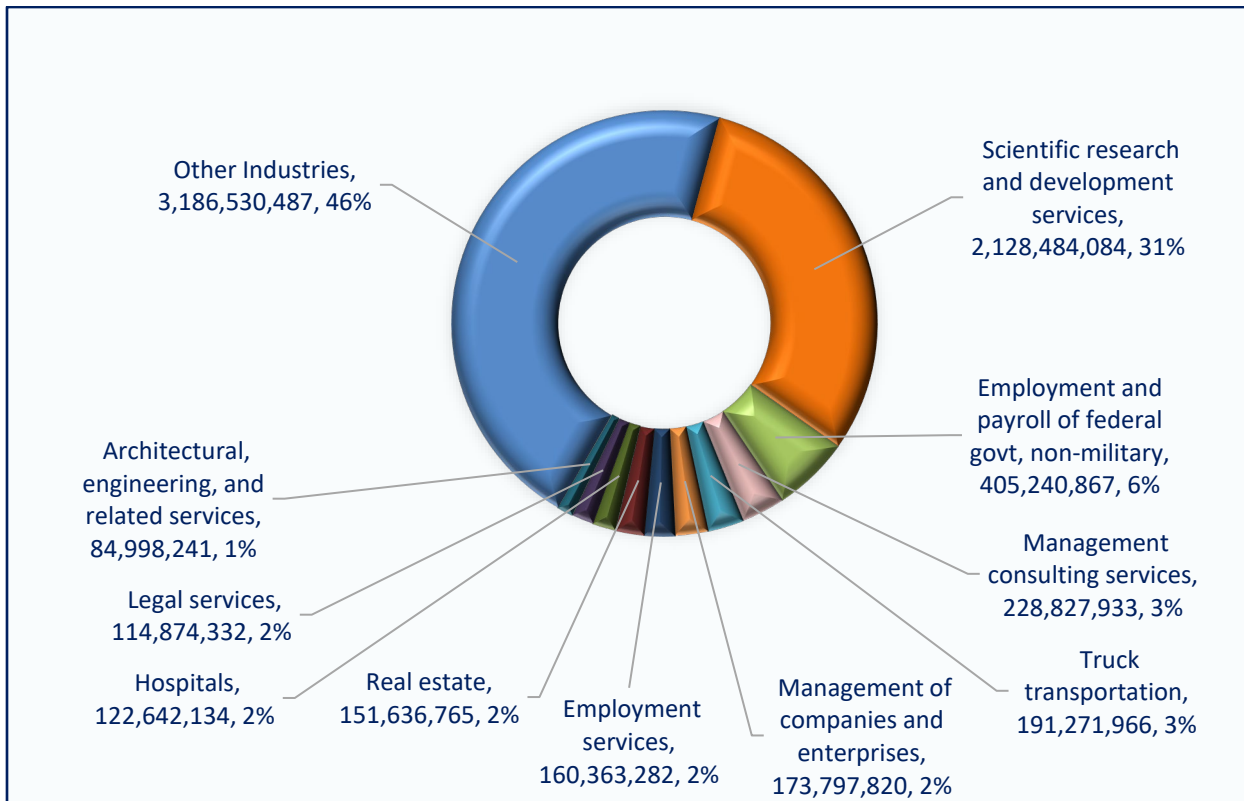
Figure 28: Top Ten Most Impacted Industries by Employment, California (NASA)



The total income impact of NASA in California was \$6.9 billion in Fiscal Year 2023. Of this amount, \$377 million (5%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$4.1 billion (60%). The remaining income (induced impact), estimated to be \$2.4 billion (35%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 29 depicts the ten most impacted industries by labor income. Scientific research and development, the federal government sector, and management consulting services are the most impacted sectors. The three industries together account for 40% of the total labor income earned. The reason that these industries' share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services industry was \$162,267 (including benefits), compared to an average of \$87,027 across California.

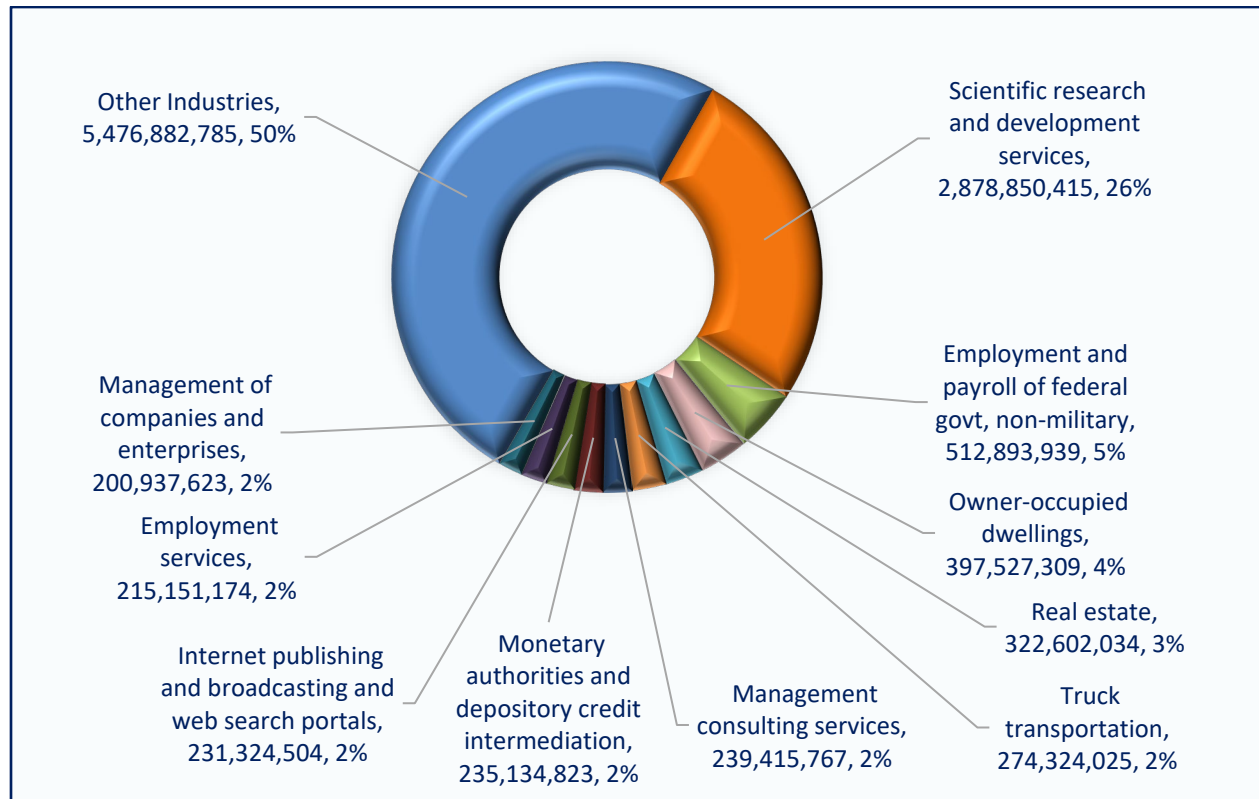
Figure 29: Top Ten Most Impacted Industries by Labor Income, California (NASA)



The total value-added impact of NASA in California was \$10.9 billion in Fiscal Year 2023. Of this amount, \$463 million (4%) was created by civil service employees and \$6.1 billion (56%) was created indirectly by the \$5.8 billion in procurement spending across all industry sectors in California. \$4.4 billion (40%) was generated by increased consumption spending supported by increased earnings.

Figure 30 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development is the most impacted industry, accounting for 26% of the total value-added created. NASA activities accounted for an increase of nearly \$2.9 billion in value-added in scientific research and development services. Approximately \$513 million in the federal government non-military sector corresponds mainly to value-added by NASA employees.

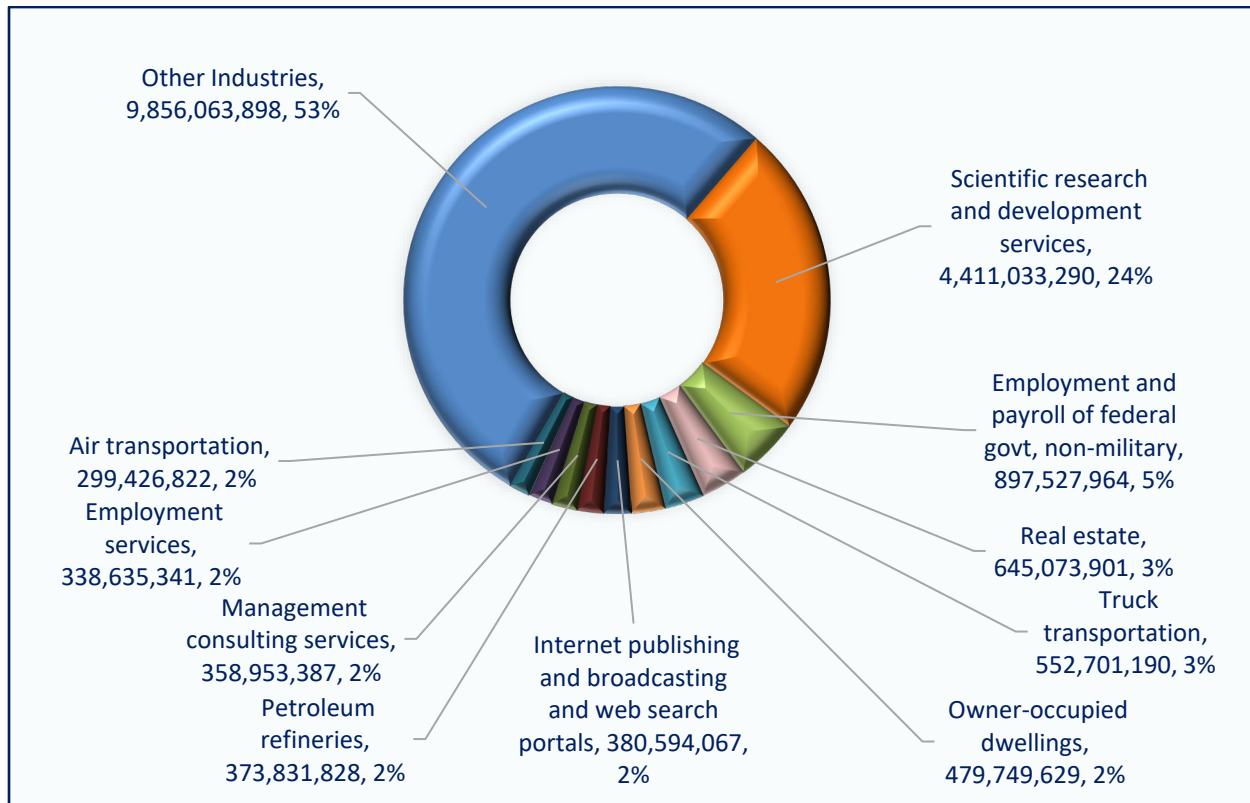
Figure 30: Top Ten Most Impacted Industries by Value-added, California (NASA)



The total output impact of NASA in California was \$18.6 billion in Fiscal Year 2023. The direct impact of \$848 million constitutes the value of production by NASA employees, accounting for around 5% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$5.8 billion resulted in an additional increase in output (gross sales) of \$4.4 billion across all industry sectors (adding up to the indirect total of \$10.2 billion in Table 54). Around \$7.6 billion (41%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of \$4.4 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 31). Similar to employment, impact in this industry is largely driven by NASA procurement spending; scientific research and development services accounted for 67% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 31: Top Ten Most Impacted Industries by Output, California (NASA)



M2M Campaign Impacts

In 2023, California had 366 M2M-related civil service employees (165 FTEs) with a corresponding labor income of \$36.4 million. M2M campaign procurement sourced in the state in the same year totaled \$1.6 billion. The total California employment impact is 16,129 jobs. The labor income and economic output associated with this employment are \$1.8 billion and \$4.7 billion, respectively. The M2M campaign generates \$263.9 million in tax revenues for the state and local governments in California (Table 57).

Table 57: Summary of M2M Campaign Impacts by Types of Impact, California

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	165	36,403	42,418	77,623	1,774
Indirect	7,906	1,132,653	1,675,920	2,736,816	110,836
Induced	8,057	634,708	1,139,311	1,930,269	151,291
Total	16,129	1,803,764	2,857,649	4,744,708	263,900
<i>Multiplier</i>	<i>97.6</i>	<i>49.6</i>	<i>67.4</i>	<i>61.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the California economy. More than 97% of the employment and 97% of the output impacts are due to NASA procurement sourced within the state.

Table 58: M2M Campaign Employment Impacts by Sources of Impact, California

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	165	39.1	0	0.0	165	1.0	100.0	0.0
Indirect	0	0.0	7,906	50.3	7,906	49.0	0.0	100.0
Induced	257	60.9	7,800	49.7	8,057	50.0	3.2	96.8
Total	423	100	15,706	100	16,129	100	2.6	97.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 59: M2M Campaign Output Impacts by Sources of Impact, California

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	77,623	54.2	0	0.0	77,623	1.6	100.0	0.0
Indirect	0	0.0	2,736,816	59.5	2,736,816	57.7	0.0	100.0
Induced	65,712	45.8	1,864,557	40.5	1,930,269	40.7	3.4	96.6
Total	143,336	100	4,601,373	100	4,744,708	100	3.0	97.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

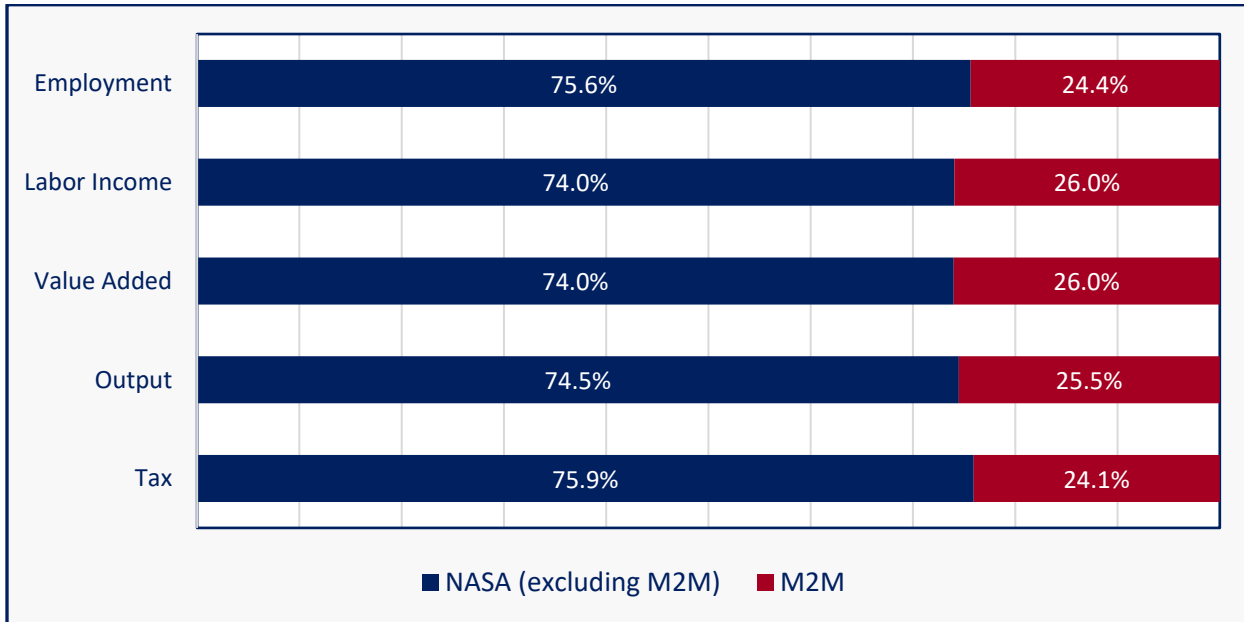
The M2M Campaign's Share of NASA Impacts

Around 25% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 60 and Figure 32). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 60: The M2M Campaign Portion of Overall NASA Impacts, California

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	66,208	6,948,668	10,985,044	18,593,591	1,096,891
M2M Portion	16,129	1,803,764	2,857,649	4,744,708	263,900
M2M Share	24.4%	26.0%	26.0%	25.5%	24.1%

Figure 32: The M2M Campaign Portion of Overall NASA Impacts, California



Investments in Climate Change Research and Technology Impacts

In 2023, California had 811 climate change research and technology-related civil service employees (449 FTEs) with a corresponding labor income of \$86.5 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$485.3 million. The total California employment impact is 6,681 jobs. The labor income and economic output associated with this employment are \$679.4 million and \$1.8 billion, respectively. Investments in climate change research and technology generate \$104.6 million in tax revenues for the state and local governments in California (Table 61).

Table 61: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, California

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	449	86,504	115,197	210,808	4,216
Indirect	2,994	348,263	512,865	829,568	38,744
Induced	3,239	244,668	443,282	785,411	61,614
Total	6,681	679,435	1,071,344	1,825,787	104,574
<i>Multiplier</i>	<i>14.9</i>	<i>7.9</i>	<i>9.3</i>	<i>8.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the California economy. More than 83% of the employment impacts and 79% of the output impacts are due to NASA procurement sourced within the state.

Table 62: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, California

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	449	40.1	0	0.0	449	6.7	100.0	0.0
Indirect	0	0.0	2,994	53.8	2,994	44.8	0.0	100.0
Induced	670	59.9	2,569	46.2	3,239	48.5	20.7	79.3
Total	1,118	100	5,563	100	6,681	100	16.7	83.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 63: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, California

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	210,808	56.4	0	0.0	210,808	11.5	100.0	0.0
Indirect	0	0.0	829,568	57.1	829,568	45.4	0.0	100.0
Induced	162,688	43.6	622,723	42.9	785,411	43.0	20.7	79.3
Total	373,496	100	1,452,291	100	1,825,787	100	20.5	79.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

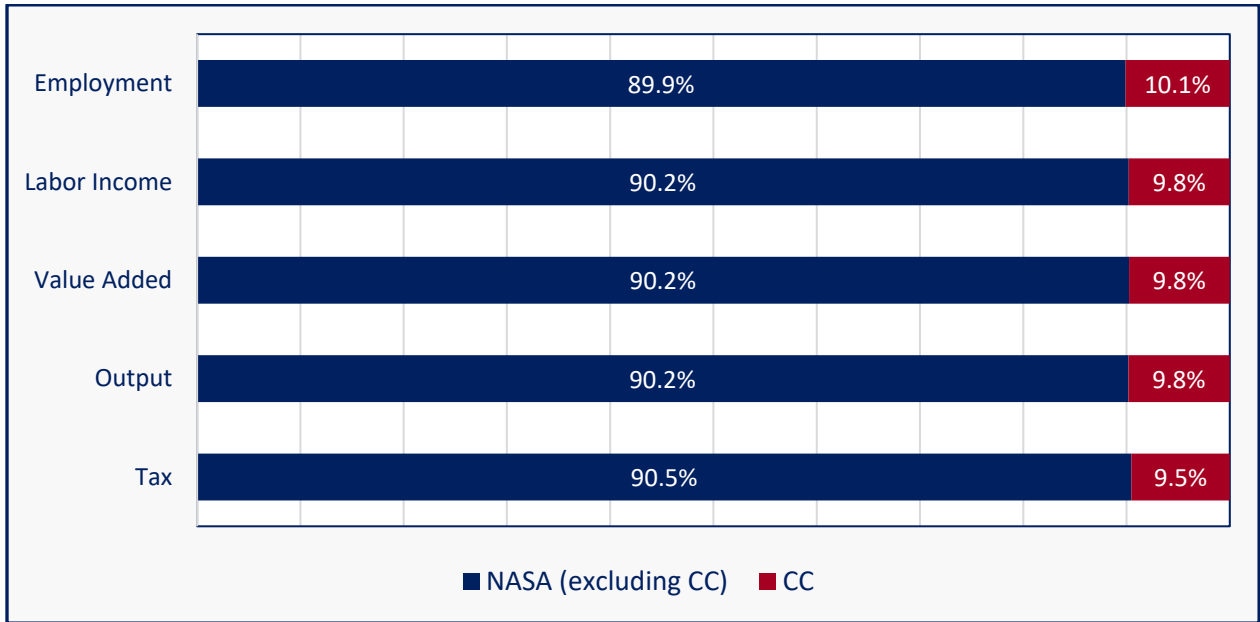
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 10% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 64 and Figure 33). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 64: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, California

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	66,208	6,948,668	10,985,044	18,593,591	1,096,891
CC Portion	6,681	679,435	1,071,344	1,825,787	104,574
CC Share	10.1%	9.8%	9.8%	9.8%	9.5%

Figure 33: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, California



Economic Impacts on the State of Colorado

NASA Impacts

In 2023, 93 NASA civil service employees (56 FTEs) residing in Colorado earned \$10.7 million in labor income. NASA procurement sourced in Colorado in the same year totaled \$1.8 billion. The total economic impact resulting from these activities is 21,616 jobs, \$1.9 billion in labor income, and \$5.1 billion in economic output. These economic activities generate \$189.9 million in tax revenues for the state and local governments in Colorado (Table 65).

Table 65: Summary of NASA Impacts by Types of Impact, Colorado

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	56	10,742	14,457	26,456	298
Indirect	12,246	1,266,424	1,713,861	3,125,228	73,212
Induced	9,314	618,292	1,098,612	1,952,896	116,377
Total	21,616	1,895,458	2,826,929	5,104,580	189,888
<i>Multiplier</i>	383.9	176.5	195.5	192.9	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Colorado economy. Table 66 examines the sources of the employment figures in the second column of Table 65. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Nearly all the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is less than 1%.

Table 66: NASA Employment Impacts by Sources of Impact, Colorado

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	56	41.4	0	0.0	56	0.3	100.0	0.0
Indirect	0	0.0	12,246	57.0	12,246	56.7	0.0	100.0
Induced	80	58.6	9,234	43.0	9,314	43.1	0.9	99.1
Total	136	100	21,480	100	21,616	100	0.6	99.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 67 examines the sources of the output figures in the fifth column of Table 65. Procurement spending is responsible for nearly all the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is less than 1%.

Table 67: NASA Output Impacts by Sources of Impact, Colorado

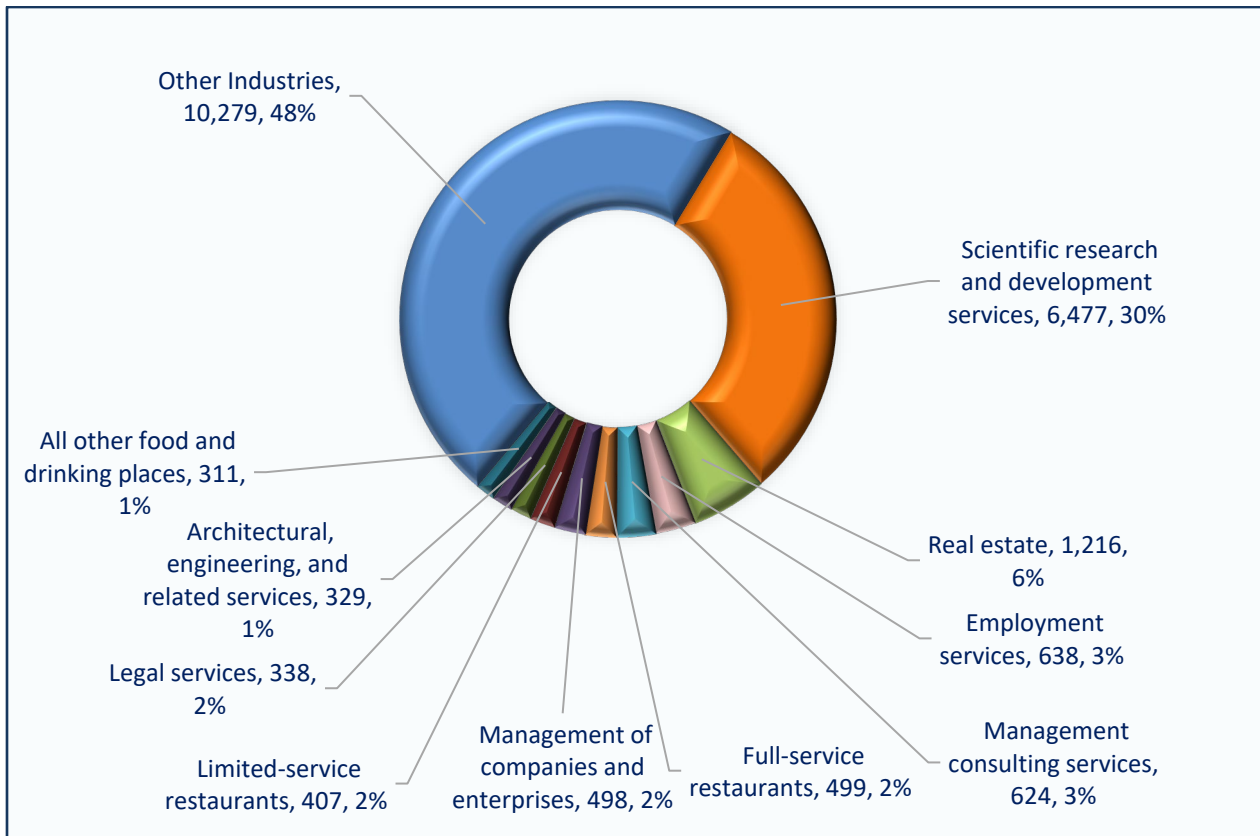
Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	26,456	60.2	0	0.0	26,456	0.5	100.0	0.0
Indirect	0	0.0	3,125,228	61.8	3,125,228	61.2	0.0	100.0
Induced	17,497	39.8	1,935,399	38.2	1,952,896	38.3	0.9	99.1
Total	43,953	100	5,060,627	100	5,104,580	100	0.9	99.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

21,616 jobs in the Colorado economy were supported by NASA activities in Fiscal Year 2023. Of these, 56 (<1%) were directly located at NASA centers. As a result of the procurement of goods and services in the Colorado economy, 12,246 additional jobs (57%) were created. The remaining employment—9,314 jobs (43%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 34 depicts the ten most impacted industries by employment. Scientific research and development services is the most impacted industry, accounting for 30% of the jobs created. Employment in this industry is driven largely by NASA procurement spending; scientific research and development services accounted for 86% of NASA procurement spending in the state in Fiscal Year 2023.

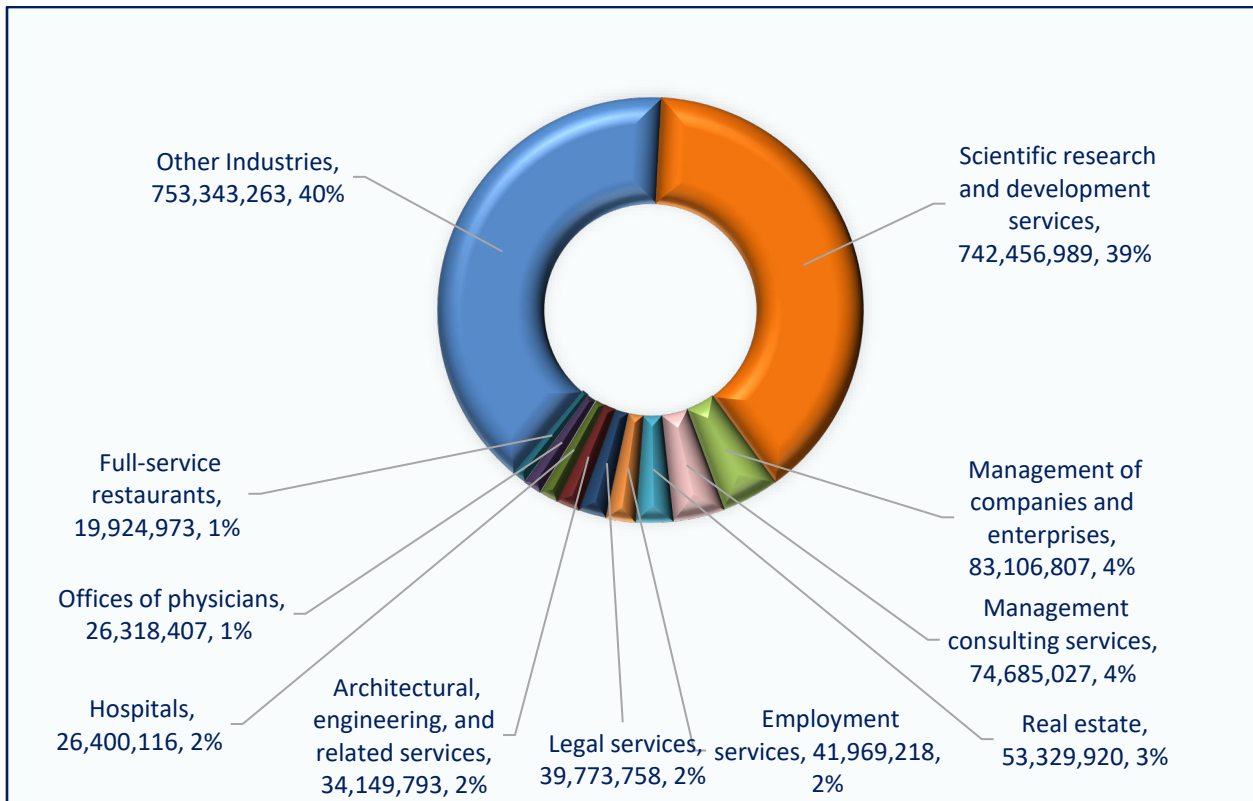
Figure 34: Top Ten Most Impacted Industries by Employment, Colorado (NASA)



The total income impact of NASA in Colorado was \$1.9 billion in Fiscal Year 2023. Of this amount, approximately \$11 million (<1%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.3 billion (67%). The remaining income (induced impact), estimated to be \$618 million (33%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 35 depicts the ten most impacted industries by labor income. Scientific research and development services account for 39% of the total labor income earned. The reason that this industry’s share of labor income is larger than their share of employment is that employee compensation in this industry is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services industry was \$111,600 (including benefits), compared to an average of \$75,037 across Colorado.

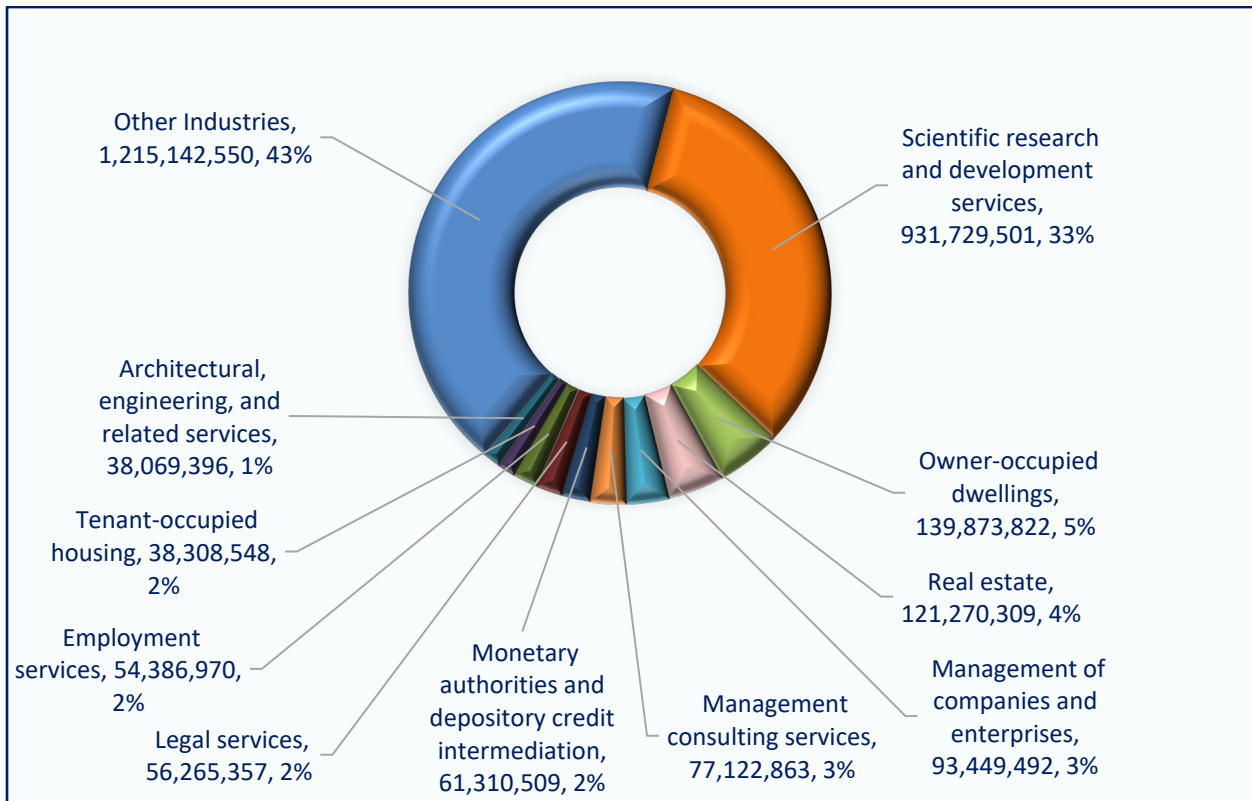
Figure 35: Top Ten Most Impacted Industries by Labor Income, Colorado (NASA)



The total value-added impact of NASA in Colorado was \$2.8 billion in Fiscal Year 2023. Of this amount, \$14 million (<1%) was created by civil service employees and approximately \$1.7 billion (61%) was created indirectly by the \$1.8 billion in procurement spending across all industry sectors in Colorado. Around \$1.1 billion (39%) was generated by increased consumption spending supported by increased earnings.

Figure 36 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development services is the most impacted industry, accounting for 33% of the total value-added created. NASA activities accounted for an increase of nearly \$932 million in value-added in scientific research and development services.

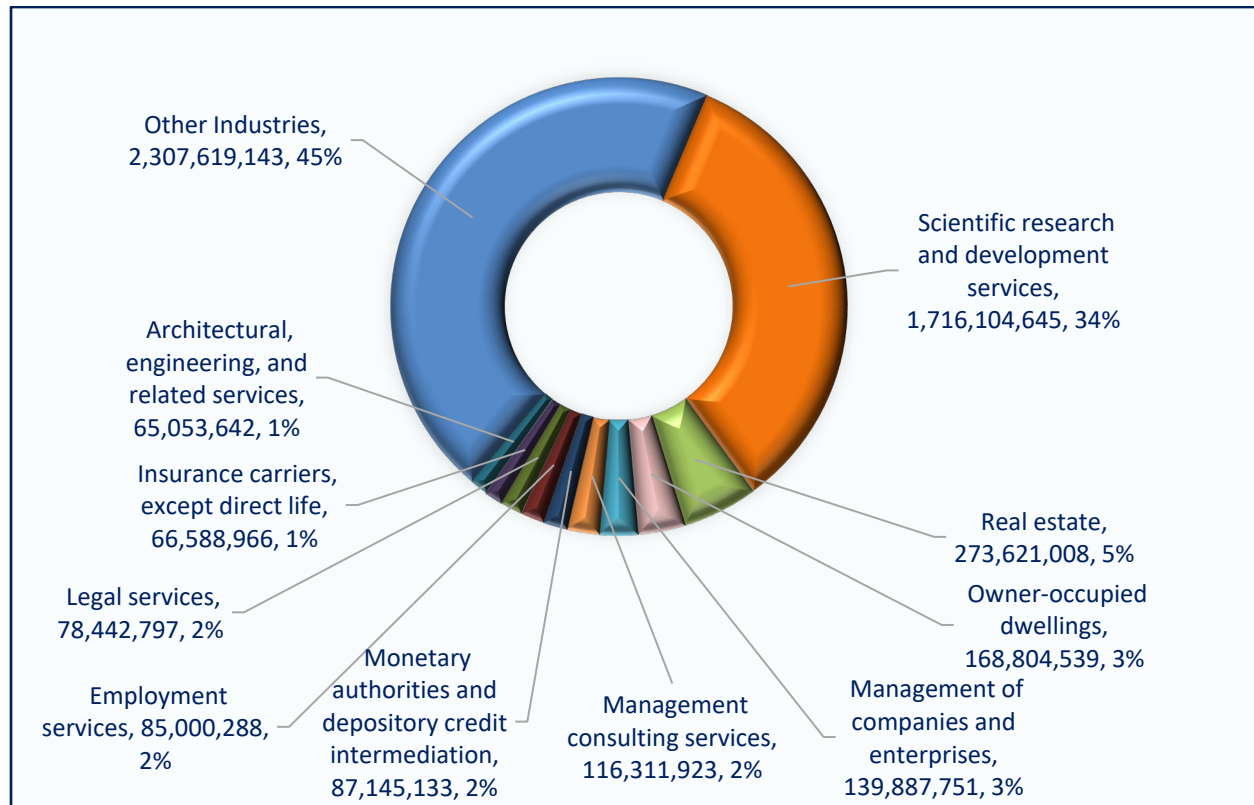
Figure 36: Top Ten Most Impacted Industries by Value-added, Colorado (NASA)



The total output impact of NASA in Colorado was \$5.1 billion in Fiscal Year 2023. The direct impact of \$26 million constitutes the value of production by NASA employees, accounting for 1% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$1.8 billion resulted in an additional increase in output (gross sales) of \$1.3 billion across all industry sectors (adding up to the indirect total of \$3.1 billion in Table 65). Approximately \$2 billion (38%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of \$1.7 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 37). Similar to employment, impact in this industry is largely driven by NASA procurement spending; scientific research and development services accounted for 86% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 37: Top Ten Most Impacted Industries by Output, Colorado (NASA)



M2M Campaign Impacts

In 2023, Colorado had 23 M2M-related civil service employees (10 FTEs) with a corresponding labor income of \$2 million. M2M campaign procurement sourced in the state in the same year totaled \$1.2 billion. The total Colorado employment impact is 13,941 jobs. The labor income and economic output associated with this employment are approximately \$1.3 billion and \$3.3 billion, respectively. The M2M campaign generates \$122.1 million in tax revenues for the state and local governments in Colorado (Table 68).

Table 68: Summary of M2M Campaign Impacts by Types of Impact, Colorado

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	10	1,994	2,656	4,860	55
Indirect	7,868	853,602	1,148,137	2,054,573	46,052
Induced	6,062	410,207	727,364	1,275,224	75,991
Total	13,941	1,265,803	1,878,157	3,334,657	122,098
<i>Multiplier</i>	<i>1347.5</i>	<i>634.7</i>	<i>707.2</i>	<i>686.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Colorado economy. Nearly all employment and output impacts are due to NASA procurement sourced within the state.

Table 69: M2M Campaign Employment Impacts by Sources of Impact, Colorado

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	10	42.3	0	0.0	10	0.1	100.0	0.0
Indirect	0	0.0	7,868	56.5	7,868	56.4	0.0	100.0
Induced	14	57.7	6,048	43.5	6,062	43.5	0.2	99.8
Total	24	100	13,916	100	13,941	100	0.2	99.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 70: M2M Campaign Output Impacts by Sources of Impact, Colorado

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	4,860	60.9	0	0.0	4,860	0.1	100.0	0.0
Indirect	0	0.0	2,054,573	61.8	2,054,573	61.6	0.0	100.0
Induced	3,117	39.1	1,272,107	38.2	1,275,224	38.2	0.2	99.8
Total	7,977	100	3,326,680	100	3,334,657	100	0.2	99.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

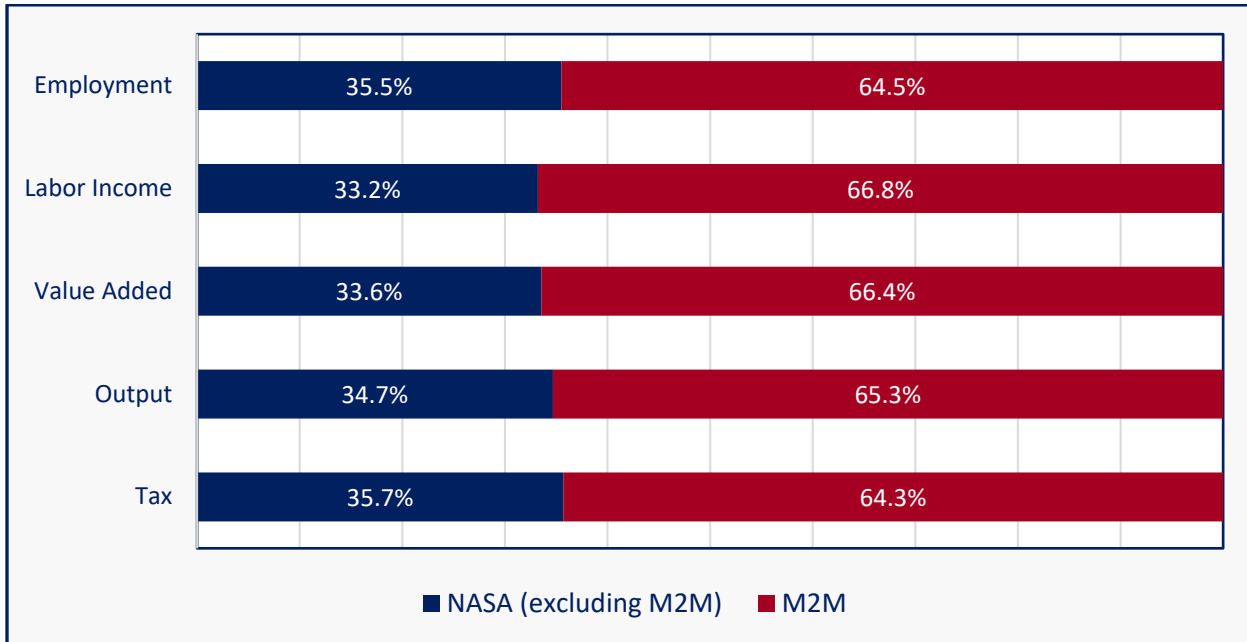
The M2M Campaign's Share of NASA Impacts

Around 65% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 71 and Figure 38). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 71: The M2M Campaign Portion of Overall NASA Impacts, Colorado

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	21,616	1,895,458	2,826,929	5,104,580	189,888
M2M Portion	13,941	1,265,803	1,878,157	3,334,657	122,098
M2M Share	64.5%	66.8%	66.4%	65.3%	64.3%

Figure 38: The M2M Campaign Portion of Overall NASA Impacts, Colorado



Investments in Climate Change Research and Technology Impacts

In 2023, Colorado had 16 climate change research and technology-related civil service employees (9 FTEs) with a corresponding labor income of \$1.5 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$183.9 million. The total Colorado employment impact is 2,306 jobs. The labor income and economic output associated with this employment are \$197.9 million and \$543 million, respectively. Investments in climate change research and technology generate \$20.2 million in tax revenues for the state and local governments in Colorado (Table 72).

Table 72: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Colorado

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	9	1,469	2,203	4,031	41
Indirect	1,294	130,700	179,424	326,812	7,462
Induced	1,003	65,779	117,090	212,175	12,682
Total	2,306	197,948	298,716	543,017	20,184
<i>Multiplier</i>	<i>268.8</i>	<i>134.7</i>	<i>135.6</i>	<i>134.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Colorado economy. Nearly all employment and output impacts are due to NASA procurement sourced within the state.

Table 73: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Colorado

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	9	42.1	0	0.0	9	0.4	100.0	0.0
Indirect	0	0.0	1,294	56.6	1,294	56.1	0.0	100.0
Induced	12	57.9	991	43.4	1,003	43.5	1.2	98.8
Total	20	100	2,285	100	2,306	100	0.9	99.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 74: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Colorado

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	4,031	61.3	0	0.0	4,031	0.7	100.0	0.0
Indirect	0	0.0	326,812	60.9	326,812	60.2	0.0	100.0
Induced	2,545	38.7	209,630	39.1	212,175	39.1	1.2	98.8
Total	6,576	100	536,442	100	543,017	100	1.2	98.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

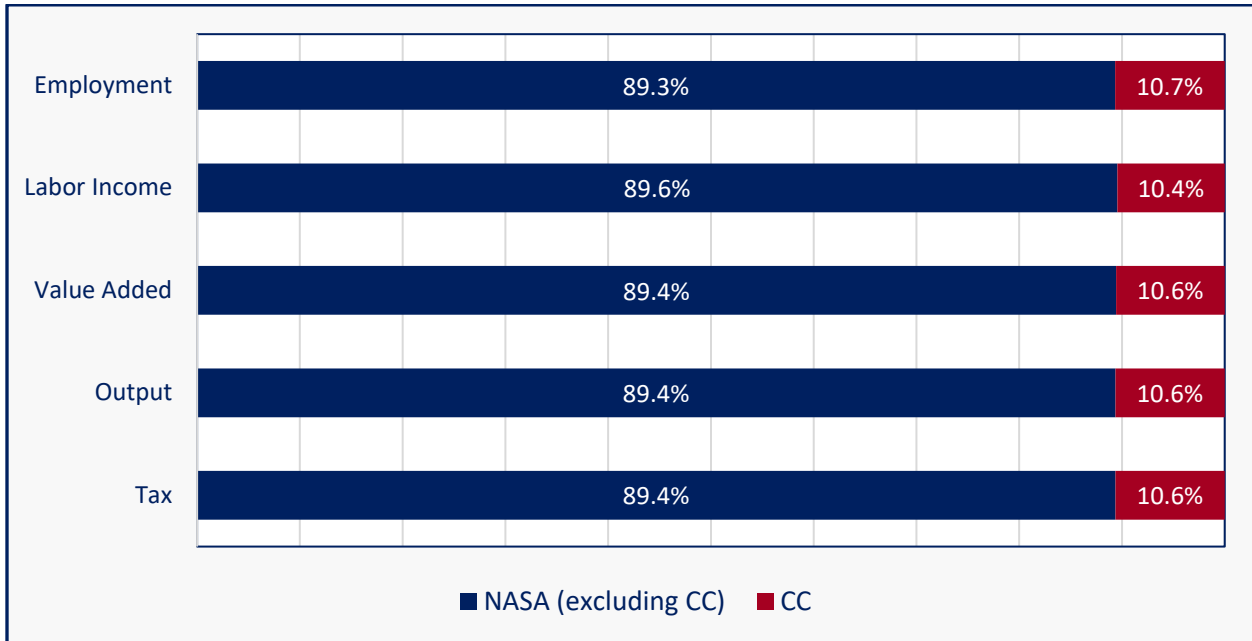
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 11% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 75 and Figure 39). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 75: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Colorado

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	21,616	1,895,458	2,826,929	5,104,580	189,888
CC Portion	2,306	197,948	298,716	543,017	20,184
CC Share	10.7%	10.4%	10.6%	10.6%	10.6%

Figure 39: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Colorado



Economic Impacts on the State of Connecticut

NASA Impacts

In 2023, 14 NASA civil service employees (9 FTEs) residing in Connecticut earned \$1.4 million in labor income. NASA procurement sourced in Connecticut in the same year totaled \$57.5 million. The total economic impact resulting from these activities is 586 jobs, \$58 million in labor income, and \$138.5 million in economic output. These economic activities generate \$7.8 million in tax revenues for the state and local governments in Connecticut (Table 76).

Table 76: Summary of NASA Impacts by Types of Impact, Connecticut

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	9	1,429	2,210	4,044	42
Indirect	337	38,005	52,853	84,292	4,188
Induced	240	18,584	31,536	50,120	3,607
Total	586	58,018	86,599	138,456	7,837
<i>Multiplier</i>	<i>68.1</i>	<i>40.6</i>	<i>39.2</i>	<i>34.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Connecticut economy. Table 77 examines the sources of the employment figures in the second column of Table 76. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 97% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 3%.

Table 77: NASA Employment Impacts by Sources of Impact, Connecticut

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	9	50.0	0	0.0	9	1.5	100.0	0.0
Indirect	0	0.0	337	59.3	337	57.5	0.0	100.0
Induced	9	50.0	232	40.7	240	41.0	3.6	96.4
Total	17	100	569	100	586	100	2.9	97.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 78 examines the sources of the output figures in the fifth column of Table 76. Procurement spending is responsible for nearly 96% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 4%.

Table 78: NASA Output Impacts by Sources of Impact, Connecticut

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	4,044	68.7	0	0.0	4,044	2.9	100.0	0.0
Indirect	0	0.0	84,292	63.6	84,292	60.9	0.0	100.0
Induced	1,838	31.3	48,282	36.4	50,120	36.2	3.7	96.3
Total	5,883	100	132,574	100	138,456	100	4.2	95.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Connecticut had three M2M-related civil service employees (1 FTE) with a corresponding labor income of \$135,000. M2M campaign procurement sourced in the state in the same year totaled \$7 million. The total Connecticut employment impact is 72 jobs. The labor income and economic output associated with this employment are \$7.4 million and \$18.7 million, respectively. The M2M campaign generates \$883,000 in tax revenues for the state and local governments in Connecticut (Table 79).

Table 79: Summary of M2M Campaign Impacts by Types of Impact, Connecticut

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	135	261	478	4
Indirect	42	4,936	6,830	12,062	437
Induced	29	2,331	3,921	6,142	442
Total	72	7,403	11,012	18,683	883
<i>Multiplier</i>	<i>70.8</i>	<i>54.9</i>	<i>42.1</i>	<i>39.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Connecticut economy. More than 97% of the employment impacts and 96% output impacts are due to NASA procurement sourced within the state.

Table 80: M2M Campaign Employment Impacts by Sources of Impact, Connecticut

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	54.7	0	0.0	1	1.4	100.0	0.0
Indirect	0	0.0	42	59.2	42	57.7	0.0	100.0
Induced	1	45.3	29	40.8	29	40.9	2.9	97.1
Total	2	100	70	100	72	100	2.6	97.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 81: M2M Campaign Output Impacts by Sources of Impact, Connecticut

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	478	74.0	0	0.0	478	2.6	100.0	0.0
Indirect	0	0.0	12,062	66.9	12,062	64.6	0.0	100.0
Induced	168	26.0	5,974	33.1	6,142	32.9	2.7	97.3
Total	646	100	18,036	100	18,683	100	3.5	96.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

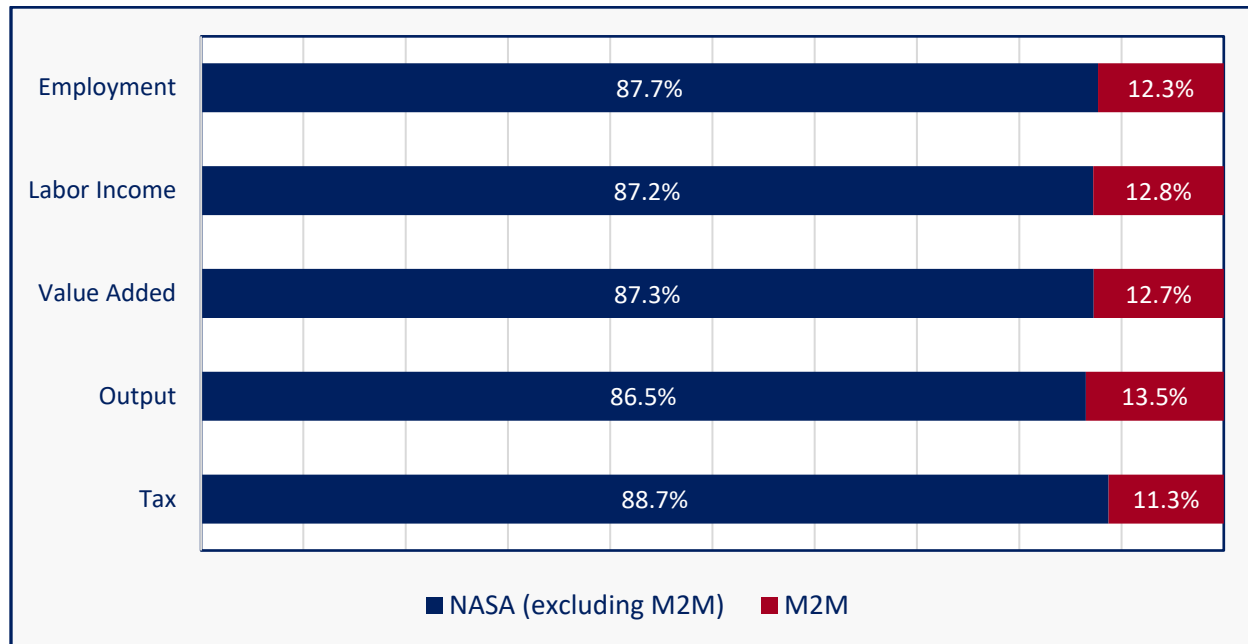
The M2M Campaign’s Share of NASA Impacts

Around 13% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 82 and Figure 40). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 82: The M2M Campaign Portion of Overall NASA Impacts, Connecticut

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	586	58,018	86,599	138,456	7,837
M2M Portion	72	7,403	11,012	18,683	883
M2M Share	12.3%	12.8%	12.7%	13.5%	11.3%

Figure 40: The M2M Campaign Portion of Overall NASA Impacts, Connecticut



Investments in Climate Change Research and Technology Impacts

In 2023, Connecticut had three climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$230,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$12.3 million. The total Connecticut employment impact is 137 jobs. The labor income and economic output associated with this employment are \$13.3 million and \$34 million, respectively. Investments in climate change research and technology generate \$1.6 million in tax revenues for the state and local governments in Connecticut (Table 83).

Table 83: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Connecticut

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	230	567	1,037	7
Indirect	79	8,878	12,381	21,300	772
Induced	56	4,230	7,217	11,675	840
Total	137	13,338	20,164	34,012	1,619
<i>Multiplier</i>	<i>62.2</i>	<i>57.9</i>	<i>35.6</i>	<i>32.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is

calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Connecticut economy. More than 97% of the employment impacts and 96% of the output impacts are due to NASA procurement sourced within the state.

Table 84: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Connecticut

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	59.0	0	0.0	2	1.6	100.0	0.0
Indirect	0	0.0	79	59.3	79	57.7	0.0	100.0
Induced	2	41.0	54	40.7	56	40.7	2.7	97.3
Total	4	100	134	100	137	100	2.7	97.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 85: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Connecticut

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,037	77.2	0	0.0	1,037	3.0	100.0	0.0
Indirect	0	0.0	21,300	65.2	21,300	62.6	0.0	100.0
Induced	307	22.8	11,368	34.8	11,675	34.3	2.6	97.4
Total	1,344	100	32,667	100	34,012	100	4.0	96.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

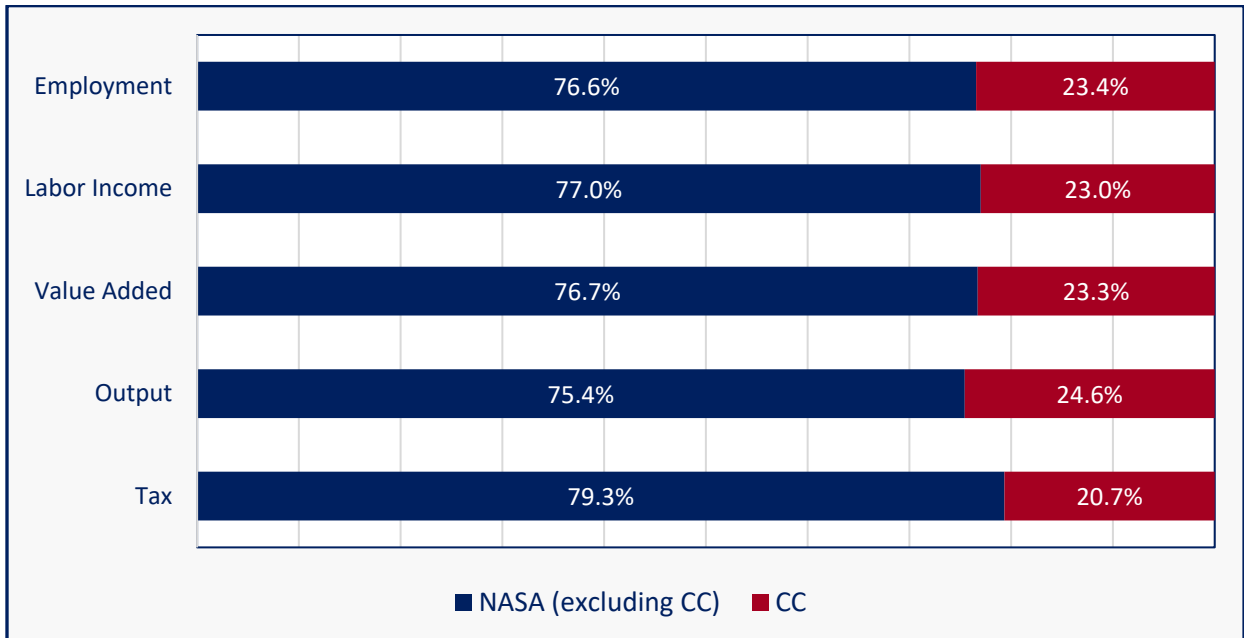
Around 23% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 86 and Figure 41). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 86: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Connecticut

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	586	58,018	86,599	138,456	7,837
CC Portion	137	13,338	20,164	34,012	1,619
CC Share	23.4%	23.0%	23.3%	24.6%	20.7%

Figure 41: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Connecticut



Economic Impacts on the State of Delaware

NASA Impacts

In 2023, seven NASA civil service employees (5 FTEs) residing in Delaware earned nearly \$857,000 in labor income. NASA procurement sourced in Delaware in the same year totaled \$34.6 million. The total economic impact resulting from these activities is 367 jobs, \$27.4 million in labor income, and \$70.2 million in economic output. These economic activities generate \$3.1 million in tax revenues for the state and local governments in Delaware (Table 87).

Table 87: Summary of NASA Impacts by Types of Impact, Delaware

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	857	1,313	2,403	25
Indirect	248	19,725	26,968	45,900	1,921
Induced	113	6,842	13,519	21,918	1,155
Total	367	27,425	41,801	70,221	3,102
<i>Multiplier</i>	<i>71.7</i>	<i>32.0</i>	<i>31.8</i>	<i>29.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Delaware economy. Table 88 examines the sources of the employment figures in the second column of Table 87. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 97% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 3%.

Table 88: NASA Employment Impacts by Sources of Impact, Delaware

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	5	54.3	0	0.0	5	1.4	100.0	0.0
Indirect	0	0.0	248	69.4	248	67.7	0.0	100.0
Induced	4	45.7	109	30.6	113	30.9	3.8	96.2
Total	9	100	357	100	367	100	2.6	97.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 89 examines the sources of the output figures in the fifth column of Table 87. Procurement spending is responsible for more than 95% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is nearly 5%.

Table 89: NASA Output Impacts by Sources of Impact, Delaware

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,403	74.2	0	0.0	2,403	3.4	100.0	0.0
Indirect	0	0.0	45,900	68.5	45,900	65.4	0.0	100.0
Induced	837	25.8	21,081	31.5	21,918	31.2	3.8	96.2
Total	3,240	100	66,981	100	70,221	100	4.6	95.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Moon to Mars (M2M) Campaign Impacts

In 2023, Delaware had two M2M-related civil service employees (<1 FTE) with a corresponding labor income of \$41,000. M2M campaign procurement sourced in the state in the same year totaled \$922,000. The total Delaware employment impact is 8 jobs. The labor income and economic output associated with this employment are \$751,000 and \$2.2 million, respectively. The M2M campaign generates \$79,000 in tax revenues for the state and local governments in Delaware (Table 90).

Table 90: Summary of M2M Campaign Impacts by Types of Impact, Delaware

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	41	77	141	1
Indirect	5	529	786	1,453	48
Induced	3	181	352	565	30
Total	8	751	1,216	2,158	79
<i>Multiplier</i>	<i>28.2</i>	<i>18.5</i>	<i>15.7</i>	<i>15.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Delaware economy. More than 94% of the employment impacts and nearly 92% of the output impacts are due to NASA procurement sourced within the state.

Table 91: M2M Campaign Employment Impacts by Sources of Impact, Delaware

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	60.3	0	0.0	<1	3.5	100.0	0.0
Indirect	0	0.0	5	64.4	5	60.6	0.0	100.0
Induced	<1	39.7	3	35.6	3	35.8	6.5	93.5
Total	1	100	8	100	8	100	5.9	94.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 92: M2M Campaign Output Impacts by Sources of Impact, Delaware

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	141	78.8	0	0.0	141	6.5	100.0	0.0
Indirect	0	0.0	1,453	73.4	1,453	67.3	0.0	100.0
Induced	38	21.2	527	26.6	565	26.2	6.7	93.3
Total	179	100	1,979	100	2,158	100	8.3	91.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

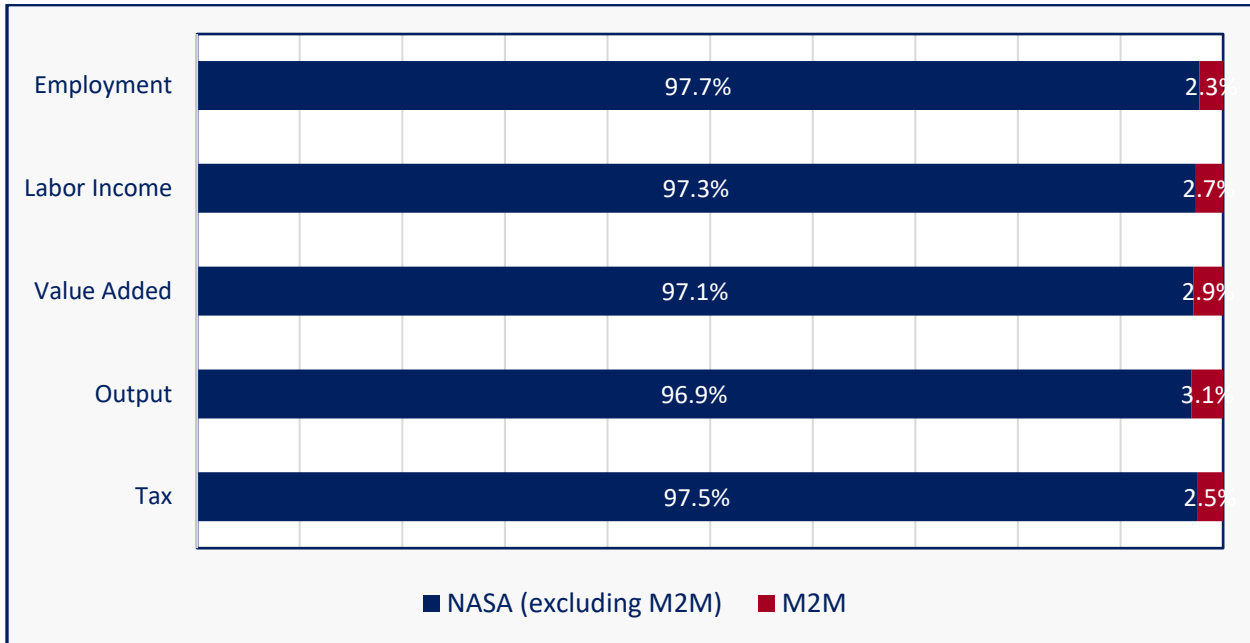
The Moon to Mars Campaign's Share of NASA Impacts

Around 3% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 93 and Figure 42). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the Moon to Mars campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 93: The M2M Campaign Portion of Overall NASA Impacts, Delaware

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	367	27,425	41,801	70,221	3,102
M2M Portion	8	751	1,216	2,158	79
M2M Share	2.3%	2.7%	2.9%	3.1%	2.5%

Figure 42: The Moon to Mars Campaign Portion of Overall NASA Impacts, Delaware



Investments in Climate Change Research and Technology Impacts

In 2023, Delaware had one climate change research and technology-related civil service employee (<1 FTE) with a corresponding labor income of \$8,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$2.2 million. The total Delaware employment impact is 22 jobs. The labor income and economic output associated with this employment are \$1.8 million and \$4.9 million, respectively. Investments in climate change research and technology generate \$187,000 in tax revenues for the state and local governments in Delaware (Table 94).

Table 94: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Delaware

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	8	14	26	<1
Indirect	14	1,377	1,984	3,413	109
Induced	8	446	894	1,472	78
Total	22	1,830	2,892	4,911	187
<i>Multiplier</i>	<i>391.5</i>	<i>242.4</i>	<i>203.3</i>	<i>188.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Delaware economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 95: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Delaware

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	<1	58.1	0	0.0	<1	0.3	100.0	0.0
Indirect	0	0.0	14	64.8	14	64.5	0.0	100.0
Induced	<1	41.9	8	35.2	8	35.3	0.5	99.5
Total	<1	100	22	100	22	100	0.4	99.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 96: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Delaware

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	26	77.0	0	0.0	26	0.5	100.0	0.0
Indirect	0	0.0	3,413	70.0	3,413	69.5	0.0	100.0
Induced	8	23.0	1,464	30.0	1,472	30.0	0.5	99.5
Total	34	100	4,877	100	4,911	100	0.7	99.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

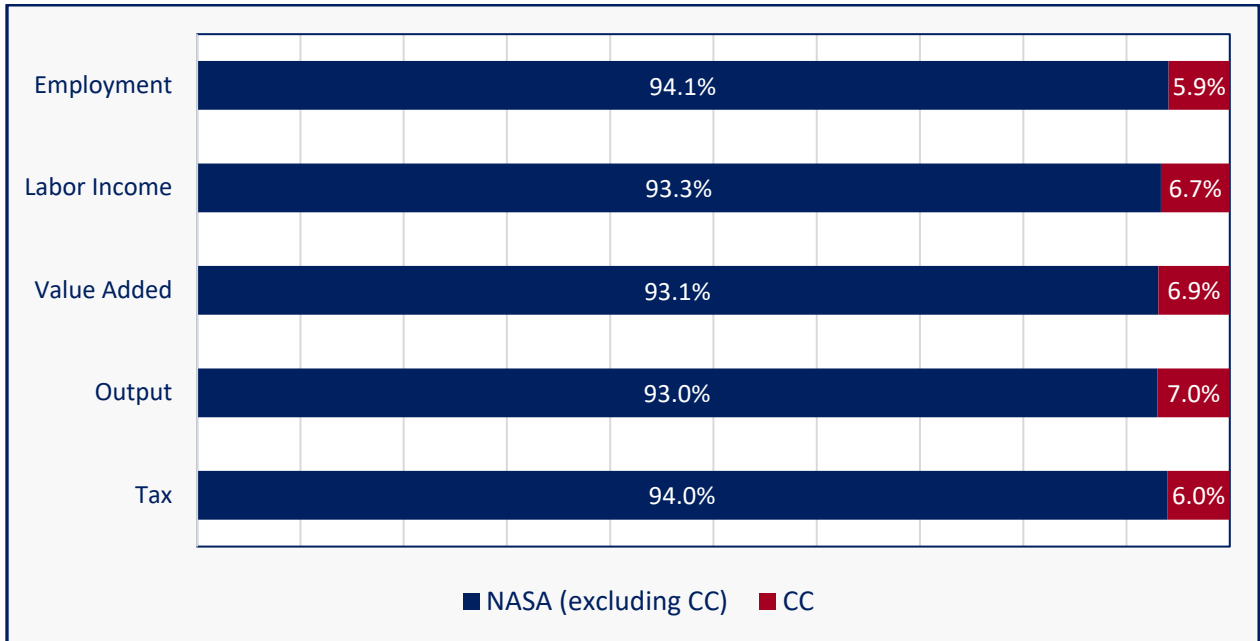
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 7% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 97 and Figure 43). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 97: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Delaware

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	367	27,425	41,801	70,221	3,102
CC Portion	22	1,830	2,892	4,911	187
CC Share	5.9%	6.7%	6.9%	7.0%	6.0%

Figure 43: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Delaware



Economic Impacts on the State of Florida

NASA Impacts

In 2023, 2,366 NASA civil service employees (2,162 FTEs) residing in Florida earned \$393.5 million in labor income. NASA procurement sourced in Florida in the same year totaled \$2.3 billion. The total economic impact resulting from these activities is 35,685 jobs, \$2.8 billion in labor income, and \$8.3 billion in economic output. These economic activities generate \$286.6 million in tax revenues for the state and local governments in Florida (Table 98).

The employment multiplier is 16.5, meaning that for every NASA job located in Florida, an additional 15.5 jobs are supported in the state economy. The output multiplier of 8.2 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$7.2 million worth of output is sustained throughout the state economy.

Table 98: Summary of NASA Impacts by Types of Impact, Florida

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2,162	393,525	555,027	1,015,686	363
Indirect	18,290	1,459,048	2,165,877	4,295,164	121,556
Induced	15,233	900,160	1,651,168	2,986,447	164,684
Total	35,685	2,752,734	4,372,071	8,297,298	286,603
<i>Multiplier</i>	<i>16.5</i>	<i>7.0</i>	<i>7.9</i>	<i>8.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Florida economy. Table 99 examines the sources of the employment figures in the second column of Table 98. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 85% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is around 15%.

Table 99: NASA Employment Impacts by Sources of Impact, Florida

Type of Impact	NASA Employment		NASA Procurement		Total		Shares	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	2,162	39.3	0	0.0	2,162	6.1	100.0	0.0
Indirect	0	0.0	18,290	60.6	18,290	51.3	0.0	100.0
Induced	3,339	60.7	11,894	39.4	15,233	42.7	21.9	78.1
Total	5,501	100	30,184	100	35,685	100	15.4	84.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 100 examines the sources of the output figures in the fifth column of Table 98. Procurement spending is responsible for nearly 80% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 20%.

Table 100: NASA Output Impacts by Sources of Impact, Florida

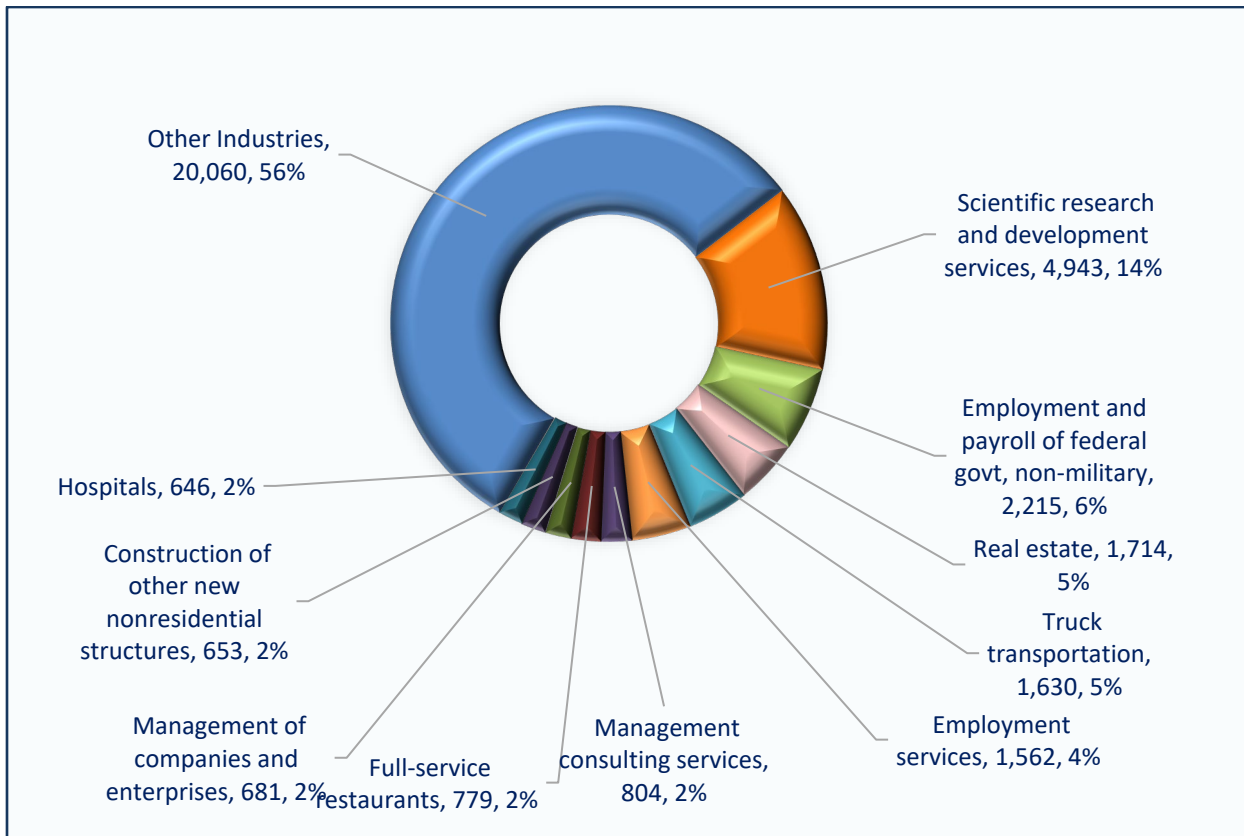
Type of Impact	NASA Employment		NASA Procurement		Total		Shares	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,015,686	60.2	0	0.0	1,015,686	12.2	100.0	0.0
Indirect	0	0.0	4,295,164	65.0	4,295,164	51.8	0.0	100.0
Induced	671,200	39.8	2,315,248	35.0	2,986,447	36.0	22.5	77.5
Total	1,686,886	100	6,610,412	100	8,297,298	100	20.3	79.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

35,685 jobs in the Florida economy were supported by NASA activities in Fiscal Year 2023. Of these, 2,162 (6%) were directly located at NASA centers. As a result of the procurement of goods and services in the Florida economy, 18,290 additional jobs (51%) were created. The remaining employment—15,233 jobs (43%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 44 depicts the ten most impacted industries by employment. The federal government sector, scientific research and development services are the most impacted industries. These two industries together account for 20% of the jobs created. The employment in scientific research and development services is driven largely by NASA procurement spending; this industry accounted for 47% of NASA procurement spending in the state in Fiscal Year 2023. The impact in the federal government sector represents mainly civil service employees working for NASA.

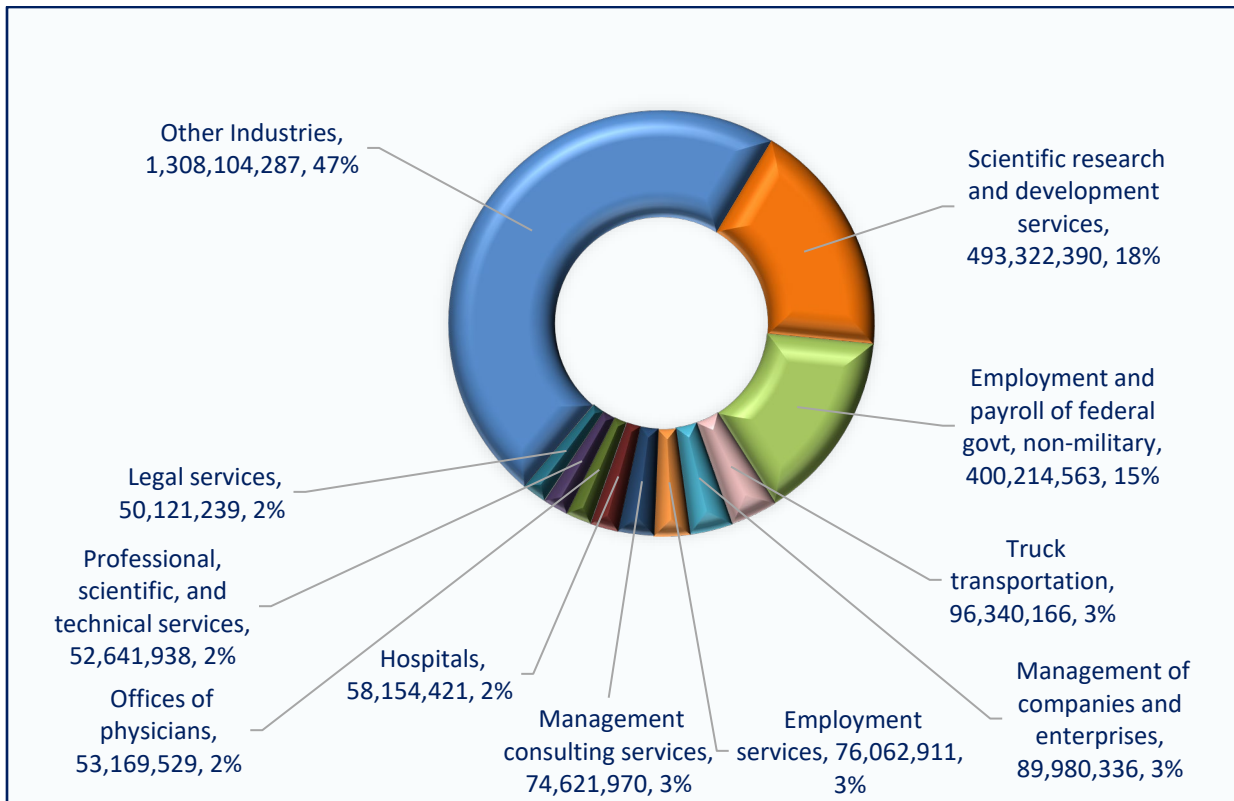
Figure 44: Top Ten Most Impacted Industries by Employment, Florida (NASA)



The total income impact of NASA in Florida was \$2.8 billion in Fiscal Year 2023. Of this amount, more than \$393 million (14%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.5 billion (53%). The remaining income (induced impact), estimated to be \$900 million (33%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 45 depicts the ten most impacted industries by labor income. As a consequence of its share of total employment, scientific research and development services (along with the federal government sector) are the most impacted industries. The two industries together account for 33% of the total labor income earned. The reason that these industries' share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services industry was \$97,153 (including benefits), compared to an average of \$60,337 across Florida.

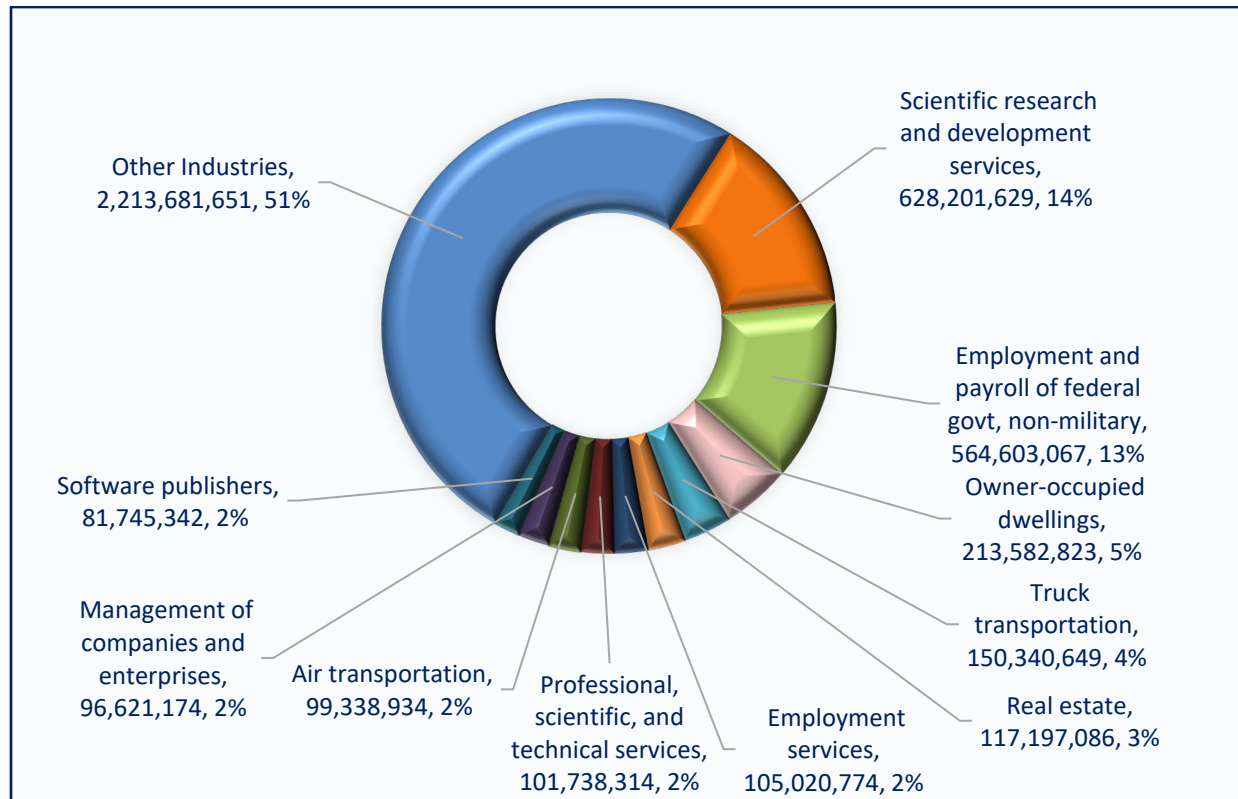
Figure 45: Top Ten Most Impacted Industries by Labor Income, Florida (NASA)



The total value-added impact of NASA in Florida was \$4.4 billion in Fiscal Year 2023. Of this amount, \$555 million (12%) was created by civil service employees and \$2.2 billion (50%) was created indirectly by the \$2.3 billion in procurement spending across all industry sectors in Florida. More than \$1.6 billion (38%) was generated by increased consumption spending supported by increased earnings.

Figure 46 depicts the ten most heavily impacted industries in terms of value-added. The federal government sector and scientific research and development services are the most impacted industries. These industries together account for 27% of the total value-added created. NASA activities accounted for an increase of \$628 million in value-added in scientific research and development services. Approximately \$565 million dollars in the federal government non-military sector corresponds mainly to value-added by NASA employees.

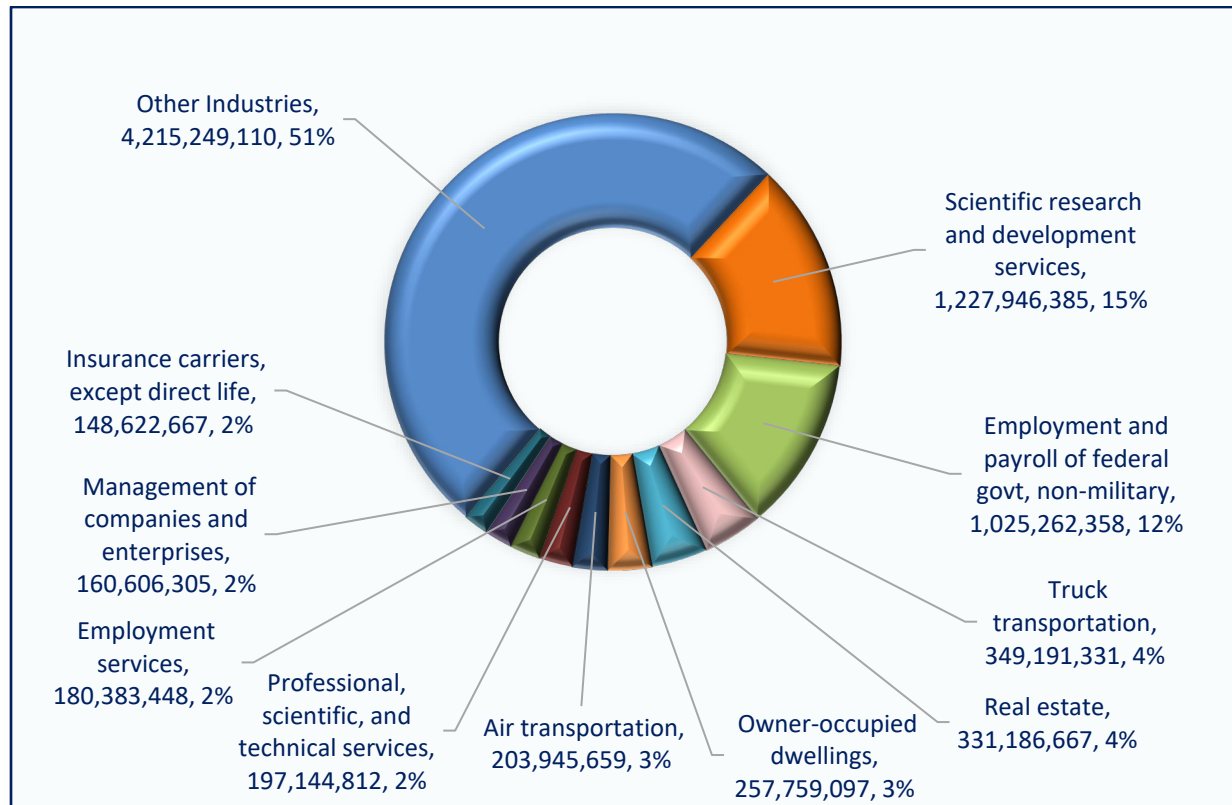
Figure 46: Top Ten Most Impacted Industries by Value-added, Florida (NASA)



The total output impact of NASA in Florida was \$8.3 billion in Fiscal Year 2023. The direct impact of \$1 billion constitutes the value of production by NASA employees, accounting for 12% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$2.3 billion resulted in an additional increase in output (gross sales) of \$2 billion across all industry sectors (adding up to the indirect total of \$4.3 billion in Table 98). Approximately \$3 billion (36%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of \$1.2 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 47). Similar to employment, impacts in this industry is largely driven by NASA procurement spending; this industry accounted for 47% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industries are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 47: Top Ten Most Impacted Industries by Output, Florida (NASA)



M2M Campaign Impacts

In 2023, Florida had 1,058 M2M-related civil service employees (688 FTEs) with a corresponding labor income of \$123.2 million. M2M campaign procurement sourced in the state in the same year totaled \$833.9 million. The total Florida employment impact is 13,123 jobs. The labor income and economic output associated with this employment are \$1.1 billion and \$3 billion, respectively. The M2M campaign generates \$94.2 million in tax revenues for the state and local governments in Florida (Table 101).

Table 101: Summary of M2M Campaign Impacts by Types of Impact, Florida

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	688	123,197	176,504	322,998	114
Indirect	6,751	586,203	825,913	1,571,645	31,967
Induced	5,684	344,407	630,916	1,126,009	62,080
Total	13,123	1,053,806	1,633,333	3,020,652	94,161
<i>Multiplier</i>	<i>19.1</i>	<i>8.6</i>	<i>9.3</i>	<i>9.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Florida economy. More than 87% of the employment impacts and nearly 83% of the output impacts are due to NASA procurement sourced within the state.

Table 102: M2M Campaign Employment Impacts by Sources of Impact, Florida

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	688	41.3	0	0.0	688	5.2	100.0	0.0
Indirect	0	0.0	6,751	58.9	6,751	51.4	0.0	100.0
Induced	976	58.7	4,708	41.1	5,684	43.3	17.2	82.8
Total	1,663	100	11,459	100	13,123	100	12.7	87.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 103: M2M Campaign Output Impacts by Sources of Impact, Florida

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	322,998	61.8	0	0.0	322,998	10.7	100.0	0.0
Indirect	0	0.0	1,571,645	62.9	1,571,645	52.0	0.0	100.0
Induced	199,891	38.2	926,118	37.1	1,126,009	37.3	17.8	82.2
Total	522,889	100	2,497,763	100	3,020,652	100	17.3	82.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

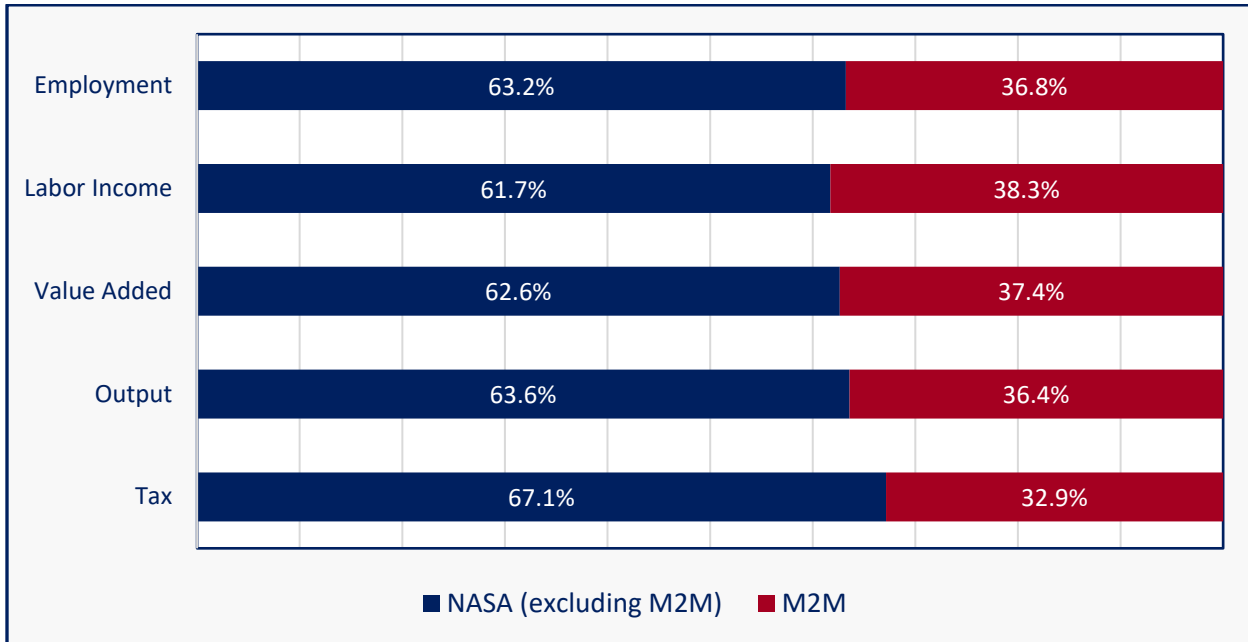
The M2M Campaign's Share of NASA Impacts

Around 36% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 104 and Figure 48). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 104: The M2M Campaign Portion of Overall NASA Impacts, Florida

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	35,685	2,752,734	4,372,071	8,297,298	286,603
M2M Portion	13,123	1,053,806	1,633,333	3,020,652	94,161
M2M Share	36.8%	38.3%	37.4%	36.4%	32.9%

Figure 48: The M2M Campaign Portion of Overall NASA Impacts, Florida



Investments in Climate Change Research and Technology Impacts

In 2023, Florida had 97 climate change research and technology-related civil service employees (22 FTEs) with a corresponding labor income of \$3.8 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$142 million. The total Florida employment impact is 2,179 jobs. The labor income and economic output associated with this employment are \$154.2 million and \$458.9 million, respectively. Investments in climate change research and technology generate nearly \$15 million in tax revenues for the state and local governments in Florida (Table 105).

Table 105: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Florida

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	22	3,755	5,581	10,214	3
Indirect	1,254	98,623	137,610	272,433	5,281
Induced	903	51,809	95,395	176,252	9,710
Total	2,179	154,187	238,587	458,899	14,994
<i>Multiplier</i>	<i>100.2</i>	<i>41.1</i>	<i>42.7</i>	<i>44.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Florida economy. More than 97% of the employment impacts and 96% of the output impacts are due to NASA procurement sourced within the state.

Table 106: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Florida

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	22	38.4	0	0.0	22	1.0	100.0	0.0
Indirect	0	0.0	1,254	59.1	1,254	57.6	0.0	100.0
Induced	35	61.6	868	40.9	903	41.4	3.9	96.1
Total	57	100	2,123	100	2,179	100	2.6	97.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 107: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Florida

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	10,214	59.9	0	0.0	10,214	2.2	100.0	0.0
Indirect	0	0.0	272,433	61.7	272,433	59.4	0.0	100.0
Induced	6,833	40.1	169,419	38.3	176,252	38.4	3.9	96.1
Total	17,047	100	441,852	100	458,899	100	3.7	96.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

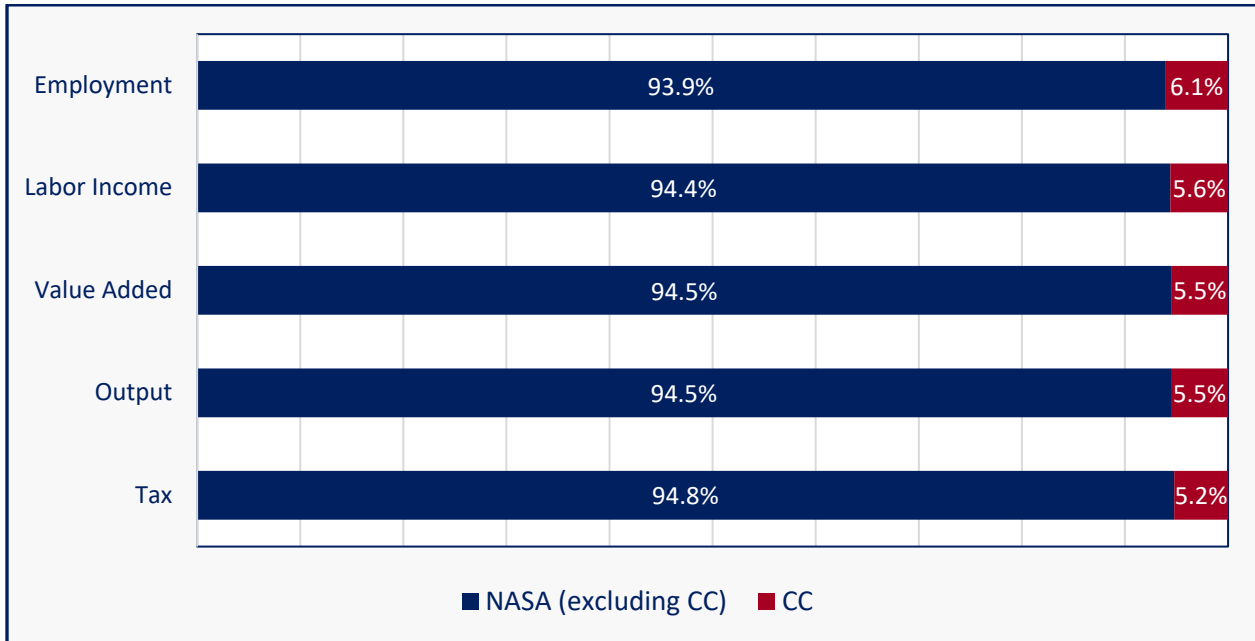
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 6% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 108 and Figure 49). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 108: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Florida

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	35,685	2,752,734	4,372,071	8,297,298	286,603
CC Portion	2,179	154,187	238,587	458,899	14,994
CC Share	6.1%	5.6%	5.5%	5.5%	5.2%

Figure 49: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Florida



Economic Impacts on the State of Georgia

NASA Impacts

In 2023, 45 NASA civil service employees (27 FTEs) residing in Georgia earned \$3.8 million in labor income. NASA procurement sourced in Georgia in the same year totaled \$28.5 million. The total economic impact resulting from these activities is 420 jobs, \$33.7 million in labor income, and \$100.7 million in economic output. These economic activities generate \$3.5 million in tax revenues for the state and local governments in Georgia (Table 109).

Table 109: Summary of NASA Impacts by Types of Impact, Georgia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	27	3,815	6,828	12,496	105
Indirect	215	18,804	27,190	51,922	1,327
Induced	178	11,031	20,430	36,327	2,103
Total	420	33,650	54,449	100,744	3,535
<i>Multiplier</i>	<i>15.8</i>	<i>8.8</i>	<i>8.0</i>	<i>8.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Georgia economy. Table 110 examines the sources of the employment figures in the second column of Table 109. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 86% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is around 14%.

Table 110: NASA Employment Impacts by Sources of Impact, Georgia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	27	46.7	0	0.0	27	6.3	100.0	0.0
Indirect	0	0.0	215	59.3	215	51.3	0.0	100.0
Induced	30	53.3	148	40.7	178	42.4	17.1	82.9
Total	57	100	363	100	420	100	13.6	86.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 111 examines the sources of the output figures in the fifth column of Table 109. Procurement spending is responsible for 81% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 19%.

Table 111: NASA Output Impacts by Sources of Impact, Georgia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	12,496	66.3	0	0.0	12,496	12.4	100.0	0.0
Indirect	0	0.0	51,922	63.4	51,922	51.5	0.0	100.0
Induced	6,365	33.7	29,962	36.6	36,327	36.1	17.5	82.5
Total	18,861	100	81,884	100	100,744	100	18.7	81.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Georgia had eight M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$518,000. M2M campaign procurement sourced in the state in the same year totaled \$5.5 million. The total Georgia employment impact is 81 jobs. The labor income and economic output associated with this employment are \$6.5 million and \$18.1 million, respectively. The M2M campaign generates \$650,000 in tax revenues for the state and local governments in Georgia (Table 112).

Table 112: Summary of M2M Campaign Impacts by Types of Impact, Georgia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	518	804	1,471	14
Indirect	44	3,853	5,423	9,776	237
Induced	34	2,130	3,940	6,895	399
Total	81	6,501	10,166	18,142	650
<i>Multiplier</i>	<i>25.9</i>	<i>12.6</i>	<i>12.7</i>	<i>12.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Georgia economy. More than 91% of the employment impacts and 87% of the output impacts are due to NASA procurement sourced within the state.

Table 113: M2M Campaign Employment Impacts by Sources of Impact, Georgia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	44.3	0	0.0	3	3.9	100.0	0.0
Indirect	0	0.0	44	59.6	44	54.4	0.0	100.0
Induced	4	55.7	30	40.4	34	41.7	11.7	88.3
Total	7	100	74	100	81	100	8.7	91.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 114: M2M Campaign Output Impacts by Sources of Impact, Georgia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,471	64.2	0	0.0	1,471	8.1	100.0	0.0
Indirect	0	0.0	9,776	61.7	9,776	53.9	0.0	100.0
Induced	819	35.8	6,076	38.3	6,895	38.0	11.9	88.1
Total	2,290	100	15,853	100	18,142	100	12.6	87.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

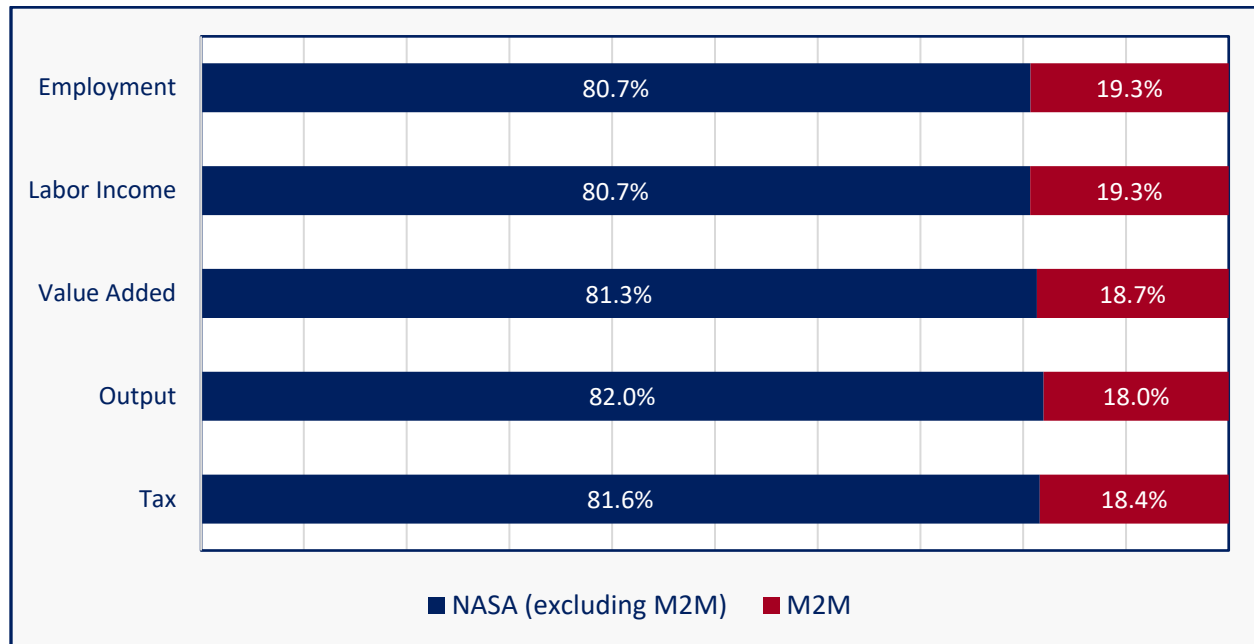
The M2M Campaign's Share of NASA Impacts

Around 19% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 115 and Figure 50). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 115: The M2M Campaign Portion of Overall NASA Impacts, Georgia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	420	33,650	54,449	100,744	3,535
M2M Portion	81	6,501	10,166	18,142	650
M2M Share	19.3%	19.3%	18.7%	18.0%	18.4%

Figure 50: The M2M Campaign Portion of Overall NASA Impacts, Georgia



Investments in Climate Change Research and Technology Impacts

In 2023, Georgia had six climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$150,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$10.3 million. The total Georgia employment impact is 145 jobs. The labor income and economic output associated with this employment are \$10.8 million and \$31.5 million, respectively. Investments in climate change research and technology generate \$1.2 million in tax revenues for the state and local governments in Georgia (Table 116).

Table 116: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Georgia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	150	473	866	4
Indirect	84	7,047	10,050	18,525	454
Induced	60	3,577	6,660	12,146	703
Total	145	10,775	17,182	31,536	1,161
<i>Multiplier</i>	<i>78.7</i>	<i>71.7</i>	<i>36.3</i>	<i>36.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Georgia economy. Around 98% of the employment impacts and 976% of the output impacts are due to NASA procurement sourced within the state.

Table 117: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Georgia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	56.5	0	0.0	2	1.3	100.0	0.0
Indirect	0	0.0	84	58.9	84	57.6	0.0	100.0
Induced	1	43.5	58	41.1	60	41.1	2.4	97.6
Total	3	100	142	100	145	100	2.3	97.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 118: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Georgia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	866	76.5	0	0.0	866	2.7	100.0	0.0
Indirect	0	0.0	18,525	60.9	18,525	58.7	0.0	100.0
Induced	266	23.5	11,880	39.1	12,146	38.5	2.2	97.8
Total	1,132	100	30,405	100	31,536	100	3.6	96.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

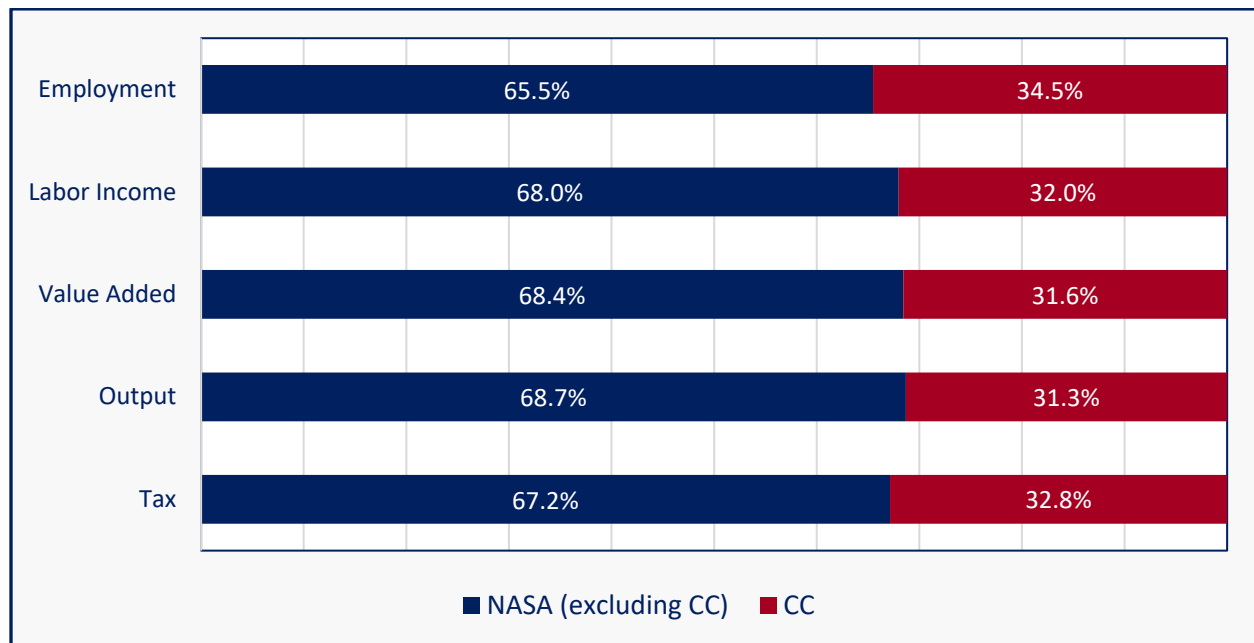
Around 32% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 119 and Figure 51). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 119: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Georgia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	420	33,650	54,449	100,744	3,535
CC Portion	145	10,775	17,182	31,536	1,161
CC Share	34.5%	32.0%	31.6%	31.3%	32.8%

Figure 51: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Georgia



Economic Impacts on the State of Hawaii

NASA Impacts

In 2023, eight NASA civil service employees (7 FTEs) residing in Hawaii earned \$1.3 million in labor income. NASA procurement sourced in Hawaii in the same year totaled \$30.4 million. The total economic impact resulting from these activities is 380 jobs, \$29.5 million in labor income, and \$79 million in economic output. These economic activities generate \$3.8 million in tax revenues for the state and local governments in Hawaii (Table 120).

Table 120: Summary of NASA Impacts by Types of Impact, Hawaii

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	7	1,277	1,698	3,108	48
Indirect	230	19,679	23,862	48,200	1,457
Induced	143	8,529	16,112	27,651	2,306
Total	380	29,485	41,672	78,958	3,812
<i>Multiplier</i>	<i>57.4</i>	<i>23.1</i>	<i>24.5</i>	<i>25.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Hawaii economy. Table 121 examines the sources of the employment figures in the second column of Table 120. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. 96% of jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 4%.

Table 121: NASA Employment Impacts by Sources of Impact, Hawaii

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	7	44.0	0	0.0	7	1.7	100.0	0.0
Indirect	0	0.0	230	63.2	230	60.7	0.0	100.0
Induced	8	56.0	134	36.8	143	37.6	5.9	94.1
Total	15	100	365	100	380	100	4.0	96.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 122 examines the sources of the output figures in the fifth column of Table 120. Procurement spending is responsible for 94% of the increase in output in the state economy arising from NASA. NASA labor force’s share of overall NASA output impact is 6%.

Table 122: NASA Output Impacts by Sources of Impact, Hawaii

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	3,108	65.1	0	0.0	3,108	3.9	100.0	0.0
Indirect	0	0.0	48,200	65.0	48,200	61.0	0.0	100.0
Induced	1,669	34.9	25,982	35.0	27,651	35.0	6.0	94.0
Total	4,777	100	74,182	100	78,958	100	6.0	94.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Hawaii had three M2M-related civil service employees (1 FTE) with a corresponding labor income of \$279,000. M2M campaign procurement sourced in the state in the same year totaled \$345,000. The total economic impact attributable to this procurement activity is 11 jobs, \$996,000 in labor income, and \$2.2 million worth of output. These economic activities generate \$116,000 in tax revenues for the state and local governments in Hawaii (Table 123).

Table 123: Summary of M2M Campaign Impacts by Types of Impact, Hawaii

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	279	329	603	11
Indirect	5	423	320	666	28
Induced	5	294	549	923	77
Total	11	996	1,198	2,191	116
<i>Multiplier</i>	<i>8.8</i>	<i>3.6</i>	<i>3.6</i>	<i>3.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Hawaii economy. 73% of the employment impacts and more than 56% of the output impacts are due to NASA employees residing in the state.

Table 124: M2M Campaign Employment Impacts by Sources of Impact, Hawaii

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	41.9	0	0.0	1	11.3	100.0	0.0
Indirect	0	0.0	5	64.0	5	46.7	0.0	100.0
Induced	2	58.1	3	36.0	5	42.0	37.4	62.6
Total	3	100	8	100	11	100	27.0	73.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 125: M2M Campaign Output Impacts by Sources of Impact, Hawaii

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	603	63.2	0	0.0	603	27.5	100.0	0.0
Indirect	0	0.0	666	53.7	666	30.4	0.0	100.0
Induced	350	36.8	573	46.3	923	42.1	37.9	62.1
Total	953	100	1,239	100	2,191	100	43.5	56.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

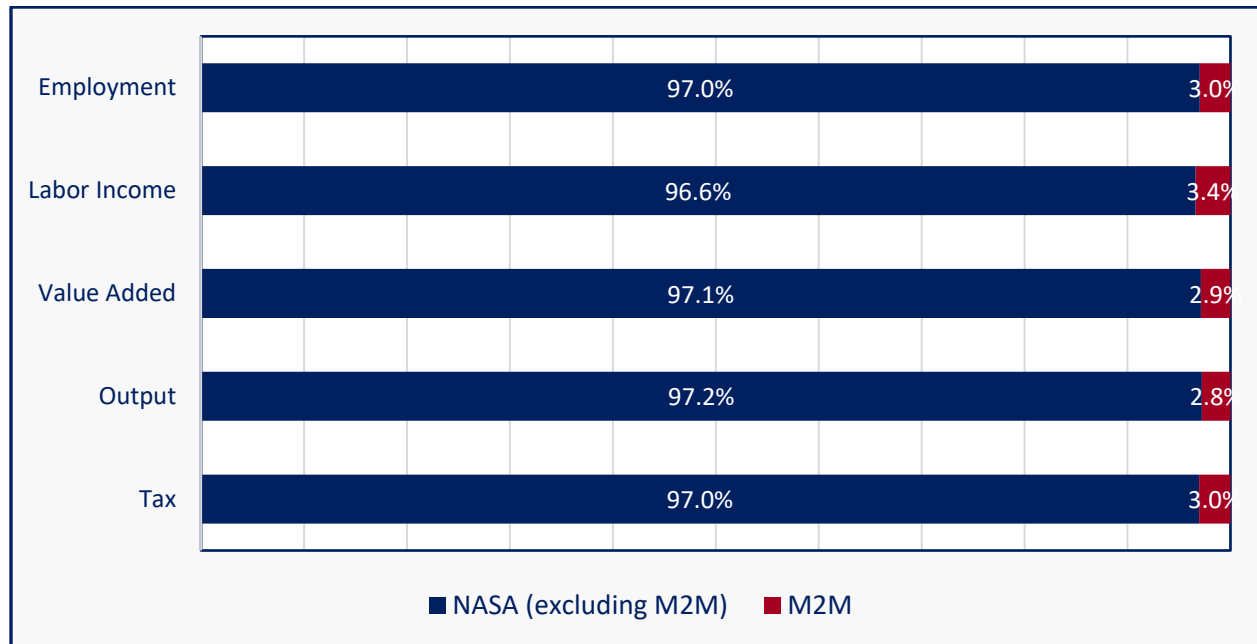
The M2M Campaign's Share of NASA Impacts

Around 3% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 126 and Figure 52). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 126: The M2M Campaign Portion of Overall NASA Impacts, Hawaii

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	380	29,485	41,672	78,958	3,812
M2M Portion	11	996	1,198	2,191	116
M2M Share	3.0%	3.4%	2.9%	2.8%	3.0%

Figure 52: The M2M Campaign Portion of Overall NASA Impacts, Hawaii



Investments in Climate Change Research and Technology Impacts

In 2023, Hawaii had three climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$178,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$4.1 million. The total Hawaii employment impact is 54 jobs. The labor income and economic output associated with this employment are \$4.1 million and \$10.9 million, respectively. Investments in climate change research and technology activities generate \$537,000 in tax revenues for the state and local governments in Hawaii (Table 127).

Table 127: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Hawaii

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	178	297	544	7
Indirect	32	2,739	3,280	6,334	198
Induced	21	1,202	2,282	3,993	333
Total	54	4,119	5,859	10,871	537
<i>Multiplier</i>	<i>46.2</i>	<i>23.2</i>	<i>19.7</i>	<i>20.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Hawaii economy. More than 95% of the employment and nearly 93% of the output impacts are due to NASA procurement sourced within the state.

Table 128: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Hawaii

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	46.6	0	0.0	1	2.2	100.0	0.0
Indirect	0	0.0	32	62.0	32	59.1	0.0	100.0
Induced	1	53.4	19	38.0	21	38.7	6.4	93.6
Total	2	100	51	100	54	100	4.6	95.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 129: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Hawaii

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	544	69.2	0	0.0	544	5.0	100.0	0.0
Indirect	0	0.0	6,334	62.8	6,334	58.3	0.0	100.0
Induced	243	30.8	3,750	37.2	3,993	36.7	6.1	93.9
Total	787	100	10,084	100	10,871	100	7.2	92.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

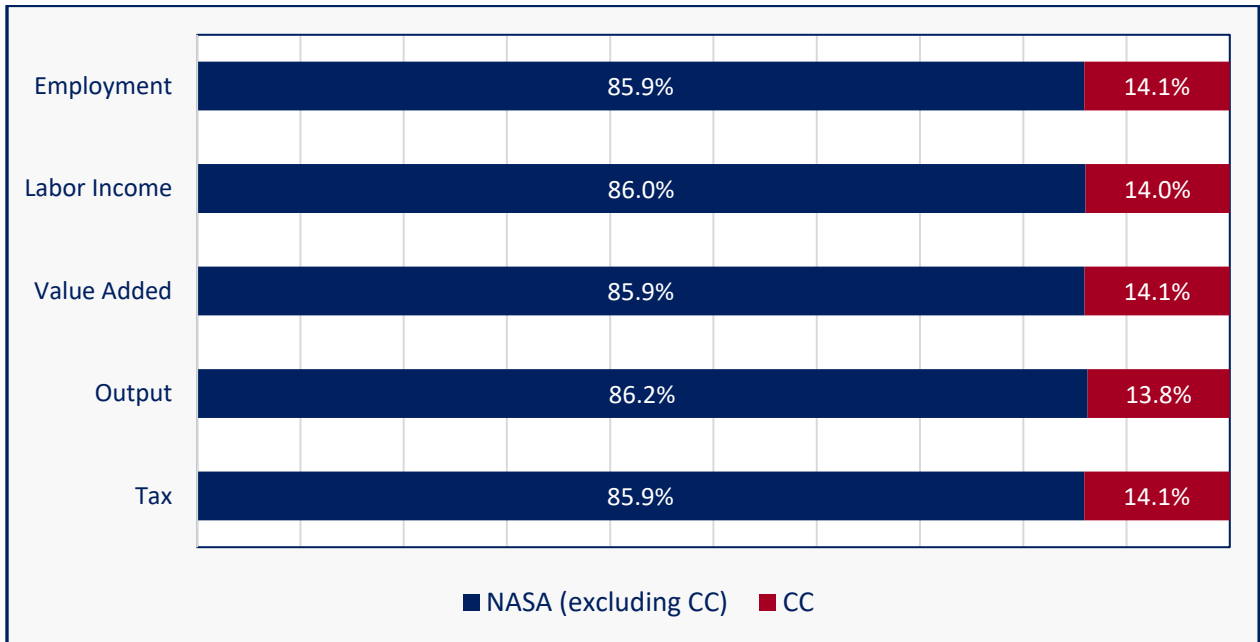
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 14% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 130 and Figure 53). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 130: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Hawaii

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	380	29,485	41,672	78,958	3,812
CC Portion	54	4,119	5,859	10,871	537
CC Share	14.1%	14.0%	14.1%	13.8%	14.1%

Figure 53: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Hawaii



Economic Impacts on the State of Idaho

NASA Impacts

In 2023, 10 NASA civil service employees (5 FTEs) residing in Idaho earned \$877,000 in labor income. NASA procurement sourced in Idaho in the same year totaled \$5.4 million. The total economic impact resulting from these activities is 84 jobs, \$6.1 million in labor income, and \$17.8 million in economic output. These economic activities generate \$597,000 in tax revenues for the state and local governments in Idaho (Table 131).

Table 131: Summary of NASA Impacts by Types of Impact, Idaho

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	877	1,370	2,508	26
Indirect	49	3,519	4,646	9,672	220
Induced	30	1,666	2,991	5,639	352
Total	84	6,062	9,007	17,818	597
<i>Multiplier</i>	<i>15.7</i>	<i>6.9</i>	<i>6.6</i>	<i>7.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Idaho economy. Table 132 examines the sources of the employment figures in the second column of Table 131. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Nearly 87% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 13%.

Table 132: NASA Employment Impacts by Sources of Impact, Idaho

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	5	47.6	0	0.0	5	6.3	100.0	0.0
Indirect	0	0.0	49	67.0	49	58.0	0.0	100.0
Induced	6	52.4	24	33.0	30	35.6	19.7	80.3
Total	11	100	73	100	84	100	13.3	86.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 133 examines the sources of the output figures in the fifth column of Table 131. Procurement spending is responsible for approximately 80% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 20%.

Table 133: NASA Output Impacts by Sources of Impact, Idaho

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,508	68.9	0	0.0	2,508	14.1	100.0	0.0
Indirect	0	0.0	9,672	68.2	9,672	54.3	0.0	100.0
Induced	1,131	31.1	4,507	31.8	5,639	31.6	20.1	79.9
Total	3,639	100	14,179	100	17,818	100	20.4	79.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Idaho had two M2M-related civil service employees (<1 FTE) with a corresponding labor income of 142,000. M2M campaign procurement sourced in the state in the same year totaled \$193,000. The total Idaho employment impact is 4 jobs. The labor income and economic output associated with this employment are \$367,000 and \$814,000, respectively. The M2M campaign generates \$32,000 in tax revenues for the state and local governments in Idaho (Table 134).

Table 134: Summary of M2M Campaign Impacts by Types of Impact, Idaho

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	142	119	217	4
Indirect	1	122	183	257	7
Induced	2	103	184	340	21
Total	4	367	485	814	32
<i>Multiplier</i>	<i>8.0</i>	<i>2.6</i>	<i>4.1</i>	<i>3.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Idaho economy. Nearly 62% of the employment impacts and 52% of the output impacts are due to NASA procurement sourced within the state.

Table 135: M2M Campaign Employment Impacts by Sources of Impact, Idaho

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	32.6	0	0.0	<1	12.5	100.0	0.0
Indirect	0	0.0	1	57.5	1	35.5	0.0	100.0
Induced	1	67.4	1	42.5	2	52.0	49.5	50.5
Total	1	100	2	100	4	100	38.2	61.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 136: M2M Campaign Output Impacts by Sources of Impact, Idaho

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	217	55.4	0	0.0	217	26.7	100.0	0.0
Indirect	0	0.0	257	61.0	257	31.6	0.0	100.0
Induced	175	44.6	165	39.0	340	41.7	51.5	48.5
Total	392	100	422	100	814	100	48.2	51.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

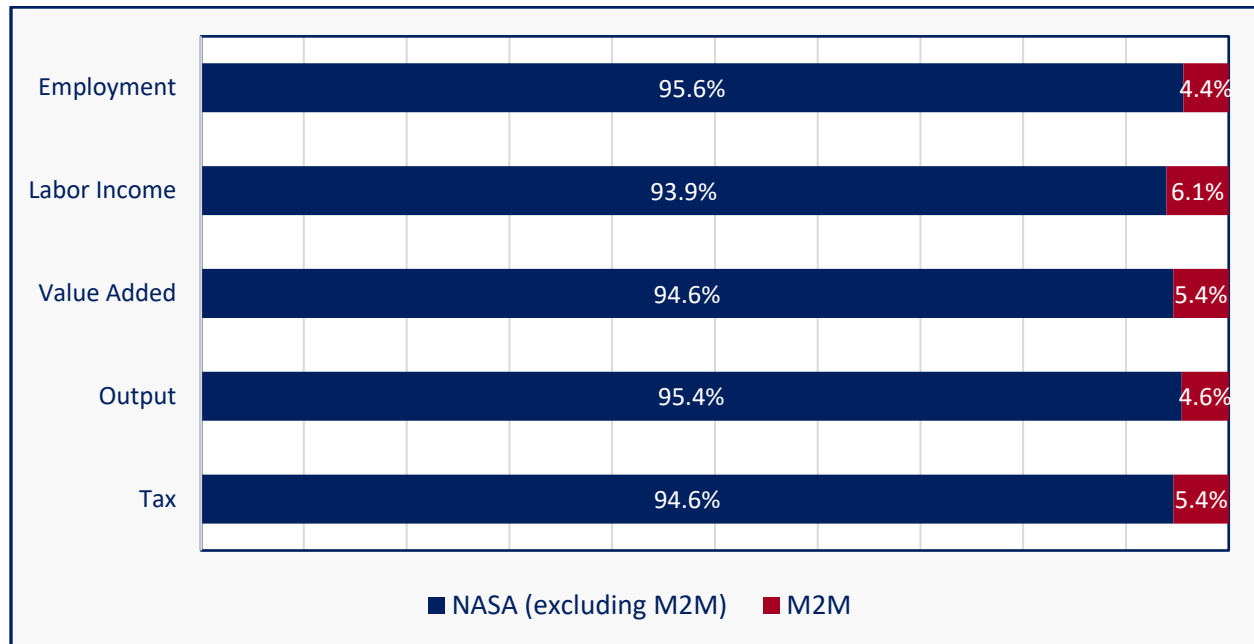
The M2M Campaign's Share of NASA Impacts

Around 5% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 137 and Figure 54). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 137: The M2M Campaign Portion of Overall NASA Impacts, Idaho

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	84	6,062	9,007	17,818	597
M2M Portion	4	367	485	814	32
M2M Share	4.4%	6.1%	5.4%	4.6%	5.4%

Figure 54: The M2M Campaign Portion of Overall NASA Impacts, Idaho



Investments in Climate Change Research and Technology Impacts

In 2023, Idaho had two climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$120,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$2.3 million. The total Idaho employment impact is 33 jobs. The labor income and economic output associated with this employment are \$2.2 million and \$6.7 million, respectively. Investments in climate change research and technology generate \$230,000 in tax revenues for the state and local governments in Idaho (Table 138).

Table 138: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Idaho

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	120	190	348	4
Indirect	21	1,504	1,972	4,205	94
Induced	11	614	1,109	2,133	133
Total	33	2,238	3,271	6,686	230
<i>Multiplier</i>	<i>44.4</i>	<i>18.7</i>	<i>17.2</i>	<i>19.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Idaho economy. Nearly 95% of employment impacts and more than 92% of output impacts are due to NASA procurement sourced within the state.

Table 139: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Idaho

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	43.2	0	0.0	1	2.3	100.0	0.0
Indirect	0	0.0	21	66.4	21	62.9	0.0	100.0
Induced	1	56.8	10	33.6	11	34.8	8.5	91.5
Total	2	100	31	100	33	100	5.2	94.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 140: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Idaho

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	348	68.0	0	0.0	348	5.2	100.0	0.0
Indirect	0	0.0	4,205	68.1	4,205	62.9	0.0	100.0
Induced	164	32.0	1,970	31.9	2,133	31.9	7.7	92.3
Total	512	100	6,175	100	6,686	100	7.7	92.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

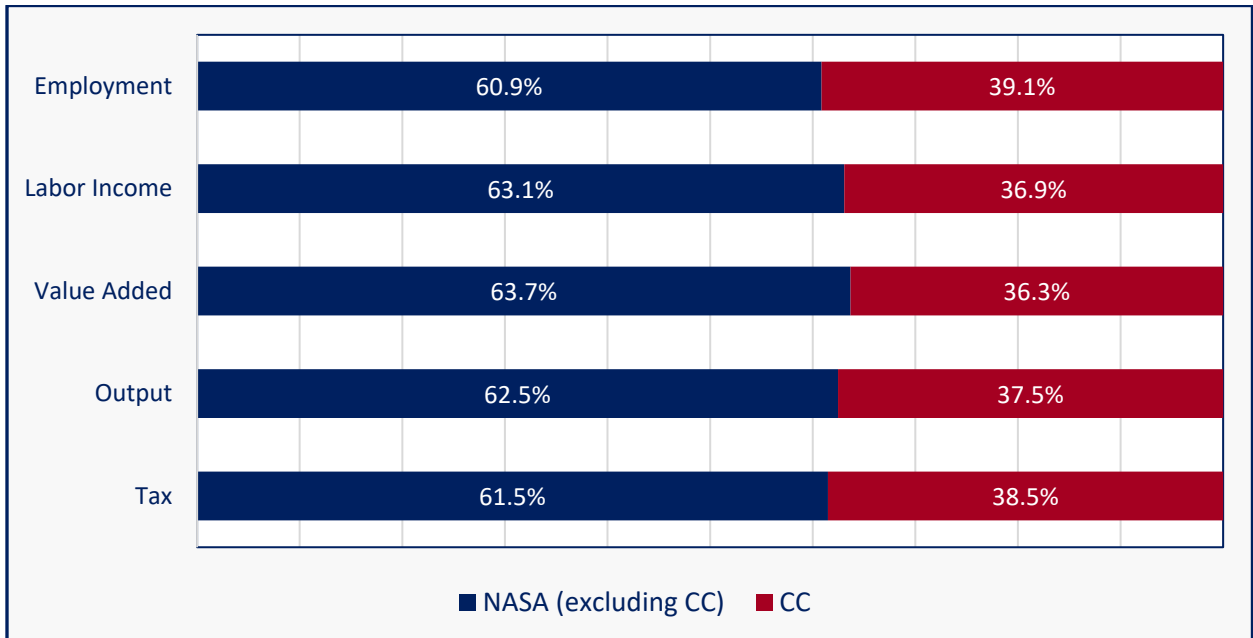
Around 38% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 141 and Figure 55). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement

spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 141: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Idaho

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	84	6,062	9,007	17,818	597
CC Portion	33	2,238	3,271	6,686	230
CC Share	39.1%	36.9%	36.3%	37.5%	38.5%

Figure 55: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Idaho



Economic Impacts on the State of Illinois

NASA Impacts

In 2023, 44 NASA civil service employees (21 FTEs) residing in Illinois earned \$2.7 million in labor income. NASA procurement sourced in Illinois in the same year totaled \$62.6 million. The total economic impact resulting from these activities is 790 jobs, \$73.1 million in labor income, and \$196.3 million in economic output. These economic activities generate \$8.9 million in tax revenues for the state and local governments in Illinois (Table 142).

Table 142: Summary of NASA Impacts by Types of Impact, Illinois

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	21	2,742	5,316	9,727	67
Indirect	413	44,293	63,256	108,395	3,456
Induced	357	26,071	44,804	78,227	5,422
Total	790	73,105	113,376	196,349	8,946
<i>Multiplier</i>	<i>38.2</i>	<i>26.7</i>	<i>21.3</i>	<i>20.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Illinois economy. Table 143 examines the sources of the employment figures in the second column of Table 142. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 95% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 5%.

Table 143: NASA Employment Impacts by Sources of Impact, Illinois

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	21	49.8	0	0.0	21	2.6	100.0	0.0
Indirect	0	0.0	413	55.1	413	52.2	0.0	100.0
Induced	21	50.2	336	44.9	357	45.2	5.9	94.1
Total	42	100	749	100	790	100	5.3	94.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 144 examines the sources of the output figures in the fifth column of Table 142. Procurement spending is responsible for nearly 93% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 7%.

Table 144: NASA Output Impacts by Sources of Impact, Illinois

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	9,727	67.3	0	0.0	9,727	5.0	100.0	0.0
Indirect	0	0.0	108,395	59.6	108,395	55.2	0.0	100.0
Induced	4,717	32.7	73,510	40.4	78,227	39.8	6.0	94.0
Total	14,445	100	181,905	100	196,349	100	7.4	92.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Illinois had 11 M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$408,000. M2M campaign procurement sourced in the state in the same year totaled \$7.5 million. The total Illinois employment impact is 109 jobs. The labor income and economic output associated with this employment are \$9.7 million and \$24.3 million, respectively. The M2M campaign generates \$1.1 million in tax revenues for the state and local governments in Illinois (Table 145).

Table 145: Summary of M2M Campaign Impacts by Types of Impact, Illinois

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	408	824	1,508	10
Indirect	59	5,745	7,524	12,405	395
Induced	47	3,537	6,080	10,425	723
Total	109	9,690	14,428	24,338	1,128
<i>Multiplier</i>	<i>34.1</i>	<i>23.7</i>	<i>17.5</i>	<i>16.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Illinois economy. More than 94% of the employment impacts and 91% of the output impacts are due to NASA procurement sourced within the state.

Table 146: M2M Campaign Employment Impacts by Sources of Impact, Illinois

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	52.1	0	0.0	3	2.9	100.0	0.0
Indirect	0	0.0	59	57.4	59	54.1	0.0	100.0
Induced	3	47.9	44	42.6	47	42.9	6.3	93.7
Total	6	100	103	100	109	100	5.6	94.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 147: M2M Campaign Output Impacts by Sources of Impact, Illinois

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,508	69.0	0	0.0	1,508	6.2	100.0	0.0
Indirect	0	0.0	12,405	56.0	12,405	51.0	0.0	100.0
Induced	677	31.0	9,748	44.0	10,425	42.8	6.5	93.5
Total	2,185	100	22,154	100	24,338	100	9.0	91.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

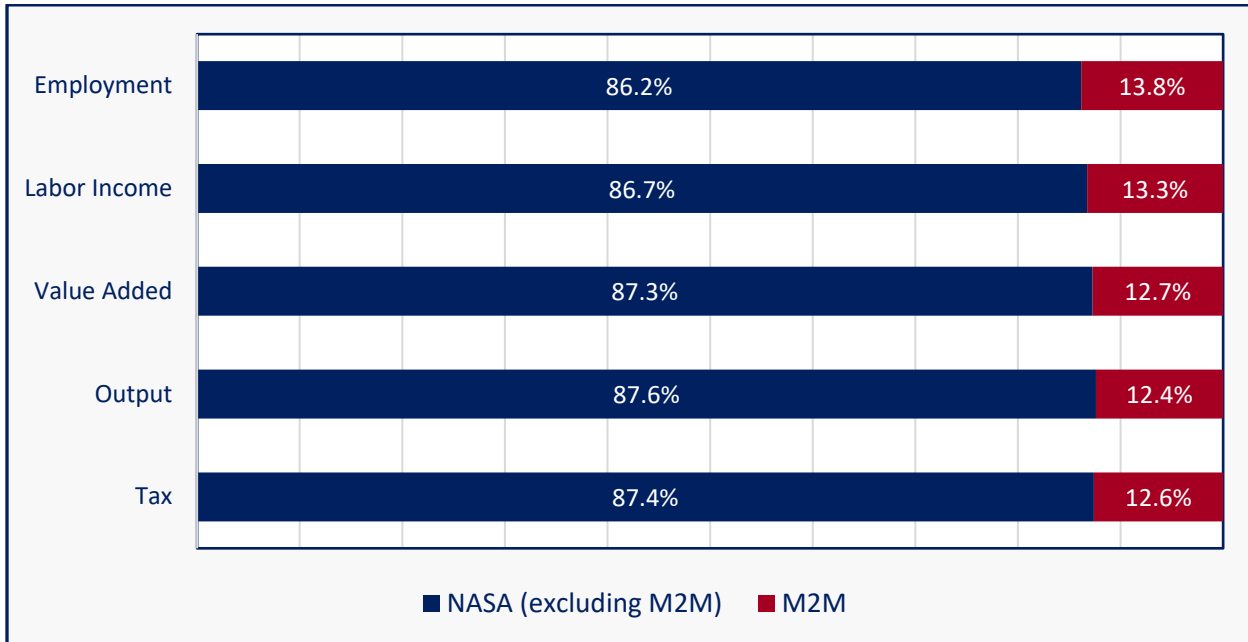
The M2M Campaign's Share of NASA Impacts

Around 13% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 148 and Figure 56). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 148: The M2M Campaign Portion of Overall NASA Impacts, Illinois

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	790	73,105	113,376	196,349	8,946
M2M Portion	109	9,690	14,428	24,338	1,128
M2M Share	13.8%	13.3%	12.7%	12.4%	12.6%

Figure 56: The M2M Campaign Portion of Overall NASA Impacts, Illinois



Investments in Climate Change Research and Technology Impacts

In 2023, Illinois had three climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$78,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$13.4 million. The total Illinois employment impact is 169 jobs. The labor income and economic output associated with this employment are \$14.9 million and \$39.5 million, respectively. Investments in climate change research and technology generate \$1.9 million in tax revenues for the state and local governments in Illinois (Table 149).

Table 149: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Illinois

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	78	138	252	2
Indirect	93	9,475	13,784	22,677	735
Induced	75	5,365	9,248	16,541	1,146
Total	169	14,917	23,170	39,470	1,884
<i>Multiplier</i>	<i>313.8</i>	<i>191.2</i>	<i>168.0</i>	<i>156.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Illinois economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 150: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Illinois

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	43.6	0	0.0	1	0.3	100.0	0.0
Indirect	0	0.0	93	55.5	93	55.1	0.0	100.0
Induced	1	56.4	74	44.5	75	44.6	0.9	99.1
Total	1	100	167	100	169	100	0.7	99.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 151: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Illinois

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	252	64.4	0	0.0	252	0.6	100.0	0.0
Indirect	0	0.0	22,677	58.0	22,677	57.5	0.0	100.0
Induced	139	35.6	16,402	42.0	16,541	41.9	0.8	99.2
Total	392	100	39,078	100	39,470	100	1.0	99.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

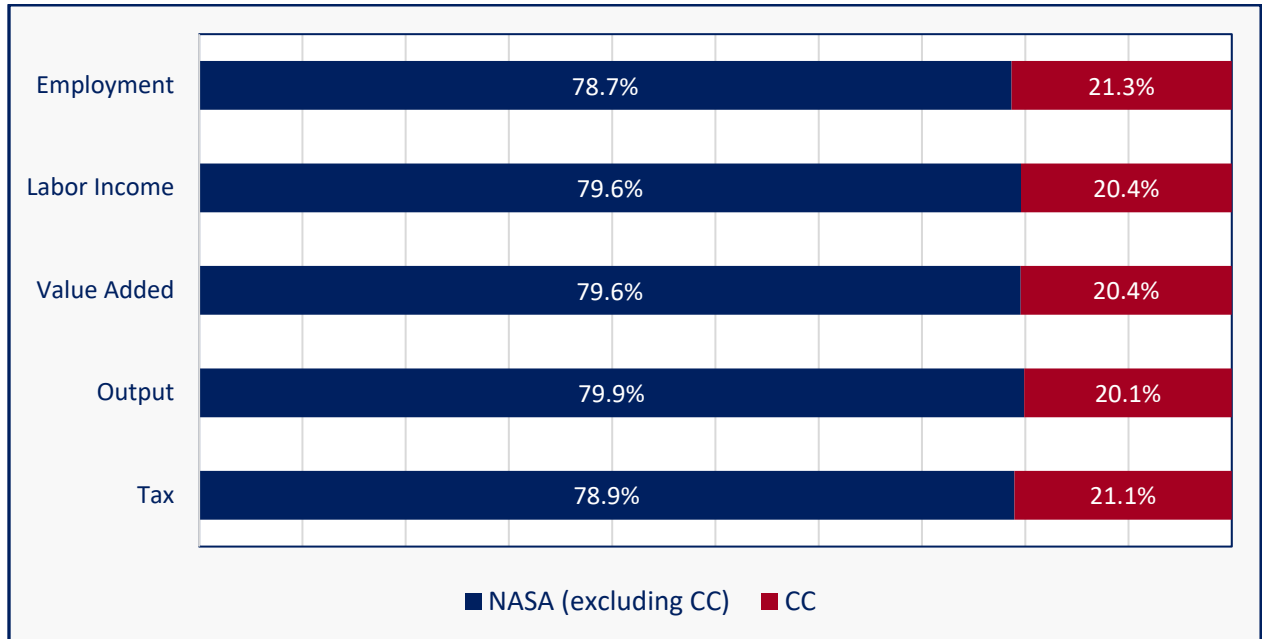
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 21% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 152 and Figure 57). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 152: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Illinois

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	790	73,105	113,376	196,349	8,946
CC Portion	169	14,917	23,170	39,470	1,884
CC Share	21.3%	20.4%	20.4%	20.1%	21.1%

Figure 57: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Illinois



Economic Impacts on the State of Indiana

NASA Impacts

In 2023, 24 NASA civil service employees (14 FTEs) residing in Indiana earned \$2.1 million in labor income. NASA procurement sourced in Indiana in the same year totaled \$81.6 million. The total economic impact resulting from these activities is 777 jobs, \$60.7 million in labor income, and \$195 million in economic output. These economic activities generate \$7.5 million in tax revenues for the state and local governments in Indiana (Table 153).

Table 153: Summary of NASA Impacts by Types of Impact, Indiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	14	2,079	3,721	6,810	68
Indirect	462	40,074	76,149	127,672	3,834
Induced	300	18,555	32,933	60,523	3,558
Total	777	60,709	112,803	195,005	7,460
<i>Multiplier</i>	53.6	29.2	30.3	28.6	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Indiana economy. Table 154 examines the sources of the employment figures in the second column of Table 153. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 96% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 4%.

Table 154: NASA Employment Impacts by Sources of Impact, Indiana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	14	50.4	0	0.0	14	1.9	100.0	0.0
Indirect	0	0.0	462	61.7	462	59.5	0.0	100.0
Induced	14	49.6	286	38.3	300	38.7	4.7	95.3
Total	29	100	748	100	777	100	3.7	96.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 155 examines the sources of the output figures in the fifth column of Table 153. Procurement spending is responsible for 95% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 5%.

Table 155: NASA Output Impacts by Sources of Impact, Indiana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	6,810	69.6	0	0.0	6,810	3.5	100.0	0.0
Indirect	0	0.0	127,672	68.9	127,672	65.5	0.0	100.0
Induced	2,968	30.4	57,555	31.1	60,523	31.0	4.9	95.1
Total	9,778	100	185,227	100	195,005	100	5.0	95.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Indiana had six M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$386,000. M2M campaign procurement sourced in the state in the same year totaled \$6.9 million. The total Indiana employment impact is 74 jobs. The labor income and economic output associated with this employment are \$5.7 million and \$17.7 million, respectively. The M2M campaign generates \$669,000 in tax revenues for the state and local governments in Indiana (Table 156).

Table 156: Summary of M2M Campaign Impacts by Types of Impact, Indiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	386	774	1,417	13
Indirect	43	3,590	6,524	10,676	326
Induced	28	1,751	3,107	5,613	330
Total	74	5,727	10,405	17,706	669
<i>Multiplier</i>	<i>24.4</i>	<i>14.9</i>	<i>13.4</i>	<i>12.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the estimated ratios of value-added-to-employee-compensation in guided missile and space vehicle manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratio of output-to-employee-compensation in the same industry.

The following two tables examine the contribution of different NASA activities to the Indiana economy. More than 92% of the employment impacts and 89% of the output impacts are due to NASA procurement sourced within the state.

Table 157: M2M Campaign Employment Impacts by Sources of Impact, Indiana

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	54.1	0	0.0	3	4.1	100.0	0.0
Indirect	0	0.0	43	63.0	43	58.2	0.0	100.0
Induced	3	45.9	25	37.0	28	37.7	9.2	90.8
Total	6	100	68	100	74	100	7.6	92.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 158: M2M Campaign Output Impacts by Sources of Impact, Indiana

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,417	73.0	0	0.0	1,417	8.0	100.0	0.0
Indirect	0	0.0	10,676	67.7	10,676	60.3	0.0	100.0
Induced	523	27.0	5,089	32.3	5,613	31.7	9.3	90.7
Total	1,940	100	15,765	100	17,706	100	11.0	89.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

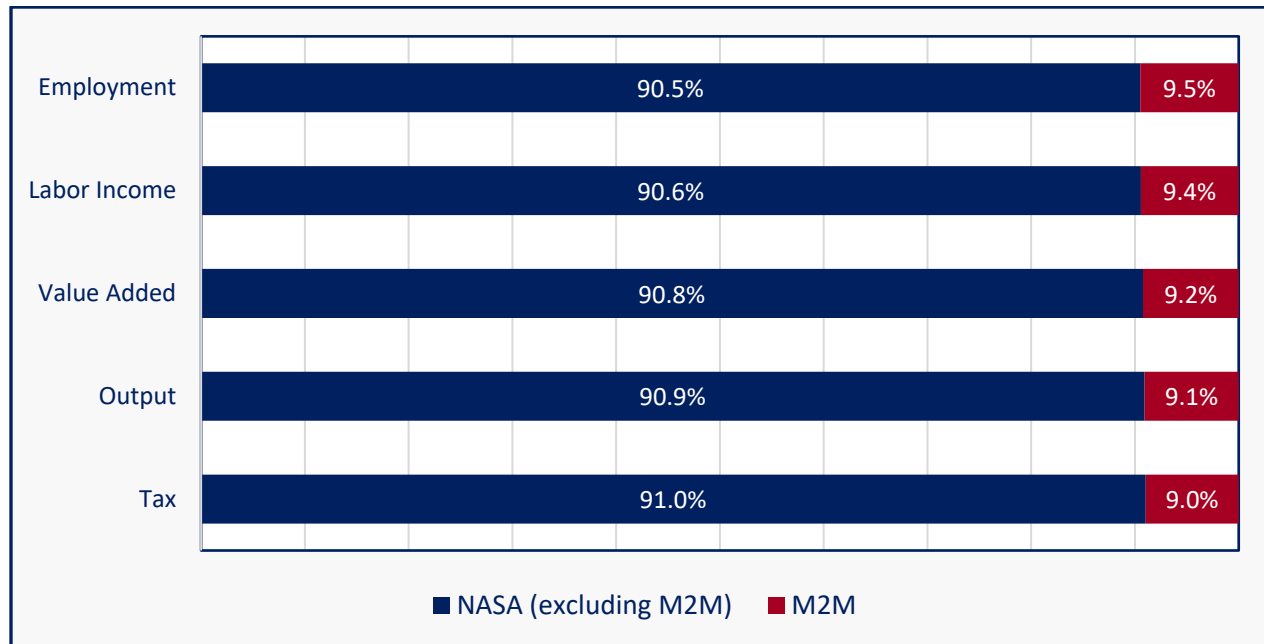
The M2M Campaign's Share of NASA Impacts

Around 9% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 159 and Figure 58). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 159: The M2M Campaign Portion of Overall NASA Impacts, Indiana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	777	60,709	112,803	195,005	7,460
M2M Portion	74	5,727	10,405	17,706	669
M2M Share	9.5%	9.4%	9.2%	9.1%	9.0%

Figure 58: The M2M Campaign Portion of Overall NASA Impacts, Indiana



Investments in Climate Change Research and Technology Impacts

In 2023, Indiana had three climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$103,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$7.2 million. The total Indiana employment impact is 74 jobs. The labor income and economic output associated with this employment are \$5.4 million and \$17.3 million, respectively. Investments in climate change research and technology generate \$679,000 in tax revenues for the state and local governments in Indiana (Table 160).

Table 160: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Indiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	103	183	335	3
Indirect	45	3,663	6,816	11,342	345
Induced	28	1,668	2,985	5,622	330
Total	74	5,434	9,983	17,299	679
<i>Multiplier</i>	<i>103.7</i>	<i>52.8</i>	<i>54.6</i>	<i>51.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the estimated ratios of value-added-to-employee-compensation in guided missile and space vehicle manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of

intermediary products and services, and is calculated based on the estimated ratio of output-to-employee-compensation in the same industry.

The following two tables examine the contribution of different NASA activities to the Indiana economy. Nearly 98% of the employment impacts and more than 97% of the output impacts are due to NASA procurement sourced within the state.

Table 161: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Indiana

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	46.7	0	0.0	1	1.0	100.0	0.0
Indirect	0	0.0	45	62.8	45	61.5	0.0	100.0
Induced	1	53.3	27	37.2	28	37.6	2.9	97.1
Total	2	100	72	100	74	100	2.1	97.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 162: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Indiana

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	335	68.3	0	0.0	335	1.9	100.0	0.0
Indirect	0	0.0	11,342	67.5	11,342	65.6	0.0	100.0
Induced	155	31.7	5,467	32.5	5,622	32.5	2.8	97.2
Total	490	100	16,809	100	17,299	100	2.8	97.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

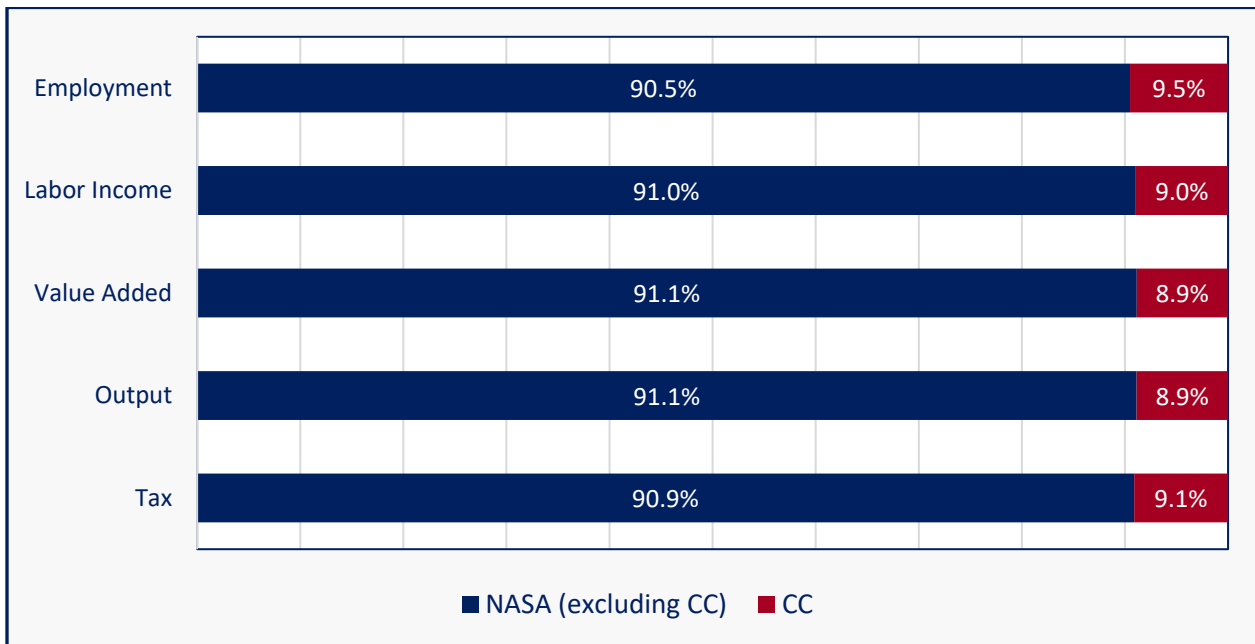
The Investments in Climate Change Research and Technology’s Share of NASA Impacts

Around 9% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 163 and Figure 59). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 163: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Indiana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	777	60,709	112,803	195,005	7,460
CC Portion	74	5,434	9,983	17,299	679
CC Share	9.5%	9.0%	8.9%	8.9%	9.1%

Figure 59: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Indiana



Economic Impacts on the State of Iowa

NASA Impacts

In 2023, 12 NASA civil service employees (6 FTEs) residing in Iowa earned \$1.1 million in labor income. NASA procurement sourced in Iowa in the same year totaled \$52.3 million. The total economic impact resulting from these activities is 556 jobs, \$38.7 million in labor income, and \$121.8 million in economic output. These economic activities generate \$4.1 million in tax revenues for the state and local governments in Iowa (Table 164).

Table 164: Summary of NASA Impacts by Types of Impact, Iowa

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	6	1,139	1,587	2,905	31
Indirect	369	27,764	41,860	83,895	2,040
Induced	181	9,792	18,746	34,999	1,996
Total	556	38,695	62,193	121,798	4,067
<i>Multiplier</i>	<i>89.9</i>	<i>34.0</i>	<i>39.2</i>	<i>41.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Iowa economy. Table 165 examines the sources of the employment figures in the second column of Table 164. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact around 2%.

Table 165: NASA Employment Impacts by Sources of Impact, Iowa

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	6	47.3	0	0.0	6	1.1	100.0	0.0
Indirect	0	0.0	369	67.9	369	66.3	0.0	100.0
Induced	7	52.7	174	32.1	181	32.6	3.8	96.2
Total	13	100	543	100	556	100	2.4	97.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 166 examines the sources of the output figures in the fifth column of Table 164. Procurement spending is responsible for more than 96% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 4%.

Table 166: NASA Output Impacts by Sources of Impact, Iowa

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,905	68.1	0	0.0	2,905	2.4	100.0	0.0
Indirect	0	0.0	83,895	71.4	83,895	68.9	0.0	100.0
Induced	1,363	31.9	33,636	28.6	34,999	28.7	3.9	96.1
Total	4,268	100	117,531	100	121,798	100	3.5	96.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Iowa had one M2M-related civil service employees (<1 FTE) with a corresponding labor income of \$16,000. M2M campaign procurement sourced in the state in the same year totaled \$208,000. The total economic impact attributable to this procurement activity is 3 jobs, \$174,000 in labor income, and \$516,000 worth of output. These economic activities generate \$19,000 in tax revenues for the state and local governments in Iowa (Table 167).

Table 167: Summary of M2M Campaign Impacts by Types of Impact, Iowa

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	16	20	36	<1
Indirect	2	114	166	324	10
Induced	1	44	85	156	9
Total	3	174	271	516	19
<i>Multiplier</i>	<i>39.9</i>	<i>11.0</i>	<i>13.7</i>	<i>14.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Iowa economy. More than 94% of the employment impacts and 89% of the output impacts are due to NASA procurement sourced within the state.

Table 168: M2M Campaign Employment Impacts by Sources of Impact, Iowa

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	45.8	0	0.0	<1	2.5	100.0	0.0
Indirect	0	0.0	2	74.5	2	70.4	0.0	100.0
Induced	<1	54.2	1	25.5	1	27.1	11.0	89.0
Total	<1	100	3	100	3	100	5.5	94.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 169: M2M Campaign Output Impacts by Sources of Impact, Iowa

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	36	66.7	0	0.0	36	7.0	100.0	0.0
Indirect	0	0.0	324	70.1	324	62.7	0.0	100.0
Induced	18	33.3	138	29.9	156	30.3	11.5	88.5
Total	54	100	462	100	516	100	10.5	89.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

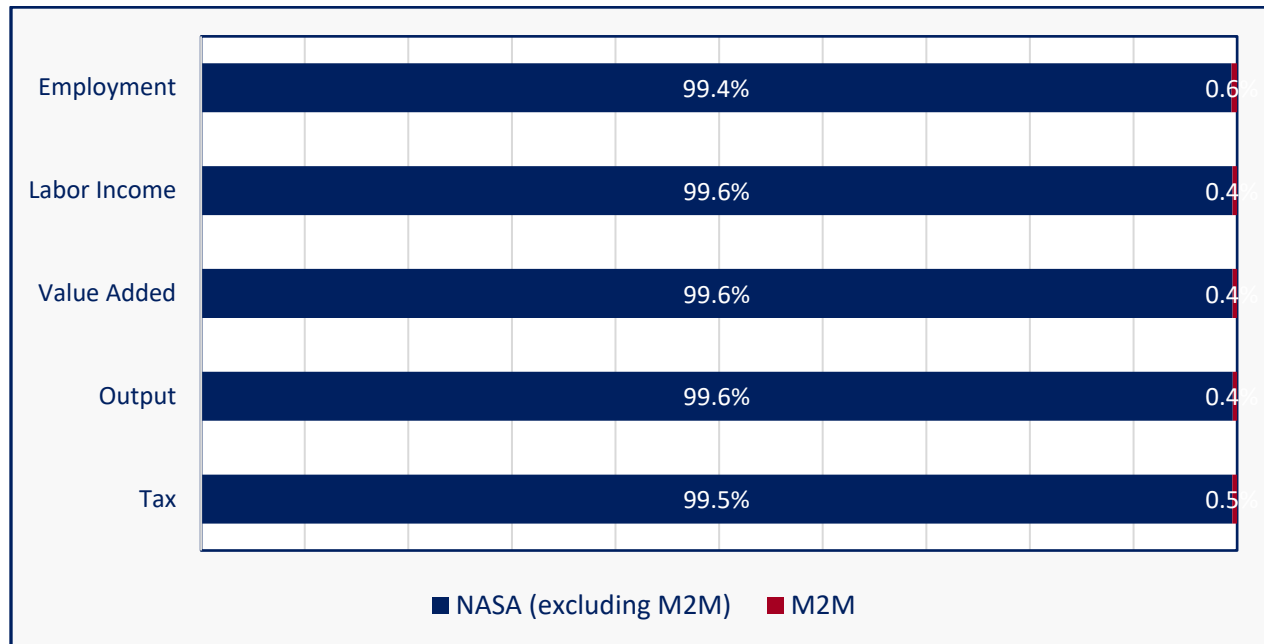
The M2M Campaign's Share of NASA Impacts

Less than 1% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 170 and Figure 60).

Table 170: The M2M Campaign Portion of Overall NASA Impacts, Iowa

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	556	38,695	62,193	121,798	4,067
M2M Portion	3	174	271	516	19
M2M Share	0.6%	0.4%	0.4%	0.4%	0.5%

Figure 60: The M2M Campaign Portion of Overall NASA Impacts, Iowa



Investments in Climate Change Research and Technology Impacts

In 2023, Iowa had two climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$180,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$2.6 million. The total economic impact attributable to this procurement activity is 32 jobs, \$2.1 million in labor income, and \$6.7 million worth of output. These economic activities generate \$221,000 in tax revenues for the state and local governments in Iowa (Table 171).

Table 171: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Iowa

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	180	355	650	5
Indirect	20	1,362	2,078	4,136	107
Induced	10	525	1,002	1,908	109
Total	32	2,067	3,435	6,695	221
<i>Multiplier</i>	<i>23.0</i>	<i>11.5</i>	<i>9.7</i>	<i>10.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Iowa economy. Approximately 92% of the employment impacts and 87% of the output impacts are due to NASA procurement sourced within the state.

Table 172: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Iowa

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	51.5	0	0.0	1	4.3	100.0	0.0
Indirect	0	0.0	20	69.8	20	64.0	0.0	100.0
Induced	1	48.5	9	30.2	10	31.7	12.9	87.1
Total	3	100	29	100	32	100	8.4	91.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 173: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Iowa

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	650	74.2	0	0.0	650	9.7	100.0	0.0
Indirect	0	0.0	4,136	71.1	4,136	61.8	0.0	100.0
Induced	227	25.8	1,682	28.9	1,908	28.5	11.9	88.1
Total	877	100	5,818	100	6,695	100	13.1	86.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

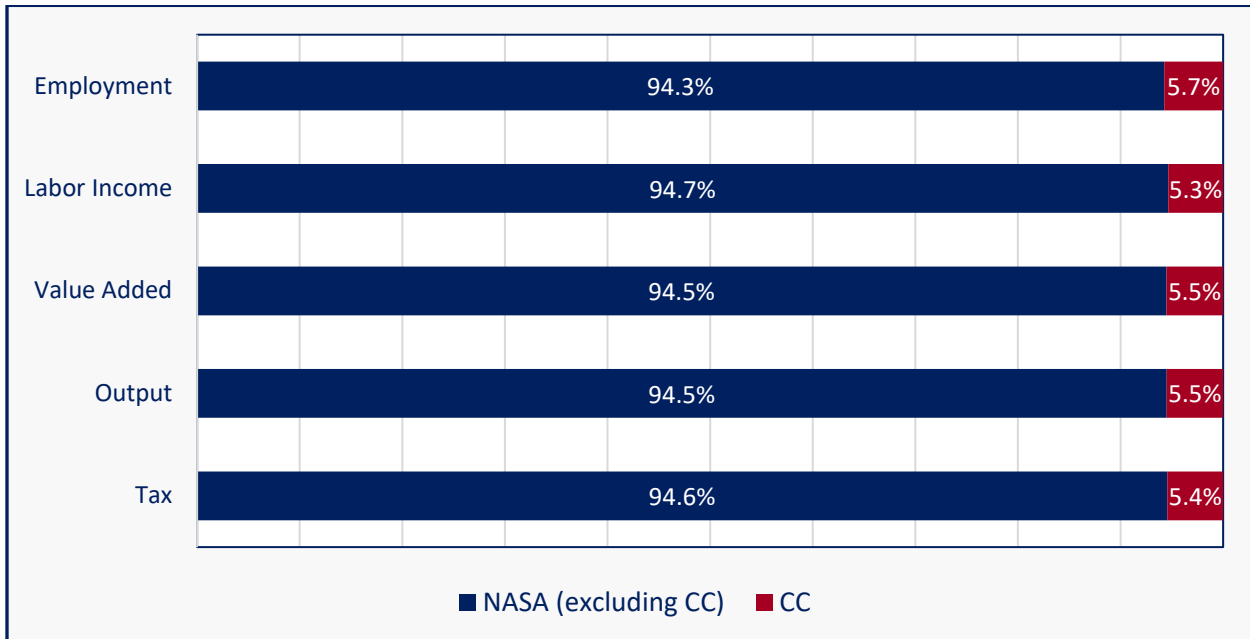
Around 5% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 174 and Figure 61). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement

spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 174: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Iowa

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	556	38,695	62,193	121,798	4,067
CC Portion	32	2,067	3,435	6,695	221
CC Share	5.7%	5.3%	5.5%	5.5%	5.4%

Figure 61: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Iowa



Economic Impacts on the State of Kansas

NASA Impacts

In 2023, 12 NASA civil service employees (9 FTEs) residing in Kansas earned \$1.4 million in labor income. NASA procurement sourced in Kansas in the same year totaled \$11.5 million. The total economic impact resulting from these activities is 147 jobs, \$11.1 million in labor income, and \$33.2 million in economic output. These economic activities generate \$1.1 million in tax revenues for the state and local governments in Kansas (Table 175).

Table 175: Summary of NASA Impacts by Types of Impact, Kansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	9	1,356	2,249	4,116	34
Indirect	87	6,830	9,467	19,006	447
Induced	51	2,913	5,285	10,112	609
Total	147	11,098	17,001	33,234	1,089
<i>Multiplier</i>	<i>16.7</i>	<i>8.2</i>	<i>7.6</i>	<i>8.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kansas economy. Table 176 examines the sources of the employment figures in the second column of Table 175. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 88% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 12%.

Table 176: NASA Employment Impacts by Sources of Impact, Kansas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	9	51.3	0	0.0	9	6.0	100.0	0.0
Indirect	0	0.0	87	67.1	87	59.3	0.0	100.0
Induced	8	48.7	43	32.9	51	34.7	16.4	83.6
Total	17	100	129	100	147	100	11.7	88.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 177 examines the sources of the output figures in the fifth column of Table 175. Procurement spending is responsible for approximately 83% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is around 17%.

Table 177: NASA Output Impacts by Sources of Impact, Kansas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	4,116	71.1	0	0.0	4,116	12.4	100.0	0.0
Indirect	0	0.0	19,006	69.2	19,006	57.2	0.0	100.0
Induced	1,670	28.9	8,442	30.8	10,112	30.4	16.5	83.5
Total	5,786	100	27,449	100	33,234	100	17.4	82.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Kansas had two M2M-related civil service employees (1 FTE) with a corresponding labor income of \$164,000. M2M campaign procurement sourced in the state in the same year totaled \$202,000. The total Kansas employment impact is 6 jobs. The labor income and economic output associated with this employment are \$403,000 and \$1.3 million, respectively. The M2M campaign generates \$36,000 in tax revenues for the state and local governments in Kansas (Table 178).

Table 178: Summary of M2M Campaign Impacts by Types of Impact, Kansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	164	361	661	4
Indirect	3	132	173	310	11
Induced	2	106	191	357	22
Total	6	403	725	1,329	36
<i>Multiplier</i>	<i>4.5</i>	<i>2.4</i>	<i>2.0</i>	<i>2.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kansas economy. Around 61% of the employment impacts and 36% of the output impacts are due to NASA procurement sourced within the state.

Table 179: M2M Campaign Employment Impacts by Sources of Impact, Kansas

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	57.7	0	0.0	1	22.4	100.0	0.0
Indirect	0	0.0	3	76.1	3	46.5	0.0	100.0
Induced	1	42.3	1	23.9	2	31.0	53.0	47.0
Total	2	100	4	100	6	100	38.9	61.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 180: M2M Campaign Output Impacts by Sources of Impact, Kansas

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	661	77.6	0	0.0	661	49.7	100.0	0.0
Indirect	0	0.0	310	65.1	310	23.4	0.0	100.0
Induced	191	22.4	166	34.9	357	26.9	53.5	46.5
Total	852	100	477	100	1,329	100	64.1	35.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

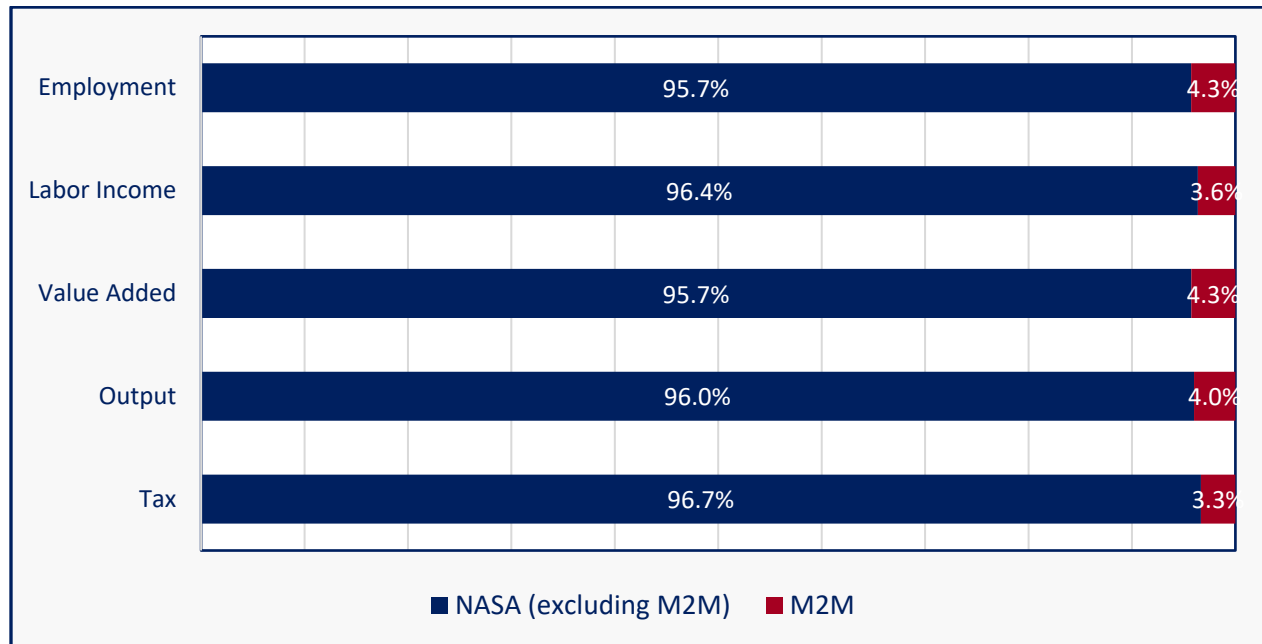
The M2M Campaign’s Share of NASA Impacts

Around 4% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 181 and Figure 62). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 181: The M2M Campaign Portion of Overall NASA Impacts, Kansas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	147	11,098	17,001	33,234	1,089
M2M Portion	6	403	725	1,329	36
M2M Share	4.3%	3.6%	4.3%	4.0%	3.3%

Figure 62: The M2M Campaign Portion of Overall NASA Impacts, Kansas



Investments in Climate Change Research and Technology Impacts

In 2023, Kansas had six climate change research and technology-related civil service employees (3 FTEs) with a corresponding labor income of \$496,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$4.4 million. The total Kansas employment impact is 57 jobs. The labor income and economic output associated with this employment are \$4.3 million and \$12.8 million, respectively. These economic activities generate \$431,000 in tax revenues for the state and local governments in Kansas (Table 182).

Table 182: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Kansas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	496	782	1,432	12
Indirect	34	2,644	3,662	7,365	173
Induced	20	1,139	2,073	4,078	245
Total	57	4,279	6,518	12,875	431
<i>Multiplier</i>	<i>18.8</i>	<i>8.6</i>	<i>8.3</i>	<i>9.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kansas economy. Nearly 89% of the employment impacts and 84% of the output impacts are due to NASA procurement sourced within the state.

Table 183: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Kansas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	3	48.1	0	0.0	3	5.3	100.0	0.0
Indirect	0	0.0	34	66.5	34	59.2	0.0	100.0
Induced	3	51.9	17	33.5	20	35.5	16.2	83.8
Total	6	100	51	100	57	100	11.1	88.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 184: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Kansas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,432	68.4	0	0.0	1,432	11.1	100.0	0.0
Indirect	0	0.0	7,365	68.3	7,365	57.2	0.0	100.0
Induced	660	31.6	3,418	31.7	4,078	31.7	16.2	83.8
Total	2,092	100	10,783	100	12,875	100	16.2	83.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

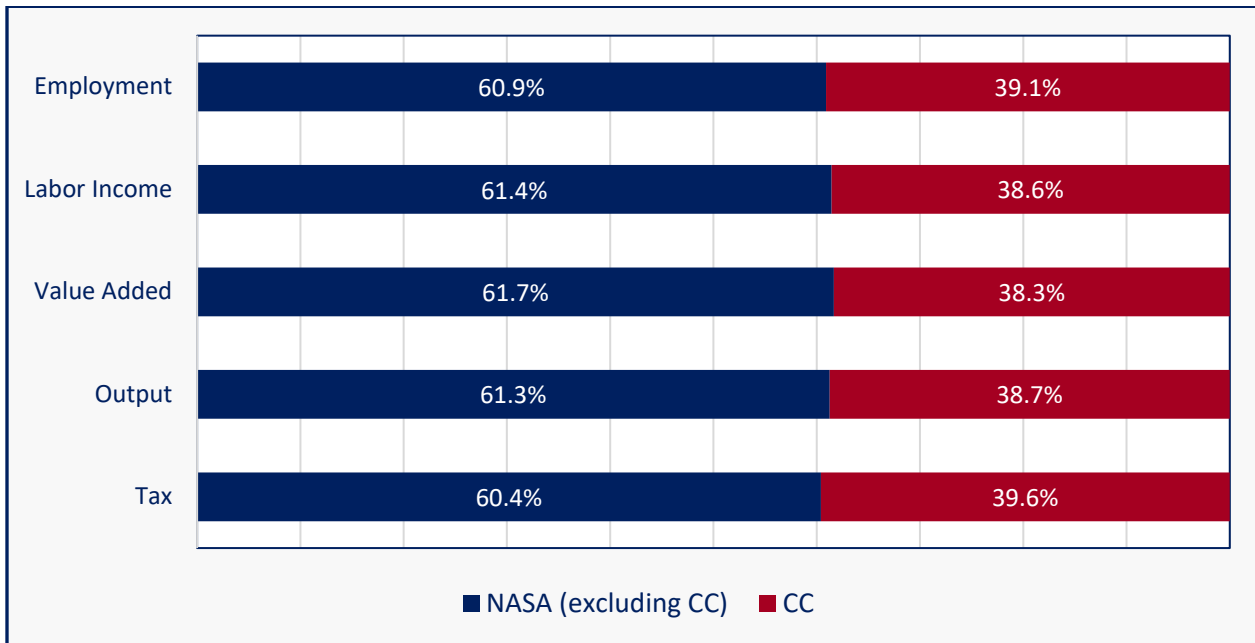
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 39% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 185 and Figure 63). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 185: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kansas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	147	11,098	17,001	33,234	1,089
CC Portion	57	4,279	6,518	12,875	431
CC Share	39.1%	38.6%	38.3%	38.7%	39.6%

Figure 63: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kansas



Economic Impacts on the State of Kentucky

NASA Impacts

In 2023, 15 NASA civil service employees (8 FTEs) residing in Kentucky earned \$1.2 million in labor income. NASA procurement sourced in Kentucky in the same year totaled \$6.9 million. The total economic impact resulting from these activities is 90 jobs, \$6.8 million in labor income, and \$21.3 million in economic output. These economic activities generate \$1 million in tax revenues for the state and local governments in Kentucky (Table 186).

Table 186: Summary of NASA Impacts by Types of Impact, Kentucky

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	8	1,226	2,088	3,820	41
Indirect	49	3,701	5,506	11,274	571
Induced	33	1,878	3,299	6,194	381
Total	90	6,805	10,893	21,288	992
<i>Multiplier</i>	<i>11.1</i>	<i>5.6</i>	<i>5.2</i>	<i>5.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kentucky economy. Table 187 examines the sources of the employment figures in the second column of Table 186. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 82% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 18%.

Table 187: NASA Employment Impacts by Sources of Impact, Kentucky

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	8	49.7	0	0.0	8	9.0	100.0	0.0
Indirect	0	0.0	49	66.9	49	54.8	0.0	100.0
Induced	8	50.3	25	33.1	33	36.2	25.1	74.9
Total	16	100	74	100	90	100	18.1	81.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 188 examines the sources of the output figures in the fifth column of Table 186. Procurement spending is responsible for nearly 75% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 25%.

Table 188: NASA Output Impacts by Sources of Impact, Kentucky

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	3,820	70.9	0	0.0	3,820	17.9	100.0	0.0
Indirect	0	0.0	11,274	70.9	11,274	53.0	0.0	100.0
Induced	1,566	29.1	4,628	29.1	6,194	29.1	25.3	74.7
Total	5,386	100	15,902	100	21,288	100	25.3	74.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Kentucky had six M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$374,000. M2M campaign procurement sourced in the state in the same year totaled \$1.2 million. The total Kentucky employment impact is 20 jobs. The labor income and economic output associated with this employment are \$1.5 million and \$4.5 million, respectively. The M2M campaign generates \$147,000 in tax revenues for the state and local governments in Kentucky (Table 189).

Table 189: Summary of M2M Campaign Impacts by Types of Impact, Kentucky

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	374	666	1,218	12
Indirect	10	726	965	1,952	50
Induced	7	427	746	1,375	85
Total	20	1,526	2,377	4,545	147
<i>Multiplier</i>	<i>7.8</i>	<i>4.1</i>	<i>3.6</i>	<i>3.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kentucky economy. More than 75% of the employment impacts and 63% of the output impacts are due to NASA procurement sourced within the state.

Table 190: M2M Campaign Employment Impacts by Sources of Impact, Kentucky

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	51.8	0	0.0	3	12.8	100.0	0.0
Indirect	0	0.0	10	67.3	10	50.6	0.0	100.0
Induced	2	48.2	5	32.7	7	36.5	32.7	67.3
Total	5	100	15	100	20	100	24.8	75.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 191: M2M Campaign Output Impacts by Sources of Impact, Kentucky

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,218	73.0	0	0.0	1,218	26.8	100.0	0.0
Indirect	0	0.0	1,952	67.9	1,952	43.0	0.0	100.0
Induced	450	27.0	924	32.1	1,375	30.2	32.7	67.3
Total	1,668	100	2,876	100	4,545	100	36.7	63.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

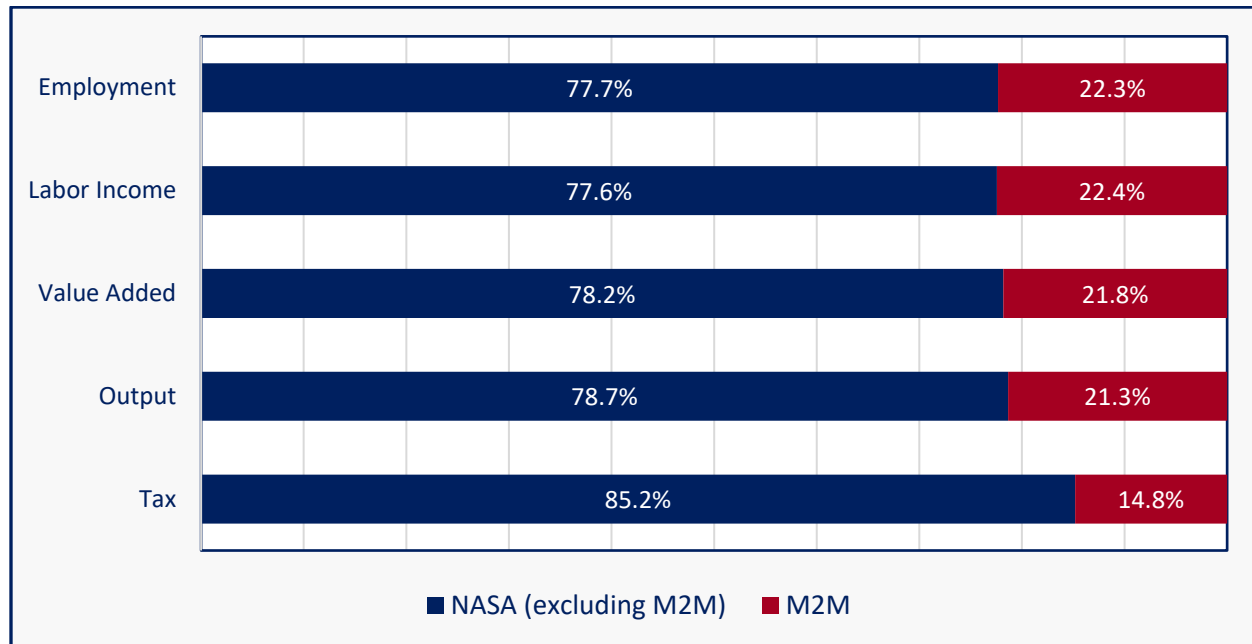
The M2M Campaign's Share of NASA Impacts

Around 21% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 192 and Figure 64). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 192: The M2M Campaign Portion of Overall NASA Impacts, Kentucky

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	90	6,805	10,893	21,288	992
M2M Portion	20	1,526	2,377	4,545	147
M2M Share	22.3%	22.4%	21.8%	21.3%	14.8%

Figure 64: The M2M Campaign Portion of Overall NASA Impacts, Kentucky



Investments in Climate Change Research and Technology Impacts

In 2023, Kentucky had two climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$201,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$573,000. The total Kentucky employment impact is 12 jobs. The labor income and economic output associated with this employment are \$759,000 and \$2.2 million, respectively. Investments in climate change research and technology generate \$82,000 in tax revenues for the state and local governments in Kentucky (Table 193).

Table 193: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Kentucky

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	201	263	480	7
Indirect	7	342	472	955	31
Induced	4	216	380	731	45
Total	12	759	1,114	2,166	82
<i>Multiplier</i>	<i>11.4</i>	<i>3.8</i>	<i>4.2</i>	<i>4.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Kentucky economy. More than 78% of the employment impacts and 65% of the output impacts are due to NASA procurement sourced within the state.

Table 194: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Kentucky

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	39.9	0	0.0	1	8.7	100.0	0.0
Indirect	0	0.0	7	72.8	7	56.9	0.0	100.0
Induced	2	60.1	2	27.2	4	34.4	38.3	61.7
Total	3	100	9	100	12	100	21.9	78.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 195: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Kentucky

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	480	63.5	0	0.0	480	22.2	100.0	0.0
Indirect	0	0.0	955	67.7	955	44.1	0.0	100.0
Induced	276	36.5	455	32.3	731	33.7	37.7	62.3
Total	756	100	1,410	100	2,166	100	34.9	65.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

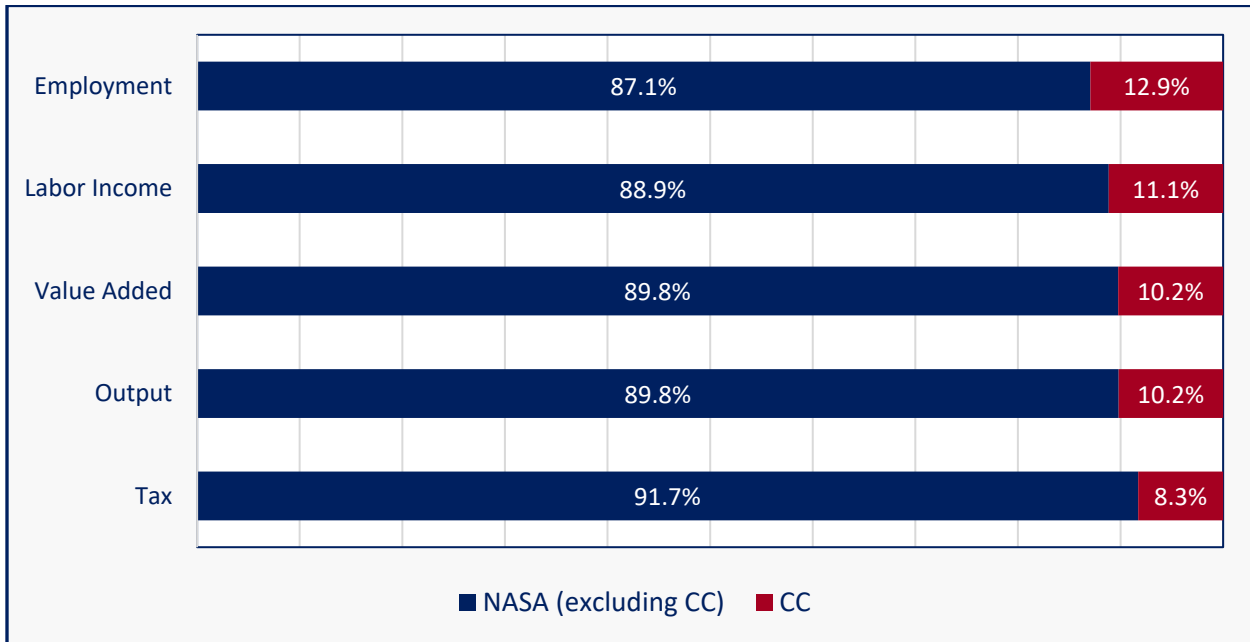
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 11% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 196 and Figure 65). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 196: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kentucky

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	90	6,805	10,893	21,288	992
CC Portion	12	759	1,114	2,166	82
CC Share	12.9%	11.1%	10.2%	10.2%	8.3%

Figure 65: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Kentucky



Economic Impacts on the State of Louisiana

NASA Impacts

In 2023, 210 NASA civil service employees (191 FTEs) residing in Louisiana earned \$35 million in labor income. NASA procurement sourced in Louisiana in the same year totaled more than \$147.2 million. The total economic impact resulting from these activities is 2,418 jobs, \$159.1 million in labor income, and \$507.4 million in economic output. These economic activities generate \$16.9 million in tax revenues for the state and local governments in Louisiana (Table 197).

Table 197: Summary of NASA Impacts by Types of Impact, Louisiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	191	34,987	49,063	89,784	710
Indirect	1,430	82,121	118,791	271,533	6,453
Induced	797	42,033	78,632	146,059	9,743
Total	2,418	159,141	246,485	507,376	16,905
<i>Multiplier</i>	<i>12.7</i>	<i>4.5</i>	<i>5.0</i>	<i>5.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Louisiana economy. Table 198 examines the sources of the employment figures in the second column of Table 197. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 82% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 18%.

Table 198: NASA Employment Impacts by Sources of Impact, Louisiana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	191	43.7	0	0.0	191	7.9	100.0	0.0
Indirect	0	0.0	1,430	72.2	1,430	59.2	0.0	100.0
Induced	246	56.3	551	27.8	797	32.9	30.9	69.1
Total	437	100	1,981	100	2,418	100	18.1	81.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 199 examines the sources of the output figures in the fifth column of Table 197. Procurement spending is responsible for more than 73% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is nearly 27%.

Table 199: NASA Output Impacts by Sources of Impact, Louisiana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	89,784	66.2	0	0.0	89,784	17.7	100.0	0.0
Indirect	0	0.0	271,533	73.1	271,533	53.5	0.0	100.0
Induced	45,943	33.8	100,116	26.9	146,059	28.8	31.5	68.5
Total	135,728	100	371,649	100	507,376	100	26.8	73.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Louisiana had 78 M2M-related civil service employees (52 FTEs) with a corresponding labor income of \$9.1 million. M2M campaign procurement sourced in the state in the same year totaled \$73.4 million. The total Louisiana employment impact is 1,045 jobs. The labor income and economic output associated with this employment are \$66.8 million and \$218.2 million, respectively. The M2M campaign generates \$7.3 million in tax revenues for the state and local governments in Louisiana (Table 200).

Table 200: Summary of M2M Campaign Impacts by Types of Impact, Louisiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	52	9,148	13,266	24,276	186
Indirect	677	40,643	61,616	136,060	3,297
Induced	316	17,006	31,602	57,869	3,858
Total	1,045	66,798	106,484	218,206	7,340
<i>Multiplier</i>	<i>20.2</i>	<i>7.3</i>	<i>8.0</i>	<i>9.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Louisiana economy. Around 89% of the employment impacts and 84% of the output impacts are due to NASA procurement sourced within the state.

Table 201: M2M Campaign Employment Impacts by Sources of Impact, Louisiana

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	52	46.1	0	0.0	52	4.9	100.0	0.0
Indirect	0	0.0	677	72.6	677	64.8	0.0	100.0
Induced	60	53.9	255	27.4	316	30.2	19.2	80.8
Total	112	100	933	100	1,045	100	10.7	89.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 202: M2M Campaign Output Impacts by Sources of Impact, Louisiana

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	24,276	68.2	0	0.0	24,276	11.1	100.0	0.0
Indirect	0	0.0	136,060	74.5	136,060	62.4	0.0	100.0
Induced	11,327	31.8	46,542	25.5	57,869	26.5	19.6	80.4
Total	35,603	100	182,602	100	218,206	100	16.3	83.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

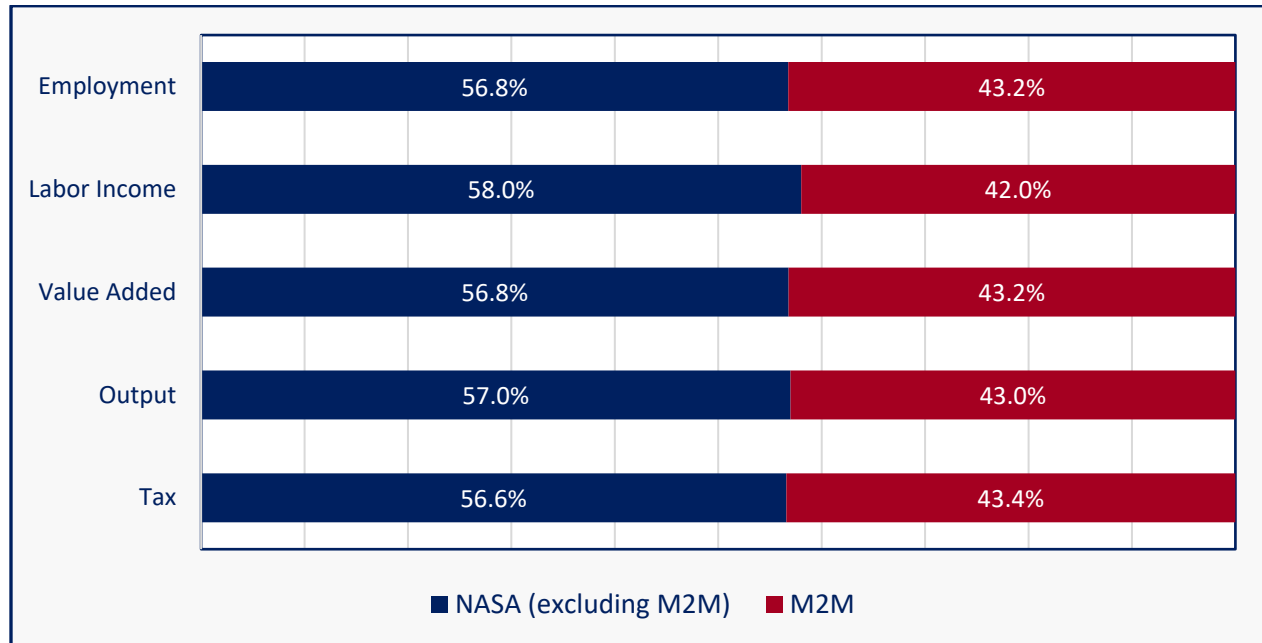
The M2M Campaign's Share of NASA Impacts

Around 43% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 203 and Figure 66). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 203: The M2M Campaign Portion of Overall NASA Impacts, Louisiana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,418	159,141	246,485	507,376	16,905
M2M Portion	1,045	66,798	106,484	218,206	7,340
M2M Share	43.2%	42.0%	43.2%	43.0%	43.4%

Figure 66: The M2M Campaign Portion of Overall NASA Impacts, Louisiana



Investments in Climate Change Research and Technology Impacts

In 2023, Louisiana had nine climate change research and technology-related civil service employees (3 FTEs) with a corresponding labor income of \$481,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$5.7 million. The total Louisiana employment impact is 87 jobs. The labor income and economic output associated with this employment are \$5.5 million and \$17.3 million, respectively. Investments in climate change research and technology generate \$680,000 in tax revenues for the state and local governments in Louisiana (Table 204).

Table 204: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Louisiana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	481	731	1,338	10
Indirect	55	3,549	4,645	10,451	306
Induced	29	1,498	2,847	5,464	364
Total	87	5,528	8,223	17,253	680
<i>Multiplier</i>	<i>30.4</i>	<i>11.5</i>	<i>11.3</i>	<i>12.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Louisiana economy. More than 92% of the employment impacts and 88% of the output impacts are due to NASA procurement sourced within the state.

Table 205: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Louisiana

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	3	43.4	0	0.0	3	3.3	100.0	0.0
Indirect	0	0.0	55	68.1	55	63.0	0.0	100.0
Induced	4	56.6	26	31.9	29	33.8	12.7	87.3
Total	7	100	80	100	87	100	7.6	92.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 206: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Louisiana

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,338	65.7	0	0.0	1,338	7.8	100.0	0.0
Indirect	0	0.0	10,451	68.7	10,451	60.6	0.0	100.0
Induced	697	34.3	4,767	31.3	5,464	31.7	12.8	87.2
Total	2,035	100	15,219	100	17,253	100	11.8	88.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

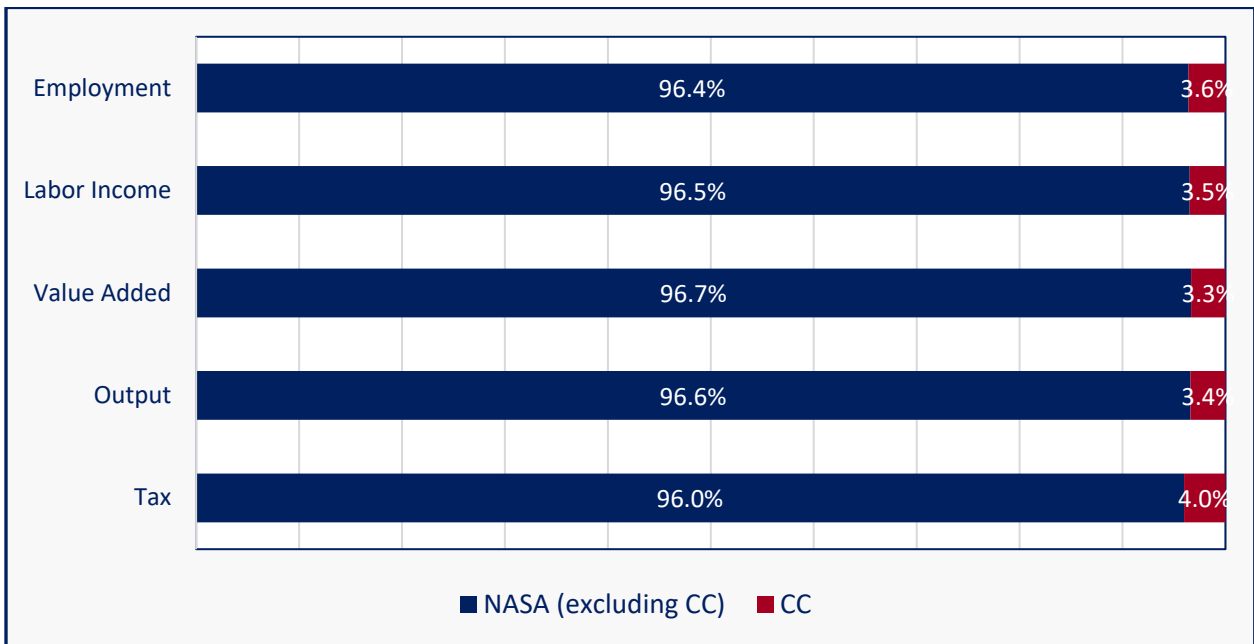
Around 4% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 207 and Figure 67). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 207: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Louisiana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,418	159,141	246,485	507,376	16,905
CC Portion	87	5,528	8,223	17,253	680
CC Share	3.6%	3.5%	3.3%	3.4%	4.0%

Figure 67: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Louisiana



Economic Impacts on the State of Maine

NASA Impacts

In 2023, six NASA civil service employees (4 FTEs) residing in Maine earned \$657,000 in labor income. NASA procurement sourced in Maine in the same year totaled \$17.1 million. The total economic impact resulting from these activities is 178 jobs, \$12.9 million in labor income, and \$40 million in economic output. These economic activities generate \$2 million in tax revenues for the state and local governments in Maine (Table 208).

Table 208: Summary of NASA Impacts by Types of Impact, Maine

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	4	657	957	1,751	20
Indirect	107	8,347	12,665	25,859	1,122
Induced	67	3,898	7,185	12,367	882
Total	178	12,902	20,807	39,977	2,024
<i>Multiplier</i>	<i>47.8</i>	<i>19.6</i>	<i>21.7</i>	<i>22.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maine economy. Table 209 examines the sources of the employment figures in the second column of Table 208. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 95% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is approximately 5%.

Table 209: NASA Employment Impacts by Sources of Impact, Maine

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	4	42.3	0	0.0	4	2.1	100.0	0.0
Indirect	0	0.0	107	63.3	107	60.2	0.0	100.0
Induced	5	57.7	62	36.7	67	37.7	7.6	92.4
Total	9	100	169	100	178	100	4.9	95.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 210 examines the sources of the output figures in the fifth column of Table 208. Procurement spending is responsible for more than 93% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 7%.

Table 210: NASA Output Impacts by Sources of Impact, Maine

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,751	65.7	0	0.0	1,751	4.4	100.0	0.0
Indirect	0	0.0	25,859	69.3	25,859	64.7	0.0	100.0
Induced	915	34.3	11,452	30.7	12,367	30.9	7.4	92.6
Total	2,665	100	37,311	100	39,977	100	6.7	93.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Maine had one M2M-related civil service employees (1 FTE) with a corresponding labor income of \$236,000. M2M campaign procurement sourced in the state in the same year totaled \$3.8 million. The total economic impact attributable to this procurement activity is 31 jobs, \$2.5 million in labor income, and \$7.6 million worth of output. These economic activities generate \$327,000 in tax revenues for the state and local governments in Maine (Table 211).

Table 211: Summary of M2M Campaign Impacts by Types of Impact, Maine

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	236	257	470	7
Indirect	17	1,504	2,294	4,719	150
Induced	13	770	1,405	2,388	170
Total	31	2,510	3,956	7,576	327
<i>Multiplier</i>	<i>30.8</i>	<i>10.6</i>	<i>15.4</i>	<i>16.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maine economy. Approximately 91% of the employment and 90% of the output impacts are due to NASA procurement sourced within the state.

Table 212: M2M Campaign Employment Impacts by Sources of Impact, Maine

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	35.8	0	0.0	1	3.3	100.0	0.0
Indirect	0	0.0	17	59.9	17	54.5	0.0	100.0
Induced	2	64.2	11	40.1	13	42.3	13.8	86.2
Total	3	100	28	100	31	100	9.1	90.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 213: M2M Campaign Output Impacts by Sources of Impact, Maine

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	470	59.9	0	0.0	470	6.2	100.0	0.0
Indirect	0	0.0	4,719	69.5	4,719	62.3	0.0	100.0
Induced	314	40.1	2,074	30.5	2,388	31.5	13.2	86.8
Total	784	100	6,792	100	7,576	100	10.3	89.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

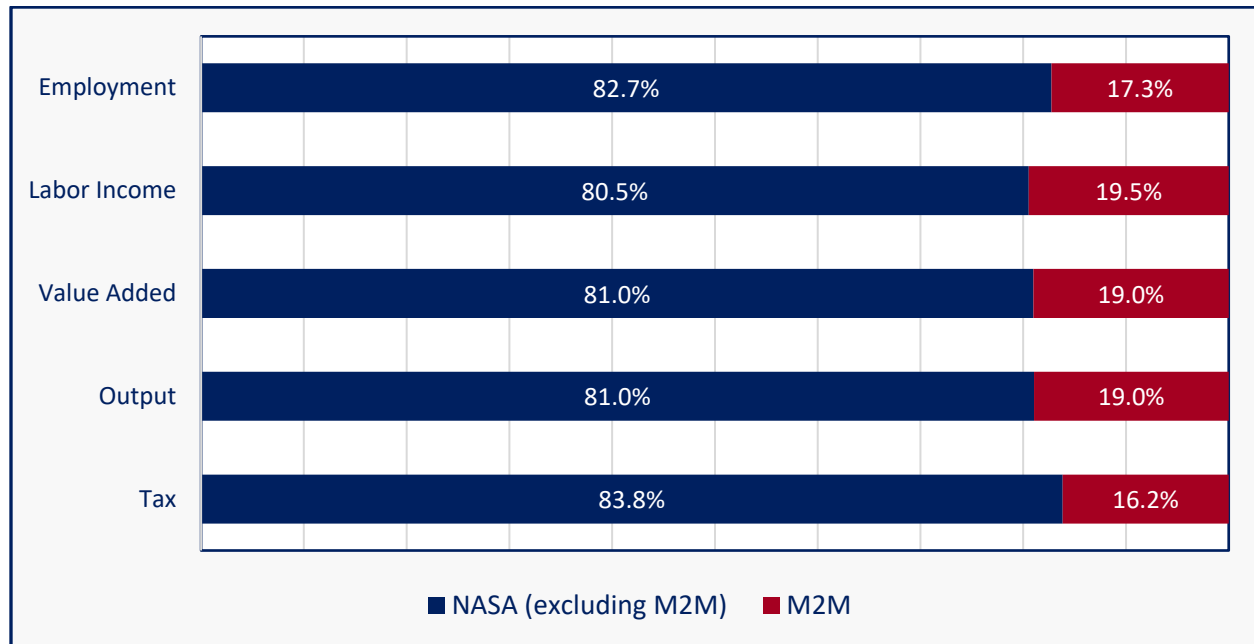
The M2M Campaign's Share of NASA Impacts

Around 18% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 214 and Figure 68). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 214: The M2M Campaign Portion of Overall NASA Impacts, Maine

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	178	12,902	20,807	39,977	2,024
M2M Portion	31	2,510	3,956	7,576	327
M2M Share	17.3%	19.5%	19.0%	19.0%	16.2%

Figure 68: The M2M Campaign Portion of Overall NASA Impacts, Maine



Investments in Climate Change Research and Technology Impacts

In 2023, Maine had two climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$74,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$6.6 million. The total Maine employment impact is 76 jobs. The labor income and economic output associated with this employment are \$5.1 million and \$16.2 million, respectively. Investments in climate change research and technology generate \$975,000 in tax revenues for the state and local governments in Maine (Table 215).

Table 215: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Maine

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	74	162	296	2
Indirect	48	3,503	5,561	10,977	622
Induced	27	1,512	2,812	4,922	351
Total	76	5,089	8,534	16,195	975
<i>Multiplier</i>	<i>120.2</i>	<i>68.5</i>	<i>52.8</i>	<i>54.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maine economy. More than 98% of the employment impacts and nearly 98% output impacts are due to NASA procurement sourced within the state.

Table 216: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Maine

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	50.9	0	0.0	1	0.8	100.0	0.0
Indirect	0	0.0	48	65.1	48	64.0	0.0	100.0
Induced	1	49.1	26	34.9	27	35.1	2.3	97.7
Total	1	100	74	100	76	100	1.6	98.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 217: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Maine

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	296	73.1	0	0.0	296	1.8	100.0	0.0
Indirect	0	0.0	10,977	69.5	10,977	67.8	0.0	100.0
Induced	109	26.9	4,813	30.5	4,922	30.4	2.2	97.8
Total	405	100	15,790	100	16,195	100	2.5	97.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

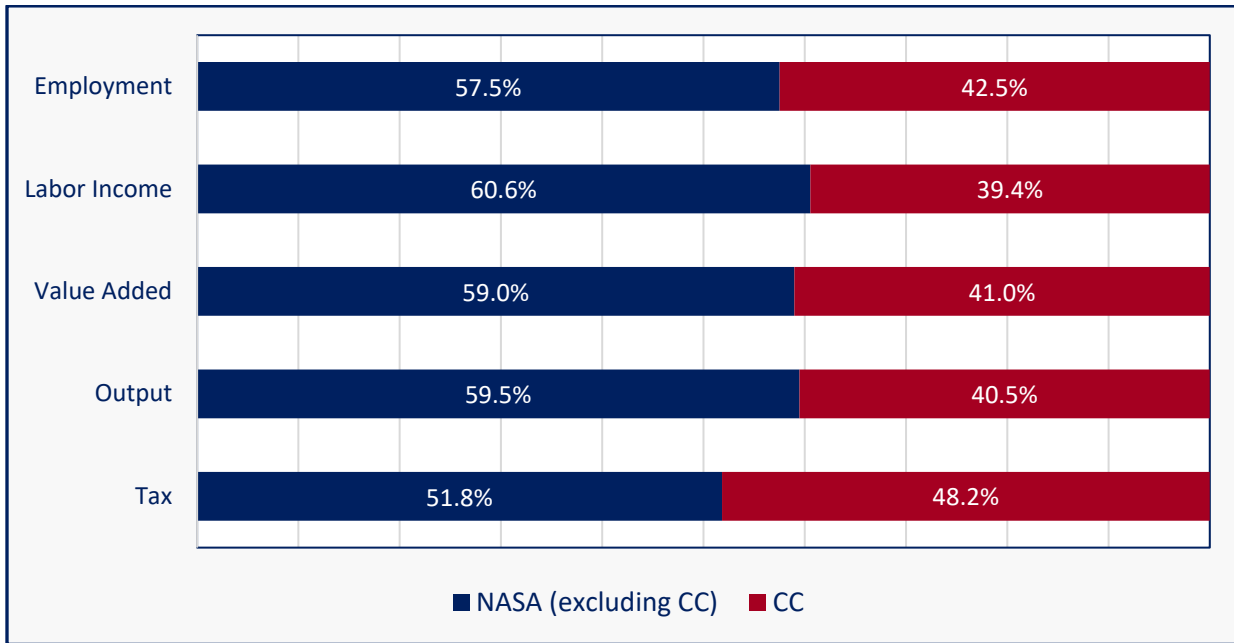
The Investments in Climate Change Research and Technology’s Share of NASA Impacts

Around 42% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 218 and Figure 69). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 218: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maine

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	178	12,902	20,807	39,977	2,024
CC Portion	76	5,089	8,534	16,195	975
CC Share	42.5%	39.4%	41.0%	40.5%	48.2%

Figure 69: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maine



Economic Impacts on the State of Maryland

NASA Impacts

In 2023, 3,263 NASA civil service employees (3,067 FTEs) residing in Maryland earned \$650.2 million in labor income. NASA procurement sourced in Maryland in the same year totaled \$2.6 billion. The total economic impact resulting from these activities is 33,809 jobs, \$3.3 billion in labor income, and \$8.3 billion in economic output. These economic activities generate \$367.8 million in tax revenues for the state and local governments in Maryland (Table 219).

The employment multiplier is 11, meaning that for every NASA job located in Maryland, an additional 10 jobs are supported in the state economy. The output multiplier of 5.7 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$4.7 million worth of output is sustained throughout the state economy.

Table 219: Summary of NASA Impacts by Types of Impact, Maryland

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3,067	650,169	787,488	1,441,084	24,908
Indirect	16,743	1,724,234	2,332,889	4,104,732	142,170
Induced	13,999	899,360	1,636,354	2,720,649	200,749
Total	33,809	3,273,763	4,756,730	8,266,465	367,827
<i>Multiplier</i>	<i>11.0</i>	<i>5.0</i>	<i>6.0</i>	<i>5.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maryland economy. Table 220 examines the sources of the employment figures in the second column of Table 219. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Around 80% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 20%.

Table 220: NASA Employment Impacts by Sources of Impact, Maryland

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	3,067	45.3	0	0.0	3,067	9.1	100.0	0.0
Indirect	0	0.0	16,743	61.9	16,743	49.5	0.0	100.0
Induced	3,703	54.7	10,296	38.1	13,999	41.4	26.4	73.6
Total	6,770	100	27,039	100	33,809	100	20.0	80.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 221 examines the sources of the output figures in the fifth column of Table 219. Procurement spending is responsible for nearly 74% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 26%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 221: NASA Output Impacts by Sources of Impact, Maryland

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,441,084	66.2	0	0.0	1,441,084	17.4	100.0	0.0
Indirect	0	0.0	4,104,732	67.4	4,104,732	49.7	0.0	100.0
Induced	736,839	33.8	1,983,810	32.6	2,720,649	32.9	27.1	72.9
Total	2,177,923	100	6,088,542	100	8,266,465	100	26.3	73.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

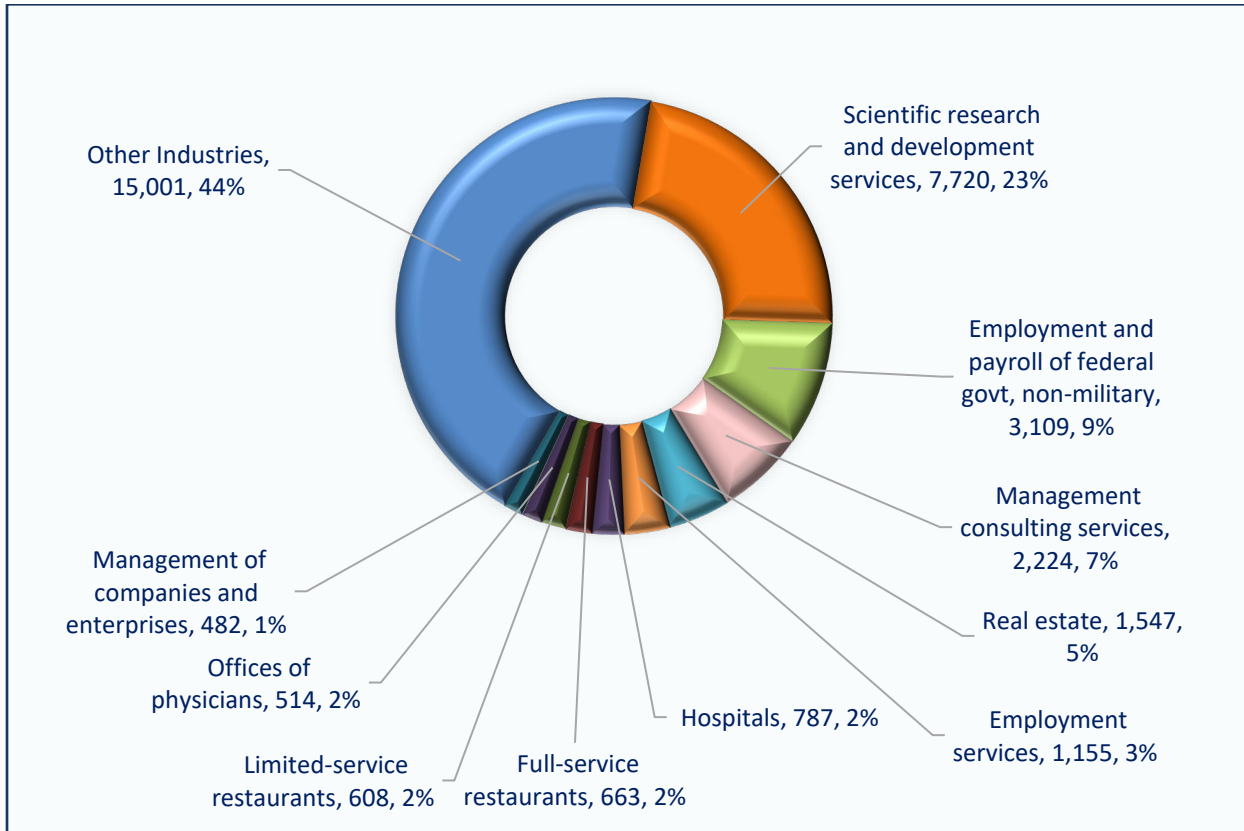
33,809 jobs in the Maryland economy were supported by NASA activities in Fiscal Year 2023.

Of these, 3,067 (9%) were directly located at NASA centers. As a result of the procurement of goods and services in the Maryland economy, 16,743 additional jobs (50%) were created. The remaining employment—13,999 jobs (41%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 70 depicts the ten most impacted industries by employment. Scientific research and development services and management consulting services are the most impacted industry (along with the federal government sector). These three industries together account for 39% of the jobs created. The employment in private sector industry is driven largely by NASA procurement spending; scientific research and development services and management

consulting services accounted for 86% of NASA procurement spending in the state in Fiscal Year 2023. The impact in the federal government sector represents mainly civil service employees working for NASA.

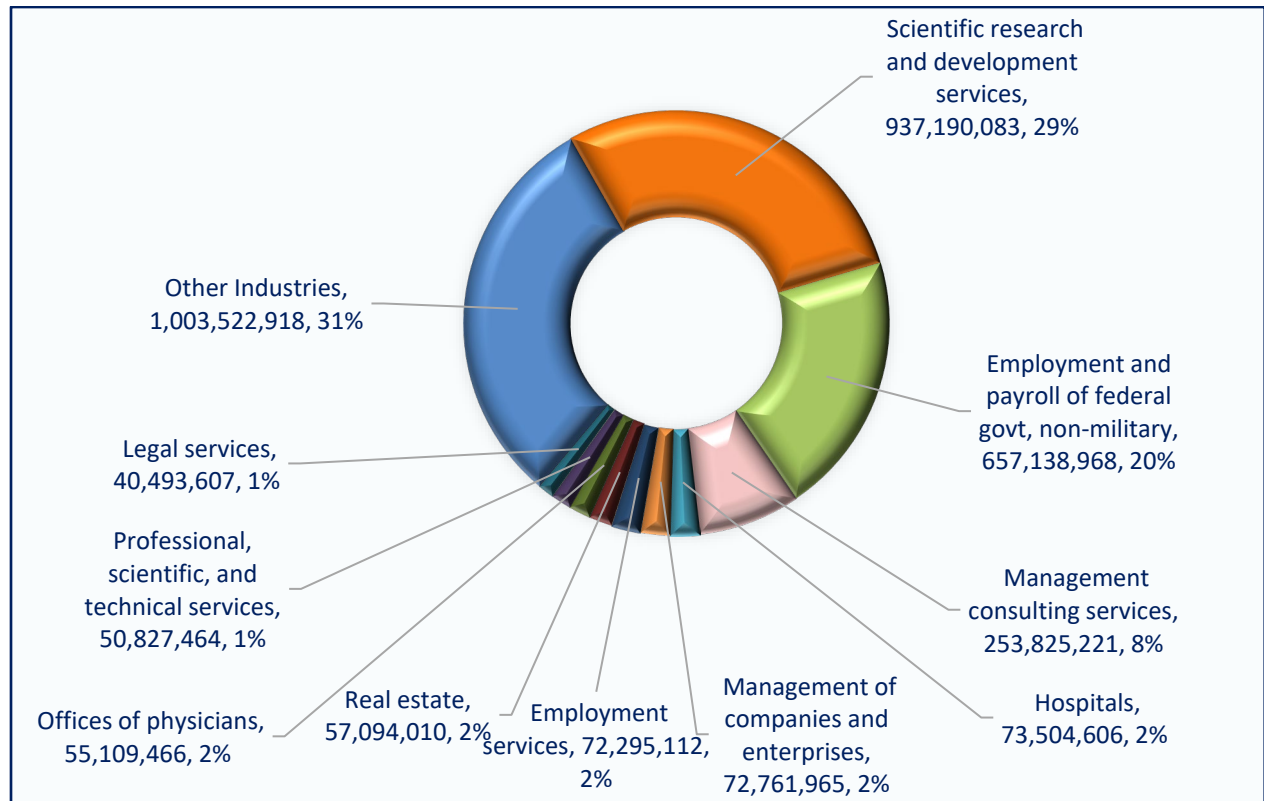
Figure 70: Top Ten Most Impacted Industries by Employment, Maryland (NASA)



The total income impact of NASA in Maryland was \$3.3 billion in Fiscal Year 2023. Of this amount, more than \$650 million (20%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.7 billion (53%). The remaining income (induced impact), estimated to be \$900 million (27%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 71 depicts the ten most impacted industries by labor income. As a consequence of its share of total employment, scientific research and development and management consulting services are the most impacted industries by income (along with the federal government sector). The three industries together account for 57% of the total labor income earned. The reason that these industries' share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services industry was \$118,167 (including benefits), compared to an average of \$75,812 across Maryland.

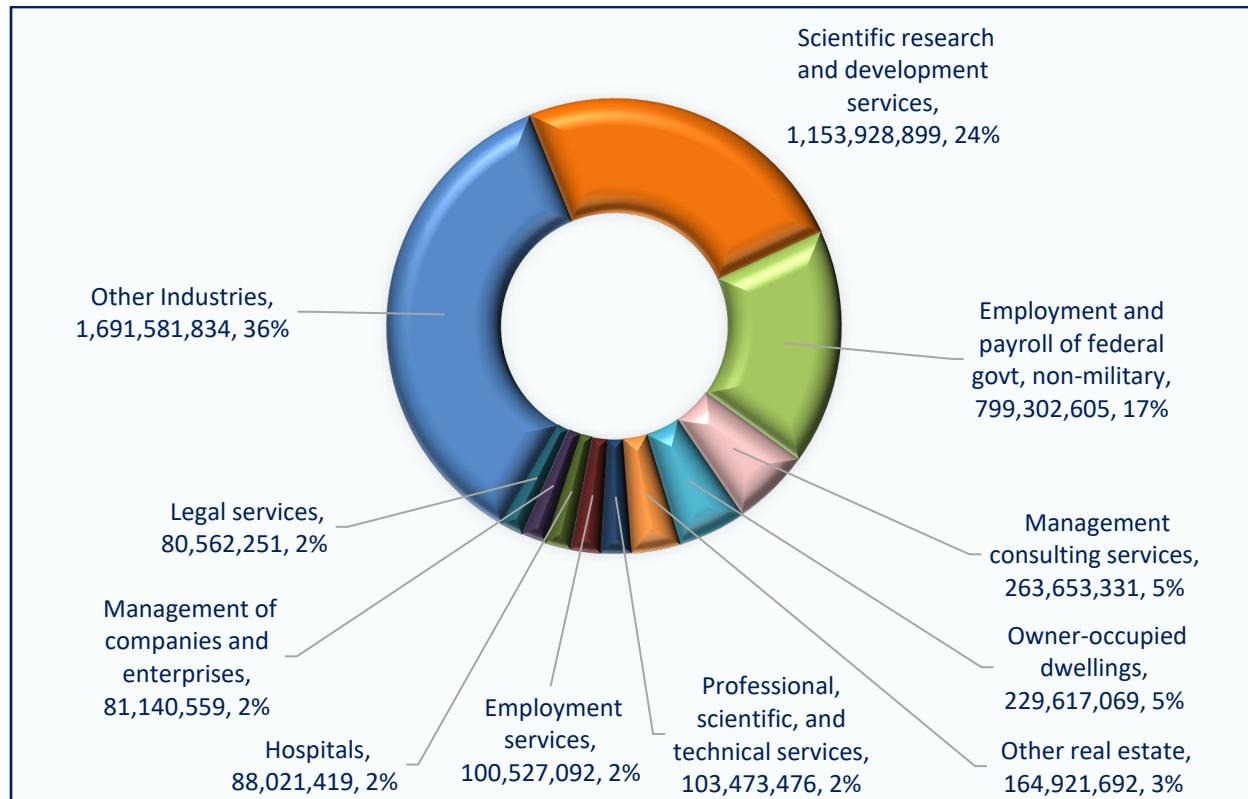
Figure 71: Top Ten Most Impacted Industries by Labor Income, Maryland (NASA)



The total value-added impact of NASA in Maryland was \$4.8 billion in Fiscal Year 2023. Of this amount, \$787 million (17%) was created by civil service employees and \$2.3 billion (49%) was created indirectly by the \$2.6 billion in procurement spending across all industry sectors in Maryland. More than \$1.6 billion (34%) was generated by increased consumption spending supported by increased earnings.

Figure 72 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development services and management consulting services are the most impacted industries (along with the federal government sector). The three industries together account for 46% of the total value-added created. NASA activities accounted for an increase of \$1.1 billion in value-added in scientific research and development services and \$264 million in value-added in management consulting services. \$799 million dollars in the federal government non-military sector corresponds mainly to value-added by NASA employees.

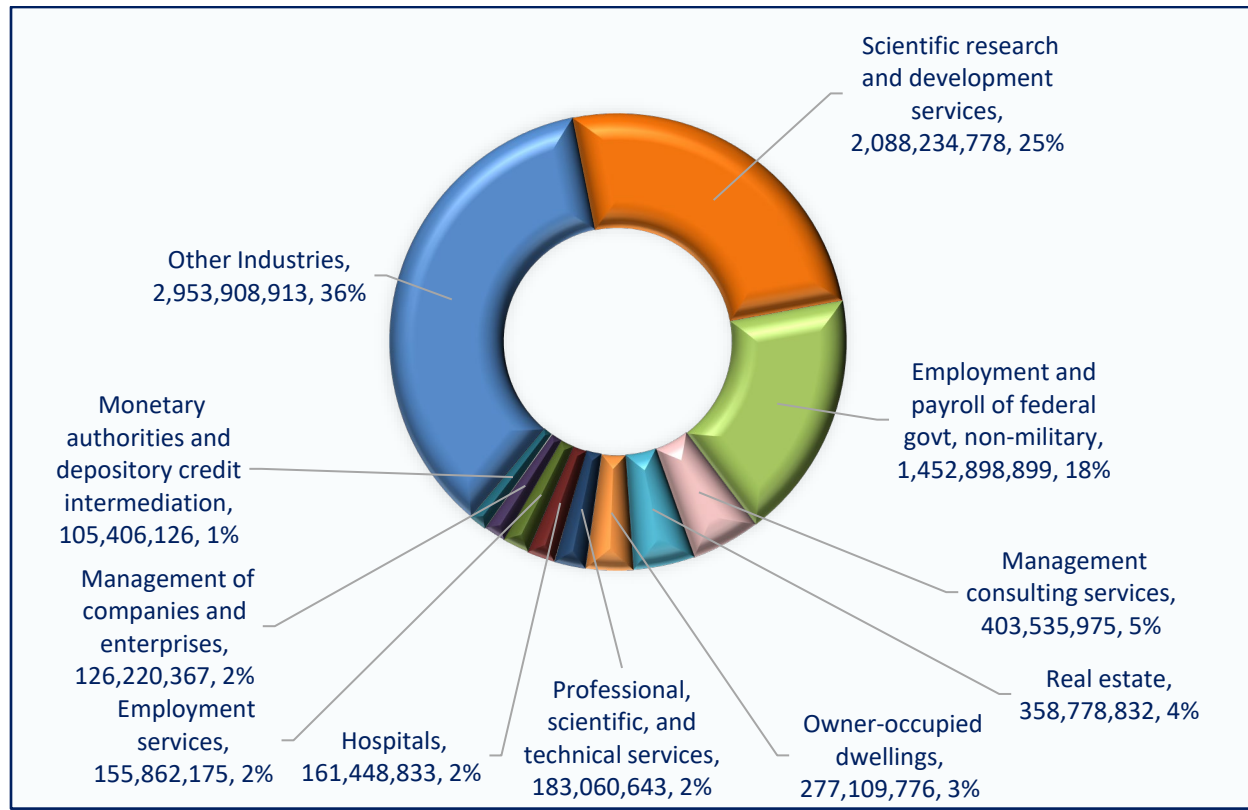
Figure 72: Top Ten Most Impacted Industries by Value-added, Maryland (NASA)



The total output impact of NASA in Maryland was \$8.3 billion in Fiscal Year 2023. The direct impact of \$1.4 billion constitutes the value of production by NASA employees, accounting for 17% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$2.6 billion resulted in an additional increase in output (gross sales) of \$1.5 billion across all industry sectors (adding up to the indirect total of \$4.1 billion in Table 219). \$2.7 billion (33%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of \$2.1 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 73) and an increase of \$404 million in sales in management consulting services. Similar to employment, impact in these industries is largely driven by NASA procurement spending; these industries accounted for 86% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 73: Top Ten Most Impacted Industries by Output, Maryland (NASA)



M2M Campaign Impacts

In 2023, Maryland had 627 M2M-related civil service employees (174 FTEs) with a corresponding labor income of \$36.3 million. M2M campaign procurement sourced in the state in the same year totaled more than \$113 million. The total Maryland employment impact is 1,519 jobs. The labor income and economic output associated with this employment are \$156 million and \$389.3 million, respectively. The M2M campaign generates \$16.8 million in tax revenues for the state and local governments in Maryland (Table 222).

Table 222: Summary of M2M Campaign Impacts by Types of Impact, Maryland

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	174	36,291	44,717	81,831	1,390
Indirect	702	76,799	105,037	181,005	6,050
Induced	643	42,863	77,370	126,424	9,331
Total	1,519	155,953	227,123	389,261	16,771
<i>Multiplier</i>	<i>8.7</i>	<i>4.3</i>	<i>5.1</i>	<i>4.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maryland economy. Approximately 76% of the employment impacts and 69% of the output impacts are due to NASA procurement sourced within the state.

Table 223: M2M Campaign Employment Impacts by Sources of Impact, Maryland

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	174	46.9	0	0.0	174	11.5	100.0	0.0
Indirect	0	0.0	702	61.2	702	46.2	0.0	100.0
Induced	197	53.1	445	38.8	643	42.3	30.7	69.3
Total	371	100	1,148	100	1,519	100	24.4	75.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 224: M2M Campaign Output Impacts by Sources of Impact, Maryland

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	81,831	67.2	0	0.0	81,831	21.0	100.0	0.0
Indirect	0	0.0	181,005	67.7	181,005	46.5	0.0	100.0
Induced	39,946	32.8	86,478	32.3	126,424	32.5	31.6	68.4
Total	121,778	100	267,483	100	389,261	100	31.3	68.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

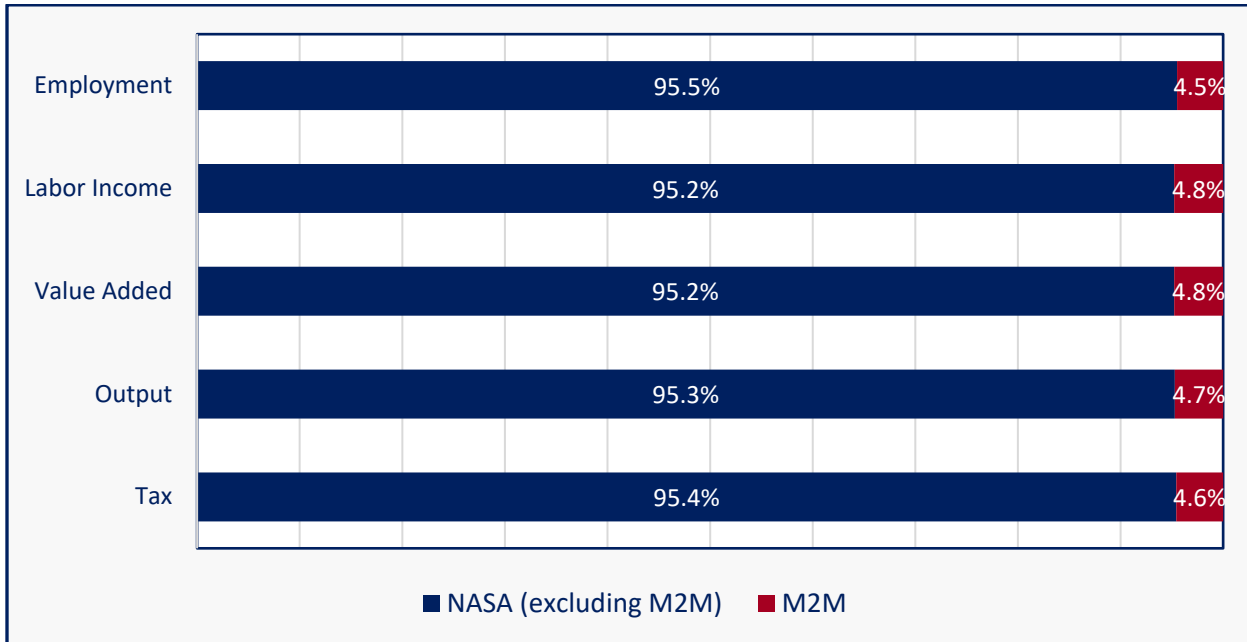
The M2M Campaign's Share of NASA Impacts

Around 5% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 225 and Figure 74). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 225: The M2M Campaign Portion of Overall NASA Impacts, Maryland

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	33,809	3,273,763	4,756,730	8,266,465	367,827
M2M Portion	1,519	155,953	227,123	389,261	16,771
M2M Share	4.5%	4.8%	4.8%	4.7%	4.6%

Figure 74: The M2M Campaign Portion of Overall NASA Impacts, Maryland



Investments in Climate Change Research and Technology Impacts

In 2023, Maryland had 933 climate change research and technology-related civil service employees (421 FTEs) with a corresponding labor income of \$89.1 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$439.1 million. The total Maryland employment impact is 5,471 jobs. The labor income and economic output associated with this employment are \$515.4 million and \$1.3 billion, respectively. Investments in climate change research and technology generate \$59.8 million in tax revenues for the state and local governments in Maryland (Table 226).

Table 226: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Maryland

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	421	89,107	108,083	197,790	3,414
Indirect	2,783	285,028	399,050	713,720	24,009
Induced	2,268	141,258	258,407	438,212	32,329
Total	5,471	515,393	765,540	1,349,723	59,752
<i>Multiplier</i>	<i>13.0</i>	<i>5.8</i>	<i>7.1</i>	<i>6.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Maryland economy. More than 82% of the employment impacts and nearly 78% of the output impacts are due to NASA procurement sourced within the state.

Table 227: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Maryland

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	421	43.8	0	0.0	421	7.7	100.0	0.0
Indirect	0	0.0	2,783	61.7	2,783	50.9	0.0	100.0
Induced	541	56.2	1,727	38.3	2,268	41.4	23.8	76.2
Total	962	100	4,510	100	5,471	100	17.6	82.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 228: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Maryland

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	197,790	65.3	0	0.0	197,790	14.7	100.0	0.0
Indirect	0	0.0	713,720	68.2	713,720	52.9	0.0	100.0
Induced	105,084	34.7	333,128	31.8	438,212	32.5	24.0	76.0
Total	302,874	100	1,046,849	100	1,349,723	100	22.4	77.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

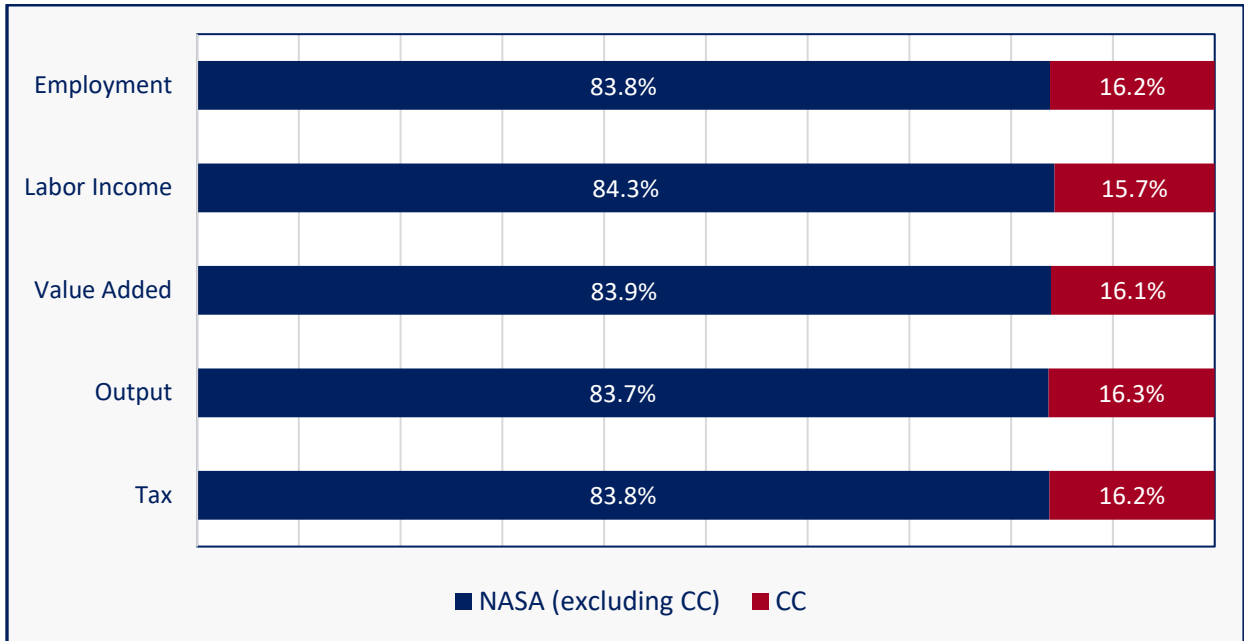
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 16% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 229 and Figure 75). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 229: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maryland

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	33,809	3,273,763	4,756,730	8,266,465	367,827
CC Portion	5,471	515,393	765,540	1,349,723	59,752
CC Share	16.2%	15.7%	16.1%	16.3%	16.2%

Figure 75: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Maryland



Economic Impacts on the State of Massachusetts

NASA Impacts

In 2023, 26 NASA civil service employees (20 FTEs) residing in Massachusetts earned \$3.9 million in labor income. NASA procurement sourced in Massachusetts in the same year totaled approximately \$260.5 million. The total economic impact resulting from these activities is 2,747 jobs, \$307.1 million in labor income, and \$718.4 million in economic output. These economic activities generate \$29 million in tax revenues for the state and local governments in Massachusetts (Table 230).

Table 230: Summary of NASA Impacts by Types of Impact, Massachusetts

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	20	3,903	5,035	9,213	142
Indirect	1,415	195,251	262,007	426,803	13,511
Induced	1,312	107,976	175,608	282,350	15,373
Total	2,747	307,129	442,650	718,366	29,026
<i>Multiplier</i>	<i>140.1</i>	<i>78.7</i>	<i>87.9</i>	<i>78.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Massachusetts economy. Table 231 examines the sources of the employment figures in the second column of Table 230. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 2%.

Table 231: NASA Employment Impacts by Sources of Impact, Massachusetts

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	20	43.4	0	0.0	20	0.7	100.0	0.0
Indirect	0	0.0	1,415	52.4	1,415	51.5	0.0	100.0
Induced	26	56.6	1,287	47.6	1,312	47.8	1.9	98.1
Total	45	100	2,702	100	2,747	100	1.6	98.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 232 examines the sources of the output figures in the fifth column of Table 230. Procurement spending is responsible for nearly 98% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 2%.

Table 232: NASA Output Impacts by Sources of Impact, Massachusetts

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	9,213	61.9	0	0.0	9,213	1.3	100.0	0.0
Indirect	0	0.0	426,803	60.7	426,803	59.4	0.0	100.0
Induced	5,660	38.1	276,690	39.3	282,350	39.3	2.0	98.0
Total	14,873	100	703,493	100	718,366	100	2.1	97.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Massachusetts had nine M2M-related civil service employees (5 FTEs) with a corresponding labor income of 951,000. M2M campaign procurement sourced in the state in the same year totaled \$17.6 million. The total Massachusetts employment impact is 192 jobs. The labor income and economic output associated with this employment are \$20.4 million and \$49.7 million, respectively. The M2M campaign generates \$2 million in tax revenues for the state and local governments in Massachusetts (Table 233).

Table 233: Summary of M2M Campaign Impacts by Types of Impact, Massachusetts

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	951	1,410	2,580	34
Indirect	103	12,266	17,303	28,849	969
Induced	84	7,168	11,587	18,280	996
Total	192	20,385	30,300	49,709	1,999
<i>Multiplier</i>	<i>35.0</i>	<i>21.4</i>	<i>21.5</i>	<i>19.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Massachusetts economy. Around 94% of the employment and 92% of the output impacts are due to NASA procurement sourced within the state.

Table 234: M2M Campaign Employment Impacts by Sources of Impact, Massachusetts

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	5	47.6	0	0.0	5	2.9	100.0	0.0
Indirect	0	0.0	103	56.7	103	53.3	0.0	100.0
Induced	6	52.4	78	43.3	84	43.8	7.2	92.8
Total	12	100	181	100	192	100	6.0	94.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 235: M2M Campaign Output Impacts by Sources of Impact, Massachusetts

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	2,580	65.7	0	0.0	2,580	5.2	100.0	0.0
Indirect	0	0.0	28,849	63.0	28,849	58.0	0.0	100.0
Induced	1,347	34.3	16,934	37.0	18,280	36.8	7.4	92.6
Total	3,926	100	45,782	100	49,709	100	7.9	92.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

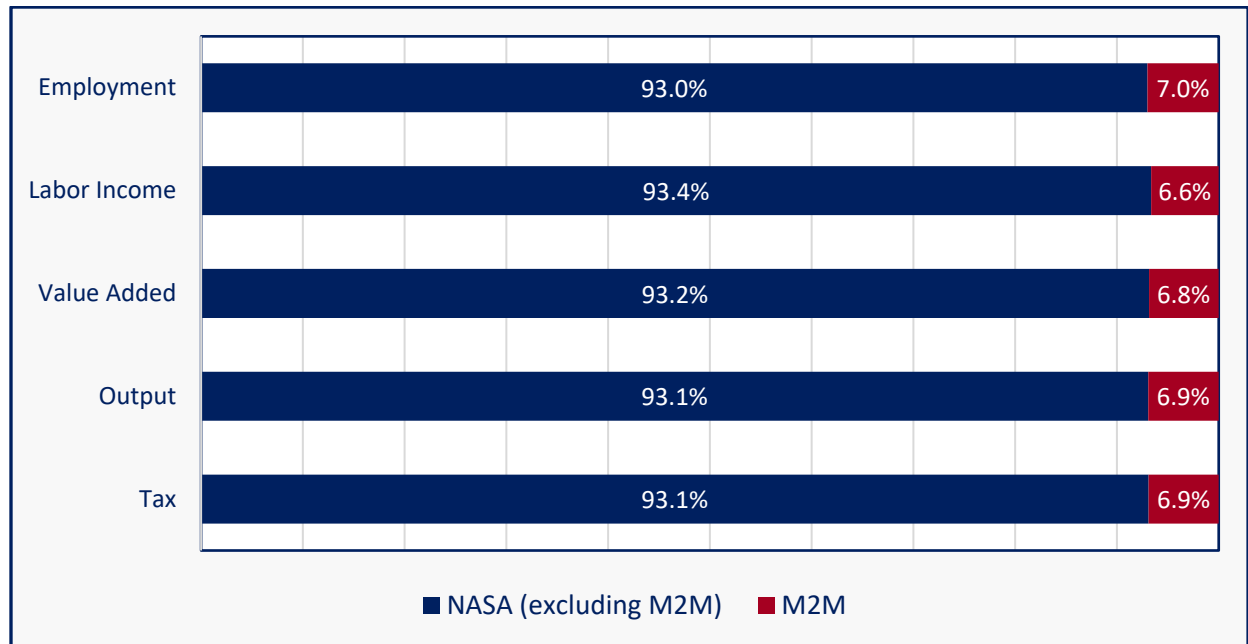
The M2M Campaign's Share of NASA Impacts

Around 7% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 236 and Figure 76). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 236: The M2M Campaign Portion of Overall NASA Impacts, Massachusetts

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,747	307,129	442,650	718,366	29,026
M2M Portion	192	20,385	30,300	49,709	1,999
M2M Share	7.0%	6.6%	6.8%	6.9%	6.9%

Figure 76: The M2M Campaign Portion of Overall NASA Impacts, Massachusetts



Investments in Climate Change Research and Technology Impacts

In 2023, Massachusetts had seven climate change research and technology-related civil service employees (3 FTEs) with a corresponding labor income of 568,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$72.8 million. The total Massachusetts employment impact is 759 jobs. The labor income and economic output associated with this employment are \$83.1 million and \$200 million, respectively. Investments in climate change research and technology generate \$8.1 million in tax revenues for the state and local governments in Massachusetts (Table 237).

Table 237: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Massachusetts

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	568	796	1,456	21
Indirect	395	53,472	72,697	120,405	3,781
Induced	361	29,104	47,479	78,058	4,250
Total	759	83,145	120,971	199,919	8,052
<i>Multiplier</i>	<i>245.0</i>	<i>146.3</i>	<i>152.0</i>	<i>137.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Massachusetts economy. Around 99% of the employment and 99% of the output impacts are due to NASA procurement sourced within the state.

Table 238: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Massachusetts

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	3	43.9	0	0.0	3	0.4	100.0	0.0
Indirect	0	0.0	395	52.5	395	52.0	0.0	100.0
Induced	4	56.1	357	47.5	361	47.6	1.1	98.9
Total	7	100	752	100	759	100	0.9	99.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 239: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Massachusetts

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,456	63.3	0	0.0	1,456	0.7	100.0	0.0
Indirect	0	0.0	120,405	60.9	120,405	60.2	0.0	100.0
Induced	846	36.7	77,212	39.1	78,058	39.0	1.1	98.9
Total	2,302	100	197,618	100	199,919	100	1.2	98.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

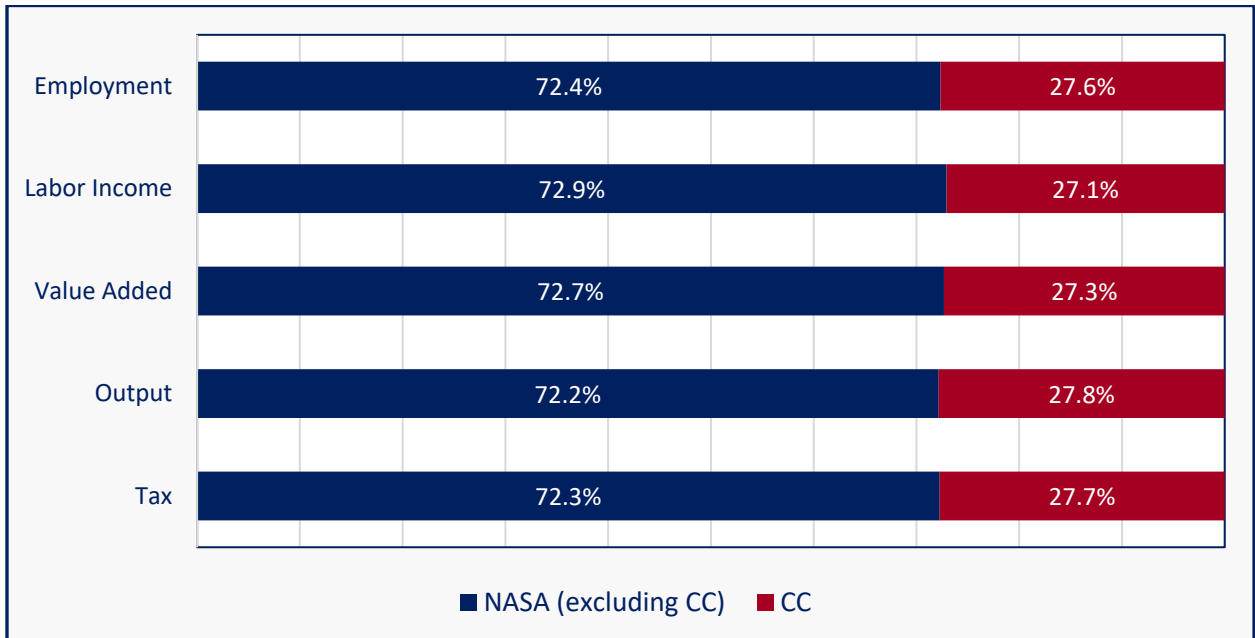
Around 28% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 240 and Figure 77). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 240: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Massachusetts

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,747	307,129	442,650	718,366	29,026
CC Portion	759	83,145	120,971	199,919	8,052
CC Share	27.6%	27.1%	27.3%	27.8%	27.7%

Figure 77: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Massachusetts



Economic Impacts on the State of Michigan

NASA Impacts

In 2023, 34 NASA civil service employees (21 FTEs) residing in Michigan earned \$2.9 million in labor income. NASA procurement sourced in Michigan in the same year totaled \$63.4 million. The total economic impact resulting from these activities is 912 jobs, \$71.6 million in labor income, and \$204.3 million in economic output. These economic activities generate \$7.3 million in tax revenues for the state and local governments in Michigan (Table 241).

Table 241: Summary of NASA Impacts by Types of Impact, Michigan

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	21	2,901	5,263	9,632	71
Indirect	509	45,143	60,307	117,448	2,857
Induced	383	23,559	40,661	77,189	4,344
Total	912	71,603	106,231	204,269	7,273
<i>Multiplier</i>	44.5	24.7	20.2	21.2	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Michigan economy. Table 242 examines the sources of the employment figures in the second column of Table 241. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 95% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is around 5%.

Table 242: NASA Employment Impacts by Sources of Impact, Michigan

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	21	46.6	0	0.0	21	2.2	100.0	0.0
Indirect	0	0.0	509	58.6	509	55.7	0.0	100.0
Induced	23	53.4	360	41.4	383	42.0	6.1	93.9
Total	44	100	868	100	912	100	4.8	95.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 242 examines the sources of the output figures in the fifth column of Table 241. Procurement spending is responsible for approximately 93% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 7%.

Table 243: NASA Output Impacts by Sources of Impact, Michigan

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	9,632	66.5	0	0.0	9,632	4.7	100.0	0.0
Indirect	0	0.0	117,448	61.9	117,448	57.5	0.0	100.0
Induced	4,843	33.5	72,346	38.1	77,189	37.8	6.3	93.7
Total	14,475	100	189,794	100	204,269	100	7.1	92.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Michigan had eight M2M-related civil service employees (5 FTEs) with a corresponding labor income of \$640,000. M2M campaign procurement sourced in the state in the same year totaled \$5.4 million. The total Michigan employment impact is 85 jobs. The labor income and economic output associated with this employment are \$6.7 million and \$18.9 million, respectively. The M2M campaign generates \$662,000 in tax revenues for the state and local governments in Michigan (Table 244).

Table 244: Summary of M2M Campaign Impacts by Types of Impact, Michigan

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	640	1,186	2,169	16
Indirect	45	3,842	5,242	9,592	244
Induced	35	2,228	3,825	7,140	402
Total	85	6,711	10,252	18,902	662
<i>Multiplier</i>	<i>18.4</i>	<i>10.5</i>	<i>8.6</i>	<i>8.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Michigan economy. Around 89% of the employment impacts and 83% of the output impacts are due to NASA procurement sourced within the state.

Table 245: M2M Campaign Employment Impacts by Sources of Impact, Michigan

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	5	48.3	0	0.0	5	5.4	100.0	0.0
Indirect	0	0.0	45	59.5	45	52.8	0.0	100.0
Induced	5	51.7	30	40.5	35	41.8	14.0	86.0
Total	10	100	75	100	85	100	11.3	88.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 246: M2M Campaign Output Impacts by Sources of Impact, Michigan

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	2,169	68.1	0	0.0	2,169	11.5	100.0	0.0
Indirect	0	0.0	9,592	61.0	9,592	50.7	0.0	100.0
Induced	1,016	31.9	6,123	39.0	7,140	37.8	14.2	85.8
Total	3,186	100	15,716	100	18,902	100	16.9	83.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

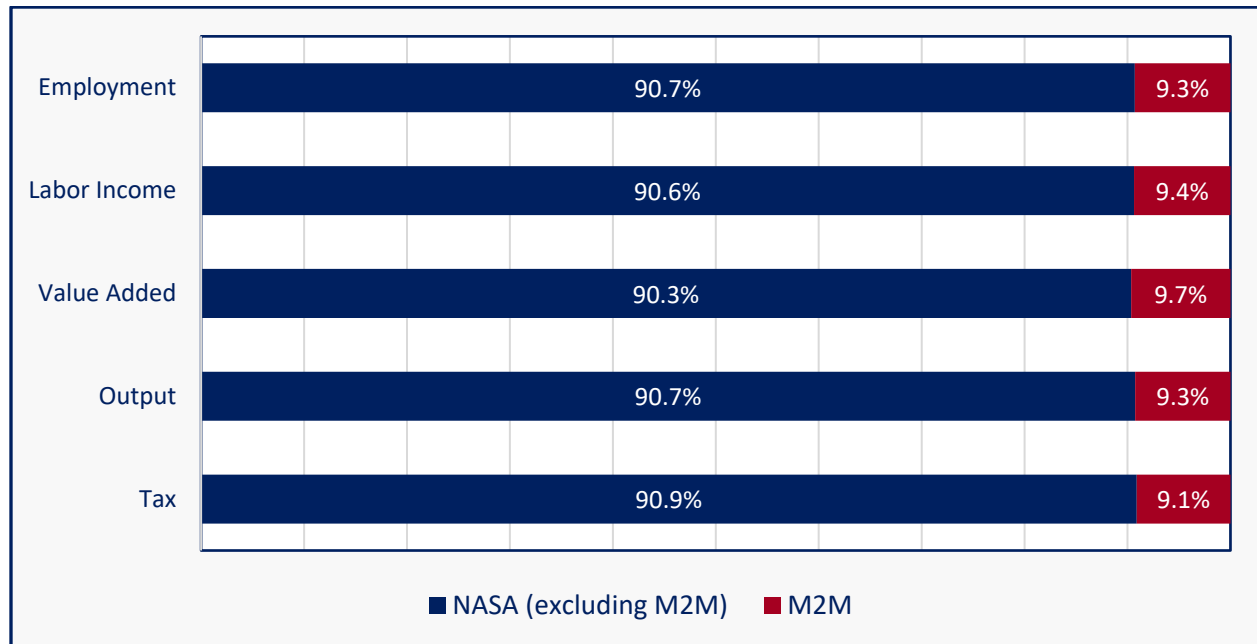
The M2M Campaign's Share of NASA Impacts

Around 9% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 247 and Figure 78). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 247: The M2M Campaign Portion of Overall NASA Impacts, Michigan

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	912	71,603	106,231	204,269	7,273
M2M Portion	85	6,711	10,252	18,902	662
M2M Share	9.3%	9.4%	9.7%	9.3%	9.1%

Figure 78: The M2M Campaign Portion of Overall NASA Impacts, Michigan



Investments in Climate Change Research and Technology Impacts

In 2023, Michigan had four climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$289,000. Investments in climate change research and technology sourced in the state in the same year totaled \$27.9 million. The total Michigan employment impact is 402 jobs. The labor income and economic output associated with this employment are \$30.9 million and \$87.6 million, respectively. Investments in climate change research and technology generate \$3.2 million in tax revenues for the state and local governments in Michigan (Table 248).

Table 248: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Michigan

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	289	369	676	7
Indirect	229	20,344	27,368	52,181	1,243
Induced	171	10,286	17,861	34,735	1,954
Total	402	30,919	45,599	87,592	3,205
<i>Multiplier</i>	<i>279.0</i>	<i>107.2</i>	<i>123.4</i>	<i>129.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Michigan economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 249: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Michigan

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	35.5	0	0.0	1	0.4	100.0	0.0
Indirect	0	0.0	229	57.6	229	57.0	0.0	100.0
Induced	3	64.5	169	42.4	171	42.6	1.5	98.5
Total	4	100	397	100	402	100	1.0	99.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 250: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Michigan

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	676	56.9	0	0.0	676	0.8	100.0	0.0
Indirect	0	0.0	52,181	60.4	52,181	59.6	0.0	100.0
Induced	511	43.1	34,224	39.6	34,735	39.7	1.5	98.5
Total	1,187	100	86,405	100	87,592	100	1.4	98.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

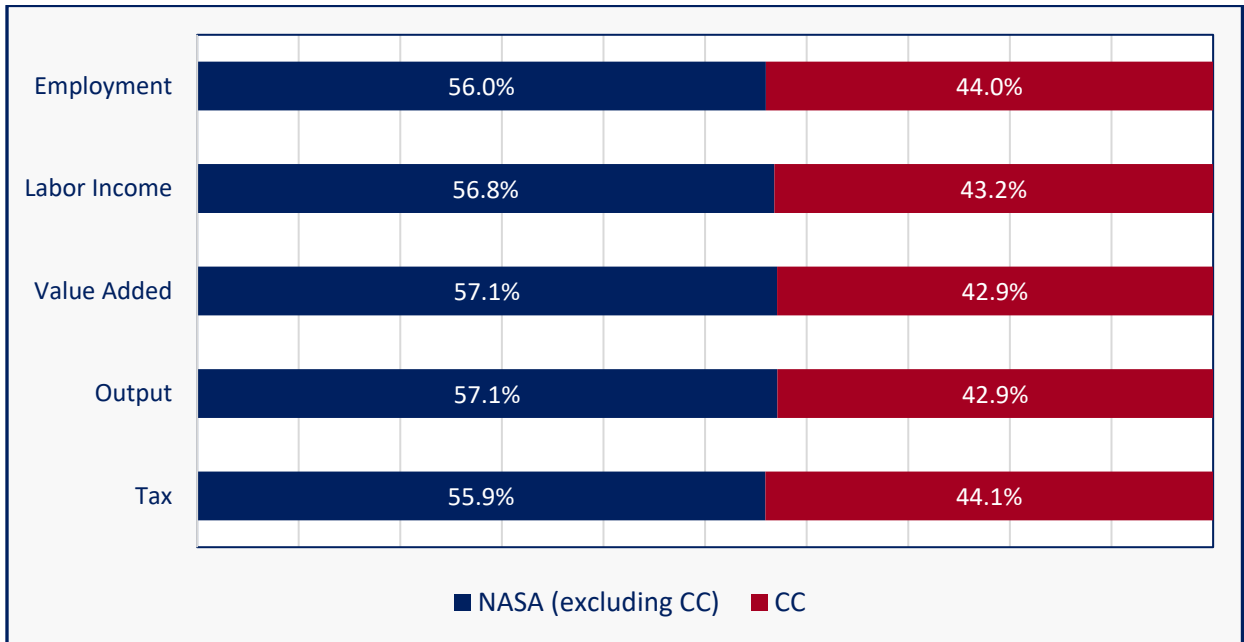
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 43% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 251 and Figure 79). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 251: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Michigan

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	912	71,603	106,231	204,269	7,273
CC Portion	402	30,919	45,599	87,592	3,205
CC Share	44.0%	43.2%	42.9%	42.9%	44.1%

Figure 79: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Michigan



Economic Impacts on the State of Minnesota

NASA Impacts

In 2023, 27 NASA civil service employees (14 FTEs) residing in Minnesota earned \$2.1 million in labor income. NASA procurement sourced in Minnesota in the same year totaled \$19.8 million. The total economic impact resulting from these activities is 300 jobs, \$24.5 million in labor income, and \$70.5 million in economic output. These economic activities generate \$3.1 million in tax revenues for the state and local governments in Minnesota (Table 252).

Table 252: Summary of NASA Impacts by Types of Impact, Minnesota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	14	2,051	3,685	6,744	74
Indirect	163	13,993	19,413	37,436	1,287
Induced	123	8,449	14,460	26,302	1,694
Total	300	24,493	37,558	70,482	3,055
<i>Multiplier</i>	20.9	11.9	10.2	10.5	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Minnesota economy. Table 253 examines the sources of the employment figures in the second column of Table 252. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 90% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 10%.

Table 253: NASA Employment Impacts by Sources of Impact, Minnesota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	14	46.9	0	0.0	14	4.8	100.0	0.0
Indirect	0	0.0	163	60.5	163	54.4	0.0	100.0
Induced	16	53.1	106	39.5	123	40.9	13.2	86.8
Total	31	100	269	100	300	100	10.2	89.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 254 examines the sources of the output figures in the fifth column of Table 252. Procurement spending is responsible for more than 85% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 15%.

Table 254: NASA Output Impacts by Sources of Impact, Minnesota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	6,744	65.5	0	0.0	6,744	9.6	100.0	0.0
Indirect	0	0.0	37,436	62.2	37,436	53.1	0.0	100.0
Induced	3,557	34.5	22,745	37.8	26,302	37.3	13.5	86.5
Total	10,301	100	60,181	100	70,482	100	14.6	85.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Minnesota had 10 M2M-related civil service employees (4 FTEs) with a corresponding labor income of \$592,000. M2M campaign procurement sourced in the state in the same year totaled \$2.7 million. The total Minnesota employment impact is 43 jobs. The labor income and economic output associated with this employment are \$3.6 million and \$11 million, respectively. The M2M campaign generates \$452,000 in tax revenues for the state and local governments in Minnesota (Table 255).

Table 255: Summary of M2M Campaign Impacts by Types of Impact, Minnesota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	4	592	933	1,707	21
Indirect	23	1,814	2,636	5,611	191
Induced	17	1,220	2,082	3,712	239
Total	43	3,626	5,651	11,030	452
<i>Multiplier</i>	<i>11.9</i>	<i>6.1</i>	<i>6.1</i>	<i>6.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Minnesota economy. Around 81% of the employment impacts and 76% of the output impacts are due to NASA procurement sourced within the state.

Table 256: M2M Campaign Employment Impacts by Sources of Impact, Minnesota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	4	44.8	0	0.0	4	8.4	100.0	0.0
Indirect	0	0.0	23	63.8	23	51.9	0.0	100.0
Induced	4	55.2	13	36.2	17	39.7	26.0	74.0
Total	8	100	35	100	43	100	18.7	81.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 257: M2M Campaign Output Impacts by Sources of Impact, Minnesota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,707	63.5	0	0.0	1,707	15.5	100.0	0.0
Indirect	0	0.0	5,611	67.3	5,611	50.9	0.0	100.0
Induced	980	36.5	2,732	32.7	3,712	33.7	26.4	73.6
Total	2,687	100	8,343	100	11,030	100	24.4	75.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

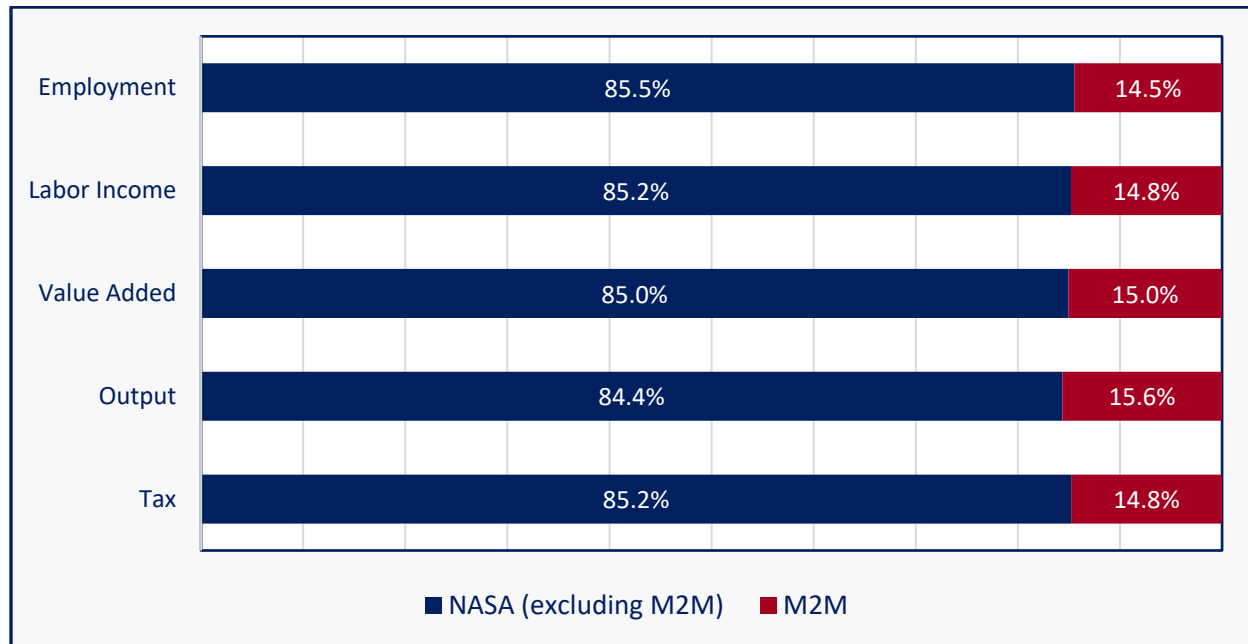
The M2M Campaign's Share of NASA Impacts

Around 15% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 258 and Figure 80). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output impacts (due to industry-specific multipliers).

Table 258: The M2M Campaign Portion of Overall NASA Impacts, Minnesota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	300	24,493	37,558	70,482	3,055
M2M Portion	43	3,626	5,651	11,030	452
M2M Share	14.5%	14.8%	15.0%	15.6%	14.8%

Figure 80: The M2M Campaign Portion of Overall NASA Impacts, Minnesota



Investments in Climate Change Research and Technology Impacts

In 2023, Minnesota had five climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$220,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$4.2 million. The total Minnesota employment impact is 64 jobs. The labor income and economic output associated with this employment are \$5 million and \$14.4 million, respectively. Investments in climate change research and technology generate \$639,000 in tax revenues for the state and local governments in Minnesota (Table 259).

Table 259: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Minnesota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	220	508	930	8
Indirect	36	3,036	4,194	7,836	270
Induced	26	1,751	3,004	5,612	361
Total	64	5,008	7,706	14,378	639
<i>Multiplier</i>	<i>32.5</i>	<i>22.7</i>	<i>15.2</i>	<i>15.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Minnesota economy. Around 94% of the employment impacts and 91% of the output impacts are due to NASA procurement sourced within the state.

Table 260: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Minnesota

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	50.2	0	0.0	2	3.1	100.0	0.0
Indirect	0	0.0	36	60.0	36	56.4	0.0	100.0
Induced	2	49.8	24	40.0	26	40.6	7.5	92.5
Total	4	100	60	100	64	100	6.1	93.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 261: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Minnesota

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	930	69.7	0	0.0	930	6.5	100.0	0.0
Indirect	0	0.0	7,836	60.1	7,836	54.5	0.0	100.0
Induced	404	30.3	5,208	39.9	5,612	39.0	7.2	92.8
Total	1,334	100	13,044	100	14,378	100	9.3	90.7

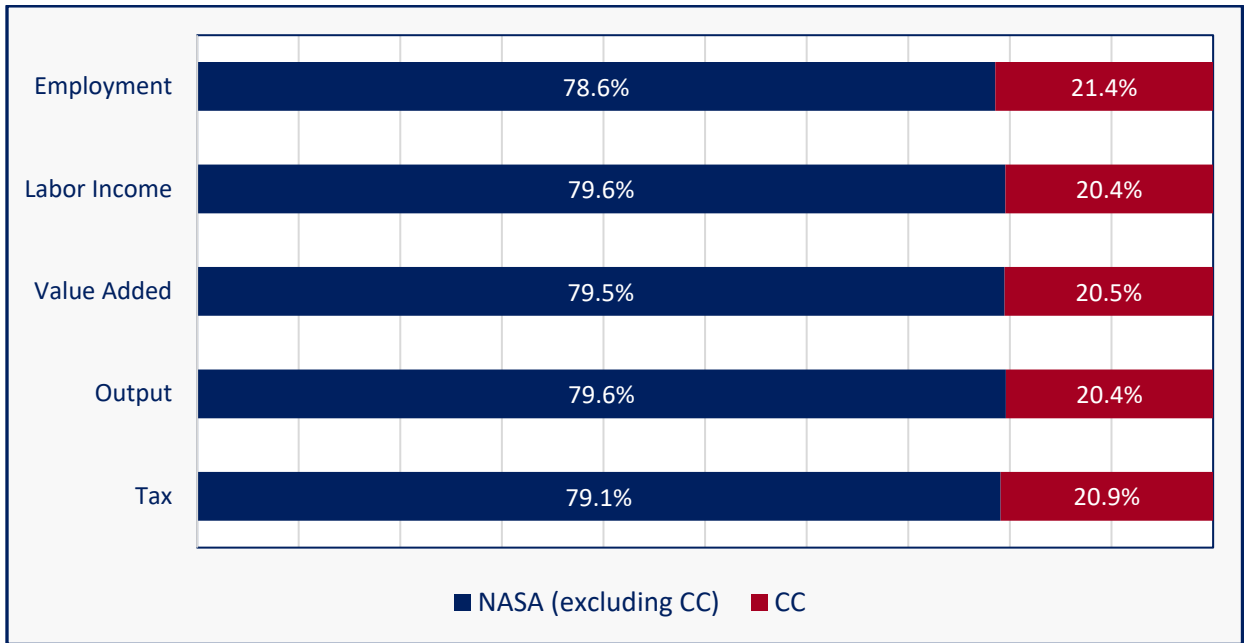
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 21% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 262 and Figure 81). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output impacts (due to industry-specific multipliers).

Table 262: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Minnesota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	300	24,493	37,558	70,482	3,055
CC Portion	64	5,008	7,706	14,378	639
CC Share	21.4%	20.4%	20.5%	20.4%	20.9%

Figure 81: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Minnesota



Economic Impacts on the State of Mississippi

NASA Impacts

In 2023, 303 NASA civil service employees (279 FTEs) residing in Mississippi earned \$47.6 million in labor income. NASA procurement sourced in Mississippi in the same year totaled \$303.3 million. The total economic impact resulting from these activities is 4,281 jobs, \$254.3 million in labor income, and \$854.4 million in economic output. These economic activities generate \$32.4 million in tax revenues for the state and local governments in Mississippi (Table 263).

The employment multiplier is 15.3, meaning that for every NASA job located in Mississippi, an additional 14.3 jobs are supported in the state economy. The output multiplier of 6.5 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$5.5 million worth of output is sustained throughout the state economy.

Table 263: Summary of NASA Impacts by Types of Impact, Mississippi

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	279	47,585	71,620	131,063	919
Indirect	2,739	148,720	217,588	498,896	16,151
Induced	1,263	57,967	112,657	224,480	15,375
Total	4,281	254,272	401,865	854,438	32,446
<i>Multiplier</i>	<i>15.3</i>	<i>5.3</i>	<i>5.6</i>	<i>6.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Mississippi economy. Table 264 examines the sources of the employment figures in the second column of Table 263. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Around 86% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is around 14%.

Table 264: NASA Employment Impacts by Sources of Impact, Mississippi

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	279	48.1	0	0.0	279	6.5	100.0	0.0
Indirect	0	0.0	2,739	74.0	2,739	64.0	0.0	100.0
Induced	301	51.9	961	26.0	1,263	29.5	23.9	76.1
Total	580	100	3,700	100	4,281	100	13.6	86.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 265 examines the sources of the output figures in the fifth column of Table 263. Procurement spending is responsible for more than 78% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is nearly 22%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 265: NASA Output Impacts by Sources of Impact, Mississippi

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	131,063	70.7	0	0.0	131,063	15.3	100.0	0.0
Indirect	0	0.0	498,896	74.6	498,896	58.4	0.0	100.0
Induced	54,331	29.3	170,149	25.4	224,480	26.3	24.2	75.8
Total	185,394	100	669,044	100	854,438	100	21.7	78.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Mississippi had 50 M2M-related civil service employees (35 FTEs) with a corresponding labor income of \$6 million. M2M campaign procurement sourced in the state in the same year totaled \$61.4 million. The total Mississippi employment impact is 691 jobs. The labor income and economic output associated with this employment are \$42.2 million and \$161.8 million, respectively. The M2M campaign generates \$5.6 million in tax revenues for the state and local governments in Mississippi (Table 266).

Table 266: Summary of M2M Campaign Impacts by Types of Impact, Mississippi

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	35	6,007	8,896	16,280	116
Indirect	464	27,226	43,566	111,312	3,164
Induced	192	8,998	17,438	34,190	2,341
Total	691	42,230	69,900	161,782	5,621
<i>Multiplier</i>	<i>19.9</i>	<i>7.0</i>	<i>7.9</i>	<i>9.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Mississippi economy. Approximately 90% of the employment impacts and 86% of the output impacts are due to NASA procurement sourced within the state.

Table 267: M2M Campaign Employment Impacts by Sources of Impact, Mississippi

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	35	49.2	0	0.0	35	5.0	100.0	0.0
Indirect	0	0.0	464	74.8	464	67.2	0.0	100.0
Induced	36	50.8	156	25.2	192	27.8	18.6	81.4
Total	70	100	621	100	691	100	10.2	89.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 268: M2M Campaign Output Impacts by Sources of Impact, Mississippi

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	16,280	71.8	0	0.0	16,280	10.1	100.0	0.0
Indirect	0	0.0	111,312	80.0	111,312	68.8	0.0	100.0
Induced	6,408	28.2	27,782	20.0	34,190	21.1	18.7	81.3
Total	22,687	100	139,094	100	161,782	100	14.0	86.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

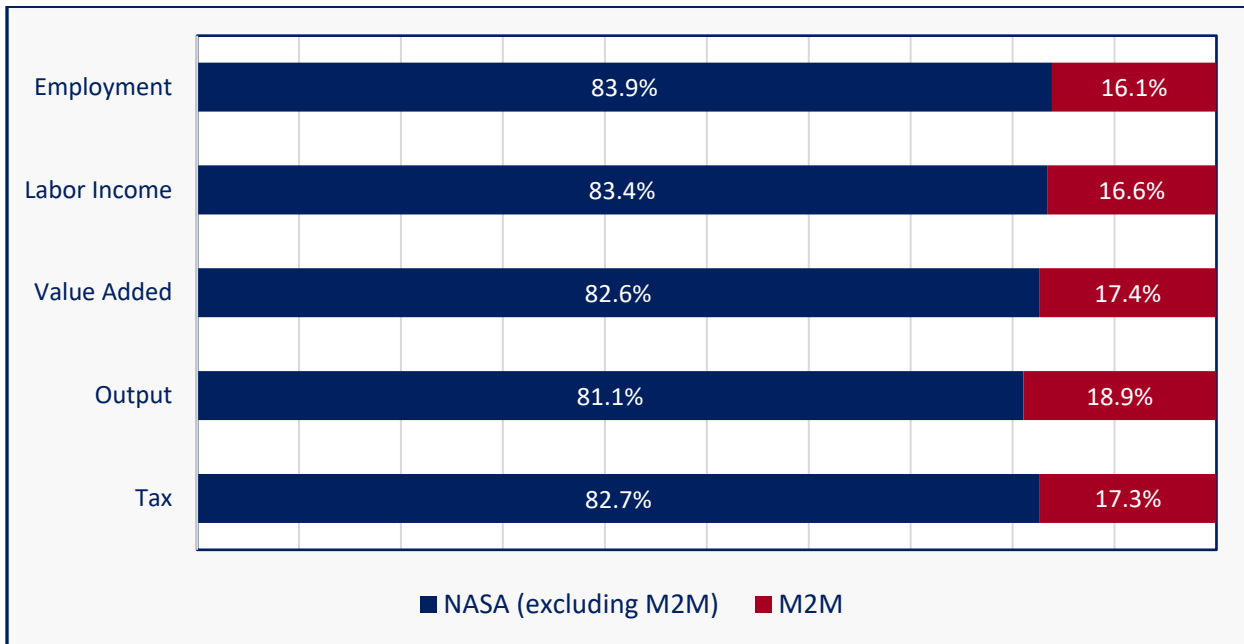
The M2M Campaign’s Share of NASA Impacts

Around 17% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 269 and Figure 82). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 269: The M2M Campaign Portion of Overall NASA Impacts, Mississippi

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	4,281	254,272	401,865	854,438	32,446
M2M Portion	691	42,230	69,900	161,782	5,621
M2M Share	16.1%	16.6%	17.4%	18.9%	17.3%

Figure 82: The M2M Campaign Portion of Overall NASA Impacts, Mississippi



Investments in Climate Change Research and Technology Impacts

In 2023, Mississippi had four climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$415,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$19.8 million. The total Mississippi employment impact is 286 jobs. The labor income and economic output associated with this employment are \$14.4 million and \$45.8 million, respectively. Investments in climate change research and technology generate \$1.9 million in tax revenues for the state and local governments in Mississippi (Table 270).

Table 270: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Mississippi

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	415	560	1,024	8
Indirect	208	10,570	14,225	31,046	937
Induced	76	3,397	6,649	13,747	941
Total	286	14,383	21,434	45,817	1,885
<i>Multiplier</i>	<i>131.2</i>	<i>34.6</i>	<i>38.3</i>	<i>44.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Mississippi economy. More than 98% of the employment impacts and nearly 97% of the output impacts are due to NASA procurement sourced within the state.

Table 271: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Mississippi

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	42.7	0	0.0	2	0.8	100.0	0.0
Indirect	0	0.0	208	73.9	208	72.6	0.0	100.0
Induced	3	57.3	73	26.1	76	26.7	3.8	96.2
Total	5	100	281	100	286	100	1.8	98.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 272: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Mississippi

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,024	66.3	0	0.0	1,024	2.2	100.0	0.0
Indirect	0	0.0	31,046	70.1	31,046	67.8	0.0	100.0
Induced	520	33.7	13,227	29.9	13,747	30.0	3.8	96.2
Total	1,544	100	44,273	100	45,817	100	3.4	96.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

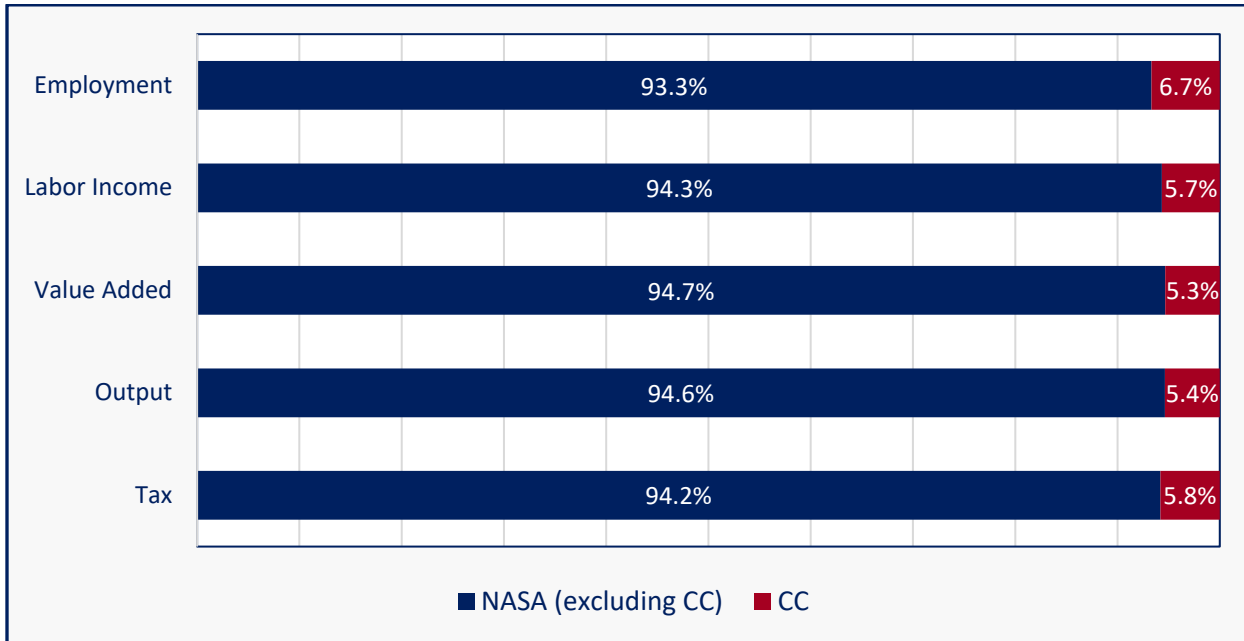
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 6% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 273 and Figure 83). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 273: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Mississippi

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	4,281	254,272	401,865	854,438	32,446
CC Portion	286	14,383	21,434	45,817	1,885
CC Share	6.7%	5.7%	5.3%	5.4%	5.8%

Figure 83: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Mississippi



Economic Impacts on the State of Missouri

NASA Impacts

In 2023, 18 NASA civil service employees (13 FTEs) residing in Missouri earned \$2 million in labor income. NASA procurement sourced in Missouri in the same year totaled \$28.2 million. The total economic impact resulting from these activities is 369 jobs, \$28 million in labor income, and \$83.3 million in economic output. These economic activities generate \$2.6 million in tax revenues for the state and local governments in Missouri (Table 274).

Table 274: Summary of NASA Impacts by Types of Impact, Missouri

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	13	1,996	3,296	6,031	49
Indirect	213	17,498	25,638	49,403	1,159
Induced	143	8,462	15,127	27,837	1,430
Total	369	27,956	44,061	83,271	2,638
<i>Multiplier</i>	<i>28.7</i>	<i>14.0</i>	<i>13.4</i>	<i>13.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Missouri economy. Table 275 examines the sources of the employment figures in the second column of Table 274. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Nearly 93% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 7%.

Table 275: NASA Employment Impacts by Sources of Impact, Missouri

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	13	46.8	0	0.0	13	3.5	100.0	0.0
Indirect	0	0.0	213	62.3	213	57.7	0.0	100.0
Induced	15	53.2	129	37.7	143	38.8	10.2	89.8
Total	27	100	341	100	369	100	7.4	92.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 276 examines the sources of the output figures in the fifth column of Table 274. Procurement spending is responsible for more than 89% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 11%.

Table 276: NASA Output Impacts by Sources of Impact, Missouri

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	6,031	67.5	0	0.0	6,031	7.2	100.0	0.0
Indirect	0	0.0	49,403	66.5	49,403	59.3	0.0	100.0
Induced	2,907	32.5	24,930	33.5	27,837	33.4	10.4	89.6
Total	8,938	100	74,333	100	83,271	100	10.7	89.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Missouri had three M2M-related civil service employees (2 FTEs) with a corresponding labor income of \$344,000. M2M campaign procurement sourced in the state in the same year totaled \$2.6 million. The total Missouri employment impact is 38 jobs. The labor income and economic output associated with this employment are \$2.9 million and \$8.4 million, respectively. The M2M campaign generates \$262,000 in tax revenues for the state and local governments in Missouri (Table 277).

Table 277: Summary of M2M Campaign Impacts by Types of Impact, Missouri

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	344	507	927	9
Indirect	21	1,711	2,426	4,619	106
Induced	15	892	1,591	2,882	148
Total	38	2,947	4,524	8,428	262
<i>Multiplier</i>	<i>19.0</i>	<i>8.6</i>	<i>8.9</i>	<i>9.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Missouri economy. Around 88% of the employment impacts and 83% of the output impacts are due to NASA procurement sourced within the state.

Table 278: M2M Campaign Employment Impacts by Sources of Impact, Missouri

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	2	44.3	0	0.0	2	5.3	100.0	0.0
Indirect	0	0.0	21	62.7	21	55.2	0.0	100.0
Induced	2	55.7	12	37.3	15	39.5	16.8	83.2
Total	4	100	33	100	38	100	11.9	88.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 279: M2M Campaign Output Impacts by Sources of Impact, Missouri

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	927	66.0	0	0.0	927	11.0	100.0	0.0
Indirect	0	0.0	4,619	65.8	4,619	54.8	0.0	100.0
Induced	478	34.0	2,403	34.2	2,882	34.2	16.6	83.4
Total	1,406	100	7,023	100	8,428	100	16.7	83.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

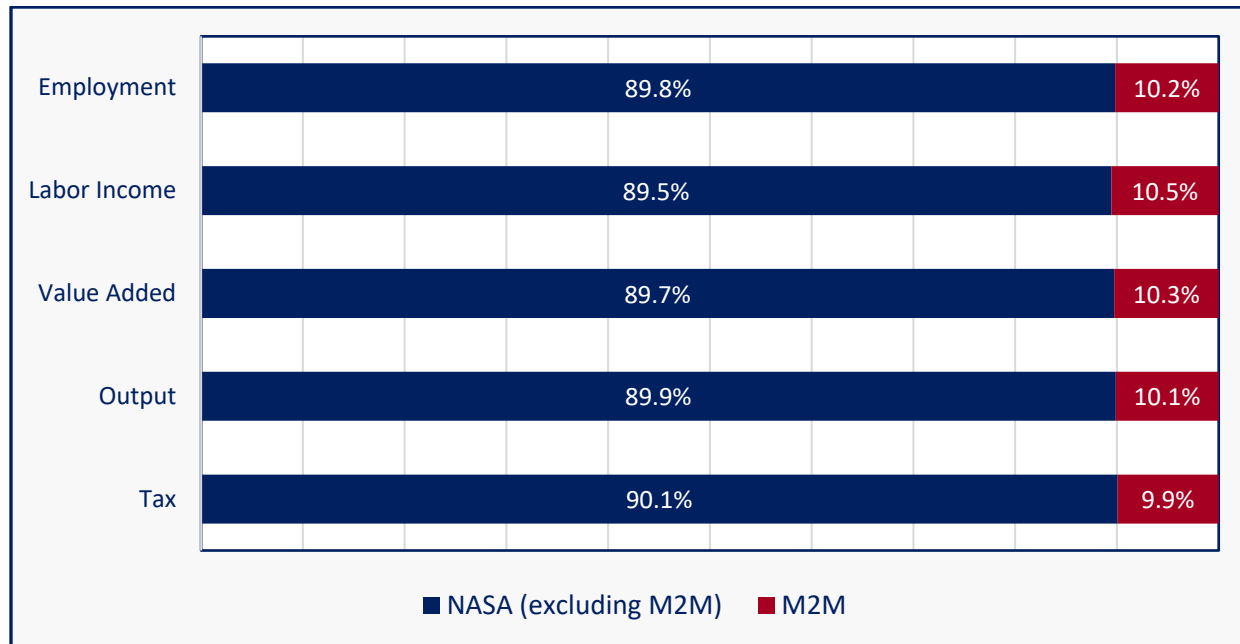
The M2M Campaign's Share of NASA Impacts

Around 10% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 280 and Figure 84). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 280: The M2M Campaign Portion of Overall NASA Impacts, Missouri

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	369	27,956	44,061	83,271	2,638
M2M Portion	38	2,947	4,524	8,428	262
M2M Share	10.2%	10.5%	10.3%	10.1%	9.9%

Figure 84: The M2M Campaign Portion of Overall NASA Impacts, Missouri



Investments in Climate Change Research and Technology Impacts

In 2023, Missouri had four climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$95,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$7.8 million. The total Missouri employment impact is 100 jobs. The labor income and economic output associated with this employment are \$7.2 million and \$21.9 million, respectively. Investments in climate change research and technology generate \$706,000 in tax revenues for the state and local governments in Missouri (Table 281).

Table 281: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Missouri

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	95	208	381	2
Indirect	61	4,948	7,074	14,074	324
Induced	38	2,191	3,930	7,399	380
Total	100	7,234	11,213	21,855	706
<i>Multiplier</i>	<i>123.1</i>	<i>75.9</i>	<i>53.8</i>	<i>57.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Missouri economy. Around 98% of the employment impacts and 98% of the output impacts are due to NASA procurement sourced within the state.

Table 282: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Missouri

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	50.9	0	0.0	1	0.8	100.0	0.0
Indirect	0	0.0	61	62.1	61	61.1	0.0	100.0
Induced	1	49.1	37	37.9	38	38.1	2.1	97.9
Total	2	100	98	100	100	100	1.6	98.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 283: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Missouri

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	381	72.2	0	0.0	381	1.7	100.0	0.0
Indirect	0	0.0	14,074	66.0	14,074	64.4	0.0	100.0
Induced	147	27.8	7,253	34.0	7,399	33.9	2.0	98.0
Total	528	100	21,327	100	21,855	100	2.4	97.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

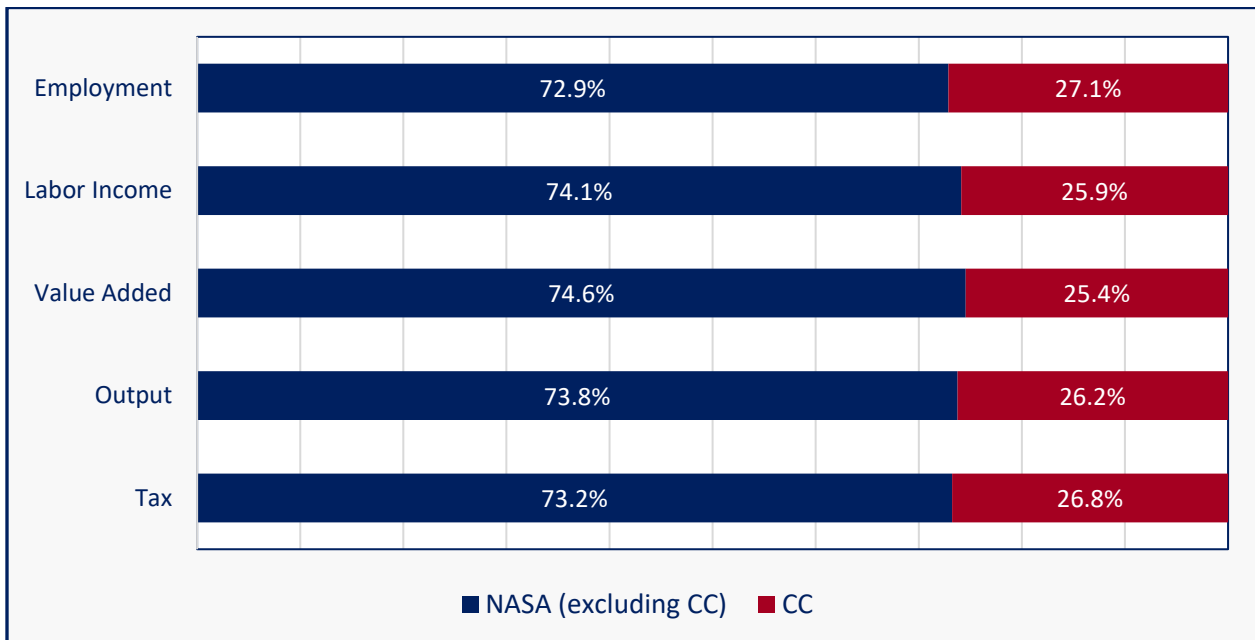
Around 26% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 284 and Figure 85). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 284: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Missouri

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	369	27,956	44,061	83,271	2,638
CC Portion	100	7,234	11,213	21,855	706
CC Share	27.1%	25.9%	25.4%	26.2%	26.8%

Figure 85: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Missouri



Economic Impacts on the State of Montana

NASA Impacts

In 2023, four NASA civil service employees (3 FTEs) residing in Montana earned \$383,000 in labor income. NASA procurement sourced in Montana in the same year totaled \$12.5 million. The total economic impact resulting from these activities is 157 jobs, \$10.5 million in labor income, and \$31.8 million in economic output. These economic activities generate \$953,000 in tax revenues for the state and local governments in Montana (Table 285).

Table 285: Summary of NASA Impacts by Types of Impact, Montana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	383	780	1,427	16
Indirect	98	7,111	9,410	20,675	491
Induced	55	2,976	5,041	9,725	447
Total	157	10,470	15,231	31,828	953
<i>Multiplier</i>	51.6	27.4	19.5	22.3	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Montana economy. Table 286 examines the sources of the employment figures in the second column of Table 285. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 96% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 4%.

Table 286: NASA Employment Impacts by Sources of Impact, Montana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	3	52.2	0	0.0	3	1.9	100.0	0.0
Indirect	0	0.0	98	65.2	98	62.8	0.0	100.0
Induced	3	47.8	53	34.8	55	35.3	5.0	95.0
Total	6	100	151	100	157	100	3.7	96.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 287 examines the sources of the output figures in the fifth column of Table 285. Procurement spending is responsible for 94% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 6%.

Table 287: NASA Output Impacts by Sources of Impact, Montana

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,427	74.2	0	0.0	1,427	4.5	100.0	0.0
Indirect	0	0.0	20,675	69.1	20,675	65.0	0.0	100.0
Induced	496	25.8	9,229	30.9	9,725	30.6	5.1	94.9
Total	1,924	100	29,904	100	31,828	100	6.0	94.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

There were no M2M-specific NASA employees in Montana in FY 2023, but \$166,000 in M2M-related NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 2 jobs, \$135,000 in labor income, and \$399,000 worth of output. These economic activities generate \$12,000 in tax revenues for the state and local governments in Montana (Table 288).

Table 288: Summary of M2M Campaign Impacts by Types of Impact, Montana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	1	97	129	277	7
Induced	1	38	64	122	6
Total	2	135	193	399	12
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

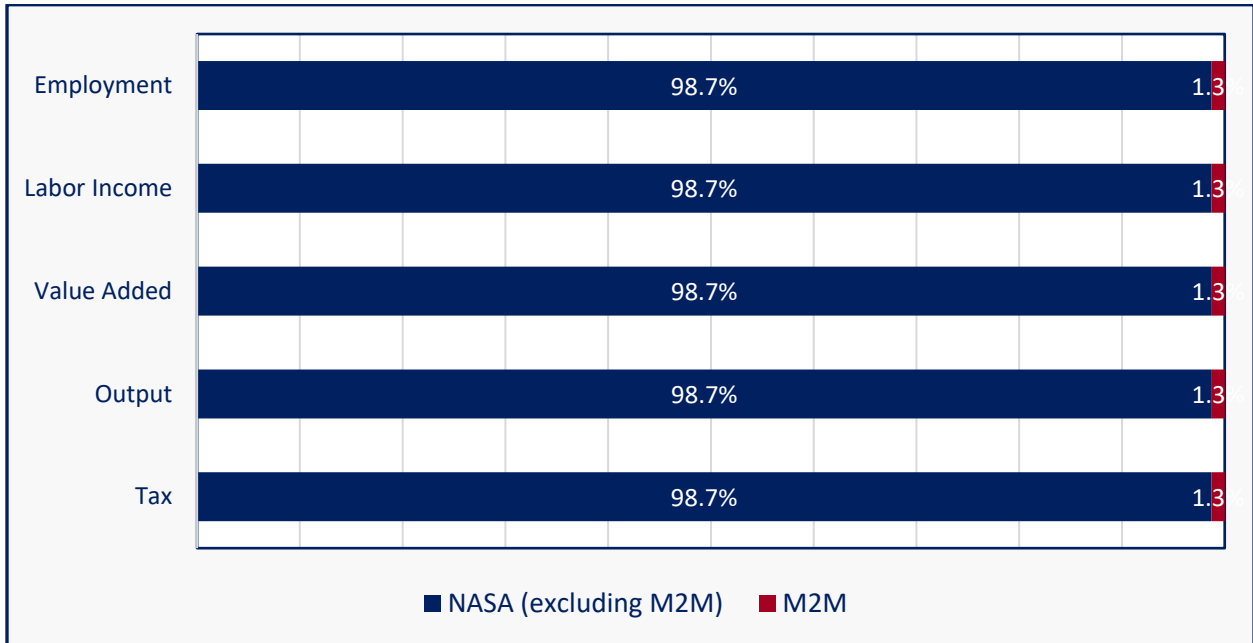
The M2M Campaign's Share of NASA Impacts

Around 1% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 289 and Figure 86).

Table 289: The M2M Campaign Portion of Overall NASA Impacts, Montana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	157	10,470	15,231	31,828	953
M2M Portion	2	135	193	399	12
M2M Share	1.3%	1.3%	1.3%	1.3%	1.3%

Figure 86: The M2M Campaign Portion of Overall NASA Impacts, Montana



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Montana in FY 2023, but \$4.5 million in investments in climate change research and technology NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 54 jobs, \$3.5 million in labor income, and \$10.8 million worth of output. These economic activities generate \$335,000 in tax revenues for the state and local governments in Montana (Table 290).

Table 290: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Montana

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	35	2,530	3,395	7,424	179
Induced	19	1,004	1,714	3,390	156
Total	54	3,534	5,109	10,814	335
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

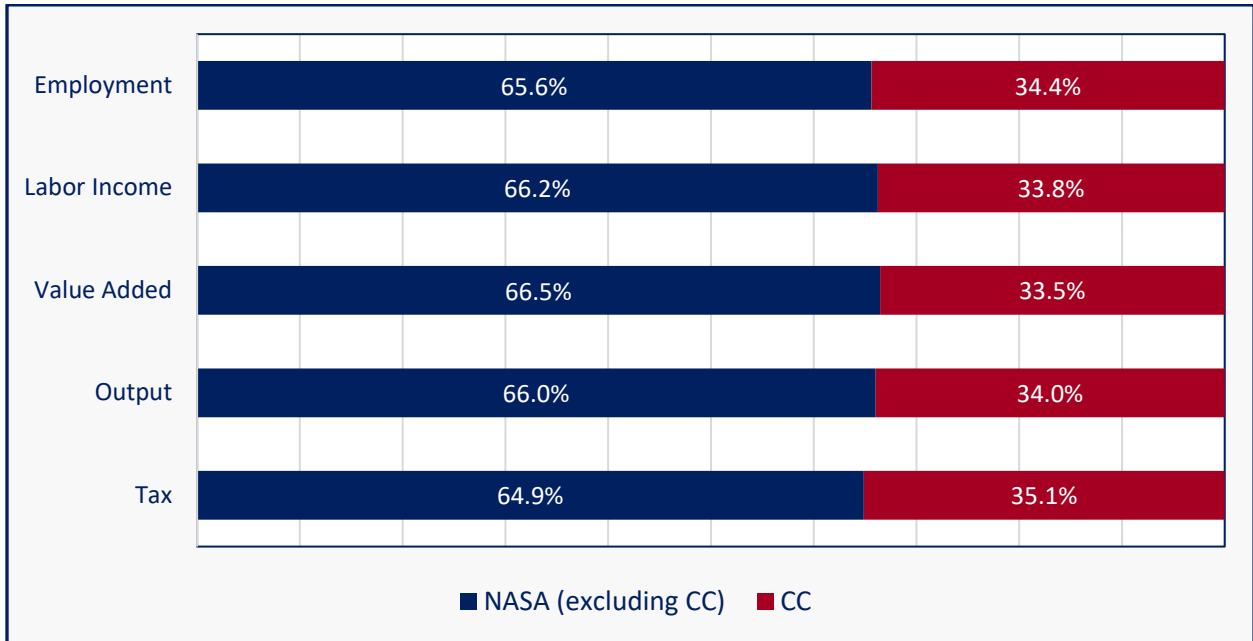
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 34% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 291 and Figure 87). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 291: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Montana

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	157	10,470	15,231	31,828	953
CC Portion	54	3,534	5,109	10,814	335
CC Share	34.4%	33.8%	33.5%	34.0%	35.1%

Figure 87: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Montana



Economic Impacts on the State of Nebraska

NASA Impacts

In 2023, five NASA civil service employees (2 FTEs) residing in Nebraska earned \$301,000 in labor income. NASA procurement sourced in Nebraska in the same year totaled \$2.6 million. The total economic impact resulting from these activities is 33 jobs, \$2.4 million in labor income, and \$7.4 million in economic output. These economic activities generate \$238,000 in tax revenues for the state and local governments in Nebraska (Table 292).

Table 292: Summary of NASA Impacts by Types of Impact, Nebraska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	301	531	972	7
Indirect	19	1,472	2,287	4,177	119
Induced	11	659	1,262	2,253	112
Total	33	2,432	4,080	7,403	238
<i>Multiplier</i>	15.8	8.1	7.7	7.6	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Nebraska economy. Table 293 examines the sources of the employment figures in the second column of Table 292. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 88% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 12%.

Table 293: NASA Employment Impacts by Sources of Impact, Nebraska

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	2	51.1	0	0.0	2	6.3	100.0	0.0
Indirect	0	0.0	19	66.9	19	58.7	0.0	100.0
Induced	2	48.9	9	33.1	11	35.0	17.3	82.7
Total	4	100	29	100	33	100	12.4	87.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 293 examines the sources of the output figures in the fifth column of Table 292. Procurement spending is responsible for more than 81% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 19%.

Table 294: NASA Output Impacts by Sources of Impact, Nebraska

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	972	71.1	0	0.0	972	13.1	100.0	0.0
Indirect	0	0.0	4,177	69.2	4,177	56.4	0.0	100.0
Induced	394	28.9	1,859	30.8	2,253	30.4	17.5	82.5
Total	1,366	100	6,036	100	7,403	100	18.5	81.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Nebraska had two M2M-related civil service employees (1 FTE) with a corresponding labor income of \$119,000. M2M campaign procurement sourced in the state in the same year totaled \$137,000. The total Nebraska employment impact is 4 jobs. The labor income and economic output associated with this employment are \$281,000 and \$787,000, respectively. These economic activities generate \$23,000 in tax revenues for the state and local governments in Nebraska (Table 295).

Table 295: Summary of M2M Campaign Impacts by Types of Impact, Nebraska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	119	175	321	3
Indirect	2	85	118	207	7
Induced	1	77	148	259	13
Total	4	281	441	787	23
<i>Multiplier</i>	5.4	2.4	2.5	2.5	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Nebraska economy. 61% of the employment impacts and 40% of the output impacts are due to NASA procurement sourced within the state.

Table 296: M2M Campaign Employment Impacts by Sources of Impact, Nebraska

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	47.6	0	0.0	1	18.6	100.0	0.0
Indirect	0	0.0	2	72.9	2	44.5	0.0	100.0
Induced	1	52.4	1	27.1	1	37.0	55.3	44.7
Total	1	100	2	100	4	100	39.0	61.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 297: M2M Campaign Output Impacts by Sources of Impact, Nebraska

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	321	68.4	0	0.0	321	40.7	100.0	0.0
Indirect	0	0.0	207	65.1	207	26.3	0.0	100.0
Induced	148	31.6	111	34.9	259	32.9	57.2	42.8
Total	469	100	318	100	787	100	59.6	40.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

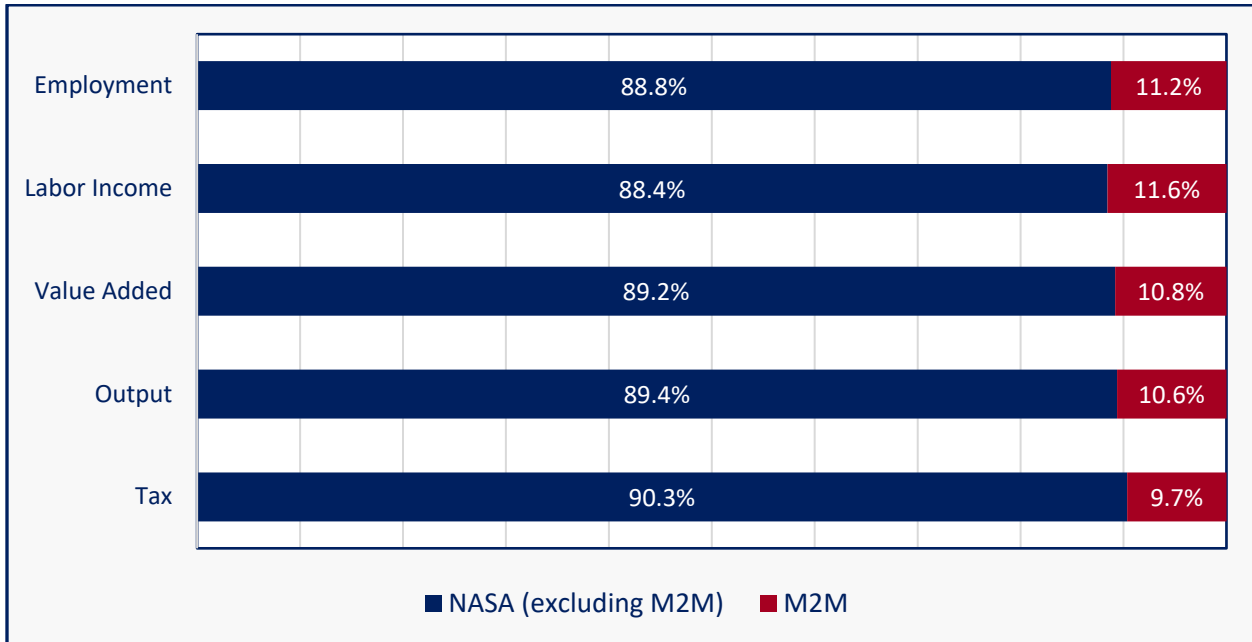
The M2M Campaign's Share of NASA Impacts

Around 11% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 298 and Figure 88). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 298: The M2M Campaign Portion of Overall NASA Impacts, Nebraska

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	33	2,432	4,080	7,403	238
M2M Portion	4	281	441	787	23
M2M Share	11.2%	11.6%	10.8%	10.6%	9.7%

Figure 88: The M2M Campaign Portion of Overall NASA Impacts, Nebraska



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Nebraska in FY 2023, but \$479,000 in investments in climate change research and technology NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 6 jobs, \$361,000 in labor income, and \$1.1 million worth of output. These economic activities generate \$43,000 in tax revenues for the state and local governments in Nebraska (Table 299).

Table 299: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Nebraska

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	4	264	409	769	26
Induced	2	97	187	340	17
Total	6	361	595	1,109	43
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

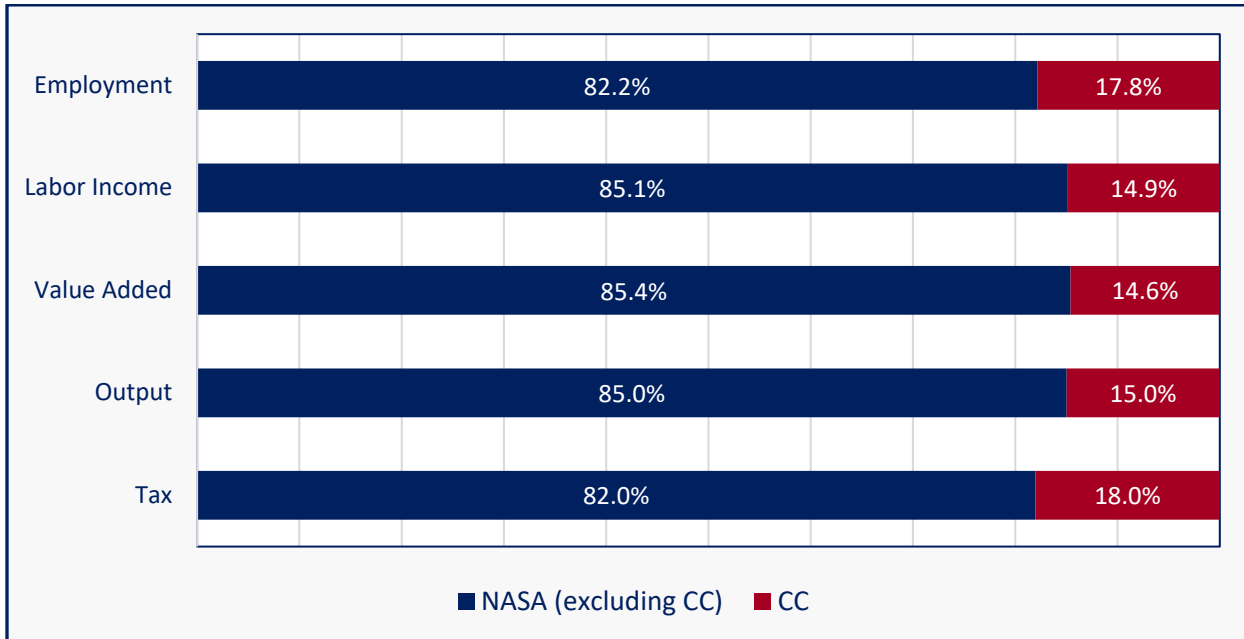
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 16% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 300 and Figure 89). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 300: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nebraska

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	33	2,432	4,080	7,403	238
CC Portion	6	361	595	1,109	43
CC Share	17.8%	14.9%	14.6%	15.0%	18.0%

Figure 89: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nebraska



Economic Impacts on the State of Nevada

NASA Impacts

In 2023, seven NASA civil service employees (6 FTEs) residing in Nevada earned \$1 million in labor income. NASA procurement sourced in Nevada in the same year totaled \$48.2 million. The total economic impact resulting from these activities is 553 jobs, \$48.9 million in labor income, and \$105.6 million in economic output. These economic activities generate \$3.3 million in tax revenues for the state and local governments in Nevada (Table 301).

Table 301: Summary of NASA Impacts by Types of Impact, Nevada

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	6	1,016	1,482	2,712	2
Indirect	294	32,795	47,281	53,501	286
Induced	254	15,057	29,499	49,394	2,999
Total	553	48,868	78,261	105,606	3,287
<i>Multiplier</i>	<i>95.9</i>	<i>48.1</i>	<i>52.8</i>	<i>38.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Nevada economy. Table 302 examines the sources of the employment figures in the second column of Table 301. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 2%.

Table 302: NASA Employment Impacts by Sources of Impact, Nevada

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	6	46.7	0	0.0	6	1.0	100.0	0.0
Indirect	0	0.0	294	54.3	294	53.1	0.0	100.0
Induced	7	53.3	247	45.7	254	45.8	2.6	97.4
Total	12	100	541	100	553	100	2.2	97.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 303 examines the sources of the output figures in the fifth column of Table 301. Procurement spending is responsible for more than 96% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 4%.

Table 303: NASA Output Impacts by Sources of Impact, Nevada

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,712	67.6	0	0.0	2,712	2.6	100.0	0.0
Indirect	0	0.0	53,501	52.7	53,501	50.7	0.0	100.0
Induced	1,301	32.4	48,092	47.3	49,394	46.8	2.6	97.4
Total	4,013	100	101,594	100	105,606	100	3.8	96.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Nevada had one M2M-related civil service employee (<1 FTE) with a corresponding labor income of \$10,000. M2M campaign procurement sourced in the state in the same year totaled \$40 million. The total economic impact attributable to this procurement activity is 422 jobs, \$42.2 million in labor income, and \$81.3 million worth of output. These economic activities generate \$2.6 million in tax revenues for the state and local governments in Nevada (Table 304).

Table 304: Summary of M2M Campaign Impacts by Types of Impact, Nevada

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	10	32	59	<1
Indirect	210	29,338	39,982	39,661	54
Induced	212	12,860	25,060	41,575	2,524
Total	422	42,208	65,074	81,295	2,578
<i>Multiplier</i>	<i>3341.7</i>	<i>4295.1</i>	<i>2008.6</i>	<i>1371.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Nevada economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 305: M2M Campaign Employment Impacts by Sources of Impact, Nevada

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	68.1	0	0.0	<1	<0.1	100.0	0.0
Indirect	0	0.0	210	49.8	210	49.7	0.0	100.0
Induced	<1	31.9	212	50.2	212	50.2	<0.1	100.0
Total	<1	100	422	100	422	100	<0.1	100.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 306: M2M Campaign Output Impacts by Sources of Impact, Nevada

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	59	83.1	0	0.0	59	0.1	100.0	0.0
Indirect	0	0.0	39,661	48.8	39,661	48.8	0.0	100.0
Induced	12	16.9	41,563	51.2	41,575	51.1	<0.1	100.0
Total	71	100	81,223	100	81,295	100	0.1	99.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

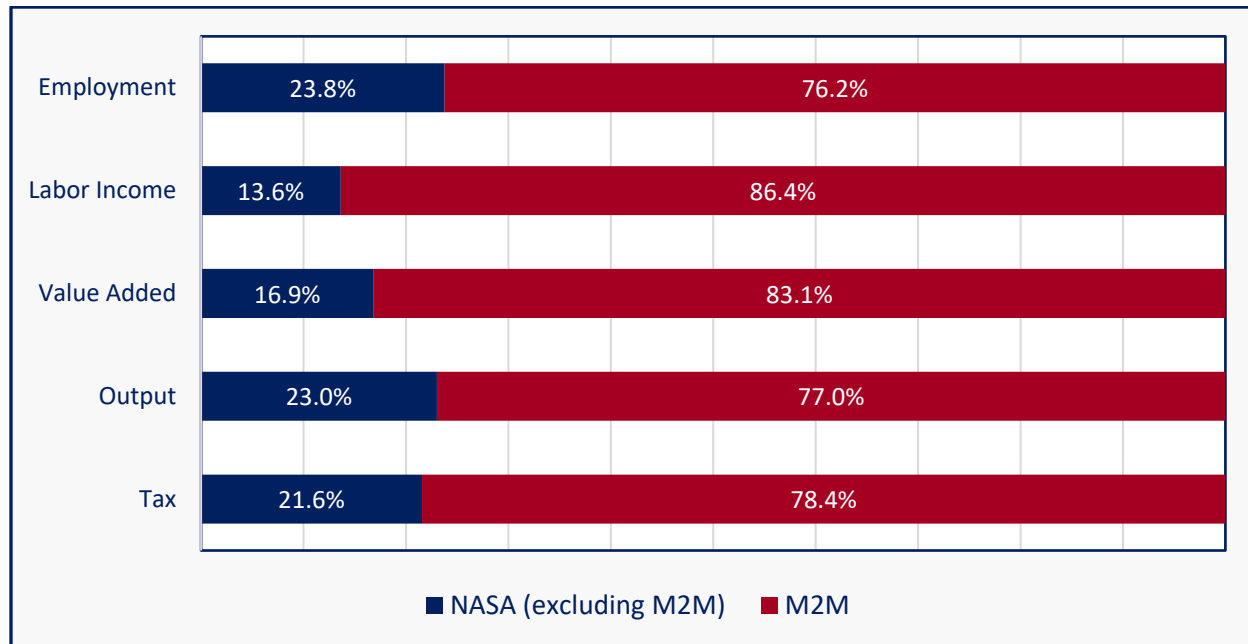
The M2M Campaign's Share of NASA Impacts

Around 80% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 307 and Figure 90). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 307: The M2M Campaign Portion of Overall NASA Impacts, Nevada

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	553	48,868	78,261	105,606	3,287
M2M Portion	422	42,208	65,074	81,295	2,578
M2M Share	76.2%	86.4%	83.1%	77.0%	78.4%

Figure 90: The M2M Campaign Portion of Overall NASA Impacts, Nevada



Investments in Climate Change Research and Technology Impacts

In 2023, Nevada had two climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$415,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$17.7 million. The total Nevada employment impact is 207 jobs. The labor income and economic output associated with this employment are \$19.1 million and \$39.1 million, respectively. Investments in climate change research and technology generate \$1.2 million in tax revenues for the state and local governments in Nevada (Table 308).

Table 308: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Nevada

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	415	513	940	1
Indirect	106	12,961	17,541	18,978	76
Induced	99	5,744	11,302	19,211	1,166
Total	207	19,120	29,357	39,128	1,243
<i>Multiplier</i>	<i>103.5</i>	<i>46.0</i>	<i>57.2</i>	<i>41.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Nevada economy. Approximately 98% of the employment impacts and 96% of the output impacts are due to NASA procurement sourced within the state.

Table 309: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Nevada

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	40.7	0	0.0	2	1.0	100.0	0.0
Indirect	0	0.0	106	52.6	106	51.4	0.0	100.0
Induced	3	59.3	96	47.4	99	47.7	2.9	97.1
Total	5	100	202	100	207	100	2.4	97.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 310: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Nevada

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	940	62.7	0	0.0	940	2.4	100.0	0.0
Indirect	0	0.0	18,978	50.4	18,978	48.5	0.0	100.0
Induced	558	37.3	18,652	49.6	19,211	49.1	2.9	97.1
Total	1,498	100	37,630	100	39,128	100	3.8	96.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

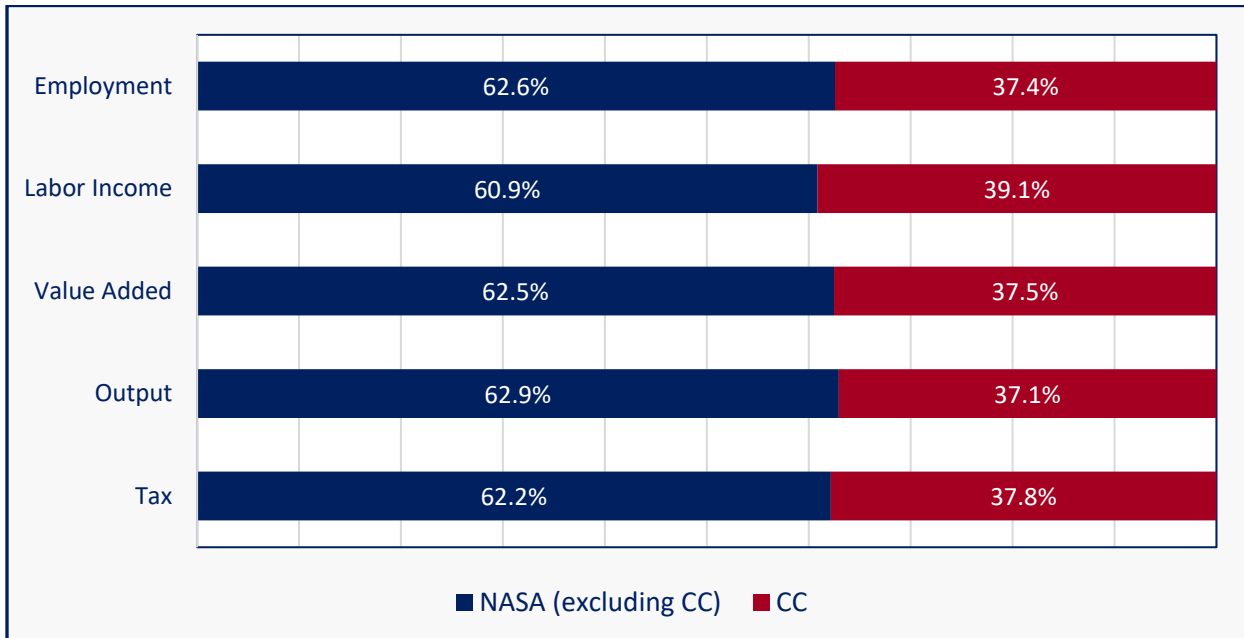
Around 38% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 311 and Figure 91). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 311: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nevada

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	553	48,868	78,261	105,606	3,287
CC Portion	207	19,120	29,357	39,128	1,243
CC Share	37.4%	39.1%	37.5%	37.1%	37.8%

Figure 91: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Nevada



Economic Impacts on the State of New Hampshire

NASA Impacts

In 2023, six NASA civil service employees (5 FTEs) residing in New Hampshire earned \$1 million in labor income. NASA procurement sourced in New Hampshire in the same year totaled \$62.3 million. The total economic impact resulting from these activities is 703 jobs, \$63.7 million in labor income, and \$162 million in economic output. These economic activities generate \$5.7 million in tax revenues for the state and local governments in New Hampshire (Table 312).

Table 312: Summary of NASA Impacts by Types of Impact, New Hampshire

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	1,014	1,333	2,439	3
Indirect	430	43,449	57,769	106,343	2,979
Induced	267	19,255	32,547	53,244	2,733
Total	703	63,719	91,650	162,026	5,715
<i>Multiplier</i>	135.4	62.8	68.8	66.4	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Hampshire economy. Table 313 examines the sources of the employment figures in the second column of Table 312. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 2%.

Table 313: NASA Employment Impacts by Sources of Impact, New Hampshire

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	5	46.8	0	0.0	5	0.7	100.0	0.0
Indirect	0	0.0	430	62.2	430	61.2	0.0	100.0
Induced	6	53.2	261	37.8	267	38.0	2.2	97.8
Total	11	100	692	100	703	100	1.6	98.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 314 examines the sources of the output figures in the fifth column of Table 312. Procurement spending is responsible for approximately 98% of the increase in output in the state economy arising from NASA. NASA labor force’s share of overall NASA output impact is 2%.

Table 314: NASA Output Impacts by Sources of Impact, New Hampshire

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,439	66.8	0	0.0	2,439	1.5	100.0	0.0
Indirect	0	0.0	106,343	67.1	106,343	65.6	0.0	100.0
Induced	1,210	33.2	52,034	32.9	53,244	32.9	2.3	97.7
Total	3,649	100	158,377	100	162,026	100	2.3	97.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, New Hampshire had two M2M campaign -related civil service employees (1 FTE) with a corresponding labor income of \$99,000. M2M campaign procurement sourced in the state in the same year totaled \$4.8 million. The total New Hampshire employment impact is 52 jobs. The labor income and economic output associated with this employment are \$5 million and \$12.6 million, respectively. The M2M campaign generates \$440,000 in tax revenues for the state and local governments in New Hampshire (Table 315).

Table 315: Summary of M2M Campaign Impacts by Types of Impact, New Hampshire

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	99	151	276	<1
Indirect	32	3,396	4,540	8,215	232
Induced	20	1,500	2,518	4,061	208
Total	52	4,996	7,209	12,553	440
<i>Multiplier</i>	<i>89.1</i>	<i>50.3</i>	<i>47.8</i>	<i>45.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Hampshire economy. Around 98% of the employment and 97% of the output impacts are due to NASA procurement sourced within the state.

Table 316: M2M Campaign Employment Impacts by Sources of Impact, New Hampshire

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	49.7	0	0.0	1	1.1	100.0	0.0
Indirect	0	0.0	32	61.7	32	60.3	0.0	100.0
Induced	1	50.3	20	38.3	20	38.6	2.9	97.1
Total	1	100	51	100	52	100	2.3	97.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 317: M2M Campaign Output Impacts by Sources of Impact, New Hampshire

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	276	70.8	0	0.0	276	2.2	100.0	0.0
Indirect	0	0.0	8,215	67.5	8,215	65.4	0.0	100.0
Induced	114	29.2	3,947	32.5	4,061	32.4	2.8	97.2
Total	390	100	12,163	100	12,553	100	3.1	96.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

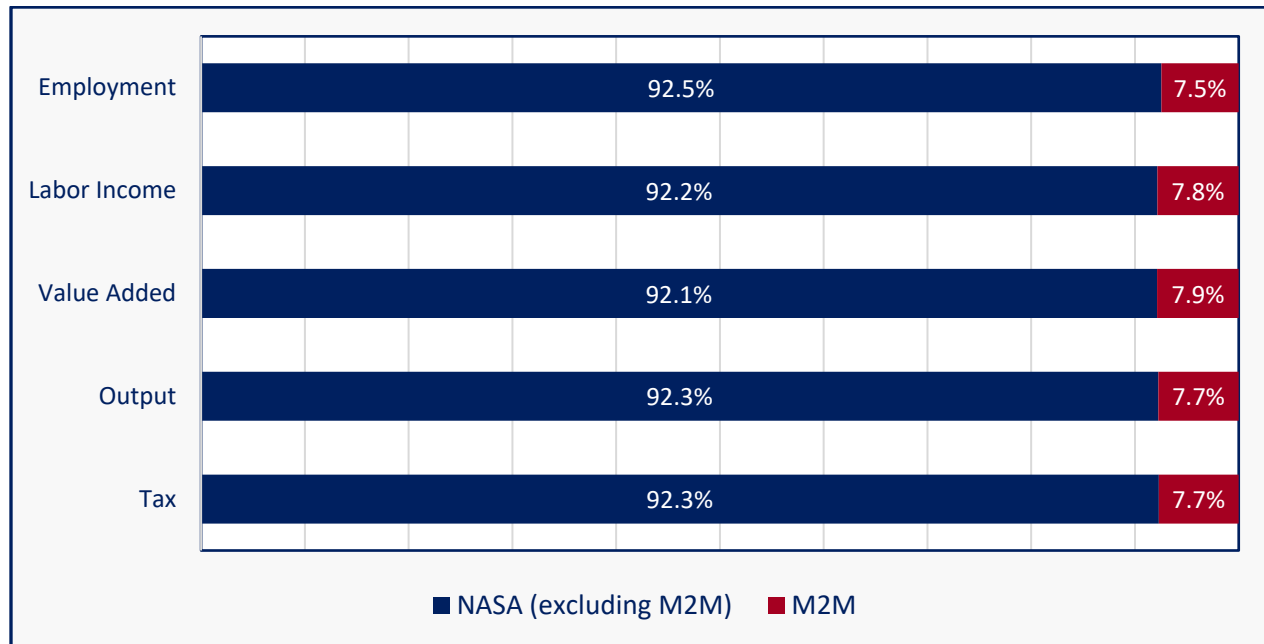
The M2M Campaign's Share of NASA Impacts

Around 8% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 318 and Figure 92). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 318: The M2M Campaign Portion of Overall NASA Impacts, New Hampshire

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	703	63,719	91,650	162,026	5,715
M2M Portion	52	4,996	7,209	12,553	440
M2M Share	7.5%	7.8%	7.9%	7.7%	7.7%

Figure 92: The M2M Campaign Portion of Overall NASA Impacts, New Hampshire



Investments in Climate Change Research and Technology Impacts

In 2023, New Hampshire had one climate change research and technology-related civil service employee (<1 FTE) with a corresponding labor income of \$30,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$38.4 million. The total New Hampshire employment impact is 431 jobs. The labor income and economic output associated with this employment are \$38.5 million and \$98.8 million, respectively. Investments in climate change research and technology generate \$3.5 million in tax revenues for the state and local governments in New Hampshire (Table 319).

Table 319: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Hampshire

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	30	46	84	<1
Indirect	266	26,857	36,200	65,832	1,837
Induced	165	11,629	19,766	32,837	1,685
Total	431	38,516	56,012	98,754	3,523
<i>Multiplier</i>	<i>2405.5</i>	<i>1302.0</i>	<i>1217.5</i>	<i>1173.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Hampshire economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 320: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Hampshire

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	<1	47.9	0	0.0	<1	<0.1	100.0	0.0
Indirect	0	0.0	266	61.7	266	61.6	0.0	100.0
Induced	<1	52.1	165	38.3	165	38.3	0.1	99.9
Total	<1	100	431	100	431	100	0.1	99.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 321: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Hampshire

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	84	69.5	0	0.0	84	0.1	100.0	0.0
Indirect	0	0.0	65,832	66.7	65,832	66.7	0.0	100.0
Induced	37	30.5	32,800	33.3	32,837	33.3	0.1	99.9
Total	121	100	98,633	100	98,754	100	0.1	99.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

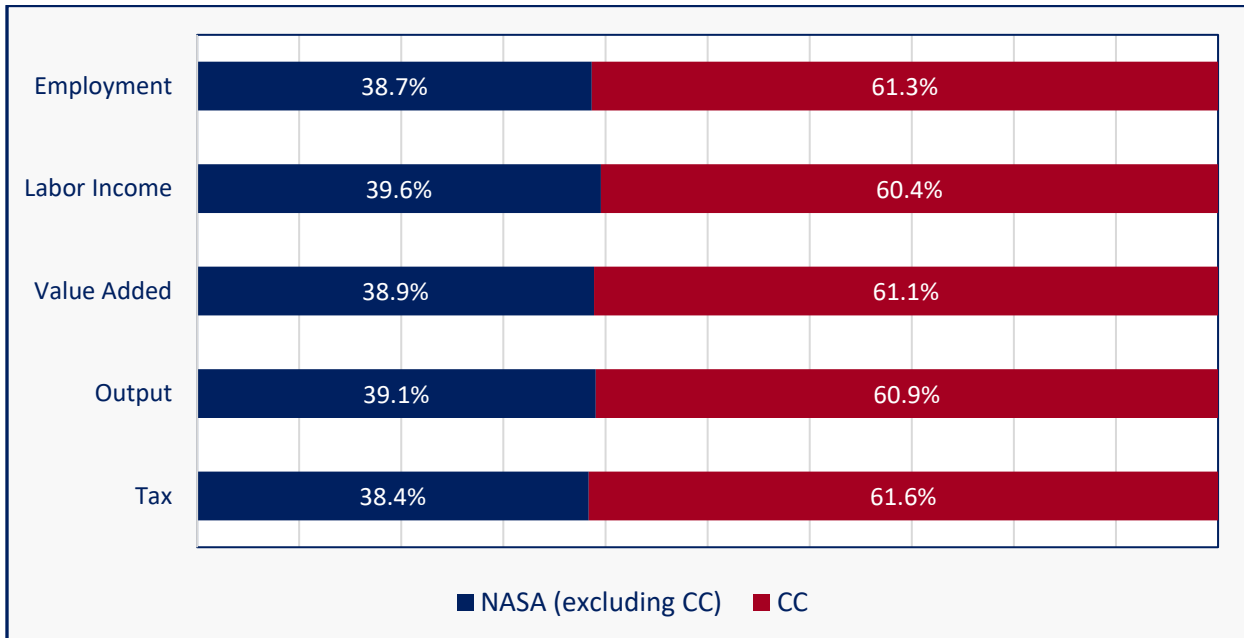
Around 61% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 322 and Figure 93). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 322: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Hampshire

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	703	63,719	91,650	162,026	5,715
CC Portion	431	38,516	56,012	98,754	3,523
CC Share	61.3%	60.4%	61.1%	60.9%	61.6%

Figure 93: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Hampshire



Economic Impacts on the State of New Jersey

NASA Impacts

In 2023, 38 NASA civil service employees (23 FTEs) residing in New Jersey earned nearly \$3.9 million in labor income. NASA procurement sourced in New Jersey in the same year totaled \$49.2 million. The total economic impact resulting from these activities is 571 jobs, \$58.2 million in labor income, and \$145.1 million in economic output. These economic activities generate \$7.5 million in tax revenues for the state and local governments in New Jersey (Table 323).

Table 323: Summary of NASA Impacts by Types of Impact, New Jersey

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	23	3,895	5,783	10,582	100
Indirect	309	35,717	48,395	83,355	3,604
Induced	240	18,575	30,700	51,137	3,809
Total	571	58,187	84,878	145,074	7,514
<i>Multiplier</i>	25.4	14.9	14.7	13.7	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Jersey economy. Table 324 examines the sources of the employment figures in the second column of Table 323. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 92% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 8%.

Table 324: NASA Employment Impacts by Sources of Impact, New Jersey

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	23	48.6	0	0.0	23	3.9	100.0	0.0
Indirect	0	0.0	309	58.8	309	54.0	0.0	100.0
Induced	24	51.4	216	41.2	240	42.0	9.9	90.1
Total	46	100	525	100	571	100	8.1	91.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 325 examines the sources of the output figures in the fifth column of Table 323. Procurement spending is responsible for 89% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 11%.

Table 325: NASA Output Impacts by Sources of Impact, New Jersey

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	10,582	66.9	0	0.0	10,582	7.3	100.0	0.0
Indirect	0	0.0	83,355	64.5	83,355	57.5	0.0	100.0
Induced	5,228	33.1	45,909	35.5	51,137	35.2	10.2	89.8
Total	15,810	100	129,264	100	145,074	100	10.9	89.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, New Jersey had eight M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$455,000. M2M campaign procurement sourced in the state in the same year totaled \$7.5 million. The total New Jersey employment impact is 86 jobs. The labor income and economic output associated with this employment are \$8.1 million and \$20.9 million, respectively. The M2M campaign generates \$1.1 million in tax revenues for the state and local governments in New Jersey (Table 326).

Table 326: Summary of M2M Campaign Impacts by Types of Impact, New Jersey

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	455	818	1,497	12
Indirect	50	5,083	7,041	12,332	551
Induced	33	2,604	4,270	7,024	523
Total	86	8,143	12,130	20,853	1,086
<i>Multiplier</i>	<i>26.9</i>	<i>17.9</i>	<i>14.8</i>	<i>13.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Jersey economy. Around 93% of the employment and 90% of the output impacts are due to NASA procurement sourced within the state.

Table 327: M2M Campaign Employment Impacts by Sources of Impact, New Jersey

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	53.7	0	0.0	3	3.7	100.0	0.0
Indirect	0	0.0	50	62.3	50	57.9	0.0	100.0
Induced	3	46.3	30	37.7	33	38.3	8.3	91.7
Total	6	100	80	100	86	100	6.9	93.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 328: M2M Campaign Output Impacts by Sources of Impact, New Jersey

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,497	71.6	0	0.0	1,497	7.2	100.0	0.0
Indirect	0	0.0	12,332	65.7	12,332	59.1	0.0	100.0
Induced	594	28.4	6,430	34.3	7,024	33.7	8.5	91.5
Total	2,091	100	18,761	100	20,853	100	10.0	90.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

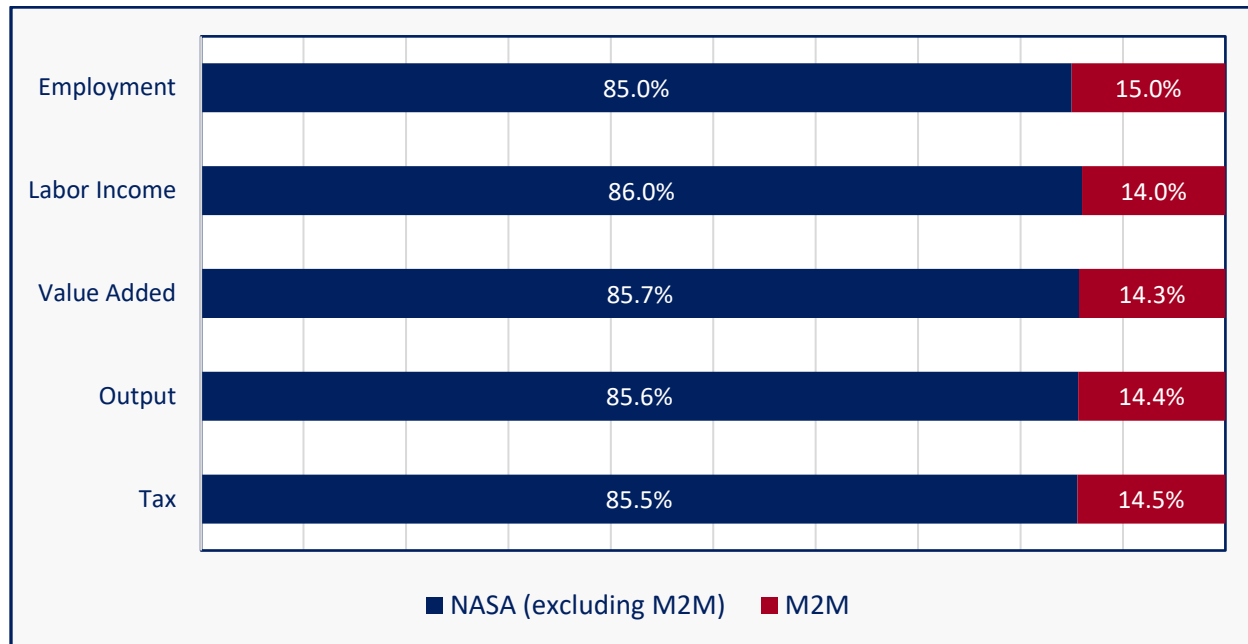
The M2M Campaign's Share of NASA Impacts

Around 14% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 329 and Figure 94). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 329: The M2M Campaign Portion of Overall NASA Impacts, New Jersey

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	571	58,187	84,878	145,074	7,514
M2M Portion	86	8,143	12,130	20,853	1,086
M2M Share	15.0%	14.0%	14.3%	14.4%	14.5%

Figure 94: The M2M Campaign Portion of Overall NASA Impacts, New Jersey



Investments in Climate Change Research and Technology Impacts

In 2023, New Jersey had nine climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$328,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$9.1 million. The total New Jersey employment impact is 105 jobs. The labor income and economic output associated with this employment are \$10.2 million and \$25.6 million, respectively. Investments in climate change research and technology generate \$1.4 million in tax revenues for the state and local governments in New Jersey (Table 330).

Table 330: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Jersey

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	328	484	886	8
Indirect	59	6,617	8,985	15,334	670
Induced	44	3,294	5,499	9,345	696
Total	105	10,239	14,968	25,565	1,375
<i>Multiplier</i>	<i>55.7</i>	<i>31.3</i>	<i>30.9</i>	<i>28.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Jersey economy. Around 96% of the employment impacts and nearly 95% of the output impacts are due to NASA procurement sourced within the state.

Table 331: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Jersey

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	45.6	0	0.0	2	1.8	100.0	0.0
Indirect	0	0.0	59	58.9	59	56.6	0.0	100.0
Induced	2	54.4	41	41.1	44	41.6	5.1	94.9
Total	4	100	101	100	105	100	3.9	96.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 332: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Jersey

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	886	66.1	0	0.0	886	3.5	100.0	0.0
Indirect	0	0.0	15,334	63.3	15,334	60.0	0.0	100.0
Induced	455	33.9	8,890	36.7	9,345	36.6	4.9	95.1
Total	1,341	100	24,225	100	25,565	100	5.2	94.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

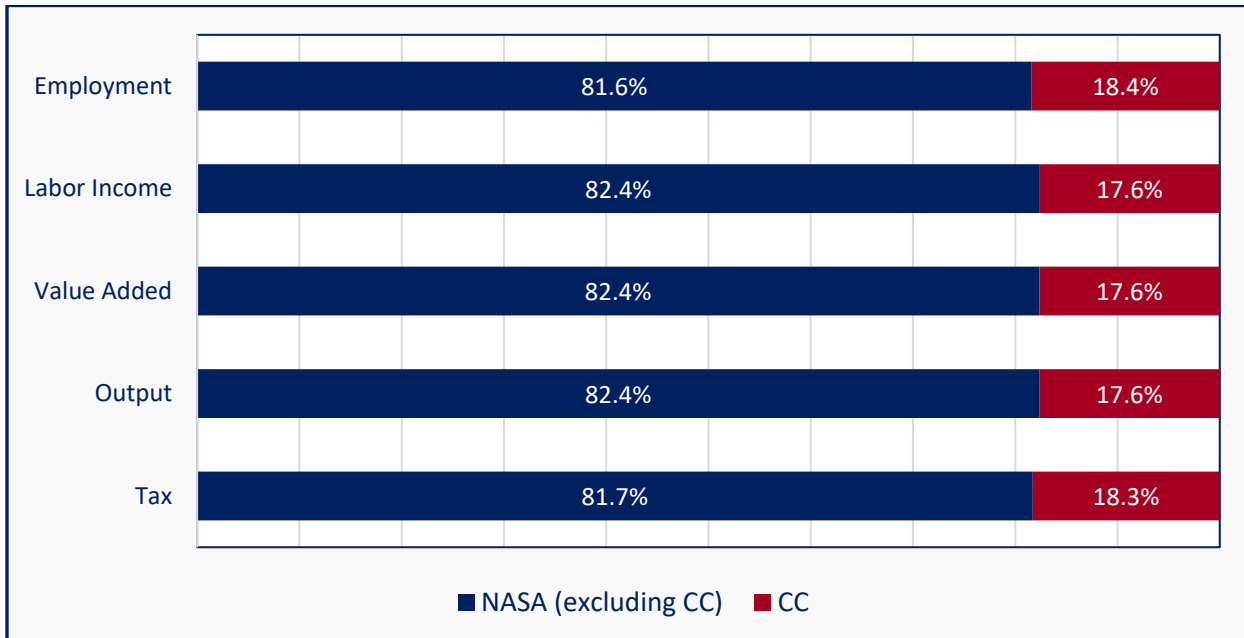
Around 18% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 333 and Figure 95). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement

spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 333: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Jersey

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	571	58,187	84,878	145,074	7,514
CC Portion	105	10,239	14,968	25,565	1,375
CC Share	18.4%	17.6%	17.6%	17.6%	18.3%

Figure 95: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Jersey



Economic Impacts on the State of New Mexico

NASA Impacts

In 2023, 96 NASA civil service employees (85 FTEs) residing in New Mexico earned \$15.4 million in labor income. NASA procurement sourced in New Mexico in the same year totaled \$146.5 million. The total economic impact resulting from these activities is 1,735 jobs, \$131 million in labor income, and \$362.4 million in economic output. These economic activities generate \$12.6 million in tax revenues for the state and local governments in New Mexico (Table 334).

Table 334: Summary of NASA Impacts by Types of Impact, New Mexico

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	85	15,422	21,784	39,864	212
Indirect	1,023	83,623	120,212	208,999	5,627
Induced	627	32,002	62,212	113,542	6,804
Total	1,735	131,047	204,208	362,404	12,642
<i>Multiplier</i>	20.4	8.5	9.4	9.1	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Mexico economy. Table 335 examines the sources of the employment figures in the second column of Table 334. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 83% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 17%.

Table 335: NASA Employment Impacts by Sources of Impact, New Mexico

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	85	44.9	0	0.0	85	7.8	100.0	0.0
Indirect	0	0.0	595	66.6	595	54.9	0.0	100.0
Induced	104	55.1	299	33.4	403	37.2	25.8	74.2
Total	189	100	894	100	1,083	100	17.4	82.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 336 examines the sources of the output figures in the fifth column of Table 334. Procurement spending is responsible for more than 84% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 16%.

Table 336: NASA Output Impacts by Sources of Impact, New Mexico

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	39,864	69.8	0	0.0	39,864	11.0	100.0	0.0
Indirect	0	0.0	208,999	68.5	208,999	57.7	0.0	100.0
Induced	17,228	30.2	96,314	31.5	113,542	31.3	15.2	84.8
Total	57,092	100	305,313	100	362,404	100	15.8	84.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, New Mexico had 31 M2M-related civil service employees (9 FTEs) with a corresponding labor income of \$1.5 million. M2M campaign procurement sourced in the state in the same year totaled \$25.7 million. The total New Mexico employment impact is 239 jobs. The labor income and economic output associated with this employment are \$20.5 million and \$56.4 million, respectively. The M2M campaign generates \$1.8 million in tax revenues for the state and local governments in New Mexico (Table 337).

Table 337: Summary of M2M Campaign Impacts by Types of Impact, New Mexico

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	9	1,544	2,220	4,063	21
Indirect	134	13,924	21,921	34,924	779
Induced	97	5,034	9,621	17,408	1,043
Total	239	20,502	33,763	56,395	1,843
<i>Multiplier</i>	<i>27.7</i>	<i>13.3</i>	<i>15.2</i>	<i>13.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Mexico economy. Approximately 93% of the employment impacts and 90% of the output impacts are due to NASA procurement sourced within the state.

Table 338: M2M Campaign Employment Impacts by Sources of Impact, New Mexico

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	9	49.5	0	0.0	9	3.6	100.0	0.0
Indirect	0	0.0	134	60.5	134	56.0	0.0	100.0
Induced	9	50.5	88	39.5	97	40.3	9.1	90.9
Total	17	100	222	100	239	100	7.3	92.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 339: M2M Campaign Output Impacts by Sources of Impact, New Mexico

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	4,063	71.3	0	0.0	4,063	7.2	100.0	0.0
Indirect	0	0.0	34,924	68.9	34,924	61.9	0.0	100.0
Induced	1,638	28.7	15,770	31.1	17,408	30.9	9.4	90.6
Total	5,701	100	50,694	100	56,395	100	10.1	89.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

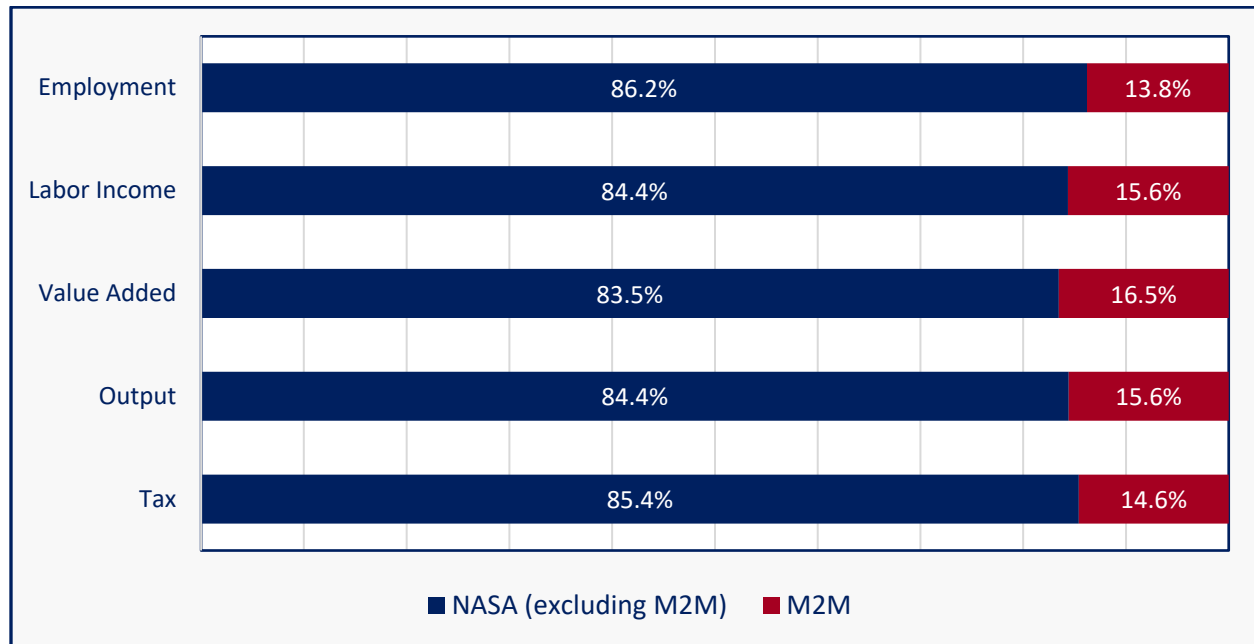
The M2M Campaign's Share of NASA Impacts

Around 15% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 340 and Figure 96). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 340: The M2M Campaign Portion of Overall NASA Impacts, New Mexico

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,735	131,047	204,208	362,404	12,642
M2M Portion	239	20,502	33,763	56,395	1,843
M2M Share	13.8%	15.6%	16.5%	15.6%	14.6%

Figure 96: The M2M Campaign Portion of Overall NASA Impacts, New Mexico



Investments in Climate Change Research and Technology Impacts

In 2023, New Mexico had nine climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$226,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$43.7 million. The total New Mexico employment impact is 607 jobs. The labor income and economic output associated with this employment are \$36.9 million and \$95.4 million, respectively. Investments in climate change research and technology generate \$3.9 million in tax revenues for the state and local governments in New Mexico (Table 341).

Table 341: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New Mexico

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	226	286	524	3
Indirect	427	27,836	35,541	62,262	1,966
Induced	178	8,858	17,588	32,584	1,951
Total	607	36,920	53,416	95,369	3,920
<i>Multiplier</i>	<i>544.4</i>	<i>163.6</i>	<i>186.6</i>	<i>182.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New Mexico economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 342: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New Mexico

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	Climate Change Emp.	Climate Change Proc.
Direct	1	42.5	0	0.0	1	0.2	100.0	0.0
Indirect	0	0.0	427	70.7	427	70.4	0.0	100.0
Induced	2	57.5	177	29.3	178	29.4	0.8	99.2
Total	3	100	604	100	607	100	0.4	99.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 343: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New Mexico

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	Climate Change Emp.	Climate Change Proc.
Direct	524	65.7	0	0.0	524	0.5	100.0	0.0
Indirect	0	0.0	62,262	65.8	62,262	65.3	0.0	100.0
Induced	273	34.3	32,311	34.2	32,584	34.2	0.8	99.2
Total	797	100	94,572	100	95,369	100	0.8	99.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

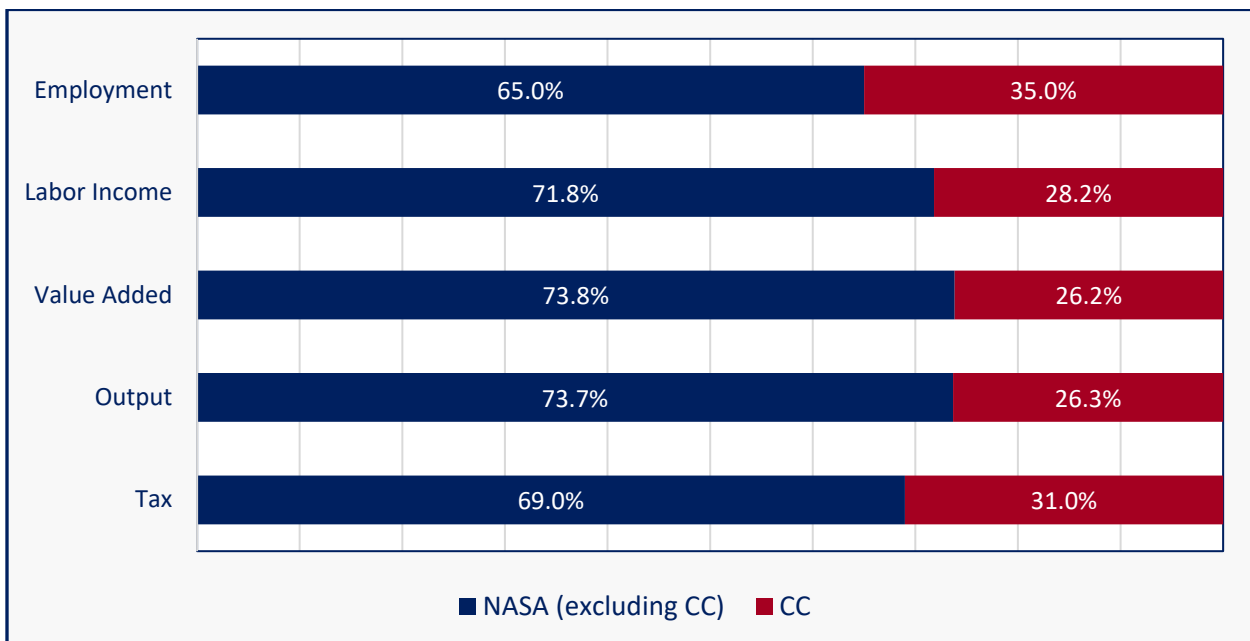
Around 29% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 344 and Figure 97). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement

spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 344: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Mexico

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,735	131,047	204,208	362,404	12,642
CC Portion	607	36,920	53,416	95,369	3,920
CC Share	35.0%	28.2%	26.2%	26.3%	31.0%

Figure 97: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New Mexico



Economic Impacts on the State of New York

NASA Impacts

In 2023, 76 NASA civil service employees (54 FTEs) residing in New York earned \$9.8 million in labor income. NASA procurement sourced in New York in the same year totaled \$182.9 million. The total economic impact resulting from these activities is 1,975 jobs, \$210.1 million in labor income, and \$517.3 million in economic output. These economic activities generate approximately \$27.8 million in tax revenues for the state and local governments in New York (Table 345).

Table 345: Summary of NASA Impacts by Types of Impact, New York

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	54	9,841	13,824	25,297	495
Indirect	1,121	132,993	189,620	313,170	13,623
Induced	800	67,262	116,823	178,876	13,664
Total	1,975	210,096	320,267	517,343	27,782
<i>Multiplier</i>	<i>36.7</i>	<i>21.3</i>	<i>23.2</i>	<i>20.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New York economy. Table 346 examines the sources of the employment figures in the second column of Table 345. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 94% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is approximately 6%.

Table 346: NASA Employment Impacts by Sources of Impact, New York

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	54	49.6	0	0.0	54	2.7	100.0	0.0
Indirect	0	0.0	1,121	60.1	1,121	56.8	0.0	100.0
Induced	55	50.4	745	39.9	800	40.5	6.8	93.2
Total	109	100	1,866	100	1,975	100	5.5	94.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 347 examines the sources of the output figures in the fifth column of Table 345. Procurement spending is responsible for nearly 93% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 7%.

Table 347: NASA Output Impacts by Sources of Impact, New York

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	25,297	66.5	0	0.0	25,297	4.9	100.0	0.0
Indirect	0	0.0	313,170	65.3	313,170	60.5	0.0	100.0
Induced	12,727	33.5	166,149	34.7	178,876	34.6	7.1	92.9
Total	38,025	100	479,318	100	517,343	100	7.3	92.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, New York had 12 M2M-related civil service employees (3 FTEs) with a corresponding labor income of \$443,000. M2M campaign procurement sourced in the state in the same year totaled \$15.8 million. The total New York employment impact is 151 jobs. The labor income and economic output associated with this employment are \$16.1 million and \$40.8 million, respectively. The M2M campaign generates \$2.2 million in tax revenues for the state and local governments in New York (Table 348).

Table 348: Summary of M2M Campaign Impacts by Types of Impact, New York

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	443	839	1,536	22
Indirect	87	10,462	15,203	25,745	1,152
Induced	60	5,215	8,984	13,567	1,036
Total	151	16,120	25,026	40,848	2,211
<i>Multiplier</i>	<i>46.1</i>	<i>36.4</i>	<i>29.8</i>	<i>26.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New York economy. Around 96% of the employment and 95% of the output impacts are due to NASA procurement sourced within the state.

Table 349: M2M Campaign Employment Impacts by Sources of Impact, New York

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	3	56.5	0	0.0	3	2.2	100.0	0.0
Indirect	0	0.0	87	60.3	87	58.0	0.0	100.0
Induced	3	43.5	57	39.7	60	39.8	4.2	95.8
Total	6	100	145	100	151	100	3.8	96.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 350: M2M Campaign Output Impacts by Sources of Impact, New York

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,536	73.2	0	0.0	1,536	3.8	100.0	0.0
Indirect	0	0.0	25,745	66.4	25,745	63.0	0.0	100.0
Induced	563	26.8	13,004	33.6	13,567	33.2	4.1	95.9
Total	2,099	100	38,749	100	40,848	100	5.1	94.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

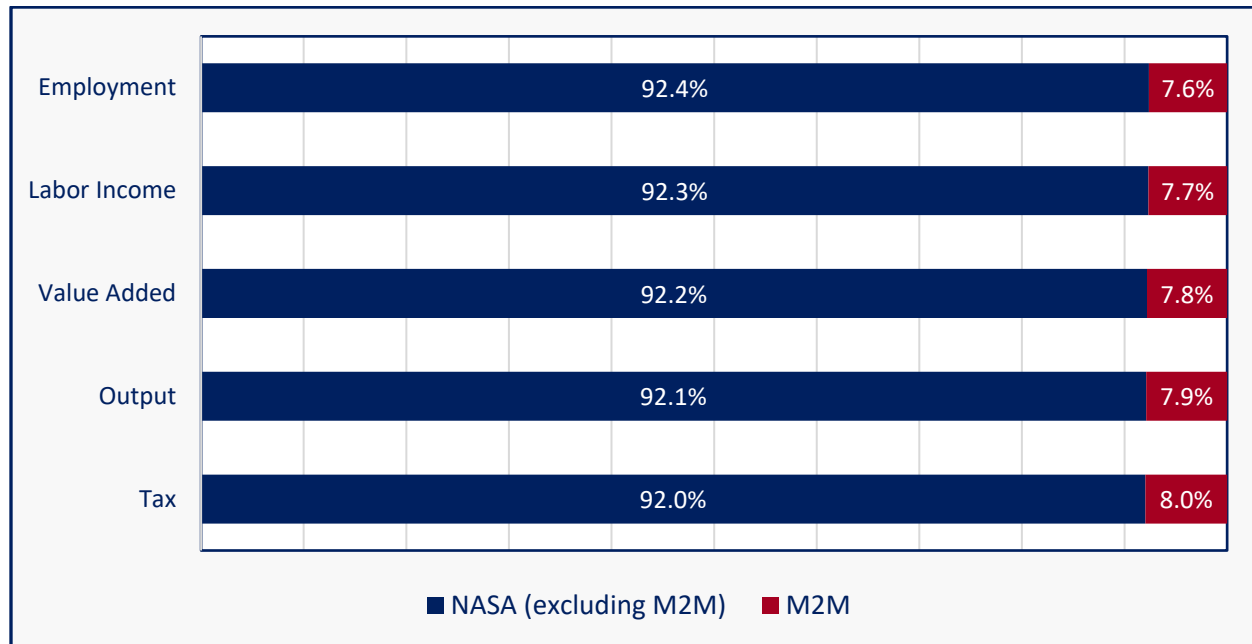
The M2M Campaign's Share of NASA Impacts

Around 8% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 351 and Figure 98). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 351: The M2M Campaign Portion of Overall NASA Impacts, New York

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,975	210,096	320,267	517,343	27,782
M2M Portion	151	16,120	25,026	40,848	2,211
M2M Share	7.6%	7.7%	7.8%	7.9%	8.0%

Figure 98: The M2M Campaign Portion of Overall NASA Impacts, New York



Investments in Climate Change Research and Technology Impacts

In 2023, New York had 32 climate change research and technology-related civil service employees (23 FTEs) with a corresponding labor income of \$4.8 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$40 million. The total New York employment impact is 474 jobs. The labor income and economic output associated with this employment are \$50.6 million and \$123.8 million, respectively. Investments in climate change research and technology activities generate nearly \$6.6 million in tax revenues for the state and local governments in New York (Table 352).

Table 352: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, New York

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	23	4,792	5,976	10,936	241
Indirect	253	29,562	42,044	68,447	2,991
Induced	198	16,293	28,417	44,405	3,393
Total	474	50,648	76,436	123,788	6,626
<i>Multiplier</i>	<i>20.4</i>	<i>10.6</i>	<i>12.8</i>	<i>11.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the New York economy. More than 89% of the employment and 86% of the output impacts are due to NASA procurement sourced within the state.

Table 353: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, New York

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	23	45.3	0	0.0	23	4.9	100.0	0.0
Indirect	0	0.0	253	59.8	253	53.3	0.0	100.0
Induced	28	54.7	170	40.2	198	41.7	14.2	85.8
Total	51	100	423	100	474	100	10.8	89.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 354: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, New York

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	10,936	63.3	0	0.0	10,936	8.8	100.0	0.0
Indirect	0	0.0	68,447	64.3	68,447	55.3	0.0	100.0
Induced	6,339	36.7	38,066	35.7	44,405	35.9	14.3	85.7
Total	17,275	100	106,513	100	123,788	100	14.0	86.0

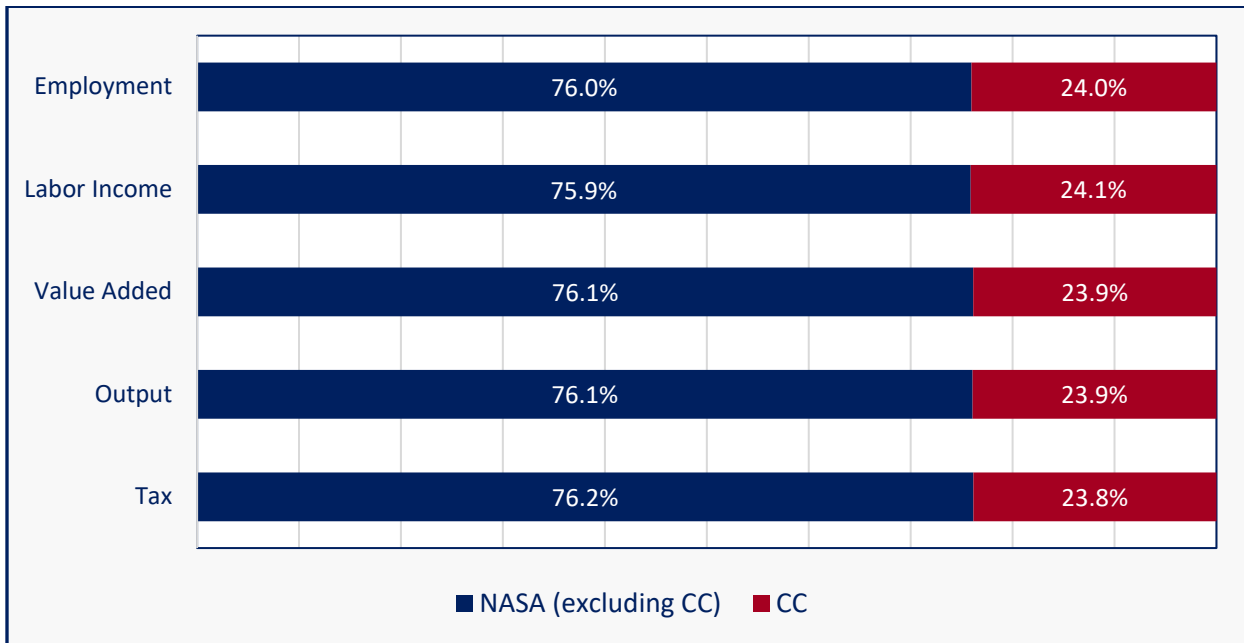
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 24% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 355 and Figure 99). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 355: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New York

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,975	210,096	320,267	517,343	27,782
CC Portion	474	50,648	76,436	123,788	6,626
CC Share	24.0%	24.1%	23.9%	23.9%	23.8%

Figure 99: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, New York



Economic Impacts on the State of North Carolina

NASA Impacts

In 2023, 56 NASA civil service employees (42 FTEs) residing in North Carolina earned \$8.1 million in labor income. NASA procurement sourced in North Carolina in the same year totaled \$63.4 million. The total economic impact resulting from these activities is 1,094 jobs, \$78.1 million in labor income, and \$204.2 million in economic output. These economic activities generate \$8.3 million in tax revenues for the state and local governments in North Carolina (Table 356).

Table 356: Summary of NASA Impacts by Types of Impact, North Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	42	8,057	10,857	19,868	226
Indirect	650	45,195	61,030	102,055	3,579
Induced	402	24,802	44,799	82,257	4,516
Total	1,094	78,055	116,686	204,181	8,321
<i>Multiplier</i>	25.9	9.7	10.7	10.3	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the North Carolina economy. Table 357 examines the sources of the employment figures in the second column of Table 356. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 91% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 9%.

Table 357: NASA Employment Impacts by Sources of Impact, North Carolina

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	42	41.5	0	0.0	42	3.9	100.0	0.0
Indirect	0	0.0	650	65.5	650	59.4	0.0	100.0
Induced	60	58.5	343	34.5	402	36.7	14.8	85.2
Total	102	100	992	100	1,094	100	9.3	90.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 358 examines the sources of the output figures in the fifth column of Table 356. Procurement spending is responsible for 84% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 16%.

Table 358: NASA Output Impacts by Sources of Impact, North Carolina

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	19,868	61.4	0	0.0	19,868	9.7	100.0	0.0
Indirect	0	0.0	102,055	59.4	102,055	50.0	0.0	100.0
Induced	12,479	38.6	69,779	40.6	82,257	40.3	15.2	84.8
Total	32,347	100	171,834	100	204,181	100	15.8	84.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, North Carolina had 12 M2M-related civil service employees (6 FTEs) with a corresponding labor income of \$1.1. M2M campaign procurement sourced in the state in the same year totaled \$2.7 million. The total North Carolina employment impact is 60 jobs. The labor income and economic output associated with this employment are \$4.5 million and \$11.5 million, respectively. The M2M campaign generates \$444,000 in tax revenues for the state and local governments in North Carolina (Table 359).

Table 359: Summary of M2M Campaign Impacts by Types of Impact, North Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	6	1,087	1,509	2,761	30
Indirect	31	1,951	2,660	4,128	157
Induced	23	1,431	2,594	4,657	256
Total	60	4,469	6,763	11,547	444
<i>Multiplier</i>	<i>10.1</i>	<i>4.1</i>	<i>4.5</i>	<i>4.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the North Carolina economy. More than 77% of the employment impacts and 62% of the output impacts are due to NASA employees residing in the state.

Table 360: M2M Campaign Employment Impacts by Sources of Impact, North Carolina

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	6	43.6	0	0.0	6	9.9	100.0	0.0
Indirect	0	0.0	31	67.6	31	52.3	0.0	100.0
Induced	8	56.4	15	32.4	23	37.8	33.7	66.3
Total	13	100	46	100	60	100	22.6	77.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 361: M2M Campaign Output Impacts by Sources of Impact, North Carolina

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	2,761	63.3	0	0.0	2,761	23.9	100.0	0.0
Indirect	0	0.0	4,128	57.5	4,128	35.8	0.0	100.0
Induced	1,602	36.7	3,055	42.5	4,657	40.3	34.4	65.6
Total	4,363	100	7,184	100	11,547	100	37.8	62.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

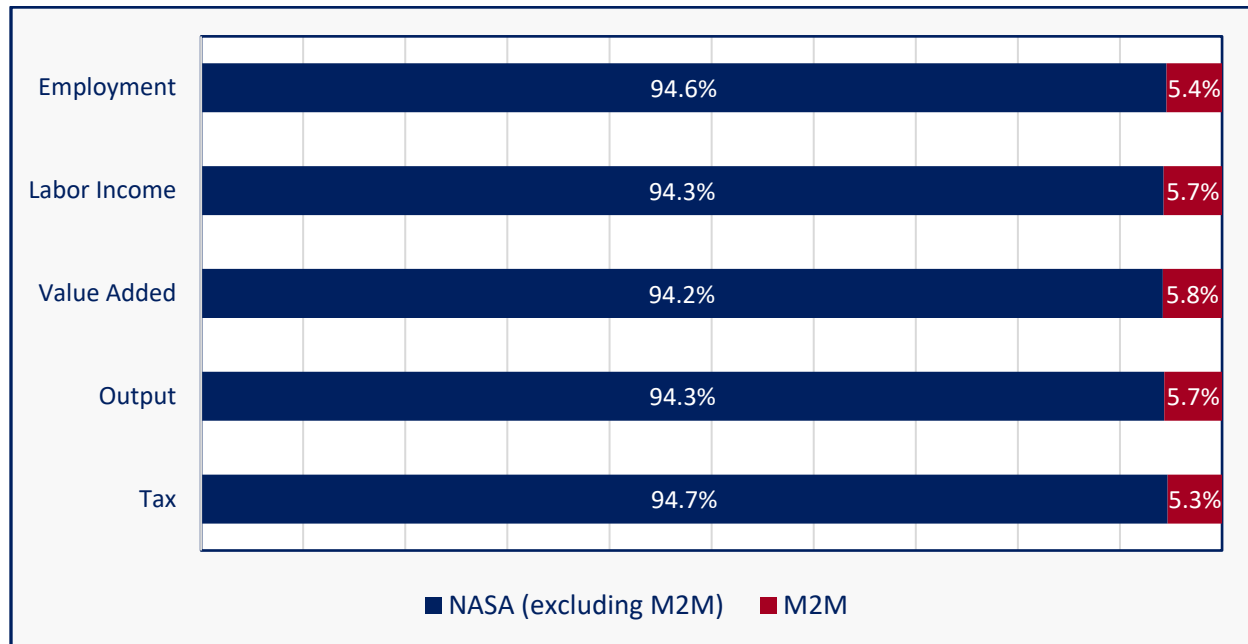
The M2M Campaign's Share of NASA Impacts

Around 6% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 362 and Figure 100). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 362: The M2M Campaign Portion of Overall NASA Impacts, North Carolina

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,094	78,055	116,686	204,181	8,321
M2M Portion	60	4,469	6,763	11,547	444
M2M Share	5.4%	5.7%	5.8%	5.7%	5.3%

Figure 100: The M2M Campaign Portion of Overall NASA Impacts, North Carolina



Investments in Climate Change Research and Technology Impacts

In 2023, North Carolina had 9 climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$357,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$20.2 million. The total North Carolina employment impact is 322 jobs. The labor income and economic output associated with this employment are \$21.5 million and \$58.7 million, respectively. Investments in climate change research and technology generate \$2.4 million in tax revenues for the state and local governments in North Carolina (Table 363).

Table 363: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, North Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	357	515	943	10
Indirect	206	14,293	19,371	34,413	1,148
Induced	114	6,850	12,386	23,344	1,281
Total	322	21,500	32,273	58,699	2,439
<i>Multiplier</i>	<i>160.4</i>	<i>60.3</i>	<i>62.6</i>	<i>62.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the North Carolina economy. Around 98% of the employment impacts and 97% of the output impacts are due to NASA procurement sourced within the state.

Table 364: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, North Carolina

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	40.7	0	0.0	2	0.6	100.0	0.0
Indirect	0	0.0	206	65.0	206	64.0	0.0	100.0
Induced	3	59.3	111	35.0	114	35.4	2.6	97.4
Total	5	100	317	100	322	100	1.5	98.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 365: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, North Carolina

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	943	61.8	0	0.0	943	1.6	100.0	0.0
Indirect	0	0.0	34,413	60.2	34,413	58.6	0.0	100.0
Induced	583	38.2	22,761	39.8	23,344	39.8	2.5	97.5
Total	1,526	100	57,173	100	58,699	100	2.6	97.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

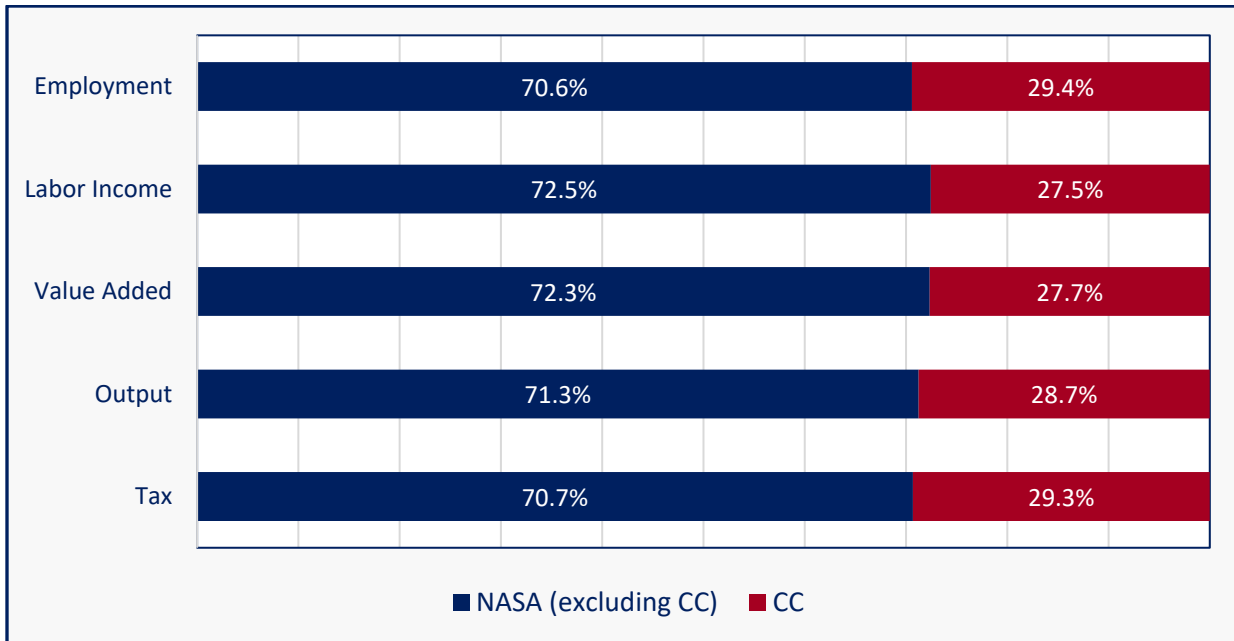
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 29% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 366 and Figure 101). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 366: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Carolina

Impact Component	Employment	Labor			Tax (\$ thousands)
		Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	
NASA Total	1,094	78,055	116,686	204,181	8,321
CC Portion	322	21,500	32,273	58,699	2,439
CC Share	29.4%	27.5%	27.7%	28.7%	29.3%

Figure 101: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Carolina



Economic Impacts on the State of North Dakota

NASA Impacts

In 2023, one NASA civil service employee (<1 FTE) residing in North Dakota earned \$13,000 in labor income. NASA procurement sourced in North Dakota in the same year totaled \$1.5 million. The total economic impact resulting from these activities is 15 jobs, \$1.1 million in labor income, and \$3.2 million in economic output. These economic activities generate \$59,000 in tax revenues for the state and local governments in North Dakota (Table 367).

Table 367: Summary of NASA Impacts by Types of Impact, North Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	13	49	90	<1
Indirect	10	784	1,087	2,265	34
Induced	5	272	469	884	25
Total	15	1,069	1,605	3,239	59
<i>Multiplier</i>	<i>77.6</i>	<i>82.7</i>	<i>32.5</i>	<i>35.9</i>	<i>n.a.</i>

The following two tables examine the contribution of different NASA activities to the North Dakota economy. Table 368 examines the sources of the employment figures in the second column of Table 367. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 2%.

Table 368: NASA Employment Impacts by Sources of Impact, North Dakota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	<1	73.4	0	0.0	<1	1.3	100.0	0.0
Indirect	0	0.0	10	68.3	10	67.1	0.0	100.0
Induced	<1	26.6	5	31.7	5	31.6	1.5	98.5
Total	<1	100	15	100	15	100	1.8	98.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 369 examines the sources of the output figures in the fifth column of Table 367. Procurement spending is responsible for 97% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 3%.

Table 369: NASA Output Impacts by Sources of Impact, North Dakota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	90	86.9	0	0.0	90	2.8	100.0	0.0
Indirect	0	0.0	2,265	72.2	2,265	69.9	0.0	100.0
Induced	14	13.1	870	27.8	884	27.3	1.5	98.5
Total	104	100	3,135	100	3,239	100	3.2	96.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, North Dakota had one M2M-related civil service employee (<1 FTE) with a corresponding labor income of \$13,000. M2M campaign procurement sourced in the state in the same year totaled \$108,000. The resulting impacts are minimal (Table 370).

Table 370: Summary of M2M Campaign Impacts by Types of Impact, North Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	13	49	90	<1
Indirect	1	57	79	161	2
Induced	<1	24	41	75	2
Total	1	94	169	326	5
<i>Multiplier</i>	<i>6.9</i>	<i>7.2</i>	<i>3.4</i>	<i>3.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the North Dakota economy. More than 80% of the employment impacts and 68% of the output impacts are due to NASA procurement sourced within the state.

Table 371: M2M Campaign Employment Impacts by Sources of Impact, North Dakota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	74.5	0	0.0	<1	14.5	100.0	0.0
Indirect	0	0.0	1	65.6	1	52.8	0.0	100.0
Induced	<1	25.5	0	34.4	<1	32.7	15.3	84.7
Total	<1	100	1	100	1	100	19.5	80.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 372: M2M Campaign Output Impacts by Sources of Impact, North Dakota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	90	87.5	0	0.0	90	27.7	100.0	0.0
Indirect	0	0.0	161	72.0	161	49.2	0.0	100.0
Induced	13	12.5	63	28.0	75	23.1	17.0	83.0
Total	103	100	223	100	326	100	31.6	68.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

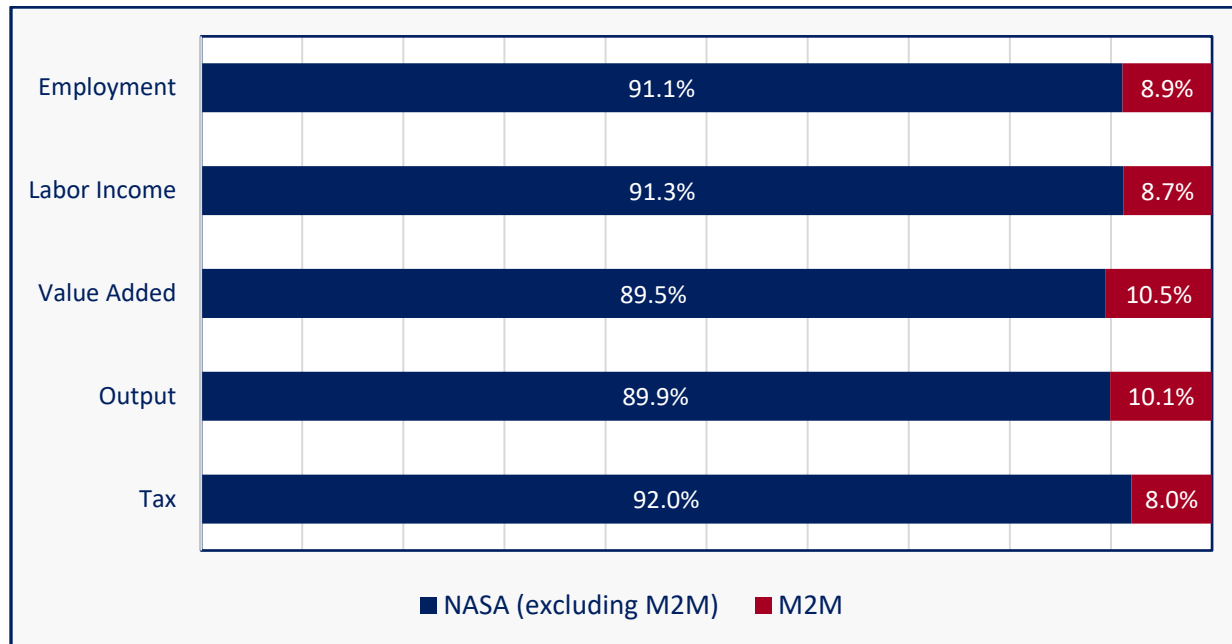
The M2M Campaign's Share of NASA Impacts

Around 9% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 373 and Figure 102). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 373: The M2M Campaign Portion of Overall NASA Impacts, North Dakota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	15	1,069	1,605	3,239	59
M2M Portion	1	94	169	326	5
M2M Share	8.9%	8.7%	10.5%	10.1%	8.0%

Figure 102: The M2M Campaign Portion of Overall NASA Impacts, North Dakota



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in North Dakota in FY 2023, but \$716,000 in investments in climate change research and technology NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 7 jobs, \$496,000 in labor income, and \$1.5 million worth of output. These economic activities generate \$28,000 in tax revenues for the state and local governments in North Dakota (Table 374).

Table 374: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, North Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	5	370	521	1,077	16
Induced	2	125	218	419	12
Total	7	496	740	1,496	28
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

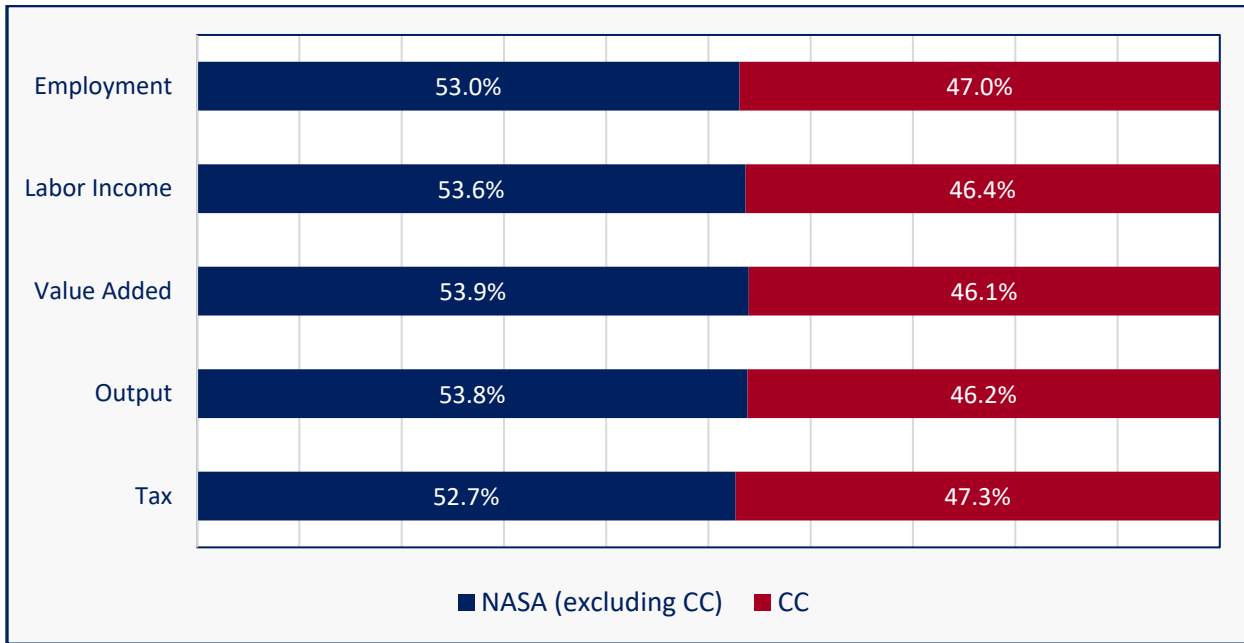
Around 47% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 375 and Figure 103). The primary reason the

shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 375: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Dakota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	15	1,069	1,605	3,239	59
CC Portion	7	496	740	1,496	28
CC Share	47.0%	46.4%	46.1%	46.2%	47.3%

Figure 103: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, North Dakota



Economic Impacts on the State of Ohio

NASA Impacts

In 2023, 1,679 NASA civil service employees (1,527 FTEs) residing in Ohio earned \$277.6 million in labor income. NASA procurement sourced in Ohio in the same year totaled \$427.6 million. The total economic impact resulting from these activities is 9,357 jobs, \$832.1 million in labor income, and \$2.4 billion in economic output. These economic activities generate \$84.4 million in tax revenues for the state and local governments in Ohio (Table 376).

The employment multiplier is 6.1, meaning that for every NASA job located in Ohio, an additional 5.1 jobs are supported in the state economy. The output multiplier of 3.4 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$2.4 million worth of output is sustained throughout the state economy.

Table 376: Summary of NASA Impacts by Types of Impact, Ohio

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1,527	277,627	392,044	717,431	7,830
Indirect	3,276	277,675	397,192	756,386	23,328
Induced	4,554	276,821	509,368	938,648	53,205
Total	9,357	832,122	1,298,604	2,412,465	84,363
<i>Multiplier</i>	<i>6.1</i>	<i>3.0</i>	<i>3.3</i>	<i>3.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Ohio economy. Table 377 examines the sources of the employment figures in the second column of Table 376. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 59% of the jobs supported throughout the state economy by NASA are due to its labor force. The share of NASA procurement spending in the overall employment impact is 41%.

Table 377: NASA Employment Impacts by Sources of Impact, Ohio

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	1,527	40.1	0	0.0	1,527	16.3	100.0	0.0
Indirect	0	0.0	3,276	59.0	3,276	35.0	0.0	100.0
Induced	2,279	59.9	2,275	41.0	4,554	48.7	50.0	50.0
Total	3,806	100	5,551	100	9,357	100	40.7	59.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 378 examines the sources of the output figures in the fifth column of Table 376. NASA procurement spending accounts for slightly over half of the output impacts, while the share of NASA labor force's share is close to 50%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 378: NASA Output Impacts by Sources of Impact, Ohio

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	717,431	60.1	0	0.0	717,431	29.7	100.0	0.0
Indirect	0	0.0	756,386	62.1	756,386	31.4	0.0	100.0
Induced	476,753	39.9	461,896	37.9	938,648	38.9	50.8	49.2
Total	1,194,184	100	1,218,282	100	2,412,465	100	49.5	50.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Ohio had 607 M2M-related civil service employees (316 FTEs) with a corresponding labor income of \$56.5 million. M2M campaign procurement sourced in the state in the same year totaled \$57.1 million. The total Ohio employment impact is 1,462 jobs. The labor income and economic output associated with this employment are \$140.2 million and \$406.1 million, respectively. The M2M campaign generates \$12.9 million in tax revenues for the state and local governments in Ohio (Table 379).

Table 379: Summary of M2M Campaign Impacts by Types of Impact, Ohio

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	316	56,516	81,043	148,306	1,594
Indirect	408	37,547	53,177	105,081	2,651
Induced	738	46,164	84,565	152,715	8,661
Total	1,462	140,226	218,785	406,102	12,906
<i>Multiplier</i>	4.6	2.5	2.7	2.7	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Ohio economy. Approximately 52% of the employment impacts and 59% of the output impacts are due to NASA employees residing in the state.

Table 380: M2M Campaign Employment Impacts by Sources of Impact, Ohio

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	316	41.8	0	0.0	316	21.6	100.0	0.0
Indirect	0	0.0	408	57.7	408	27.9	0.0	100.0
Induced	440	58.2	299	42.3	738	50.5	59.6	40.4
Total	755	100	707	100	1,462	100	51.7	48.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 381: M2M Campaign Output Impacts by Sources of Impact, Ohio

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	148,306	61.7	0	0.0	148,306	36.5	100.0	0.0
Indirect	0	0.0	105,081	63.4	105,081	25.9	0.0	100.0
Induced	92,060	38.3	60,655	36.6	152,715	37.6	60.3	39.7
Total	240,367	100	165,735	100	406,102	100	59.2	40.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

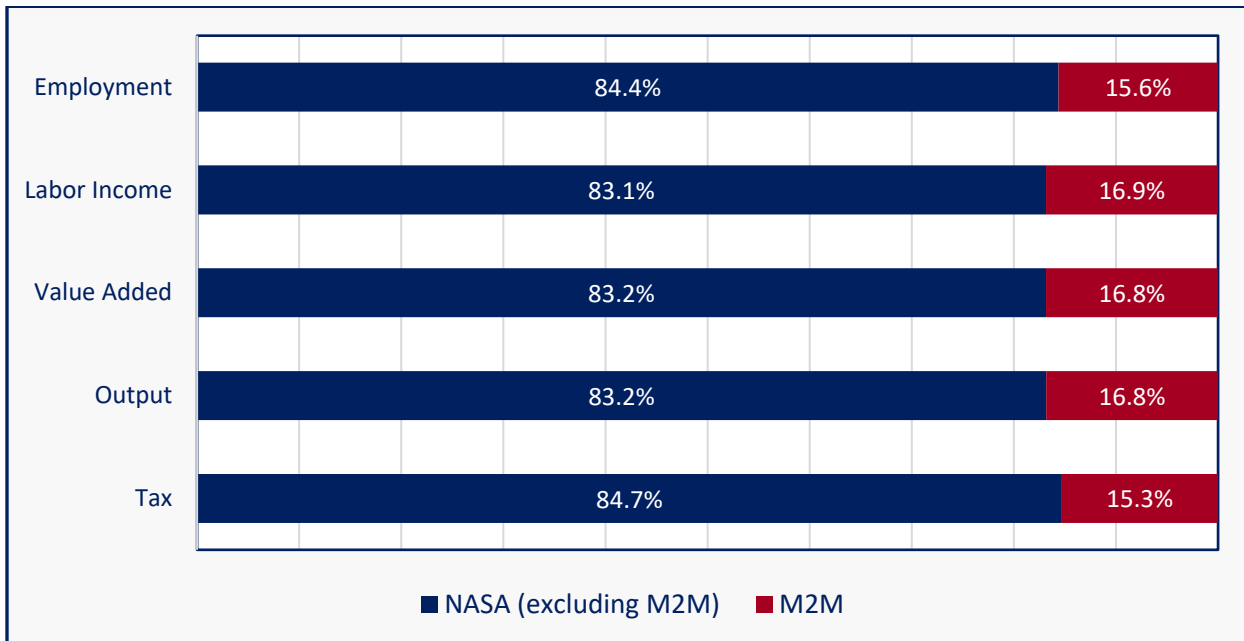
The M2M Campaign’s Share of NASA Impacts

Around 16% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 382 and Figure 104). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 382: The M2M Campaign Portion of Overall NASA Impacts, Ohio

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	9,357	832,122	1,298,604	2,412,465	84,363
M2M Portion	1,462	140,226	218,785	406,102	12,906
M2M Share	15.6%	16.9%	16.8%	16.8%	15.3%

Figure 104: The M2M Campaign Portion of Overall NASA Impacts, Ohio



Investments in Climate Change Research and Technology Impacts

In 2023, Ohio had 632 climate change research and technology-related civil service employees (303 FTEs) with a corresponding labor income of \$52.1 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$93.2 million. The total Ohio employment impact is 2,029 jobs. The labor income and economic output associated with this employment are \$171.2 million and \$512.8 million, respectively. Investments in climate change research and technology generate \$17.9 million in tax revenues for the state and local governments in Ohio (Table 383).

Table 383: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Ohio

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	303	52,078	77,715	142,217	1,469
Indirect	752	61,619	86,921	169,397	4,985
Induced	975	57,457	106,267	201,174	11,401
Total	2,029	171,154	270,903	512,788	17,854
<i>Multiplier</i>	<i>6.7</i>	<i>3.3</i>	<i>3.5</i>	<i>3.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Ohio economy. Approximately 63% of the employment impacts and 54% of the output impacts are due to NASA procurement sourced within the state.

Table 384: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Ohio

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	303	39.9	0	0.0	303	14.9	100.0	0.0
Indirect	0	0.0	752	59.2	752	37.0	0.0	100.0
Induced	456	60.1	519	40.8	975	48.0	46.8	53.2
Total	758	100	1,271	100	2,029	100	37.4	62.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 385: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Ohio

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	142,217	60.1	0	0.0	142,217	27.7	100.0	0.0
Indirect	0	0.0	169,397	61.3	169,397	33.0	0.0	100.0
Induced	94,256	39.9	106,917	38.7	201,174	39.2	46.9	53.1
Total	236,473	100	276,315	100	512,788	100	46.1	53.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

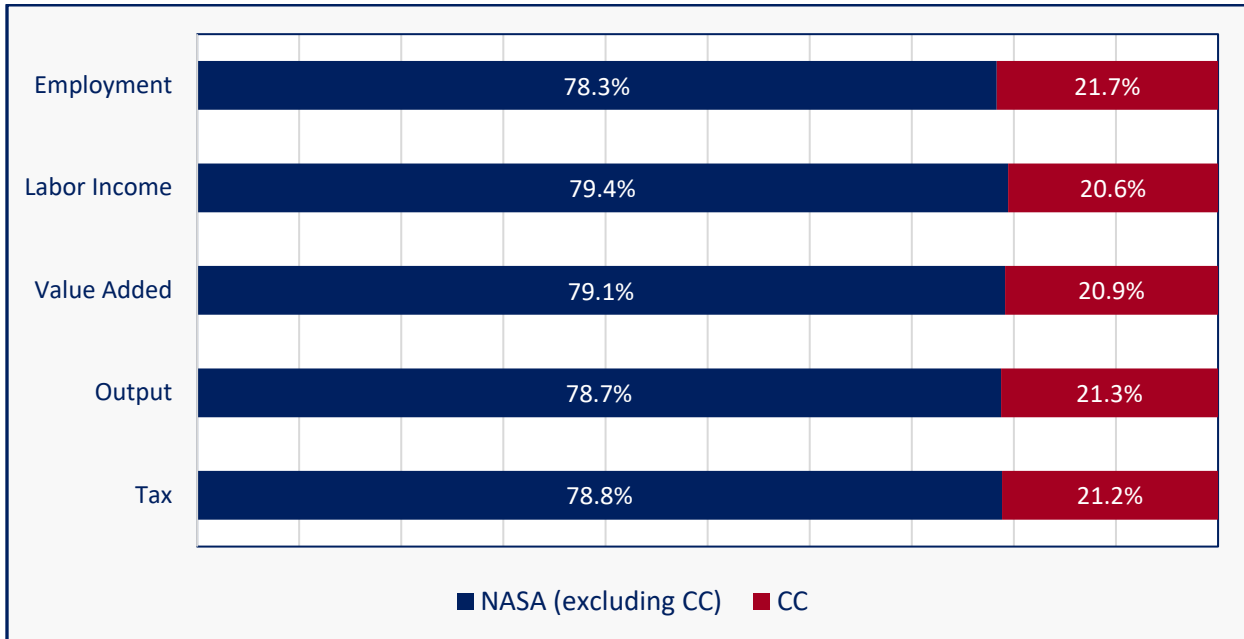
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 21% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 386 and Figure 105). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 386: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Ohio

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	9,357	832,122	1,298,604	2,412,465	84,363
CC Portion	2,029	171,154	270,903	512,788	17,854
CC Share	21.7%	20.6%	20.9%	21.3%	21.2%

Figure 105: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Ohio



Economic Impacts on the State of Oklahoma

NASA Impacts

In 2023, 20 NASA civil service employees (13 FTEs) residing in Oklahoma earned \$1.8 million in labor income. NASA procurement sourced in Oklahoma in the same year totaled \$42.1 million. The total economic impact resulting from these activities is 506 jobs, \$34.6 million in labor income, and \$109.4 million in economic output. These economic activities generate \$3.2 million in tax revenues for the state and local governments in Oklahoma (Table 387).

Table 387: Summary of NASA Impacts by Types of Impact, Oklahoma

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	13	1,798	3,268	5,980	37
Indirect	319	23,353	32,264	69,510	1,417
Induced	174	9,412	17,287	33,932	1,760
Total	506	34,563	52,819	109,423	3,214
<i>Multiplier</i>	<i>39.8</i>	<i>19.2</i>	<i>16.2</i>	<i>18.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oklahoma economy. Table 388 examines the sources of the employment figures in the second column of Table 397. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 95% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is approximately 5%.

Table 388: NASA Employment Impacts by Sources of Impact, Oklahoma

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	13	51.2	0	0.0	13	2.5	100.0	0.0
Indirect	0	0.0	319	66.4	319	63.1	0.0	100.0
Induced	12	48.8	162	33.6	174	34.4	7.0	93.0
Total	25	100	481	100	506	100	4.9	95.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 389 examines the sources of the output figures in the fifth column of Table 387. Procurement spending is responsible for around 92% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is around 8%.

Table 389: NASA Output Impacts by Sources of Impact, Oklahoma

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	5,980	71.1	0	0.0	5,980	5.5	100.0	0.0
Indirect	0	0.0	69,510	68.8	69,510	63.5	0.0	100.0
Induced	2,425	28.9	31,507	31.2	33,932	31.0	7.1	92.9
Total	8,406	100	101,017	100	109,423	100	7.7	92.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Oklahoma had one M2M-related civil service employee (1 FTE) with a corresponding labor income of \$188,000. M2M campaign procurement sourced in the state in the same year totaled \$396,000. The total Oklahoma employment impact is 6 jobs. The labor income and economic output associated with this employment are \$526,000 and \$1.6 million, respectively. The M2M campaign generates \$43,000 in tax revenues for the state and local governments in Oklahoma (Table 390).

Table 390: Summary of M2M Campaign Impacts by Types of Impact, Oklahoma

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	188	257	470	4
Indirect	2	197	288	648	13
Induced	3	141	260	500	26
Total	6	526	805	1,618	43
<i>Multiplier</i>	5.7	2.8	3.1	3.4	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oklahoma economy. Around 60% of the employment impacts and 52% of the output impacts are due to NASA procurement sourced within the state.

Table 391: M2M Campaign Employment Impacts by Sources of Impact, Oklahoma

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	44.0	0	0.0	1	17.5	100.0	0.0
Indirect	0	0.0	2	59.2	2	35.7	0.0	100.0
Induced	1	56.0	1	40.8	3	46.8	47.4	52.6
Total	2	100	3	100	6	100	39.7	60.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 392: M2M Campaign Output Impacts by Sources of Impact, Oklahoma

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	470	66.0	0	0.0	470	29.0	100.0	0.0
Indirect	0	0.0	648	71.6	648	40.1	0.0	100.0
Induced	242	34.0	257	28.4	500	30.9	48.5	51.5
Total	712	100	906	100	1,618	100	44.0	56.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

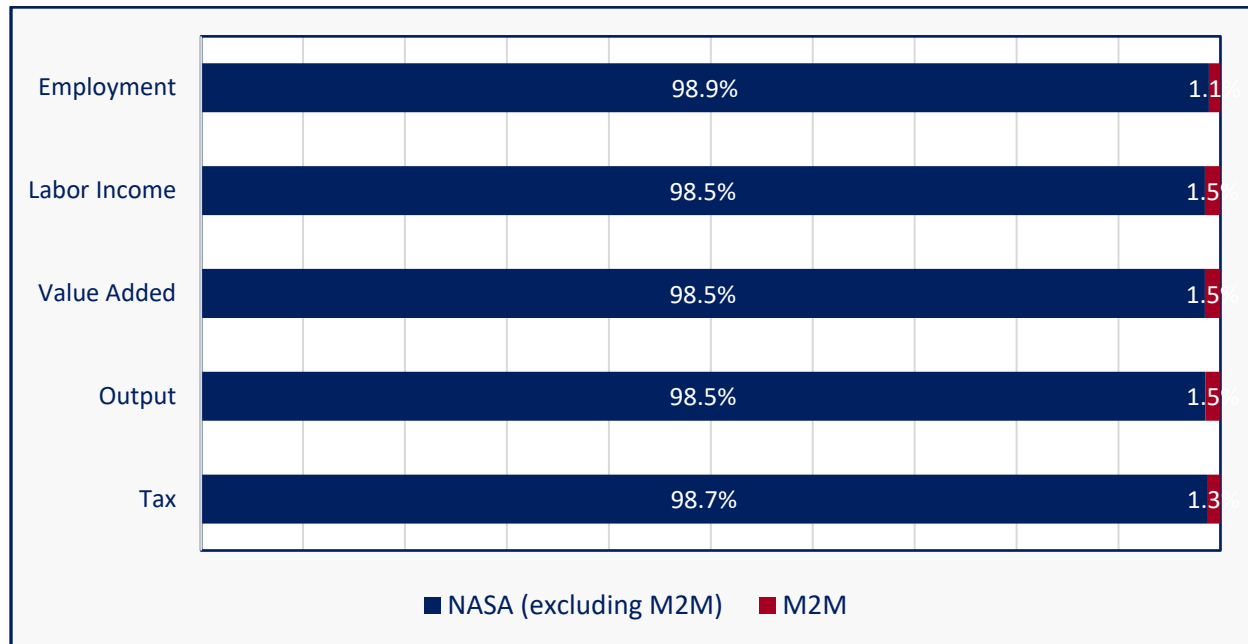
The M2M Campaign's Share of NASA Impacts

Around 1% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 393 and Figure 106). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 393: The M2M Campaign Portion of Overall NASA Impacts, Oklahoma

Impact Component	Labor Income Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	506	34,563	52,819	109,423	3,214
M2M Portion	6	526	805	1,618	43
M2M Share	1.1%	1.5%	1.5%	1.5%	1.3%

Figure 106: The M2M Campaign Portion of Overall NASA Impacts, Oklahoma



Investments in Climate Change Research and Technology Impacts

In 2023, Oklahoma had three climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$233,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$27.9 million. The total Oklahoma employment impact is 336 jobs. The labor income and economic output associated with this employment are \$22.3 million and \$71 million, respectively. Investments in climate change research and technology generate \$2.1 million in tax revenues for the state and local governments in Oklahoma (Table 394).

Table 394: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Oklahoma

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	233	600	1,098	5
Indirect	219	15,897	22,292	47,100	945
Induced	115	6,137	11,375	22,758	1,180
Total	336	22,267	34,267	70,956	2,130
<i>Multiplier</i>	<i>144.0</i>	<i>95.5</i>	<i>57.1</i>	<i>64.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oklahoma economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 395: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Oklahoma

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	56.5	0	0.0	2	0.7	100.0	0.0
Indirect	0	0.0	219	65.8	219	65.0	0.0	100.0
Induced	2	43.5	114	34.2	115	34.3	1.6	98.4
Total	4	100	332	100	336	100	1.2	98.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 396: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Oklahoma

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,098	76.0	0	0.0	1,098	1.5	100.0	0.0
Indirect	0	0.0	47,100	67.8	47,100	66.4	0.0	100.0
Induced	348	24.0	22,411	32.2	22,758	32.1	1.5	98.5
Total	1,445	100	69,510	100	70,956	100	2.0	98.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

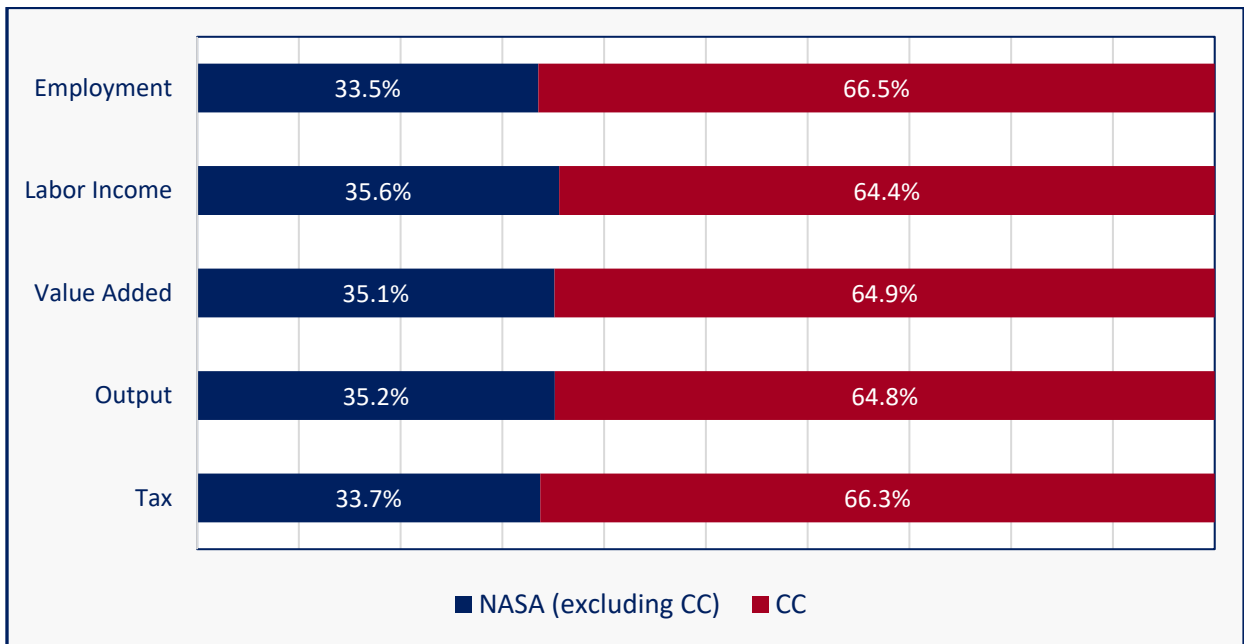
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 65% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 397 and Figure 107). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 397: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oklahoma

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	506	34,563	52,819	109,423	3,214
CC Portion	336	22,267	34,267	70,956	2,130
CC Share	66.5%	64.4%	64.9%	64.8%	66.3%

Figure 107: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oklahoma



Economic Impacts on the State of Oregon

NASA Impacts

In 2023, 12 NASA civil service employees (10 FTEs) residing in Oregon earned \$1.8 million in labor income. NASA procurement sourced in Oregon in the same year totaled \$18.6 million. The total economic impact resulting from these activities is 233 jobs, \$19.8 million in labor income, and \$54 million in economic output. These economic activities generate \$2.3 million in tax revenues for the state and local governments in Oregon (Table 398).

Table 398: Summary of NASA Impacts by Types of Impact, Oregon

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	10	1,791	2,464	4,508	82
Indirect	128	11,886	17,434	30,933	1,168
Induced	95	6,145	10,547	18,533	1,029
Total	233	19,821	30,445	53,974	2,279
<i>Multiplier</i>	24.2	11.1	12.4	12.0	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oregon economy. Table 399 examines the sources of the employment figures in the second column of Table 398. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Around 90% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 10%.

Table 399: NASA Employment Impacts by Sources of Impact, Oregon

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	10	43.5	0	0.0	10	4.1	100.0	0.0
Indirect	0	0.0	128	60.6	128	54.9	0.0	100.0
Induced	12	56.5	83	39.4	95	41.0	13.1	86.9
Total	22	100	211	100	233	100	9.5	90.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 400 examines the sources of the output figures in the fifth column of Table 398. Procurement spending is responsible for 87% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 13%.

Table 400: NASA Output Impacts by Sources of Impact, Oregon

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	4,508	64.6	0	0.0	4,508	8.4	100.0	0.0
Indirect	0	0.0	30,933	65.8	30,933	57.3	0.0	100.0
Induced	2,476	35.4	16,057	34.2	18,533	34.3	13.4	86.6
Total	6,984	100	46,990	100	53,974	100	12.9	87.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Oregon had one M2M-related civil service employee (1 FTE) with a corresponding labor income of \$124,000. M2M campaign procurement sourced in the state in the same year totaled \$1 million. The total Oregon employment impact is 13 jobs. The labor income and economic output associated with this employment are \$1.1 million and \$3 million, respectively. The M2M campaign generates \$126,000 in tax revenues for the state and local governments in Oregon (Table 401).

Table 401: Summary of M2M Campaign Impacts by Types of Impact, Oregon

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	124	146	267	6
Indirect	7	615	973	1,745	67
Induced	5	327	556	963	53
Total	13	1,066	1,674	2,974	126
<i>Multiplier</i>	<i>22.6</i>	<i>8.6</i>	<i>11.5</i>	<i>11.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oregon economy. 89% of the employment impacts and 85% of the output impacts are due to NASA procurement sourced within the state.

Table 402: M2M Campaign Employment Impacts by Sources of Impact, Oregon

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	39.1	0	0.0	1	4.4	100.0	0.0
Indirect	0	0.0	7	63.5	7	56.3	0.0	100.0
Induced	1	60.9	4	36.5	5	39.2	17.6	82.4
Total	1	100	11	100	13	100	11.3	88.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 403: M2M Campaign Output Impacts by Sources of Impact, Oregon

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	267	61.8	0	0.0	267	9.0	100.0	0.0
Indirect	0	0.0	1,745	68.6	1,745	58.7	0.0	100.0
Induced	165	38.2	798	31.4	963	32.4	17.1	82.9
Total	432	100	2,543	100	2,974	100	14.5	85.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

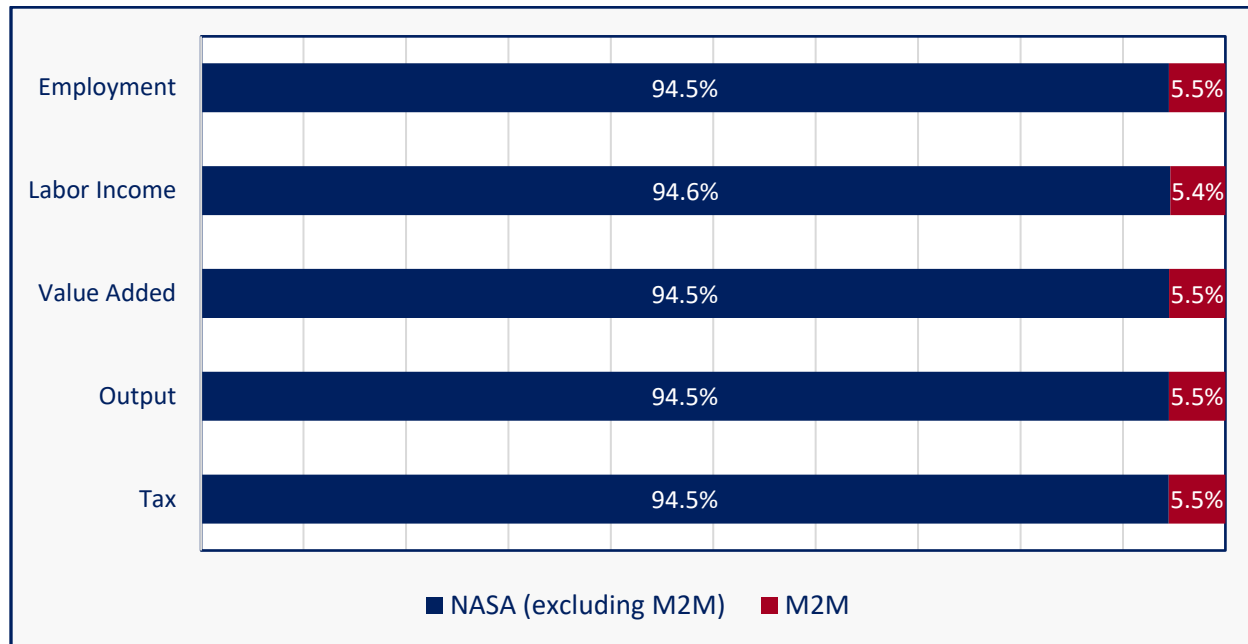
The M2M Campaign's Share of NASA Impacts

Around 5% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 404 and Figure 108).

Table 404: The M2M Campaign Portion of Overall NASA Impacts, Oregon

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	233	19,821	30,445	53,974	2,279
M2M Portion	13	1,066	1,674	2,974	126
M2M Share	5.5%	5.4%	5.5%	5.5%	5.5%

Figure 108: The M2M Campaign Portion of Overall NASA Impacts, Oregon



Investments in Climate Change Research and Technology Impacts

In 2023, Oregon had three climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$361,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$10.5 million. The total Oregon employment impact is 125 jobs. The labor income and economic output associated with this employment are \$10.3 million and \$28.9 million, respectively. Investments in climate change research and technology generate \$1.2 million in tax revenues for the state and local governments in Oregon (Table 405).

Table 405: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Oregon

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	361	572	1,047	17
Indirect	72	6,747	10,136	17,786	669
Induced	51	3,230	5,592	10,024	556
Total	125	10,338	16,300	28,858	1,242
<i>Multiplier</i>	<i>56.2</i>	<i>28.7</i>	<i>28.5</i>	<i>27.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Oregon economy. 96% of the employment impacts and 95% of the output impacts are due to NASA procurement sourced within the state.

Table 406: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Oregon

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	44.9	0	0.0	2	1.8	100.0	0.0
Indirect	0	0.0	72	59.5	72	57.2	0.0	100.0
Induced	3	55.1	49	40.5	51	41.0	5.3	94.7
Total	5	100	120	100	125	100	4.0	96.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 407: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Oregon

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,047	66.6	0	0.0	1,047	3.6	100.0	0.0
Indirect	0	0.0	17,786	65.2	17,786	61.6	0.0	100.0
Induced	525	33.4	9,499	34.8	10,024	34.7	5.2	94.8
Total	1,572	100	27,285	100	28,858	100	5.4	94.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

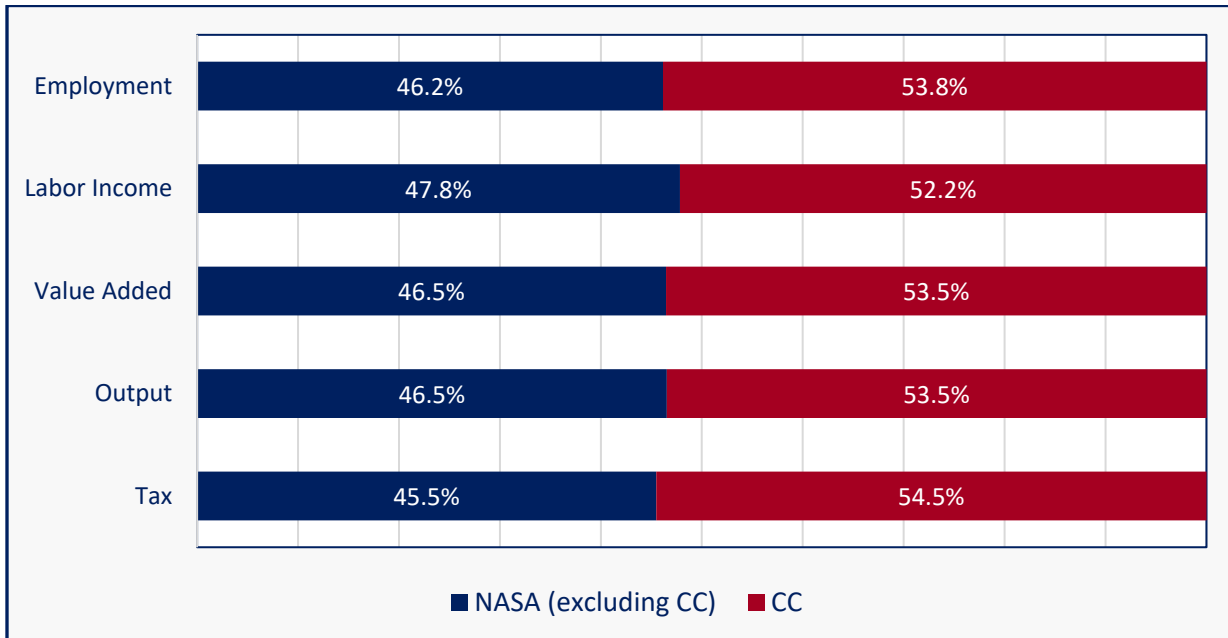
Around 54% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 408 and Figure 109). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution

of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 408: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oregon

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	233	19,821	30,445	53,974	2,279
CC Portion	125	10,338	16,300	28,858	1,242
CC Share	53.8%	52.2%	53.5%	53.5%	54.5%

Figure 109: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Oregon



Economic Impacts on the State of Pennsylvania

NASA Impacts

In 2023, 61 NASA civil service employees (42 FTEs) residing in Pennsylvania earned \$7.9 million in labor income. NASA procurement sourced in Pennsylvania in the same year totaled \$131.6 million. The total economic impact resulting from these activities is 1,749 jobs, \$159 million in labor income, and \$409 million in economic output. These economic activities generate \$16.4 million in tax revenues for the state and local governments in Pennsylvania (Table 409).

Table 409: Summary of NASA Impacts by Types of Impact, Pennsylvania

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	42	7,941	10,802	19,766	213
Indirect	896	95,348	127,374	227,820	6,732
Induced	812	55,691	91,463	161,462	9,459
Total	1,749	158,980	229,639	409,048	16,404
<i>Multiplier</i>	41.6	20.0	21.3	20.7	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Pennsylvania economy. Table 410 examines the sources of the employment figures in the second column of Table 409. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. 94% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 6%.

Table 410: NASA Employment Impacts by Sources of Impact, Pennsylvania

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	42	40.1	0	0.0	42	2.4	100.0	0.0
Indirect	0	0.0	896	54.5	896	51.2	0.0	100.0
Induced	63	59.9	749	45.5	812	46.4	7.7	92.3
Total	105	100	1,644	100	1,749	100	6.0	94.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 411 examines the sources of the output figures in the fifth column of Table 409. Procurement spending is responsible for 92% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 8%.

Table 411: NASA Output Impacts by Sources of Impact, Pennsylvania

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	19,766	60.6	0	0.0	19,766	4.8	100.0	0.0
Indirect	0	0.0	227,820	60.5	227,820	55.7	0.0	100.0
Induced	12,865	39.4	148,597	39.5	161,462	39.5	8.0	92.0
Total	32,632	100	376,417	100	409,048	100	8.0	92.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Pennsylvania had eight M2M-related civil service employees (2 FTEs) with a corresponding labor income of \$361,000. M2M campaign procurement sourced in the state in the same year totaled \$79.6 million. The total Pennsylvania employment impact is 989 jobs. The labor income and economic output associated with this employment are \$91.6 million and \$228.9 million, respectively. The M2M campaign generates \$9.3 million in tax revenues for the state and local governments in Pennsylvania (Table 412).

Table 412: Summary of M2M Campaign Impacts by Types of Impact, Pennsylvania

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	361	436	797	10
Indirect	528	59,078	78,256	136,891	3,956
Induced	459	32,189	52,301	91,240	5,343
Total	989	91,627	130,993	228,928	9,309
<i>Multiplier</i>	<i>583.0</i>	<i>253.8</i>	<i>300.8</i>	<i>287.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Pennsylvania economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 413: M2M Campaign Employment Impacts by Sources of Impact, Pennsylvania

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	2	37.1	0	0.0	2	0.2	100.0	0.0
Indirect	0	0.0	528	53.6	528	53.4	0.0	100.0
Induced	3	62.9	456	46.4	459	46.4	0.6	99.4
Total	5	100	985	100	989	100	0.5	99.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 414: M2M Campaign Output Impacts by Sources of Impact, Pennsylvania

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	797	58.4	0	0.0	797	0.3	100.0	0.0
Indirect	0	0.0	136,891	60.2	136,891	59.8	0.0	100.0
Induced	567	41.6	90,673	39.8	91,240	39.9	0.6	99.4
Total	1,364	100	227,564	100	228,928	100	0.6	99.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

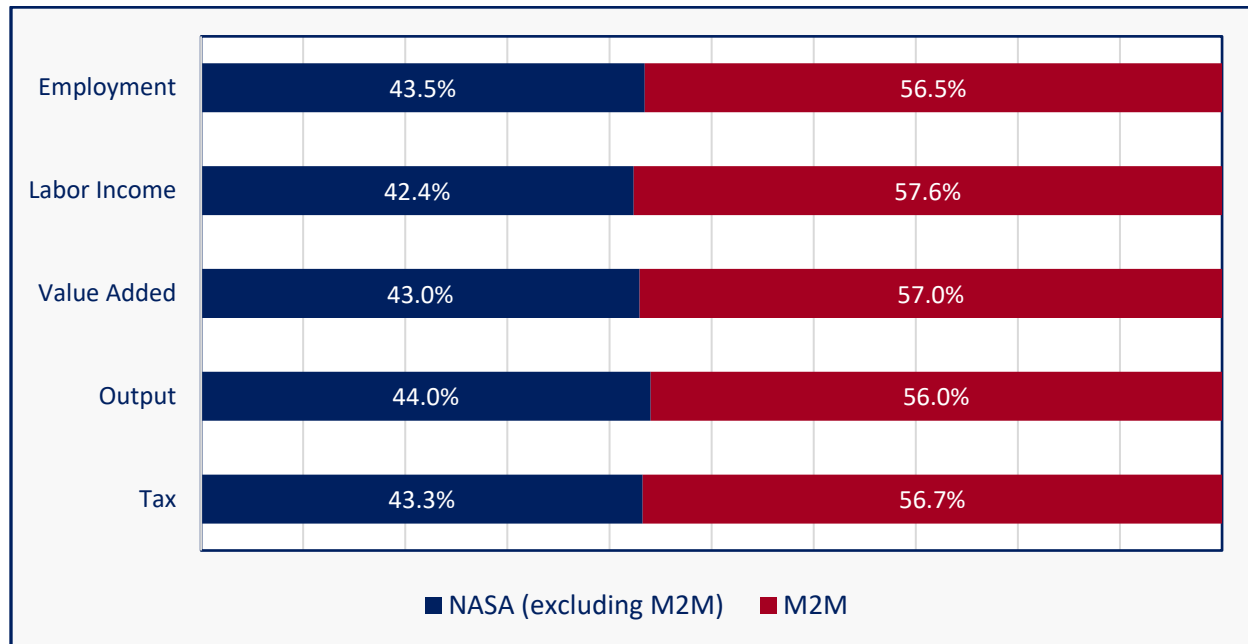
The M2M Campaign's Share of NASA Impacts

Around 57% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 415 and Figure 110). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 415: The M2M Campaign Portion of Overall NASA Impacts, Pennsylvania

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,749	158,980	229,639	409,048	16,404
M2M Portion	989	91,627	130,993	228,928	9,309
M2M Share	56.5%	57.6%	57.0%	56.0%	56.7%

Figure 110: The M2M Campaign Portion of Overall NASA Impacts, Pennsylvania



Investments in Climate Change Research and Technology Impacts

In 2023, Pennsylvania had 22 climate change research and technology-related civil service employees (13 FTEs) with a corresponding labor income of \$2.4 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$22.4 million. The total Pennsylvania employment impact is 324 jobs. The labor income and economic output associated with this employment are \$43.5 million and \$75.8 million, respectively. Investments in climate change research and technology generate \$3 million in tax revenues for the state and local governments in Pennsylvania (Table 416).

Table 416: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Pennsylvania

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	13	2,438	3,259	5,964	66
Indirect	161	25,346	33,004	39,372	1,186
Induced	151	15,720	26,296	30,468	1,785
Total	324	43,504	62,560	75,804	3,037
<i>Multiplier</i>	<i>25.5</i>	<i>17.8</i>	<i>19.2</i>	<i>12.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Pennsylvania economy. Approximately 90% of the employment and 87% of output impacts are due to NASA procurement sourced within the state.

Table 417: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Pennsylvania

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	13	38.4	0	0.0	13	3.9	100.0	0.0
Indirect	0	0.0	161	55.2	161	49.6	0.0	100.0
Induced	20	61.6	130	44.8	151	46.5	13.5	86.5
Total	33	100	291	100	324	100	10.2	89.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 418: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Pennsylvania

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	5,964	59.1	0	0.0	5,964	7.9	100.0	0.0
Indirect	0	0.0	39,372	59.9	39,372	51.9	0.0	100.0
Induced	4,130	40.9	26,338	40.1	30,468	40.2	13.6	86.4
Total	10,094	100	65,709	100	75,804	100	13.3	86.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

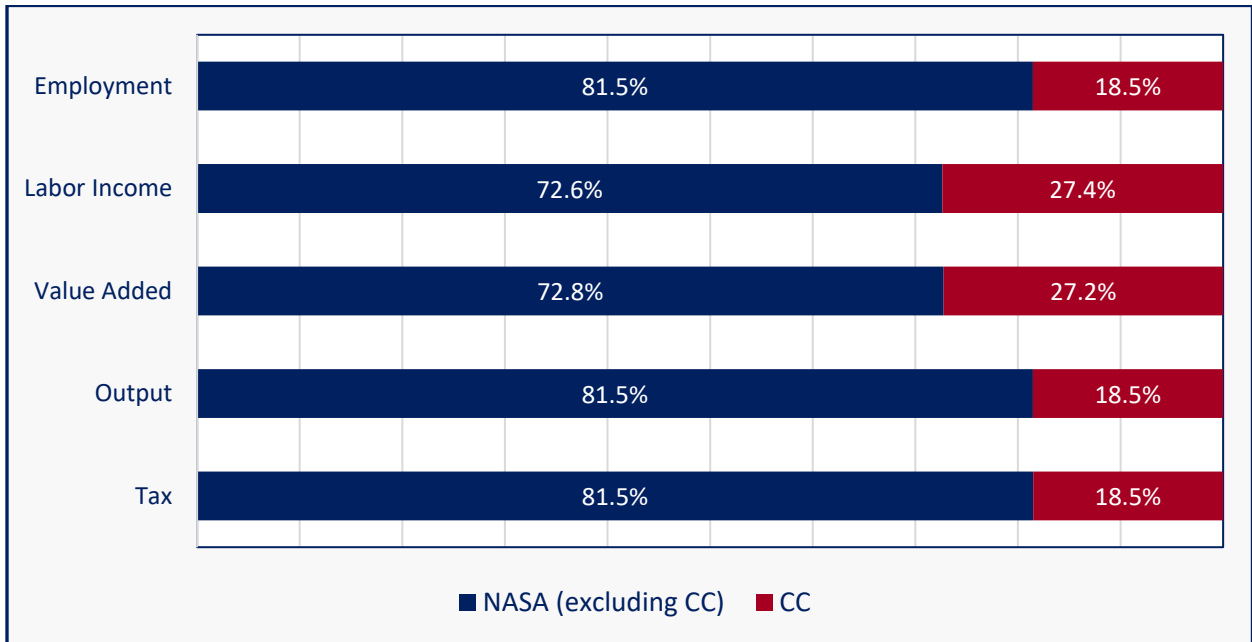
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 22% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 419 and Figure 111). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 419: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Pennsylvania

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	1,749	158,980	229,639	409,048	16,404
CC Portion	324	43,504	62,560	75,804	3,037
CC Share	18.5%	27.4%	27.2%	18.5%	18.5%

Figure 111: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Pennsylvania



Economic Impacts on the State of Rhode Island

NASA Impacts

In 2023, four NASA civil service employees (3 FTEs) residing in Rhode Island earned \$518,000 in labor income. NASA procurement sourced in Rhode Island in the same year totaled \$7.7 million. The total economic impact resulting from these activities is 93 jobs, \$7.4 million in labor income, and \$20 million in economic output. These economic activities generate \$836,000 in tax revenues for the state and local governments in Rhode Island (Table 420).

Table 420: Summary of NASA Impacts by Types of Impact, Rhode Island

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	518	655	1,198	15
Indirect	57	4,823	6,728	13,138	399
Induced	33	2,084	3,630	6,114	422
Total	93	7,424	11,013	20,450	836
<i>Multiplier</i>	<i>36.4</i>	<i>14.3</i>	<i>16.8</i>	<i>17.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Rhode Island economy. Table 421 examines the sources of the employment figures in the second column of Table 420. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Nearly 94% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 6%.

Table 421: NASA Employment Impacts by Sources of Impact, Rhode Island

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	3	43.8	0	0.0	3	2.8	100.0	0.0
Indirect	0	0.0	57	65.5	57	61.3	0.0	100.0
Induced	3	56.2	30	34.5	33	35.9	9.8	90.2
Total	6	100	87	100	93	100	6.3	93.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 422 examines the sources of the output figures in the fifth column of Table 420. Procurement spending is responsible for more than 91% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 9%.

Table 422: NASA Output Impacts by Sources of Impact, Rhode Island

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,198	66.9	0	0.0	1,198	5.9	100.0	0.0
Indirect	0	0.0	13,138	70.4	13,138	64.2	0.0	100.0
Induced	592	33.1	5,522	29.6	6,114	29.9	9.7	90.3
Total	1,790	100	18,660	100	20,450	100	8.8	91.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Rhode Island had one M2M-related civil service employee (<1 FTE) with a corresponding labor income of \$6,000. M2M campaign procurement sourced in the state in the same year totaled \$890,000. The total economic impact attributable to this procurement activity is 10 jobs, \$824,000 in labor income, and \$2.2 million worth of output. These economic activities generate \$92,000 in tax revenues for the state and local governments in Rhode Island (Table 423).

Table 423: Summary of M2M Campaign Impacts by Types of Impact, Rhode Island

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	6	17	31	<1
Indirect	6	587	792	1,480	45
Induced	4	231	397	665	46
Total	10	824	1,206	2,176	92
<i>Multiplier</i>	<i>155.6</i>	<i>132.4</i>	<i>71.3</i>	<i>70.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Rhode Island economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 424: M2M Campaign Employment Impacts by Sources of Impact, Rhode Island

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	<1	64.3	0	0.0	<1	0.6	100.0	0.0
Indirect	0	0.0	6	63.3	6	62.7	0.0	100.0
Induced	<1	35.7	4	36.7	4	36.6	1.0	99.0
Total	<1	100	10	100	10	100	1.0	99.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 425: M2M Campaign Output Impacts by Sources of Impact, Rhode Island

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	31	81.7	0	0.0	31	1.4	100.0	0.0
Indirect	0	0.0	1,480	69.2	1,480	68.0	0.0	100.0
Induced	7	18.3	658	30.8	665	30.6	1.0	99.0
Total	38	100	2,138	100	2,176	100	1.7	98.3

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

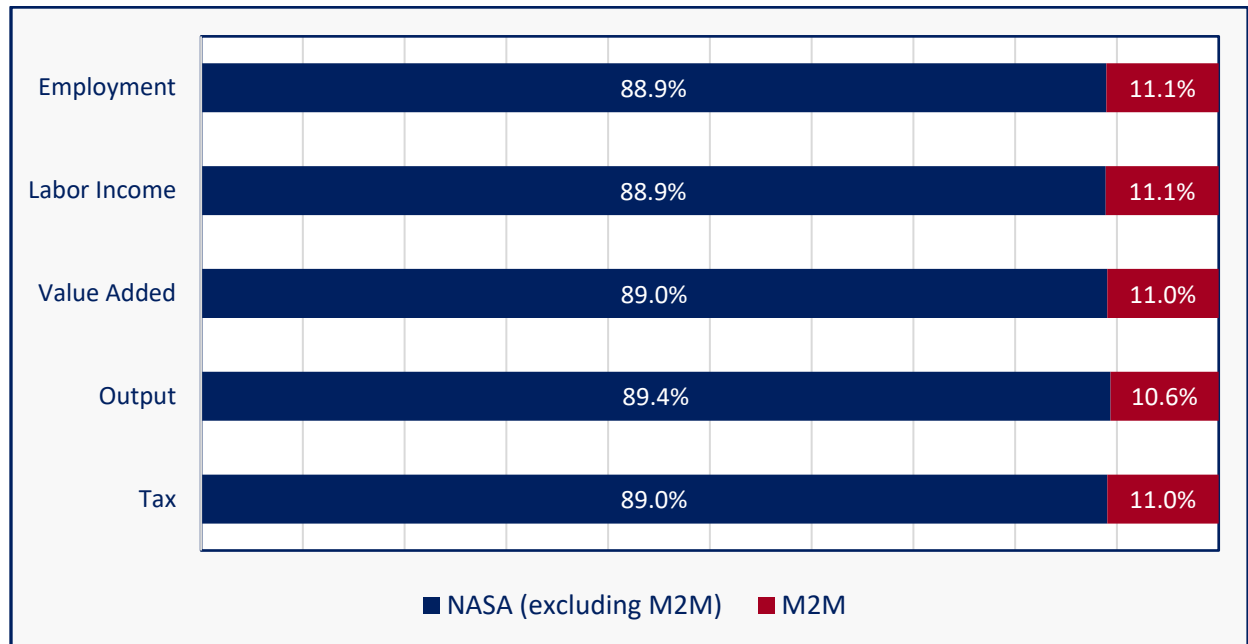
The M2M Campaign's Share of NASA Impacts

Around 11% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 426 and Figure 112). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 426: The M2M Campaign Portion of Overall NASA Impacts, Rhode Island

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	93	7,424	11,013	20,450	836
M2M Portion	10	824	1,206	2,176	92
M2M Share	11.1%	11.1%	11.0%	10.6%	11.0%

Figure 112: The M2M Campaign Portion of Overall NASA Impacts, Rhode Island



Investments in Climate Change Research and Technology Impacts

In 2023, Rhode Island had one climate change research and technology-related civil service employee (<1 FTE) with a corresponding labor income of \$9,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$2.1 million. The total economic impact attributable to this procurement activity is 24 jobs, \$1.8 million in labor income, and \$5.2 million worth of output. These economic activities generate \$218,000 in tax revenues for the state and local governments in Rhode Island (Table 427).

Table 427: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Rhode Island

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	9	20	36	<1
Indirect	16	1,320	1,876	3,629	110
Induced	8	515	920	1,557	107
Total	24	1,844	2,816	5,222	218
<i>Multiplier</i>	<i>314.8</i>	<i>214.9</i>	<i>142.6</i>	<i>144.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Rhode Island economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 428: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Rhode Island

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	<1	58.2	0	0.0	<1	0.3	100.0	0.0
Indirect	0	0.0	16	65.1	16	64.7	0.0	100.0
Induced	<1	41.8	8	34.9	8	34.9	0.7	99.3
Total	<1	100	24	100	24	100	0.5	99.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 429: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Rhode Island

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	36	77.8	0	0.0	36	0.7	100.0	0.0
Indirect	0	0.0	3,629	70.1	3,629	69.5	0.0	100.0
Induced	10	22.2	1,547	29.9	1,557	29.8	0.7	99.3
Total	46	100	5,176	100	5,222	100	0.9	99.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

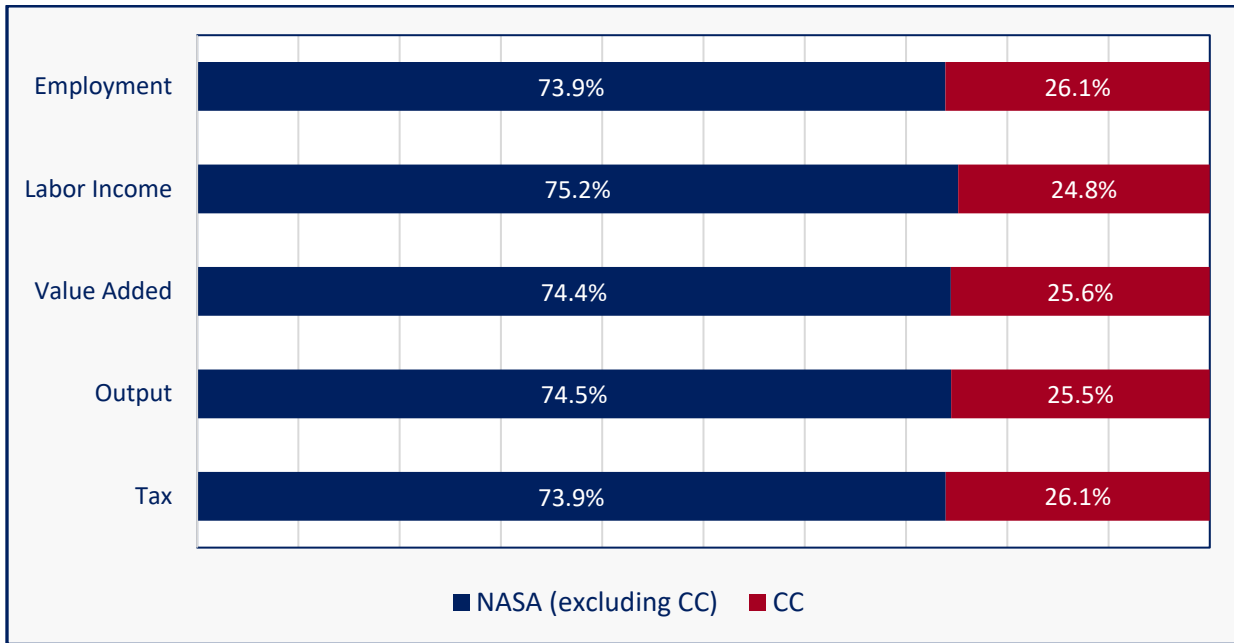
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 26% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 430 and Figure 113). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 430: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Rhode Island

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	93	7,424	11,013	20,450	836
CC Portion	24	1,844	2,816	5,222	218
CC Share	26.1%	24.8%	25.6%	25.5%	26.1%

Figure 113: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Rhode Island



Economic Impacts on the State of South Carolina

NASA Impacts

In 2023, 22 NASA civil service employees (17 FTEs) residing in South Carolina earned \$3.1 million in labor income. NASA procurement sourced in South Carolina in the same year totaled \$10.7 million. The total economic impact resulting from these activities is 176 jobs, \$13.8 million in labor income, and \$40.4 million in economic output. These economic activities generate \$1.4 million in tax revenues for the state and local governments in South Carolina (Table 431).

Table 431: Summary of NASA Impacts by Types of Impact, South Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	17	3,059	4,452	8,148	73
Indirect	91	7,070	9,345	19,118	466
Induced	68	3,648	7,040	13,126	888
Total	176	13,776	20,837	40,392	1,427
<i>Multiplier</i>	<i>10.2</i>	<i>4.5</i>	<i>4.7</i>	<i>5.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the South Carolina economy. Table 432 examines the sources of the employment figures in the second column of Table 431. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 78% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 22%.

Table 432: NASA Employment Impacts by Sources of Impact, South Carolina

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	17	45.8	0	0.0	17	9.8	100.0	0.0
Indirect	0	0.0	91	65.4	91	51.4	0.0	100.0
Induced	21	54.2	48	34.6	68	38.8	30.1	69.9
Total	38	100	138	100	176	100	21.5	78.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 433 examines the sources of the output figures in the fifth column of Table 431. Procurement spending is responsible for approximately 70% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 30%.

Table 433: NASA Output Impacts by Sources of Impact, South Carolina

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	8,148	66.9	0	0.0	8,148	20.2	100.0	0.0
Indirect	0	0.0	19,118	67.7	19,118	47.3	0.0	100.0
Induced	4,025	33.1	9,101	32.3	13,126	32.5	30.7	69.3
Total	12,173	100	28,219	100	40,392	100	30.1	69.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, South Carolina had 3 M2M-related civil service employees (1 FTE) with a corresponding labor income of \$212,000. M2M campaign procurement sourced in the state in the same year totaled \$876,000. The total economic impact attributable to this procurement activity is 12 jobs, \$1 million in labor income, and \$3.3 million worth of output. These economic activities generate \$114,000 in tax revenues for the state and local governments in South Carolina (Table 434).

Table 434: Summary of M2M Campaign Impacts by Types of Impact, South Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	212	332	607	5
Indirect	6	516	780	1,731	41
Induced	5	270	550	1,006	68
Total	12	997	1,662	3,343	114
<i>Multiplier</i>	<i>9.5</i>	<i>4.7</i>	<i>5.0</i>	<i>5.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the South Carolina economy. Approximately 80% of the employment impacts and 73% of the output impacts are due to NASA procurement sourced within the state.

Table 435: M2M Campaign Employment Impacts by Sources of Impact, South Carolina

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	47.5	0	0.0	1	10.5	100.0	0.0
Indirect	0	0.0	6	64.0	6	49.8	0.0	100.0
Induced	1	52.5	3	36.0	5	39.7	29.2	70.8
Total	3	100	10	100	12	100	22.1	77.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 436: M2M Campaign Output Impacts by Sources of Impact, South Carolina

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	607	67.8	0	0.0	607	18.1	100.0	0.0
Indirect	0	0.0	1,731	70.7	1,731	51.8	0.0	100.0
Induced	288	32.2	718	29.3	1,006	30.1	28.6	71.4
Total	895	100	2,448	100	3,343	100	26.8	73.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

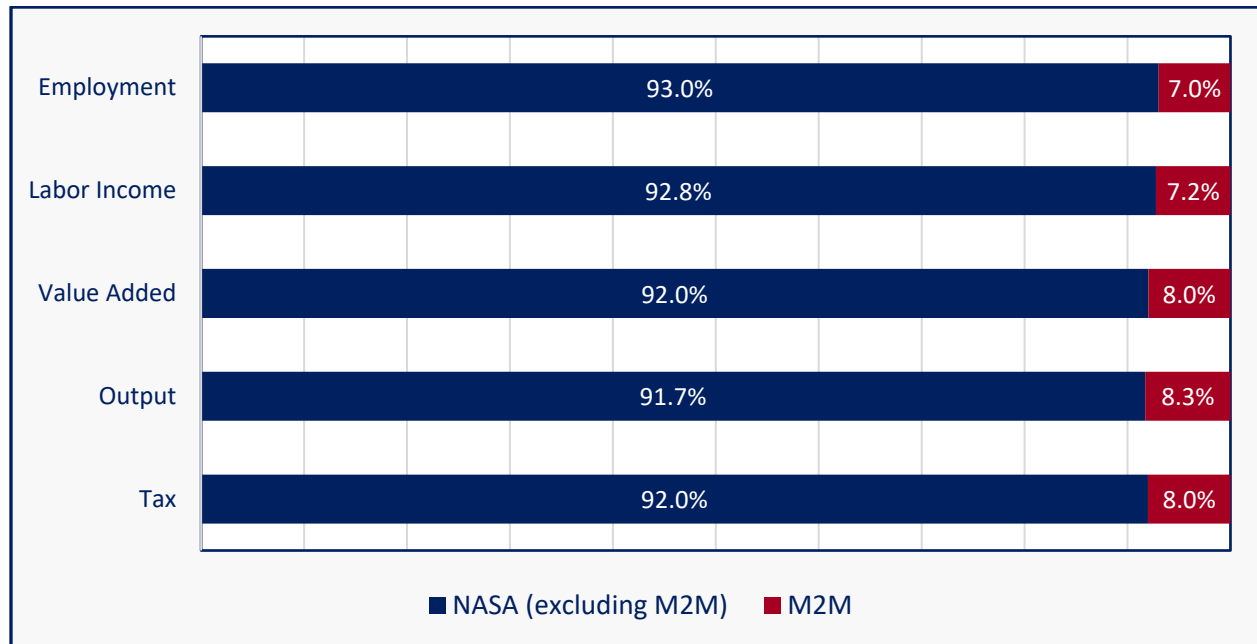
The M2M Campaign's Share of NASA Impacts

Around 8% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 437 and Figure 114). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 437: The M2M Campaign Portion of Overall NASA Impacts, South Carolina

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	176	13,776	20,837	40,392	1,427
M2M Portion	12	997	1,662	3,343	114
M2M Share	7.0%	7.2%	8.0%	8.3%	8.0%

Figure 114: The M2M Campaign Portion of Overall NASA Impacts, South Carolina



Investments in Climate Change Research and Technology Impacts

In 2023, South Carolina had one climate change research and technology-related civil service employee (1 FTE) with a corresponding labor income of \$249,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$332,000. The total South Carolina employment impact is 7 jobs. The labor income and economic output associated with this employment are \$600,000 and \$1.7 million, respectively. Investments in climate change research and technology generate \$62,000 in tax revenues for the state and local governments in South Carolina (Table 438).

Table 438: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, South Carolina

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	249	257	470	6
Indirect	3	191	281	619	17
Induced	3	160	306	585	40
Total	7	600	844	1,674	62
<i>Multiplier</i>	<i>7.0</i>	<i>2.4</i>	<i>3.3</i>	<i>3.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the South Carolina economy. Around 58% of the employment impacts and more than 51% of the output impacts are due to NASA procurement sourced within the state.

Table 439: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, South Carolina

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	34.4	0	0.0	1	14.3	100.0	0.0
Indirect	0	0.0	3	65.2	3	38.0	0.0	100.0
Induced	2	65.6	1	34.8	3	47.7	57.4	42.6
Total	3	100	4	100	7	100	41.6	58.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 440: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, South Carolina

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	470	57.5	0	0.0	470	28.1	100.0	0.0
Indirect	0	0.0	619	72.2	619	37.0	0.0	100.0
Induced	347	42.5	238	27.8	585	34.9	59.3	40.7
Total	816	100	858	100	1,674	100	48.8	51.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

The Investments in Climate Change Research and Technology's Share of NASA Impacts

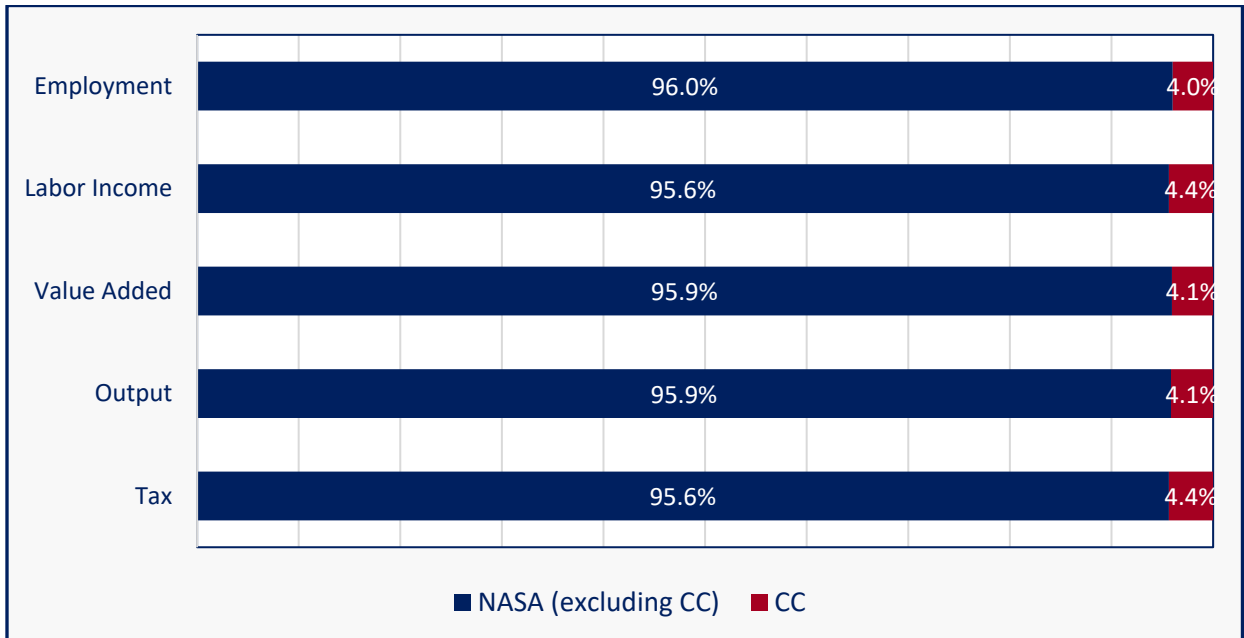
Around 4% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 441 and Figure 115). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of

procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 441: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Carolina

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	176	13,776	20,837	40,392	1,427
CC Portion	7	600	844	1,674	62
CC Share	4.0%	4.4%	4.1%	4.1%	4.4%

Figure 115: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Carolina



Economic Impacts on the State of South Dakota

NASA Impacts

In 2023, six NASA civil service employees (4 FTEs) residing in South Dakota earned \$820,000 in labor income. NASA procurement sourced in South Dakota in the same year totaled \$21.8 million. The total economic impact resulting from these activities is 248 jobs, \$20.8 million in labor income, and \$46.4 million in economic output. These economic activities generate \$1.1 million in tax revenues for the state and local governments in South Dakota (Table 442).

Table 442: Summary of NASA Impacts by Types of Impact, South Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	4	820	1,027	1,879	3
Indirect	137	13,485	20,541	24,028	231
Induced	107	6,502	11,320	20,466	819
Total	248	20,807	32,889	46,373	1,054
<i>Multiplier</i>	<i>62.0</i>	<i>25.4</i>	<i>32.0</i>	<i>24.7</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the South Dakota economy. Table 443 examines the sources of the employment figures in the second column of Table 442. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Around 96% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is approximately 4%.

Table 443: NASA Employment Impacts by Sources of Impact, South Dakota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	4	43.4	0	0.0	4	1.6	100.0	0.0
Indirect	0	0.0	137	57.3	137	55.1	0.0	100.0
Induced	5	56.6	102	42.7	107	43.3	4.9	95.1
Total	9	100	239	100	248	100	3.7	96.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 444 examines the sources of the output figures in the fifth column of Table 442. Procurement spending is responsible for nearly 94% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 6%.

Table 444: NASA Output Impacts by Sources of Impact, South Dakota

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,879	65.1	0	0.0	1,879	4.1	100.0	0.0
Indirect	0	0.0	24,028	55.3	24,028	51.8	0.0	100.0
Induced	1,007	34.9	19,460	44.7	20,466	44.1	4.9	95.1
Total	2,886	100	43,487	100	46,373	100	6.2	93.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, South Dakota had two M2M-related civil service employees (1 FTE) with a corresponding labor income of \$169,000. M2M campaign procurement sourced in the state in the same year totaled \$507,000. The total South Dakota employment impact is 8 jobs. The labor income and economic output associated with this employment are \$665,000 and \$1.8 million, respectively. The M2M campaign generates \$37,000 in tax revenues for the state and local governments in South Dakota (Table 445).

Table 445: Summary of M2M Campaign Impacts by Types of Impact, South Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	169	270	493	1
Indirect	3	302	434	663	12
Induced	3	194	336	599	24
Total	8	665	1,040	1,755	37
<i>Multiplier</i>	7.2	3.9	3.9	3.6	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the South Dakota economy. Around 72% of the employment impacts and 61% of the output impacts are due to NASA procurement sourced within the state.

Table 446: M2M Campaign Employment Impacts by Sources of Impact, South Dakota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	50.2	0	0.0	1	13.8	100.0	0.0
Indirect	0	0.0	3	60.4	3	43.7	0.0	100.0
Induced	1	49.8	2	39.6	3	42.4	32.3	67.7
Total	2	100	6	100	8	100	27.5	72.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 447: M2M Campaign Output Impacts by Sources of Impact, South Dakota

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	493	71.3	0	0.0	493	28.1	100.0	0.0
Indirect	0	0.0	663	62.3	663	37.8	0.0	100.0
Induced	199	28.7	400	37.7	599	34.1	33.1	66.9
Total	692	100	1,063	100	1,755	100	39.4	60.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

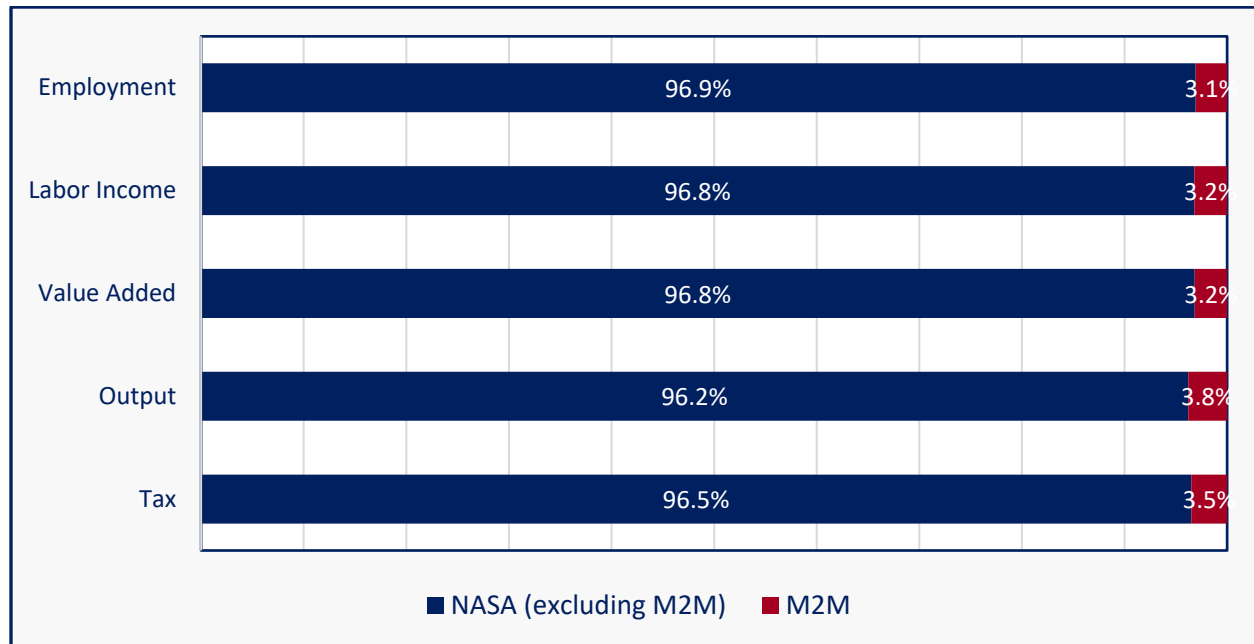
The M2M Campaign's Share of NASA Impacts

Around 3% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 448 and Figure 116). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 448: The M2M Campaign Portion of Overall NASA Impacts, South Dakota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	248	20,807	32,889	46,373	1,054
M2M Portion	8	665	1,040	1,755	37
M2M Share	3.1%	3.2%	3.2%	3.8%	3.5%

Figure 116: The M2M Campaign Portion of Overall NASA Impacts, South Dakota



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in South Dakota in FY 2023, but \$12.7 million in climate change research and technology-related NASA procurement was sourced in the state. The total South Dakota employment impact is 139 jobs. The labor income and economic output associated with this employment are \$12.2 million and \$25.2 million, respectively. Investments in climate change research and technology generate \$561,000 in tax revenues for the state and local governments in South Dakota (Table 449).

Table 449: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, South Dakota

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	77	8,489	12,362	13,351	87
Induced	62	3,676	6,406	11,850	474
Total	139	12,165	18,768	25,201	561
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

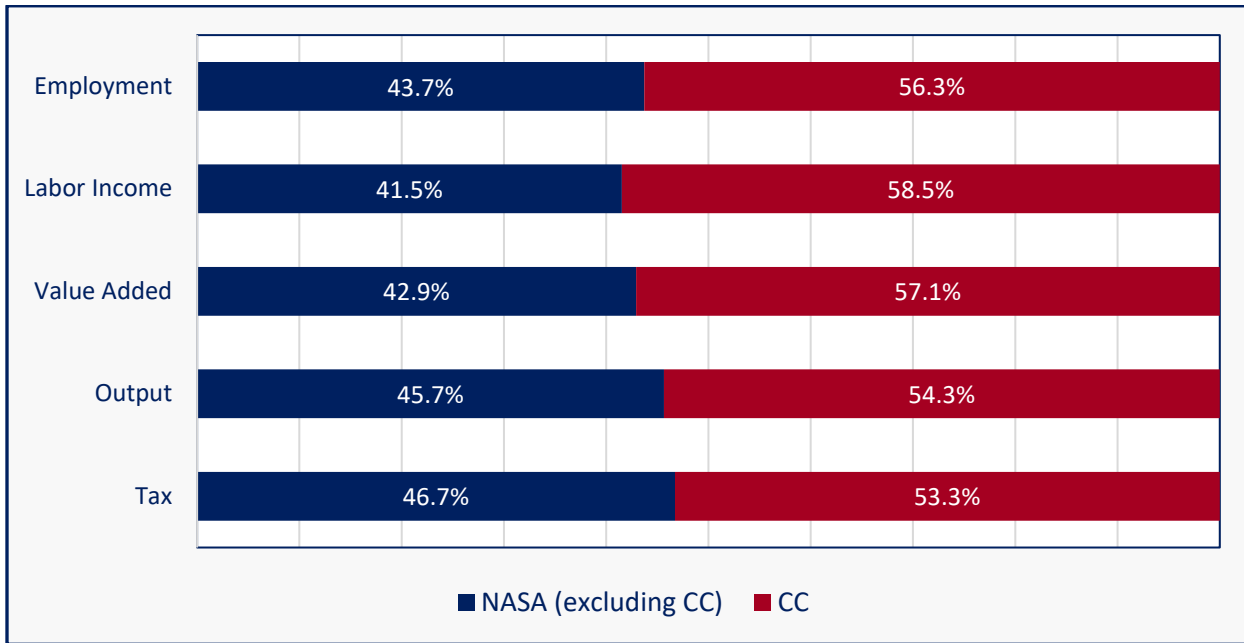
Around 56% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 450 and Figure 117). The primary reason the

shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 450: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Dakota

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	248	20,807	32,889	46,373	1,054
CC Portion	139	12,165	18,768	25,201	561
CC Share	56.3%	58.5%	57.1%	54.3%	53.3%

Figure 117: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, South Dakota



Economic Impacts on the State of Tennessee

NASA Impacts

In 2023, 86 NASA civil service employees (71 FTEs) residing in Tennessee earned \$13.5 million in labor income. NASA procurement sourced in Tennessee in the same year totaled \$65.2 million. The total economic impact resulting from these activities is 984 jobs, \$85.7 million in labor income, and \$224.3 million in economic output. These economic activities generate \$7.3 million in tax revenues for the state and local governments in Tennessee (Table 451).

Table 451: Summary of NASA Impacts by Types of Impact, Tennessee

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	71	13,514	18,215	33,334	17
Indirect	485	43,572	61,334	103,235	2,025
Induced	428	28,619	49,841	87,694	5,263
Total	984	85,705	129,390	224,263	7,305
<i>Multiplier</i>	13.9	6.3	7.1	6.7	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Tennessee economy. Table 452 examines the sources of the employment figures in the second column of Table 451. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 83% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 17%.

Table 452: NASA Employment Impacts by Sources of Impact, Tennessee

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	71	42.2	0	0.0	71	7.2	100.0	0.0
Indirect	0	0.0	485	59.4	485	49.3	0.0	100.0
Induced	97	57.8	331	40.6	428	43.5	22.7	77.3
Total	168	100	815	100	984	100	17.1	82.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 453 examines the sources of the output figures in the fifth column of Table 451. Procurement spending is responsible for 76% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 24%.

Table 453: NASA Output Impacts by Sources of Impact, Tennessee

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	33,334	62.0	0	0.0	33,334	14.9	100.0	0.0
Indirect	0	0.0	103,235	60.6	103,235	46.0	0.0	100.0
Induced	20,442	38.0	67,252	39.4	87,694	39.1	23.3	76.7
Total	53,776	100	170,488	100	224,263	100	24.0	76.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Tennessee had 32 M2M-related civil service employees (20 FTEs) with a corresponding labor income of \$3.8 million. M2M campaign procurement sourced in the state in the same year totaled \$3.2 million. The total Tennessee employment impact is 89 jobs. The labor income and economic output associated with this employment are \$9 million and \$23.7 million, respectively. The M2M campaign generates \$643,000 in tax revenues for the state and local governments in Tennessee (Table 454).

Table 454: Summary of M2M Campaign Impacts by Types of Impact, Tennessee

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	20	3,841	5,078	9,292	5
Indirect	28	2,222	3,058	5,837	121
Induced	41	2,903	5,018	8,587	516
Total	89	8,965	13,154	23,716	643
<i>Multiplier</i>	4.5	2.3	2.6	2.6	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Tennessee economy. Around 51% of the employment and 62% of the output impacts are due to NASA employees residing within the state.

Table 455: M2M Campaign Employment Impacts by Sources of Impact, Tennessee

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	20	43.3	0	0.0	20	22.2	100.0	0.0
Indirect	0	0.0	28	64.7	28	31.5	0.0	100.0
Induced	26	56.7	15	35.3	41	46.3	62.9	37.1
Total	46	100	43	100	89	100	51.3	48.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 456: M2M Campaign Output Impacts by Sources of Impact, Tennessee

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	9,292	62.9	0	0.0	9,292	39.2	100.0	0.0
Indirect	0	0.0	5,837	65.3	5,837	24.6	0.0	100.0
Induced	5,490	37.1	3,096	34.7	8,587	36.2	63.9	36.1
Total	14,783	100	8,933	100	23,716	100	62.3	37.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

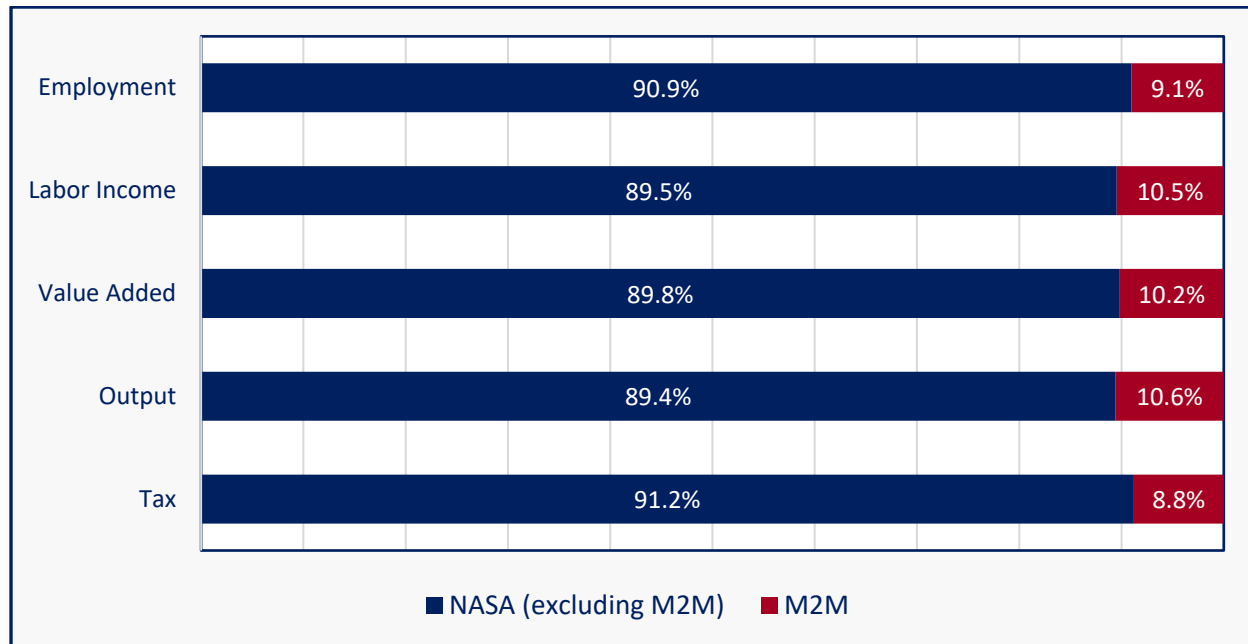
The M2M Campaign's Share of NASA Impacts

Around 10% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 457 and Figure 118). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 457: The M2M Campaign Portion of Overall NASA Impacts, Tennessee

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	984	85,705	129,390	224,263	7,305
M2M Portion	89	8,965	13,154	23,716	643
M2M Share	9.1%	10.5%	10.2%	10.6%	8.8%

Figure 118: The M2M Campaign Portion of Overall NASA Impacts, Tennessee



Investments in Climate Change Research and Technology Impacts

In 2023, Tennessee had five climate change research and technology-related civil service employees (3 FTEs) with a corresponding labor income of \$490,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$34.7 million. The total Tennessee employment impact is 470 jobs. The labor income and economic output associated with this employment are \$37.2 million and \$100.2 million, respectively. Investments in climate change research and technology generate \$3.5 million in tax revenues for the state and local governments in Tennessee (Table 458).

Table 458: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Tennessee

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	490	644	1,179	1
Indirect	278	24,455	32,857	60,117	1,149
Induced	190	12,258	21,529	38,902	2,332
Total	470	37,203	55,030	100,198	3,481
<i>Multiplier</i>	<i>187.2</i>	<i>75.9</i>	<i>85.4</i>	<i>85.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is

calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Tennessee economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 459: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Tennessee

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	3	38.6	0	0.0	3	0.5	100.0	0.0
Indirect	0	0.0	278	60.0	278	59.1	0.0	100.0
Induced	4	61.4	186	40.0	190	40.3	2.1	97.9
Total	7	100	463	100	470	100	1.4	98.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 460: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Tennessee

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	1,179	59.3	0	0.0	1,179	1.2	100.0	0.0
Indirect	0	0.0	60,117	61.2	60,117	60.0	0.0	100.0
Induced	808	40.7	38,094	38.8	38,902	38.8	2.1	97.9
Total	1,987	100	98,211	100	100,198	100	2.0	98.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

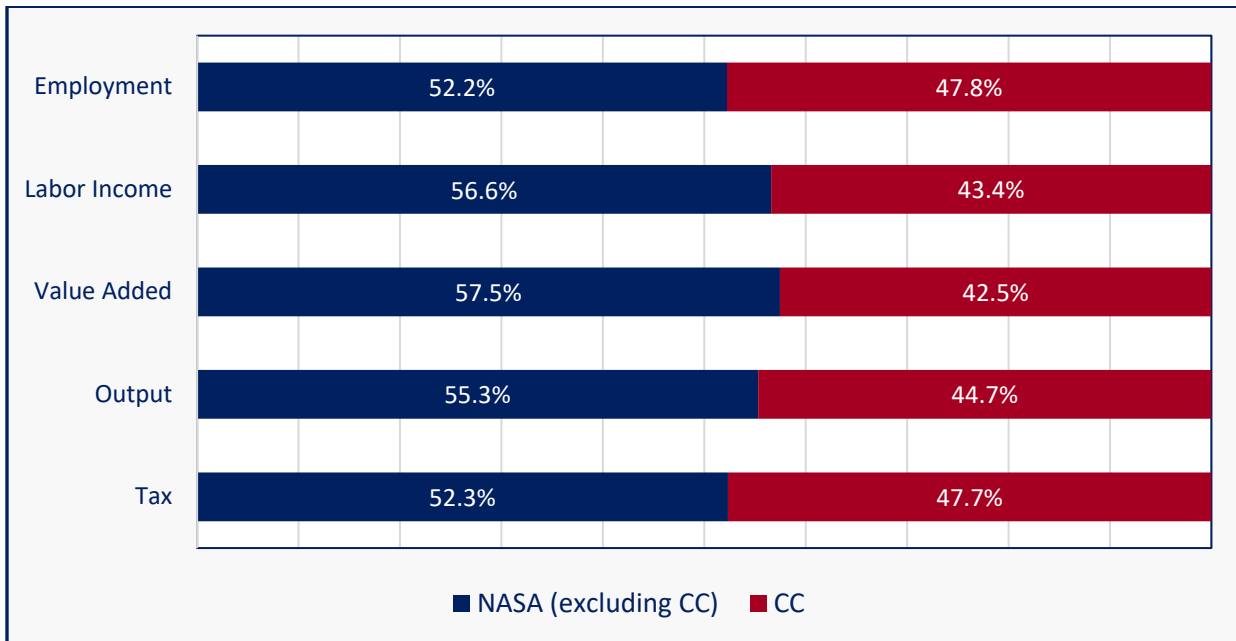
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 45% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 461 and Figure 119). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 461: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Tennessee

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	984	85,705	129,390	224,263	7,305
CC Portion	470	37,203	55,030	100,198	3,481
CC Share	47.8%	43.4%	42.5%	44.7%	47.7%

Figure 119: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Tennessee



Economic Impacts on the State of Texas

NASA Impacts

In 2023, 3,277 NASA civil service employees (2,997 FTEs) residing in Texas earned \$624.3 million in labor income. NASA procurement sourced in Texas in the same year totaled \$2.3 billion. The total economic impact resulting from these activities is 39,154 jobs, \$3.5 billion in labor income, and \$9.9 billion in economic output. These economic activities generate \$290 million in tax revenues for the state and local governments in Texas (Table 462).

The employment multiplier is 13.1, meaning that for every NASA job located in Texas, an additional 12.1 jobs are supported in the state economy. The output multiplier of 7 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$6 million worth of output is sustained throughout the state economy.

Table 462: Summary of NASA Impacts by Types of Impact, Texas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2,997	624,309	769,403	1,407,990	1,405
Indirect	17,359	1,637,120	2,334,083	4,331,268	80,651
Induced	18,798	1,193,689	2,164,612	4,115,885	207,845
Total	39,154	3,455,119	5,268,098	9,855,142	289,900
<i>Multiplier</i>	<i>13.1</i>	<i>5.5</i>	<i>6.8</i>	<i>7.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Texas economy. Table 463 examines the sources of the employment figures in the second column of Table 462. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. 79% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 21%.

Table 463: NASA Employment Impacts by Sources of Impact, Texas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	2,997	36.4	0	0.0	2,997	7.7	100.0	0.0
Indirect	0	0.0	17,359	56.1	17,359	44.3	0.0	100.0
Induced	5,227	63.6	13,571	43.9	18,798	48.0	27.8	72.2
Total	8,224	100	30,930	100	39,154	100	21.0	79.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 464 examines the sources of the output figures in the fifth column of Table 462. Procurement spending is responsible for 74% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 26%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 464: NASA Output Impacts by Sources of Impact, Texas

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,407,990	54.6	0	0.0	1,407,990	14.3	100.0	0.0
Indirect	0	0.0	4,331,268	59.5	4,331,268	43.9	0.0	100.0
Induced	1,168,559	45.4	2,947,326	40.5	4,115,885	41.8	28.4	71.6
Total	2,576,549	100	7,278,593	100	9,855,142	100	26.1	73.9

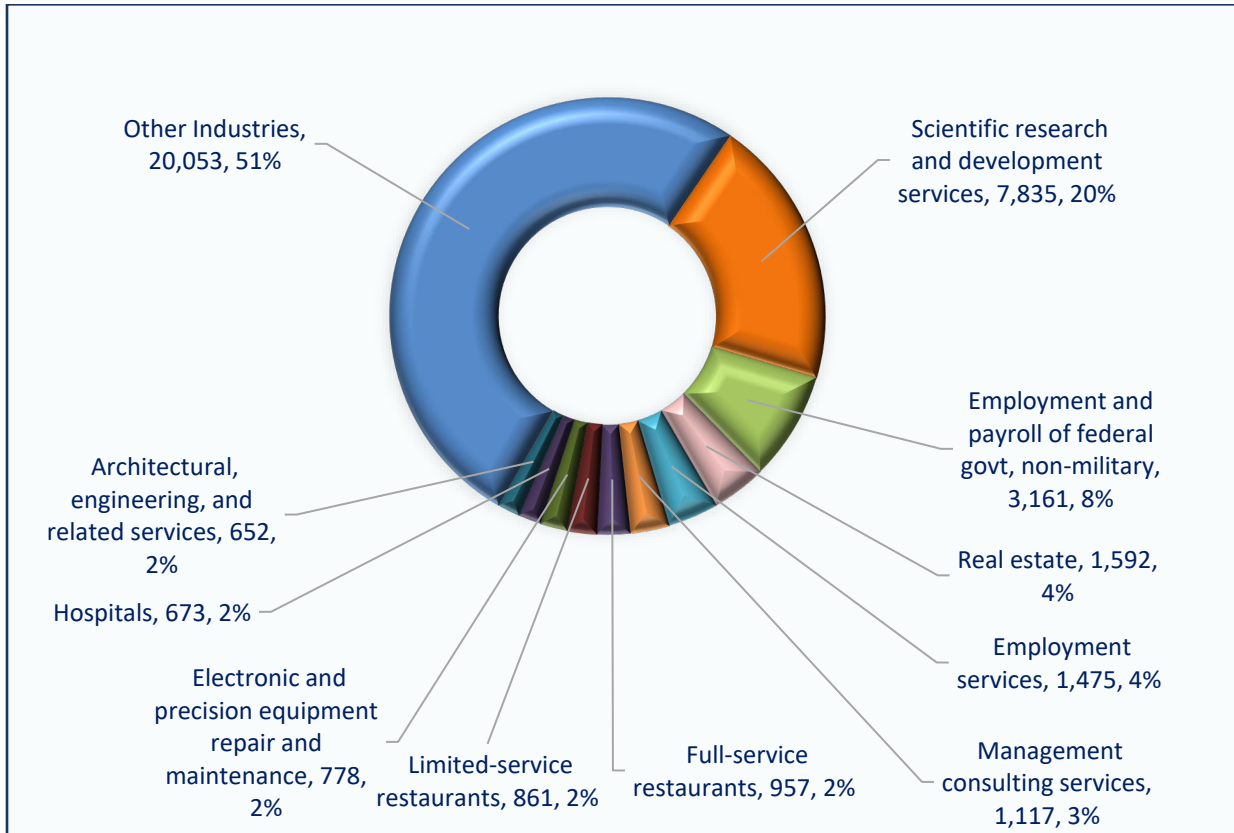
Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

39,154 jobs in the Texas economy were supported by NASA activities in Fiscal Year 2023. Of these, 2,997 (8%) were directly located at NASA centers. As a result of the procurement of goods and services in the Texas economy, 17,359 additional jobs (44%) were created. The remaining employment—18,798 jobs (48%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 120 depicts the ten most impacted industries by employment. Scientific research and development services is the most impacted industry (along with the federal government). These industries together account for 28% of the jobs created. The employment in scientific research and development services is driven largely by NASA procurement spending; this industry accounted for 79% of NASA procurement spending in the state in Fiscal Year 2023. The impact in

the federal government sector represents mainly civil service employees working for NASA. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

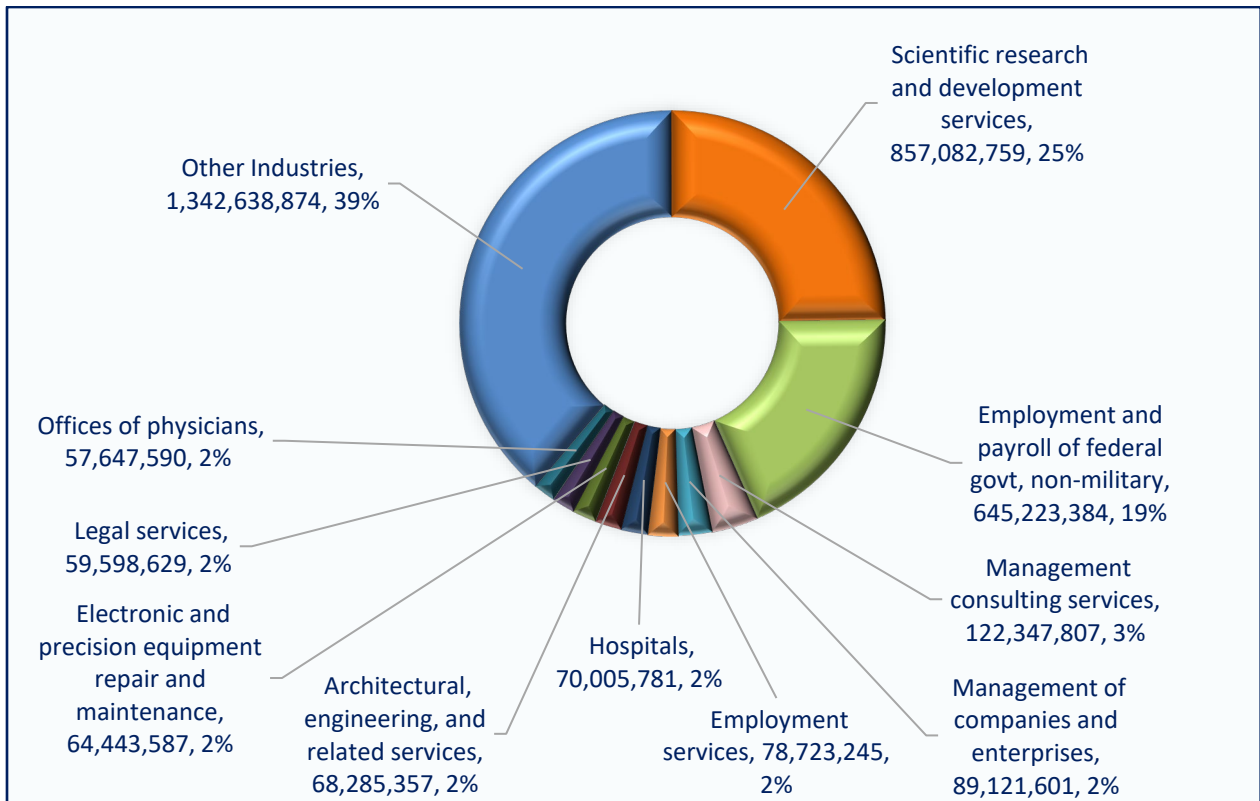
Figure 120: Top Ten Most Impacted Industries by Employment, Texas (NASA)



The total income impact of NASA in Texas was \$3.5 billion in Fiscal Year 2023. Of this amount, \$624 million (18%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.6 billion (47%). The remaining income (induced impact), estimated to be \$1.2 billion (35%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 121 depicts the ten most impacted industries by labor income. Scientific research and development services is the most impacted industry by income (along with the federal government sector). The two industries together account for 44% of the total labor income earned. The reason that these industries’ share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services industry was \$106,476 (including benefits), compared to an average of \$71,162 across Texas.

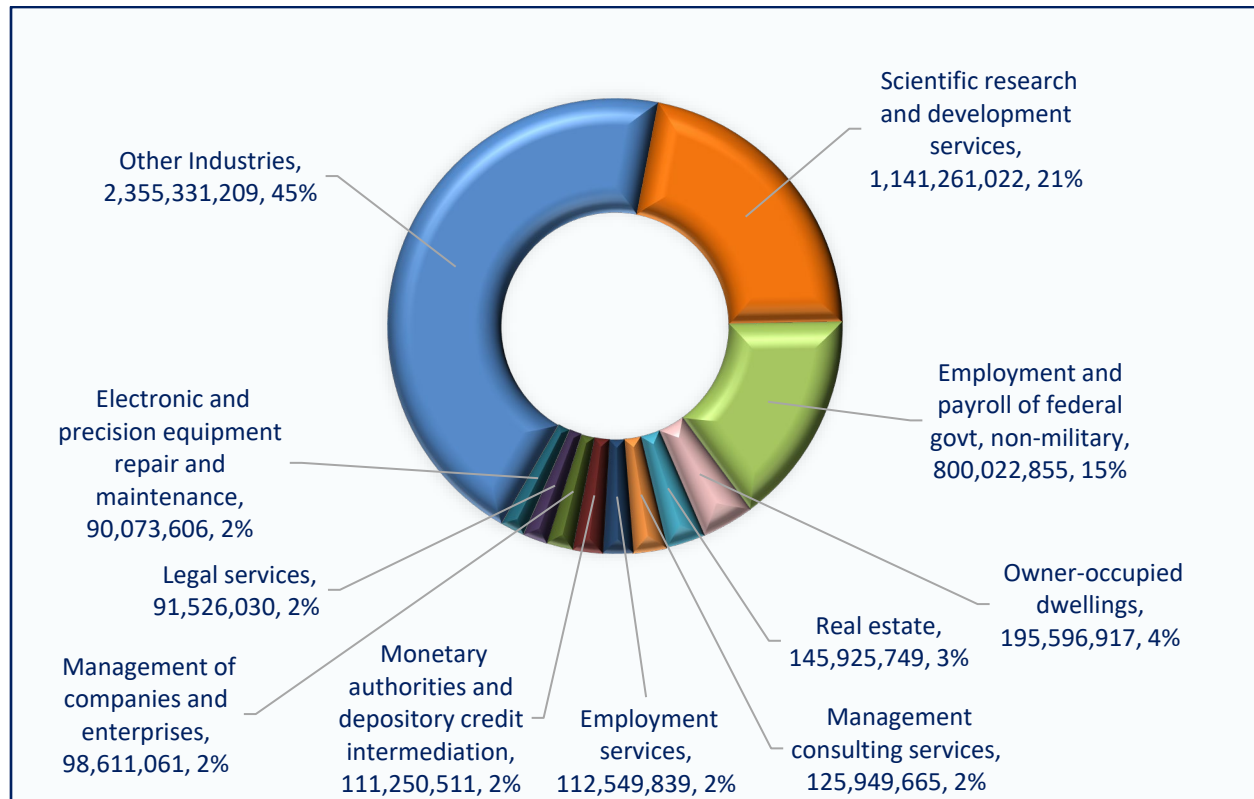
Figure 121: Top Ten Most Impacted Industries by Labor Income, Texas (NASA)



The total value-added impact of NASA in Texas was \$5.3 billion in Fiscal Year 2023. Of this amount, \$769 million (15%) was created by civil service employees and \$2.3 billion (44%) was created indirectly by the \$2.3 billion in procurement spending across all industry sectors in Texas. \$2.2 billion (41%) was generated by increased consumption spending supported by increased earnings.

Figure 122 depicts the ten most heavily impacted industries in terms of value-added. Scientific research and development is the most impacted industry (along with the federal government sector). The two industries together account for 36% of the total value-added created. NASA activities accounted for an increase of more than \$1.1 billion in value-added in scientific research and development services. \$800 million dollars in the federal government non-military sector corresponds mainly to value-added by NASA employees.

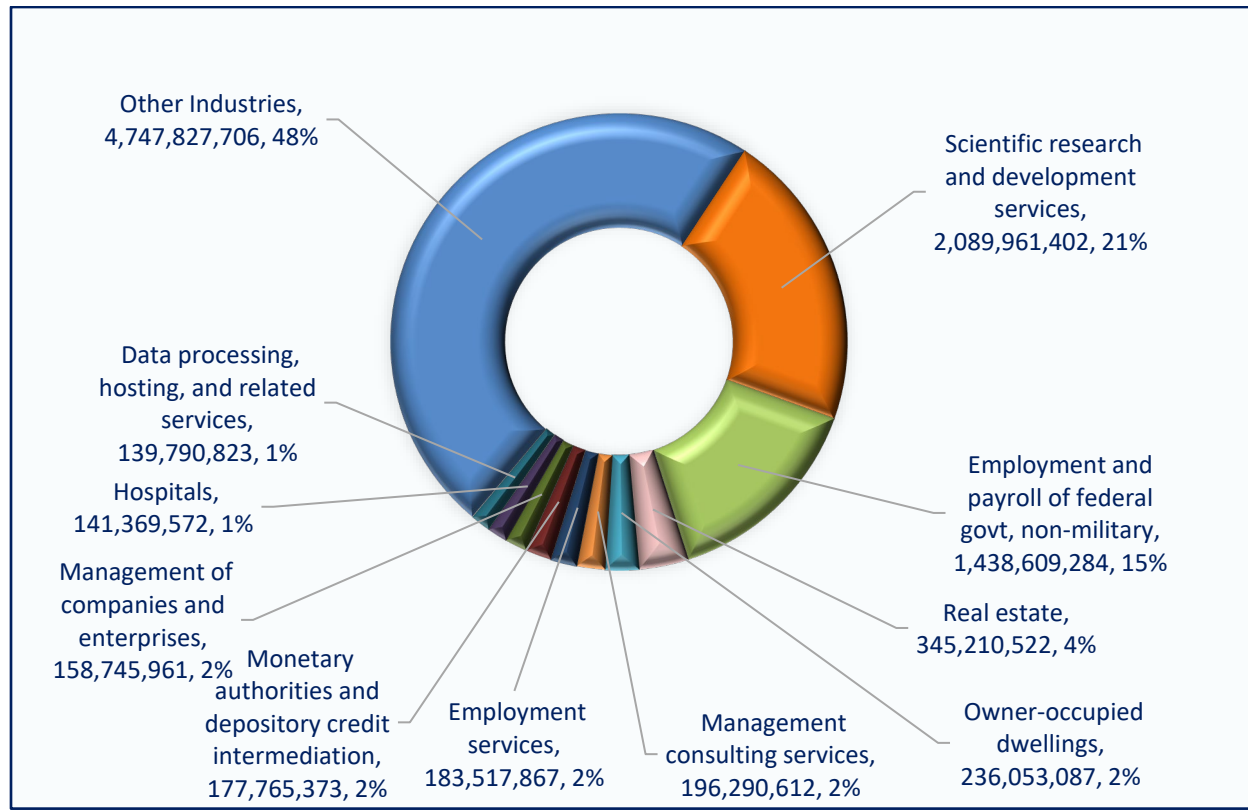
Figure 122: Top Ten Most Impacted Industries by Value-added, Texas (NASA)



The total output impact of NASA in Texas was \$9.8 billion in Fiscal Year 2023. The direct impact of \$1.4 billion constitutes the value of production by NASA employees, accounting for 14% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$2.3 billion resulted in an additional increase in output (gross sales) of \$2 billion across all industry sectors (adding up to the indirect total of \$4.3 billion in Table 462). Approximately \$3.1 billion (42%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of more than \$2 billion in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services (Figure 123). Similar to employment, impacts in this industry are largely driven by NASA procurement spending; this industry accounted for 79% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 123: Top Ten Most Impacted Industries by Output, Texas (NASA)



M2M Campaign Impacts

In 2023, Texas had 1,593 M2M-related civil service employees (1,005 FTEs) with a corresponding labor income of \$204.4 million. M2M campaign procurement sourced in the state in the same year totaled \$894 million. The total Texas employment impact is 14,133 jobs. The labor income and economic output associated with this employment are \$1.3 billion and \$3.6 billion, respectively. The M2M campaign generates \$103 million in tax revenues for the state and local governments in Texas (Table 465).

Table 465: Summary of M2M Campaign Impacts by Types of Impact, Texas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1,005	204,390	258,011	472,154	460
Indirect	6,406	637,754	901,714	1,638,714	28,265
Induced	6,722	435,849	786,754	1,469,817	74,207
Total	14,133	1,277,994	1,946,480	3,580,685	102,931
<i>Multiplier</i>	<i>14.1</i>	<i>6.3</i>	<i>7.5</i>	<i>7.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Texas economy. Approximately 82% of the employment impacts and nearly 77% of the output impacts are due to NASA procurement sourced within the state.

Table 466: M2M Campaign Employment Impacts by Sources of Impact, Texas

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1,005	38.7	0	0.0	1,005	7.1	100.0	0.0
Indirect	0	0.0	6,406	55.5	6,406	45.3	0.0	100.0
Induced	1,592	61.3	5,131	44.5	6,722	47.6	23.7	76.3
Total	2,597	100	11,536	100	14,133	100	18.4	81.6

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 467: M2M Campaign Output Impacts by Sources of Impact, Texas

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	472,154	57.0	0	0.0	472,154	13.2	100.0	0.0
Indirect	0	0.0	1,638,714	59.5	1,638,714	45.8	0.0	100.0
Induced	356,059	43.0	1,113,758	40.5	1,469,817	41.0	24.2	75.8
Total	828,213	100	2,752,472	100	3,580,685	100	23.1	76.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

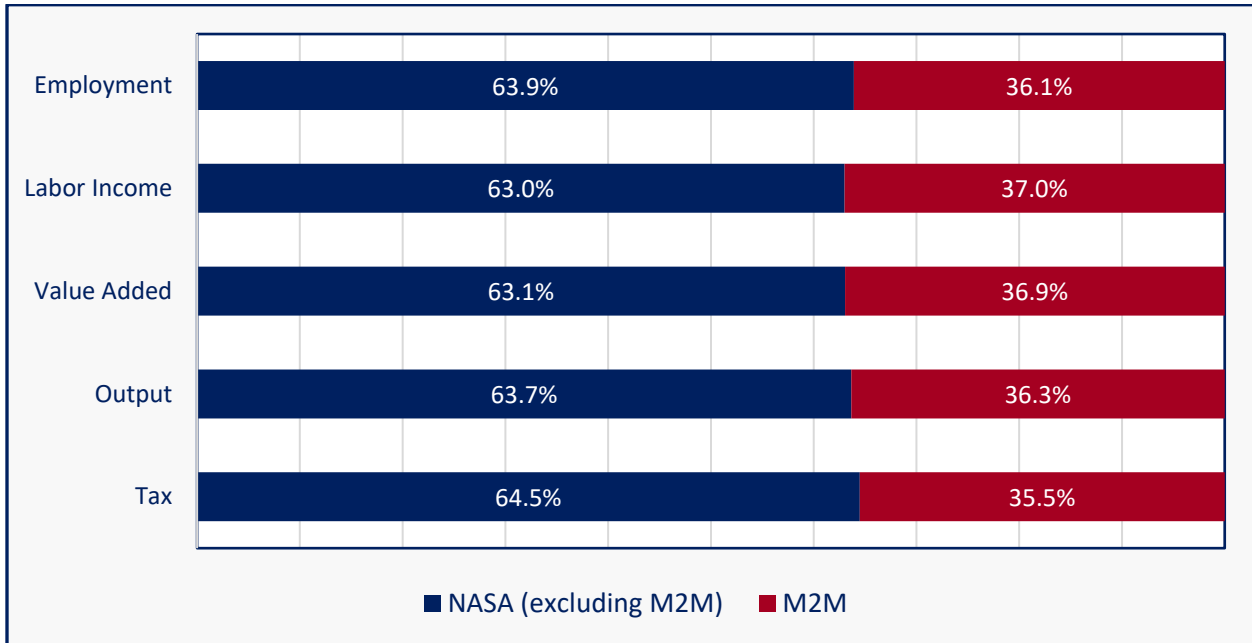
The M2M Campaign's Share of NASA Impacts

Around 36% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 468 and Figure 124). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 468: The M2M Campaign Portion of Overall NASA Impacts, Texas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	39,154	3,455,119	5,268,098	9,855,142	289,900
M2M Portion	14,133	1,277,994	1,946,480	3,580,685	102,931
M2M Share	36.1%	37.0%	36.9%	36.3%	35.5%

Figure 124: The M2M Campaign Portion of Overall NASA Impacts, Texas



Investments in Climate Change Research and Technology Impacts

In 2023, Texas had 128 climate change research and technology-related civil service employees (32 FTEs) with a corresponding labor income of \$6.2 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$71.8 million. The total Texas employment impact is 1,082 jobs. The labor income and economic output associated with this employment are \$85.8 million and \$265.2 million, respectively. Investments in climate change research and technology generate \$8.5 million in tax revenues for the state and local governments in Texas (Table 469).

Table 469: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Texas

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	32	6,188	8,327	15,237	14
Indirect	568	49,542	72,262	139,756	2,907
Induced	482	30,027	55,838	110,173	5,558
Total	1,082	85,757	136,427	265,166	8,479
<i>Multiplier</i>	<i>33.4</i>	<i>13.9</i>	<i>16.4</i>	<i>17.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Texas economy. Nearly 92% of the employment impacts and more than 89% of the output impacts are due to NASA procurement sourced within the state.

Table 470: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Texas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	32	36.2	0	0.0	32	3.0	100.0	0.0
Indirect	0	0.0	568	57.2	568	52.4	0.0	100.0
Induced	57	63.8	425	42.8	482	44.6	11.9	88.1
Total	90	100	993	100	1,082	100	8.3	91.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 471: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Texas

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	15,237	53.3	0	0.0	15,237	5.7	100.0	0.0
Indirect	0	0.0	139,756	59.1	139,756	52.7	0.0	100.0
Induced	13,371	46.7	96,803	40.9	110,173	41.5	12.1	87.9
Total	28,608	100	236,559	100	265,166	100	10.8	89.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

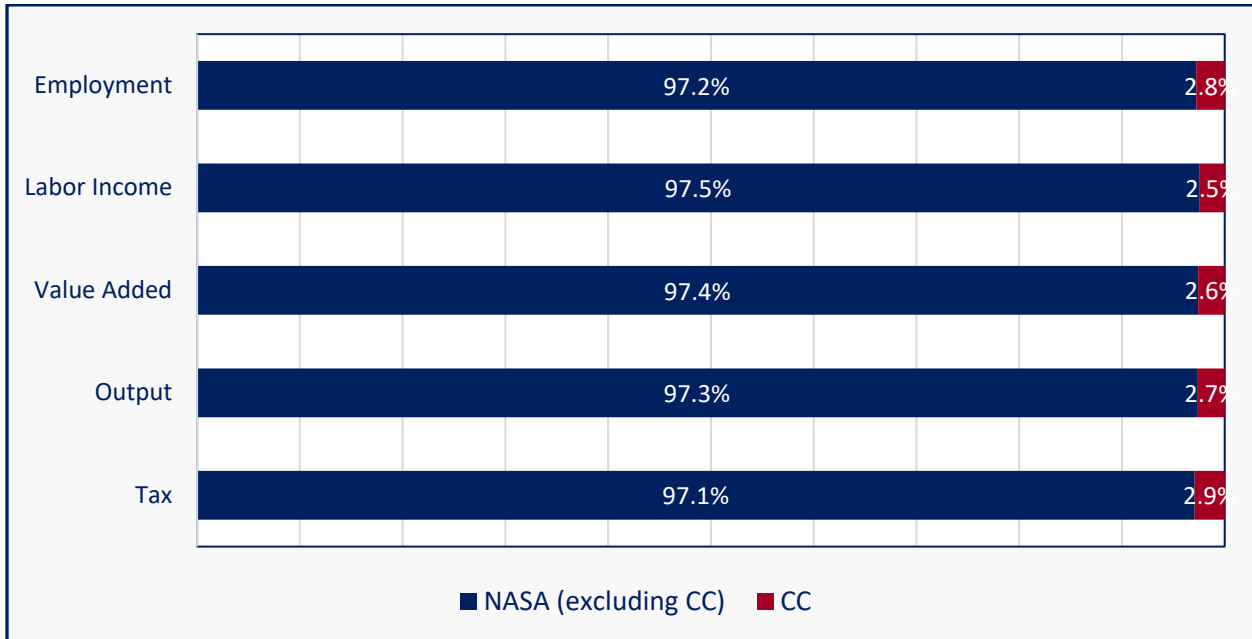
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 3% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 472 and Figure 125). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 472: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Texas

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	39,154	3,455,119	5,268,098	9,855,142	289,900
CC Portion	1,082	85,757	136,427	265,166	8,479
CC Share	2.8%	2.5%	2.6%	2.7%	2.9%

Figure 125: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Texas



Economic Impacts on the State of Utah

NASA Impacts

In 2023, 19 NASA civil service employees (11 FTEs) residing in Utah earned \$2 million in labor income. NASA procurement sourced in Utah in the same year totaled \$160.1 million. The total economic impact resulting from these activities is 2,375 jobs, \$158.6 million in labor income, and \$486.6 million in economic output. These economic activities generate \$17.3 million in tax revenues for the state and local governments in Utah (Table 473).

Table 473: Summary of NASA Impacts by Types of Impact, Utah

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	11	2,037	2,942	5,384	64
Indirect	1,524	108,636	154,337	307,507	7,172
Induced	839	47,926	94,269	173,749	10,015
Total	2,375	158,599	251,548	486,640	17,252
<i>Multiplier</i>	207.2	77.9	85.5	90.4	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Utah economy. Table 474 examines the sources of the employment figures in the second column of Table 473. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Nearly all the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is around 1%.

Table 474: NASA Employment Impacts by Sources of Impact, Utah

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	11	42.4	0	0.0	11	0.5	100.0	0.0
Indirect	0	0.0	1,524	64.9	1,524	64.2	0.0	100.0
Induced	16	57.6	824	35.1	839	35.3	1.9	98.1
Total	27	100	2,348	100	2,375	100	1.1	98.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 475 examines the sources of the output figures in the fifth column of Table 473. Procurement spending is responsible for more than 98% of the output impact. NASA labor force's share of overall NASA output impact is around 2%.

Table 475: NASA Output Impacts by Sources of Impact, Utah

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	5,384	61.4	0	0.0	5,384	1.1	100.0	0.0
Indirect	0	0.0	307,507	64.3	307,507	63.2	0.0	100.0
Induced	3,389	38.6	170,359	35.7	173,749	35.7	2.0	98.0
Total	8,773	100	477,866	100	486,640	100	1.8	98.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Utah had eight M2M-related civil service employees (5 FTEs) with a corresponding labor income of \$933,000. M2M campaign procurement sourced in the state in the same year totaled \$117.5 million. The total Utah employment impact is 1,589 jobs. The labor income and economic output associated with this employment are \$117.3 million and \$355.4 million, respectively. The M2M campaign generates \$12.3 million in tax revenues for the state and local governments in Utah (Table 476).

Table 476: Summary of M2M Campaign Impacts by Types of Impact, Utah

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	5	933	1,222	2,236	29
Indirect	985	81,436	115,128	228,830	5,093
Induced	599	34,924	68,290	124,368	7,169
Total	1,589	117,294	184,640	355,433	12,291
<i>Multiplier</i>	<i>333.8</i>	<i>125.7</i>	<i>151.1</i>	<i>159.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Utah economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 477: M2M Campaign Employment Impacts by Sources of Impact, Utah

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	5	41.1	0	0.0	5	0.3	100.0	0.0
Indirect	0	0.0	985	62.5	985	62.0	0.0	100.0
Induced	7	58.9	592	37.5	599	37.7	1.1	98.9
Total	12	100	1,577	100	1,589	100	0.7	99.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 478: M2M Campaign Output Impacts by Sources of Impact, Utah

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	2,236	60.2	0	0.0	2,236	0.6	100.0	0.0
Indirect	0	0.0	228,830	65.1	228,830	64.4	0.0	100.0
Induced	1,478	39.8	122,889	34.9	124,368	35.0	1.2	98.8
Total	3,714	100	351,719	100	355,433	100	1.0	99.0

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

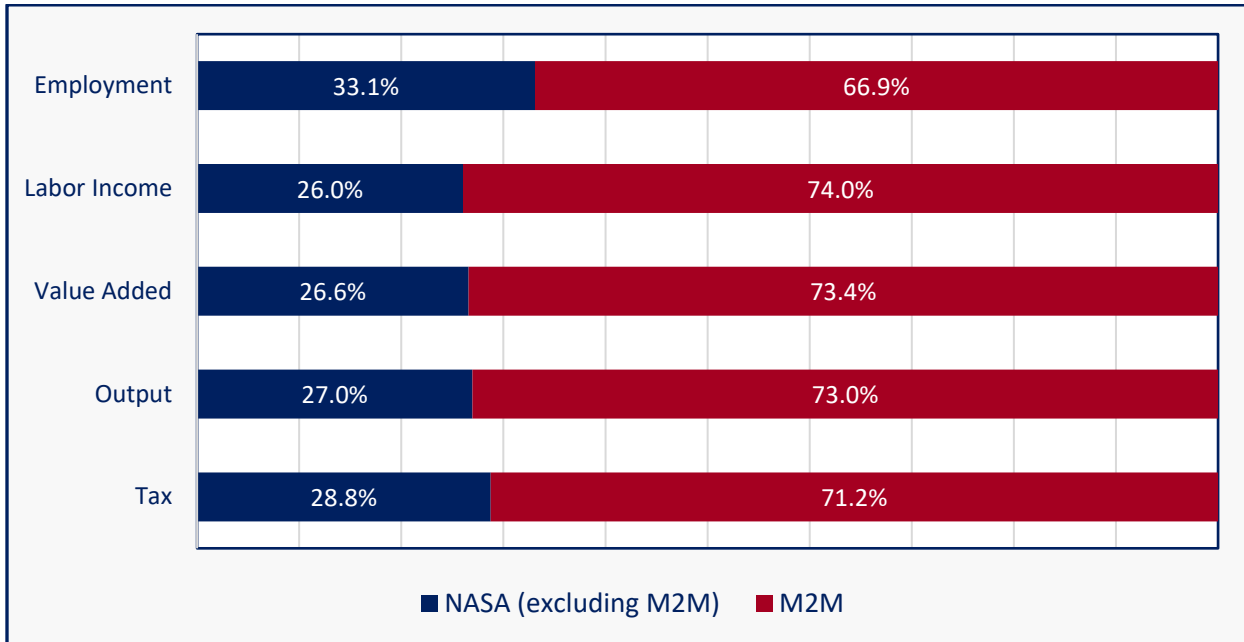
The M2M Campaign's Share of NASA Impacts

Around 72% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 479 and Figure 126). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 479: The M2M Campaign Portion of Overall NASA Impacts, Utah

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,375	158,599	251,548	486,640	17,252
M2M Portion	1,589	117,294	184,640	355,433	12,291
M2M Share	66.9%	74.0%	73.4%	73.0%	71.2%

Figure 126: The M2M Campaign Portion of Overall NASA Impacts, Utah



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Utah in FY 2023, but \$9.7 million in climate change research and technology-related NASA procurement was sourced in the state. The total Utah employment impact is 146 jobs. The labor income and economic output associated with this employment are \$9.5 million and \$29.5 million, respectively. Investments in climate change research and technology generate \$1.1 million in tax revenues for the state and local governments in Utah (Table 480).

Table 480: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Utah

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	94	6,582	9,367	18,611	448
Induced	52	2,902	5,746	10,839	625
Total	146	9,484	15,112	29,450	1,073
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

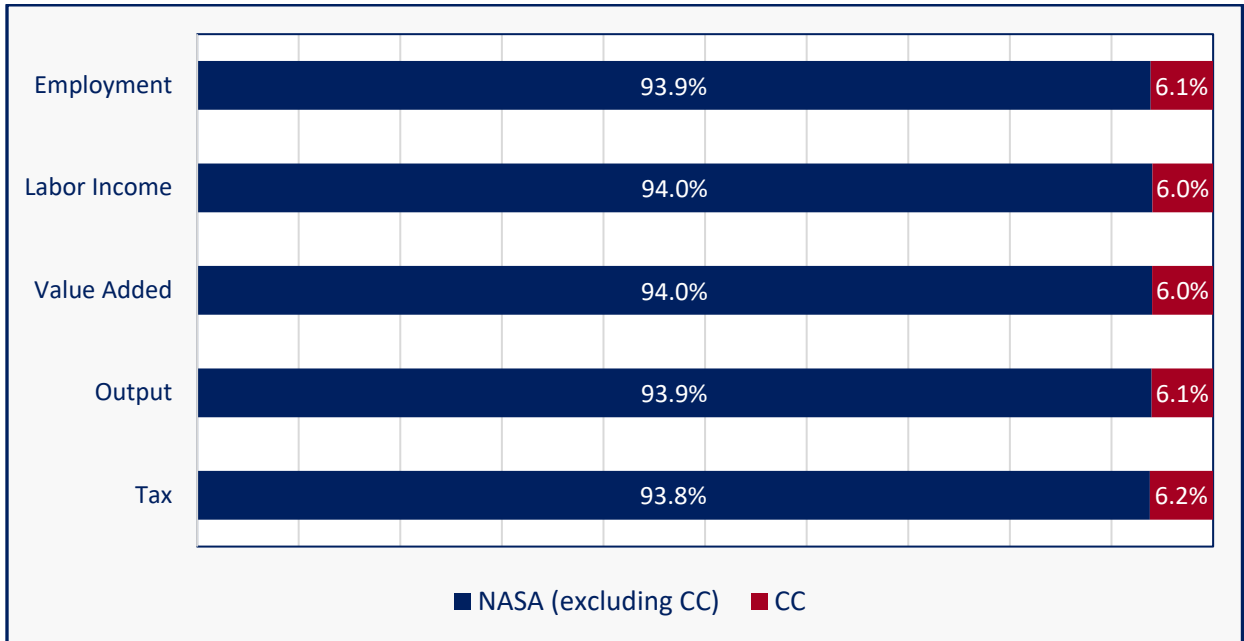
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 6% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 481 and Figure 127). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 481: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Utah

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,375	158,599	251,548	486,640	17,252
CC Portion	146	9,484	15,112	29,450	1,073
CC Share	6.1%	6.0%	6.0%	6.1%	6.2%

Figure 127: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Utah



Economic Impacts on the State of Vermont

NASA Impacts

In 2023, 6 NASA civil service employees (6 FTEs) residing in Vermont earned \$962,000 in labor income. NASA procurement sourced in Vermont in the same year totaled \$2.1 million. The total economic impact resulting from these activities is 38 jobs, \$3.2 million in labor income, and \$9.2 million in economic output. These economic activities generate \$345,000 in tax revenues for the state and local governments in Vermont (Table 482).

Table 482: Summary of NASA Impacts by Types of Impact, Vermont

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	6	962	1,540	2,819	26
Indirect	17	1,335	1,781	3,599	119
Induced	15	899	1,591	2,741	199
Total	38	3,196	4,912	9,159	345
<i>Multiplier</i>	6.3	3.3	3.2	3.2	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Vermont economy. Table 483 examines the sources of the employment figures in the second column of Table 482. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 67% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 33%.

Table 483: NASA Employment Impacts by Sources of Impact, Vermont

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	6	48.7	0	0.0	6	15.9	100.0	0.0
Indirect	0	0.0	17	65.2	17	43.9	0.0	100.0
Induced	6	51.3	9	34.8	15	40.2	41.6	58.4
Total	12	100	25	100	38	100	32.6	67.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 484 examines the sources of the output figures in the fifth column of Table 482. Procurement spending is responsible for approximately 57% of the increase in output in the state economy arising from NASA. NASA labor force’s share of overall NASA output impact is 43%.

Table 484: NASA Output Impacts by Sources of Impact, Vermont

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	2,819	70.9	0	0.0	2,819	30.8	100.0	0.0
Indirect	0	0.0	3,599	69.4	3,599	39.3	0.0	100.0
Induced	1,155	29.1	1,586	30.6	2,741	29.9	42.1	57.9
Total	3,974	100	5,186	100	9,159	100	43.4	56.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Vermont had one M2M-related civil service employee (1 FTE) with a corresponding labor income of \$81,000. M2M campaign procurement sourced in the state in the same year totaled \$167,000. The total economic impact attributable to this procurement activity is 3 jobs, \$241,000 in labor income, and \$700,000 worth of output. These economic activities generate \$25,000 in tax revenues for the state and local governments in Vermont (Table 485).

Table 485: Summary of M2M Program Impacts by Types of Impact, Vermont

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	81	130	238	2
Indirect	1	92	160	260	8
Induced	1	68	119	202	15
Total	3	241	409	700	25
<i>Multiplier</i>	<i>5.0</i>	<i>3.0</i>	<i>3.1</i>	<i>2.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Vermont economy. Around 58% of the employment impacts and 52% of the output impacts are due to NASA procurement sourced within the state.

Table 486: M2M Campaign Employment Impacts by Sources of Impact, Vermont

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	48.1	0	0.0	1	20.0	100.0	0.0
Indirect	0	0.0	1	56.8	1	33.2	0.0	100.0
Induced	1	51.9	1	43.2	1	46.8	46.0	54.0
Total	1	100	1	100	3	100	41.5	58.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 487: M2M Campaign Output Impacts by Sources of Impact, Vermont

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	238	71.5	0	0.0	238	34.0	100.0	0.0
Indirect	0	0.0	260	70.7	260	37.1	0.0	100.0
Induced	95	28.5	108	29.3	202	28.9	46.8	53.2
Total	333	100	368	100	700	100	47.5	52.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

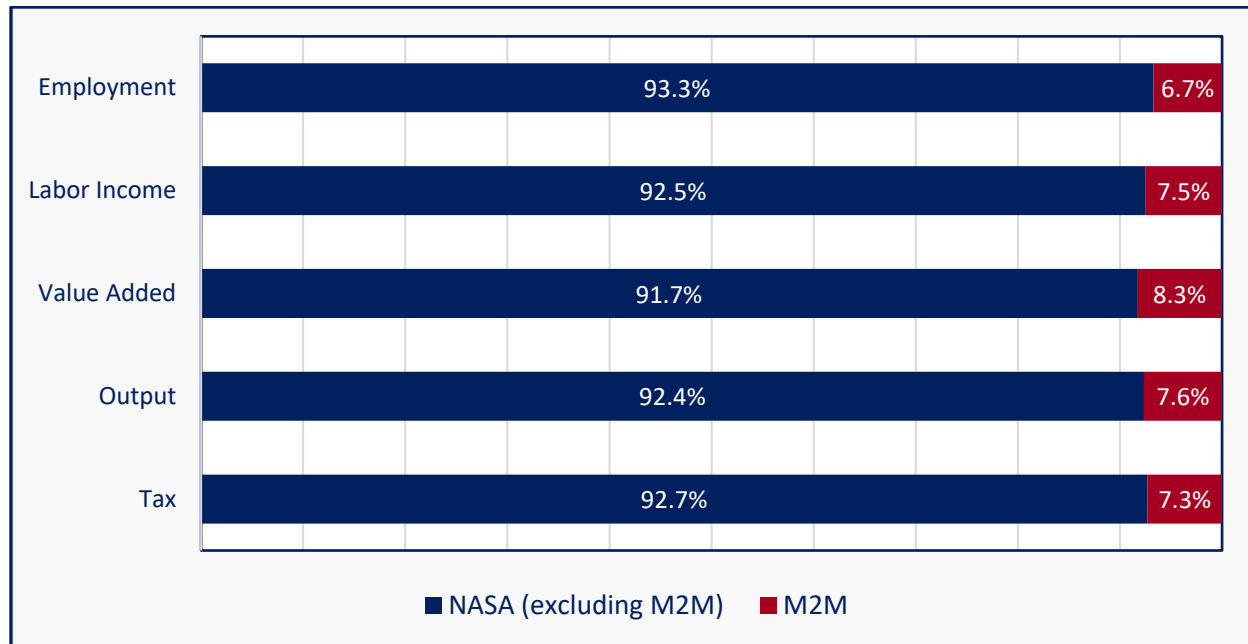
The M2M Campaign's Share of NASA Impacts

Around 7% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 488 and Figure 128). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 488: The M2M Campaign Portion of Overall NASA Impacts, Vermont

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	38	3,196	4,912	9,159	345
M2M Portion	3	241	409	700	25
M2M Share	6.7%	7.5%	8.3%	7.6%	7.3%

Figure 128: The M2M Campaign Portion of Overall NASA Impacts, Vermont



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Vermont in FY 2023, but \$628,000 in investments in climate change research and technology NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 8 jobs, \$548,000 in labor income, and \$1.6 million worth of output. These economic activities generate \$71,000 in tax revenues for the state and local governments in Vermont (Table 489).

Table 489: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Vermont

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	5	396	532	1,097	36
Induced	3	152	272	479	35
Total	8	548	804	1,576	71
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

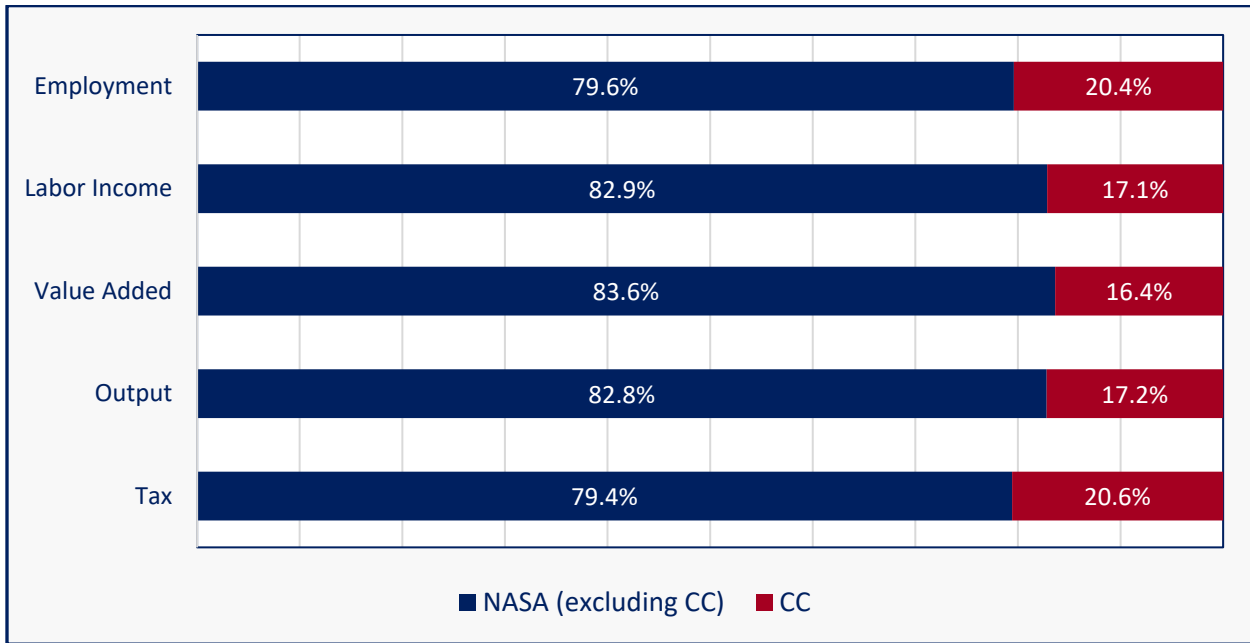
Around 18% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 490 and Figure 129). The primary reason the

shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 490: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Vermont

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	38	3,196	4,912	9,159	345
CC Portion	8	548	804	1,576	71
CC Share	20.4%	17.1%	16.4%	17.2%	20.6%

Figure 129: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Vermont



Economic Impacts on the State of Virginia

NASA Impacts

In 2023, 2,719 NASA civil service employees (2,478 FTEs) residing in Virginia earned \$484.6 million in labor income. NASA procurement sourced in Virginia in the same year totaled \$1.8 billion. The total economic impact resulting from these activities is 24,763 jobs, \$2.4 billion in labor income, and \$6.1 billion in economic output. These economic activities generate approximately \$244.2 million in tax revenues for the state and local governments in Virginia (Table 491).

The employment multiplier is 10, meaning that for every NASA job located in Virginia, an additional 9 jobs are supported in the state economy. The output multiplier of 5.2 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$4.2 million worth of output is sustained throughout the state economy.

Table 491: Summary of NASA Impacts by Types of Impact, Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2,478	484,604	636,060	1,163,975	14,291
Indirect	11,634	1,228,083	1,710,020	2,832,778	88,587
Induced	10,651	646,933	1,234,578	2,109,328	141,368
Total	24,763	2,359,619	3,580,659	6,106,081	244,246
<i>Multiplier</i>	<i>10.0</i>	<i>4.9</i>	<i>5.6</i>	<i>5.2</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Virginia economy. Table 492 examines the sources of the employment figures in the second column of Table 491. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 78% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 22%.

Table 492: NASA Employment Impacts by Sources of Impact, Virginia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	2,478	45.8	0	0.0	2,478	10.0	100.0	0.0
Indirect	0	0.0	11,634	60.1	11,634	47.0	0.0	100.0
Induced	2,927	54.2	7,724	39.9	10,651	43.0	27.5	72.5
Total	5,405	100	19,358	100	24,763	100	21.8	78.2

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 493 examines the sources of the output figures in the fifth column of Table 491. Procurement spending is responsible for more than 71% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 29%. The reason that NASA labor force's share of overall output impact is larger than its share in overall employment impact is that NASA employees produce more output per worker than the average employee that is part of the supply chain of NASA procurement.

Table 493: NASA Output Impacts by Sources of Impact, Virginia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,163,975	66.3	0	0.0	1,163,975	19.1	100.0	0.0
Indirect	0	0.0	2,832,778	65.1	2,832,778	46.4	0.0	100.0
Induced	592,031	33.7	1,517,296	34.9	2,109,328	34.5	28.1	71.9
Total	1,756,006	100	4,350,075	100	6,106,081	100	28.8	71.2

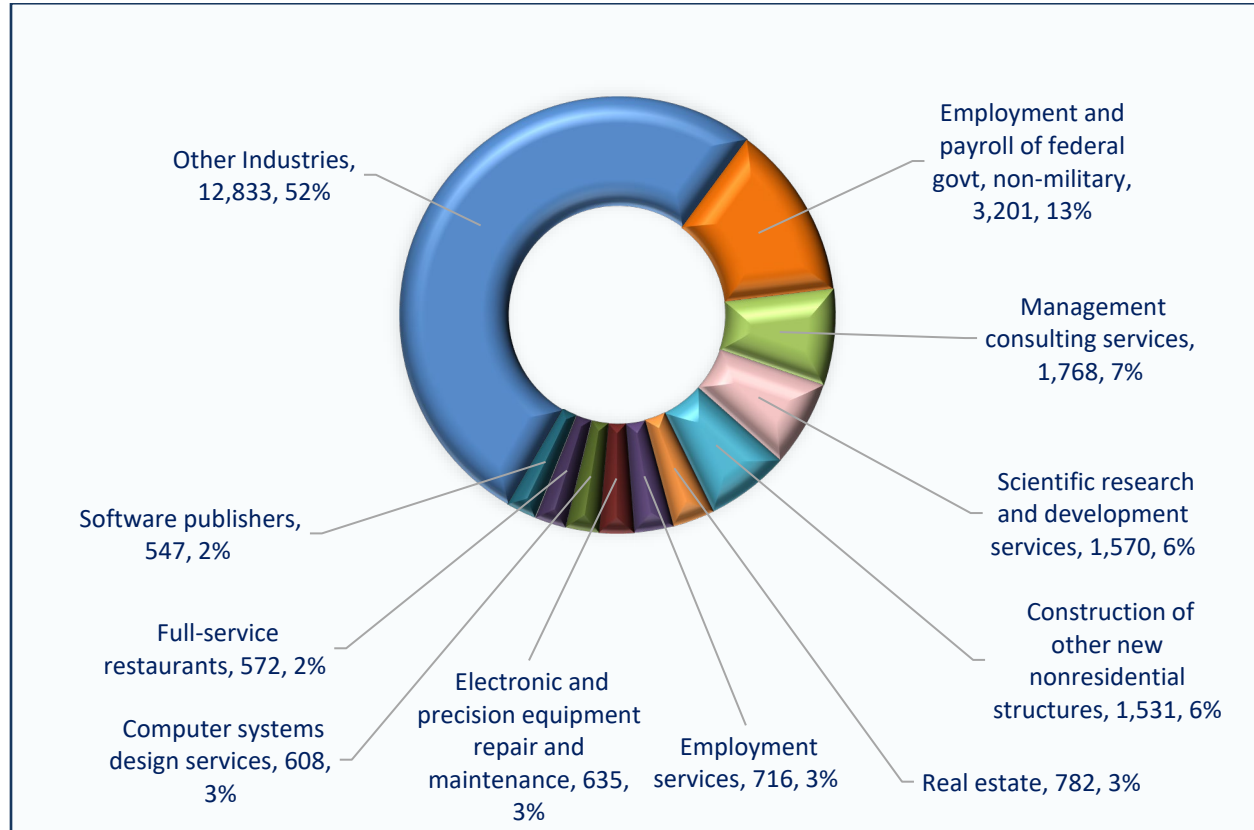
Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

24,763 jobs in the Virginia economy were supported by NASA activities in Fiscal Year 2023. Of these, 2,478 (10%) were directly located at NASA centers. As a result of the procurement of goods and services in the Virginia economy, 11,634 additional jobs (47%) were created. The remaining employment—10,651 jobs (43%)—was in the form of induced impacts as labor income and proprietor earnings were spent locally.

Figure 130 depicts the ten most impacted industries by employment. Management consulting services and scientific research and development services are the most impacted industries, respectively (along with the federal government sector). These industries together account for 26% of the jobs created. The employment in these industries is driven largely by NASA procurement spending; the two private industries accounted for 37% of NASA procurement

spending in the state in Fiscal Year 2023. The impact in the federal government sector represents mainly civil service employees working for NASA.

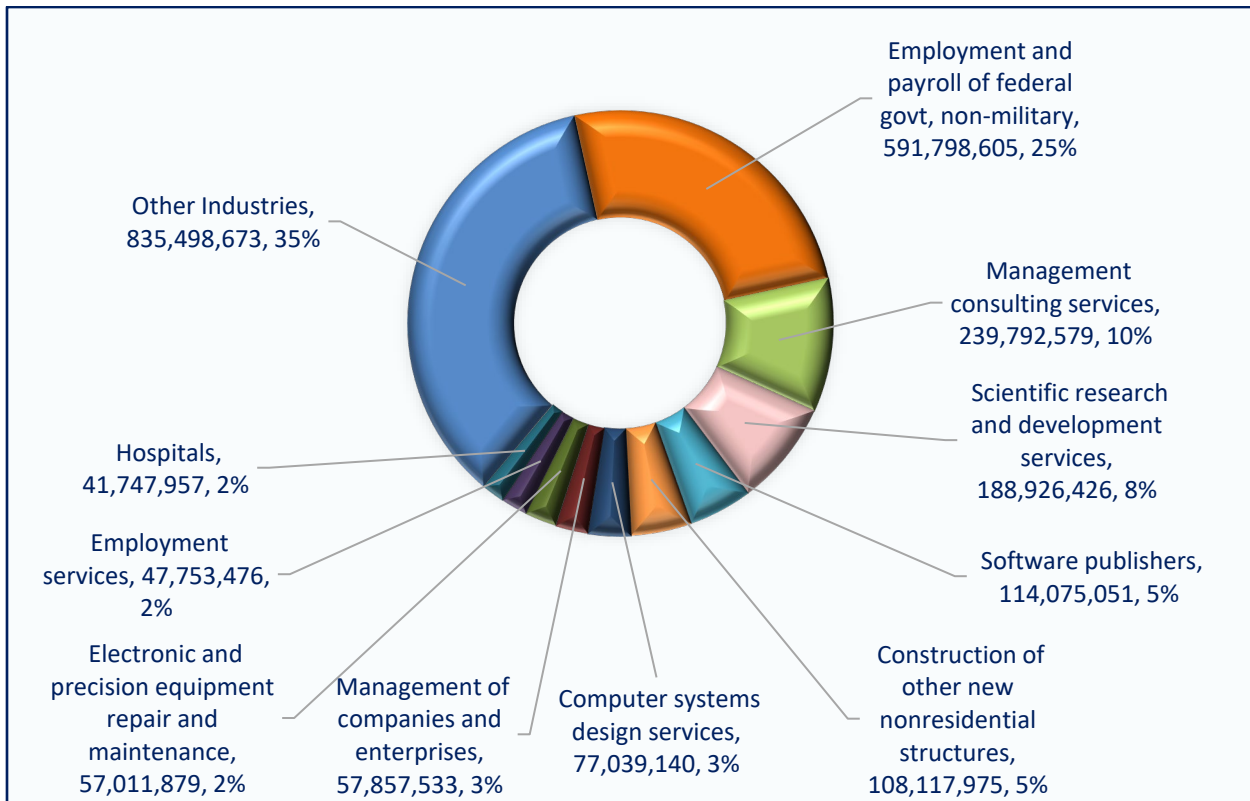
Figure 130: Top Ten Most Impacted Industries by Employment, Virginia (NASA)



The total income impact of NASA in Virginia was \$2.4 billion in Fiscal Year 2023. Of this amount, \$485 million (21%) represented wages and benefits paid to NASA employees in the state (direct impact). Payments to employees of private firms and organizations across the state that supplied goods and services to NASA (indirect impact) represented \$1.2 billion (52%). The remaining income (induced impact), estimated to be \$647 million (27%), resulted from expenditures by those earning income through the direct and indirect impacts.

Figure 131 depicts the ten most impacted industries by labor income. As a consequence of their share of total employment, management consulting services and scientific research and development services, and software publishers are the most impacted industries by income (along with the federal government sector). These industries together account for 48% of the total labor income earned. The reason that these industries’ share of labor income is larger than their share of employment is that employee compensation in these industries is greater than the state average. As of 2022, the average employee compensation in the scientific research and development services was \$117,157 (including benefits), compared to an average of \$74,155 across Virginia.

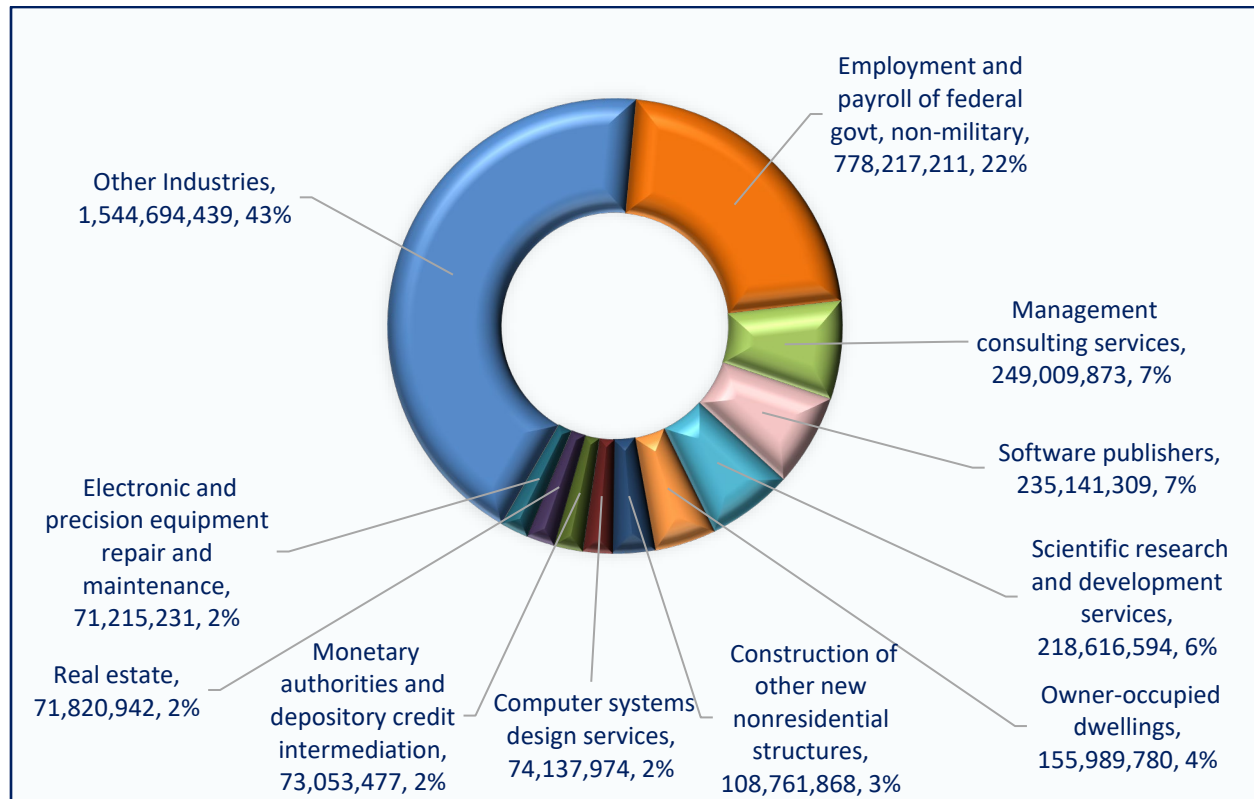
Figure 131: Top Ten Most Impacted Industries by Labor Income, Virginia (NASA)



The total value-added impact of NASA in Virginia was \$3.6 billion in Fiscal Year 2023. Of this amount, \$636 million (18%) was created by civil service employees and \$1.7 billion (48%) was created indirectly by the \$1.8 billion in procurement spending across all industry sectors in Virginia. \$1.2 billion (34%) was generated by increased consumption spending supported by increased earnings.

Figure 132 depicts the ten most heavily impacted industries in terms of value-added. Management consulting services, software publishers, and scientific research and development services (along with the federal government sector). These industries together account for 42% of the total value-added created. NASA activities accounted for an increase of \$249 million in value-added in management consulting services; \$235 million in value-added in software publishers; \$218 million in value-added in scientific research and development services. \$780 million in the federal government non-military sector corresponds mainly to value-added by NASA employees.

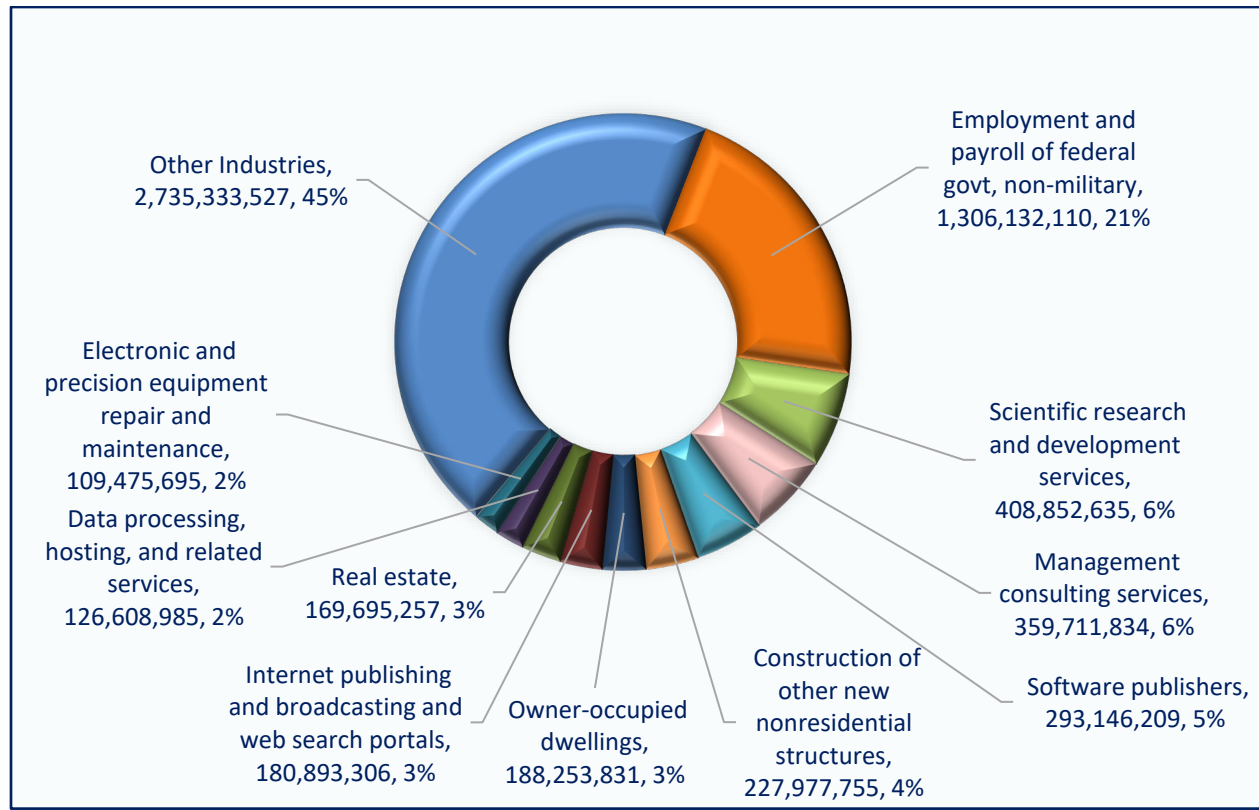
Figure 132: Top Ten Most Impacted Industries by Value-added, Virginia (NASA)



The total output impact of NASA in Virginia was \$6.1 billion in Fiscal Year 2023. The direct impact of nearly \$1.2 billion constitutes the value of production by NASA employees, accounting for 19% of the total output impact. The indirect impact is the sum of NASA procurement spending and the value of production throughout the supply chain of NASA procurement. NASA procurement expenditure of \$1.8 billion resulted in an additional increase in output (gross sales) of \$1 billion across all industry sectors (adding up to the indirect total of \$2.8 billion in Table 491). More than \$2.1 billion (35%) of the total output impact was the result of consumption spending due to increased earnings (induced impacts).

NASA activities were responsible for an increase of \$409 million in sales (including direct, indirect, and induced impacts—see Box 1 in Section 1) in scientific research and development services, \$360 million in sales in management consulting services, and \$293 million in sales in software publishers (Figure 133). Similar to employment, impacts in these industries are largely driven by NASA procurement spending; these three industries accounted for 52% of NASA procurement spending in the state in Fiscal Year 2023. The sizable impacts in the real estate industry are a typical feature of induced impacts, as a substantial proportion of household income goes to purchase or lease real estate.

Figure 133: Top Ten Most Impacted Industries by Output, Virginia (NASA)



M2M Campaign Impacts

In 2023, Virginia had 600 M2M-related civil service employees (245 FTEs) with a corresponding labor income of nearly \$44.7 million. M2M campaign procurement sourced in the state in the same year totaled \$295.3 million. The total Virginia employment impact is 4,195 jobs. The labor income and economic output associated with this employment are \$337.8 million and \$899.4 million, respectively. The M2M campaign generates nearly \$38.6 million in tax revenues for the state and local governments in Virginia (Table 494).

Table 494: Summary of M2M Campaign Impacts by Types of Impact, Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	245	44,750	62,950	115,196	1,320
Indirect	2,486	201,964	256,278	492,865	17,719
Induced	1,463	91,042	172,813	291,316	19,510
Total	4,195	337,755	492,040	899,377	38,548
<i>Multiplier</i>	<i>17.1</i>	<i>7.5</i>	<i>7.8</i>	<i>7.8</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for

space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Virginia economy. More than 88% of the employment impacts and 81% of the output impacts are due to NASA procurement sourced within the state.

Table 495: M2M Campaign Employment Impacts by Sources of Impact, Virginia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	245	48.9	0	0.0	245	5.8	100.0	0.0
Indirect	0	0.0	2,486	67.3	2,486	59.3	0.0	100.0
Induced	256	51.1	1,208	32.7	1,463	34.9	17.5	82.5
Total	501	100	3,694	100	4,195	100	11.9	88.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 496: M2M Campaign Output Impacts by Sources of Impact, Virginia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	115,196	68.7	0	0.0	115,196	12.8	100.0	0.0
Indirect	0	0.0	492,865	67.4	492,865	54.8	0.0	100.0
Induced	52,512	31.3	238,804	32.6	291,316	32.4	18.0	82.0
Total	167,708	100	731,669	100	899,377	100	18.6	81.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

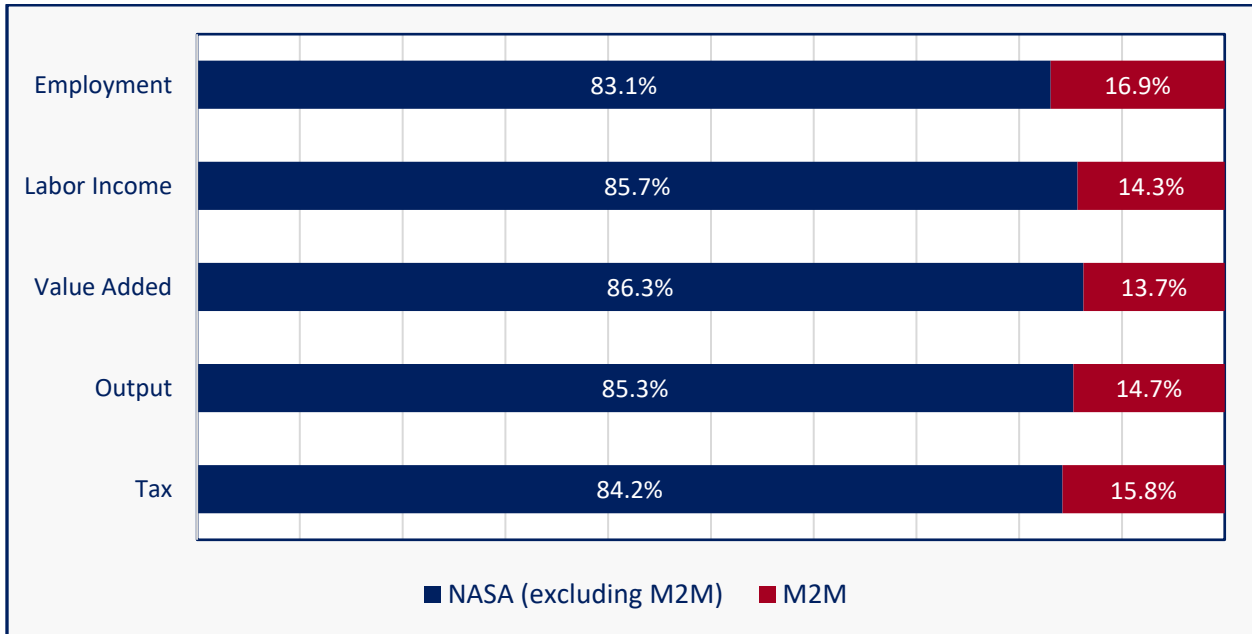
The M2M Campaign's Share of NASA Impacts

Around 15% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 497 and Figure 134). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 497: The M2M Campaign Portion of Overall NASA Impacts, Virginia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	24,763	2,359,619	3,580,659	6,106,081	244,246
M2M Portion	4,195	337,755	492,040	899,377	38,548
M2M Share	16.9%	14.3%	13.7%	14.7%	15.8%

Figure 134: The M2M Campaign Portion of Overall NASA Impacts, Virginia



Investments in Climate Change Research and Technology Impacts

In 2023, Virginia had 1,060 climate change research and technology-related civil service employees (585 FTEs) with a corresponding labor income of \$238.6 million. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$247.9 million. The total Virginia employment impact is 3,964 jobs. The labor income and economic output associated with this employment are \$377.6 million and \$1 billion, respectively. Investments in climate change research and technology generate \$37.7 million in tax revenues for the state and local governments in Virginia (Table 498).

Table 498: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	585	107,478	150,055	274,597	3,170
Indirect	1,607	165,279	221,484	377,117	11,046
Induced	1,772	104,851	200,438	349,668	23,449
Total	3,964	377,609	571,977	1,001,383	37,665
<i>Multiplier</i>	<i>6.8</i>	<i>3.5</i>	<i>3.8</i>	<i>3.6</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Virginia economy. Approximately 68% of the employment impacts and nearly 59% of the output impacts are due to NASA procurement sourced within the state.

Table 499: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Virginia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	585	45.7	0	0.0	585	14.7	100.0	0.0
Indirect	0	0.0	1,607	59.9	1,607	40.5	0.0	100.0
Induced	695	54.3	1,077	40.1	1,772	44.7	39.2	60.8
Total	1,279	100	2,684	100	3,964	100	32.3	67.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 500: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Virginia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	274,597	66.7	0	0.0	274,597	27.4	100.0	0.0
Indirect	0	0.0	377,117	64.0	377,117	37.7	0.0	100.0
Induced	137,120	33.3	212,548	36.0	349,668	34.9	39.2	60.8
Total	411,717	100	589,666	100	1,001,383	100	41.1	58.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

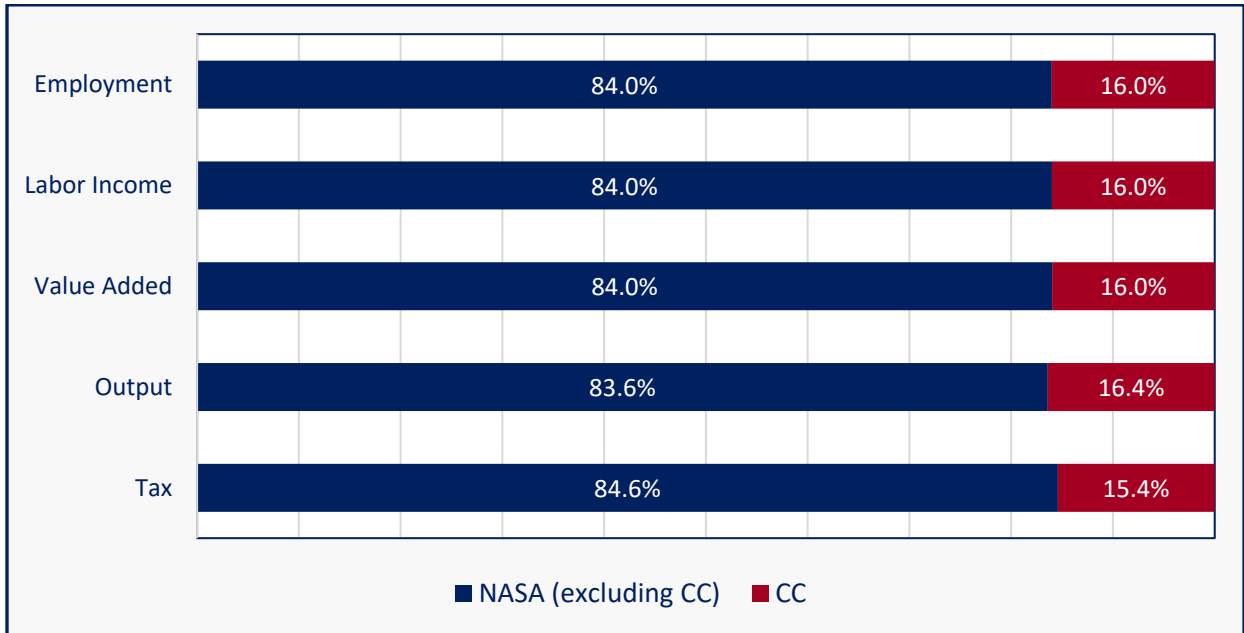
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 16% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 501 and Figure 135). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 501: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Virginia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	24,763	2,359,619	3,580,659	6,106,081	244,246
CC Portion	3,964	377,609	571,977	1,001,383	37,665
CC Share	16.0%	16.0%	16.0%	16.4%	15.4%

Figure 135: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Virginia



Economic Impacts on the State of Washington

NASA Impacts

In 2023, 47 NASA civil service employees (30 FTEs) residing in Washington earned \$5.8 million in labor income. NASA procurement sourced in Washington in the same year totaled approximately \$350.1 million. The total economic impact resulting from these activities is 3,247 jobs, \$329.6 million in labor income, and approximately \$884 million in economic output. These economic activities generate \$36 million in tax revenues for the state and local governments in Washington (Table 502).

Table 502: Summary of NASA Impacts by Types of Impact, Washington

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	30	5,806	7,755	14,192	46
Indirect	1,892	224,571	353,614	552,394	12,904
Induced	1,325	99,243	189,564	317,445	23,002
Total	3,247	329,619	550,933	884,031	35,953
<i>Multiplier</i>	<i>107.5</i>	<i>56.8</i>	<i>71.0</i>	<i>62.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Washington economy. Table 503 examines the sources of the employment figures in the second column of Table 502. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Around 98% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 2%.

Table 503: NASA Employment Impacts by Sources of Impact, Washington

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	30	47.7	0	0.0	30	0.9	100.0	0.0
Indirect	0	0.0	1,892	59.4	1,892	58.3	0.0	100.0
Induced	33	52.3	1,291	40.6	1,325	40.8	2.5	97.5
Total	63	100	3,184	100	3,247	100	1.9	98.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 504 examines the sources of the output figures in the fifth column of Table 502. Procurement spending is responsible for more than 97% of the increase in output in the state economy arising from NASA. NASA labor force’s share of overall NASA output impact is nearly 2%.

Table 504: NASA Output Impacts by Sources of Impact, Washington

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	14,192	63.3	0	0.0	14,192	1.6	100.0	0.0
Indirect	0	0.0	552,394	64.1	552,394	62.5	0.0	100.0
Induced	8,227	36.7	309,219	35.9	317,445	35.9	2.6	97.4
Total	22,418	100	861,613	100	884,031	100	2.5	97.5

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Washington had 13 M2M-related civil service employees (4 FTEs) with a corresponding labor income of \$510,000. M2M campaign procurement sourced in the state in the same year totaled \$297.2 million. The total Washington employment impact is 2,456 jobs. The labor income and economic output associated with this employment are \$275.1 million and \$724.4 million, respectively. The M2M campaign generates \$29.2 million in tax revenues for the state and local governments in Washington (Table 505).

Table 505: Summary of M2M Campaign Impacts by Types of Impact, Washington

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	4	510	916	1,677	4
Indirect	1,378	192,471	305,501	465,930	10,575
Induced	1,074	82,073	155,745	256,779	18,604
Total	2,456	275,055	462,163	724,386	29,183
<i>Multiplier</i>	<i>688.1</i>	<i>539.2</i>	<i>504.4</i>	<i>432.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Washington economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 506: M2M Campaign Employment Impacts by Sources of Impact, Washington

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	4	56.2	0	0.0	4	0.1	100.0	0.0
Indirect	0	0.0	1,378	56.3	1,378	56.1	0.0	100.0
Induced	3	43.8	1,071	43.7	1,074	43.7	0.3	99.7
Total	6	100	2,450	100	2,456	100	0.3	99.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 507: M2M Campaign Output Impacts by Sources of Impact, Washington

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	1,677	70.8	0	0.0	1,677	0.2	100.0	0.0
Indirect	0	0.0	465,930	64.5	465,930	64.3	0.0	100.0
Induced	693	29.2	256,087	35.5	256,779	35.4	0.3	99.7
Total	2,369	100	722,017	100	724,386	100	0.3	99.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

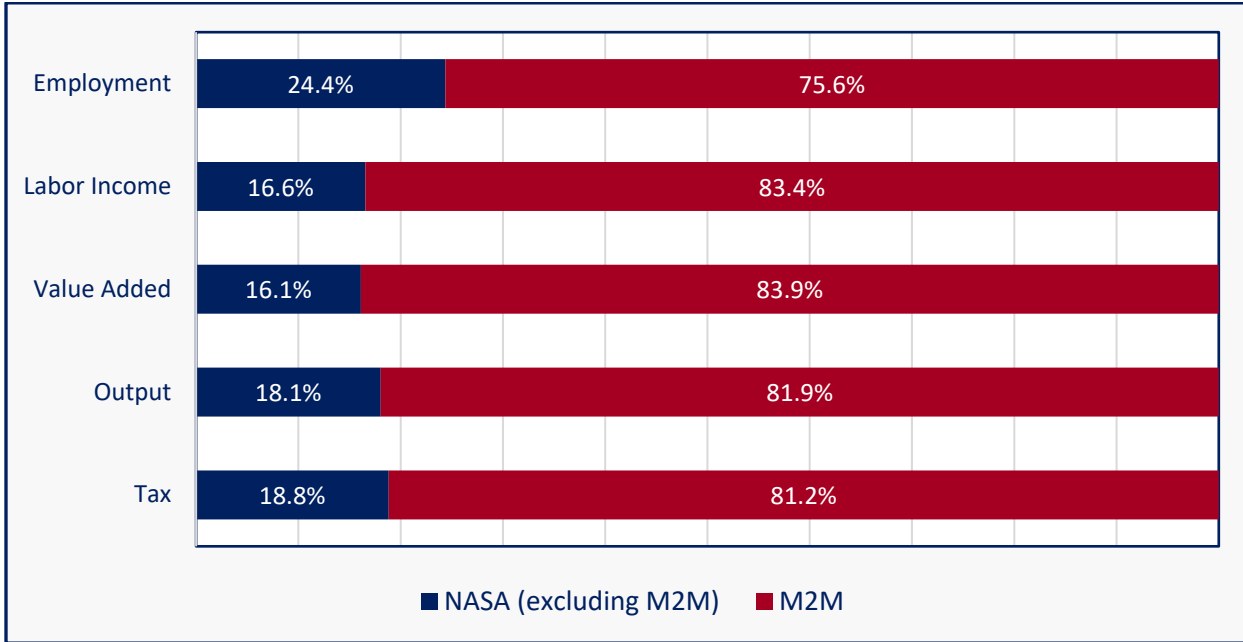
The M2M Campaign's Share of NASA Impacts

Around 81% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 508 and Figure 136). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 508: The M2M Campaign Portion of Overall NASA Impacts, Washington

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	3,247	329,619	550,933	884,031	35,953
M2M Portion	2,456	275,055	462,163	724,386	29,183
M2M Share	75.6%	83.4%	83.9%	81.9%	81.2%

Figure 136: The M2M Campaign Portion of Overall NASA Impacts, Washington



Investments in Climate Change Research and Technology Impacts

In 2023, Washington had eight climate change research and technology-related civil service employees (2 FTEs) with a corresponding labor income of \$314,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$22.9 million. The total Washington employment impact is 234 jobs. The labor income and economic output associated with this employment are \$21.8 million and \$58.7 million, respectively. Investments in climate change research and technology generate \$2.5 million in tax revenues for the state and local governments in Washington (Table 509).

Table 509: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Washington

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	314	479	876	3
Indirect	142	14,821	23,364	35,872	862
Induced	90	6,636	12,817	21,960	1,591
Total	234	21,771	36,660	58,707	2,456
<i>Multiplier</i>	<i>125.3</i>	<i>69.3</i>	<i>76.6</i>	<i>67.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Washington economy. Around 98% of the employment and output impacts are due to NASA procurement sourced within the state.

Table 510: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Washington

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	2	47.0	0	0.0	2	0.8	100.0	0.0
Indirect	0	0.0	142	61.7	142	60.6	0.0	100.0
Induced	2	53.0	88	38.3	90	38.6	2.3	97.7
Total	4	100	230	100	234	100	1.7	98.3

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 511: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Washington

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	876	65.1	0	0.0	876	1.5	100.0	0.0
Indirect	0	0.0	35,872	62.5	35,872	61.1	0.0	100.0
Induced	470	34.9	21,490	37.5	21,960	37.4	2.1	97.9
Total	1,346	100	57,361	100	58,707	100	2.3	97.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

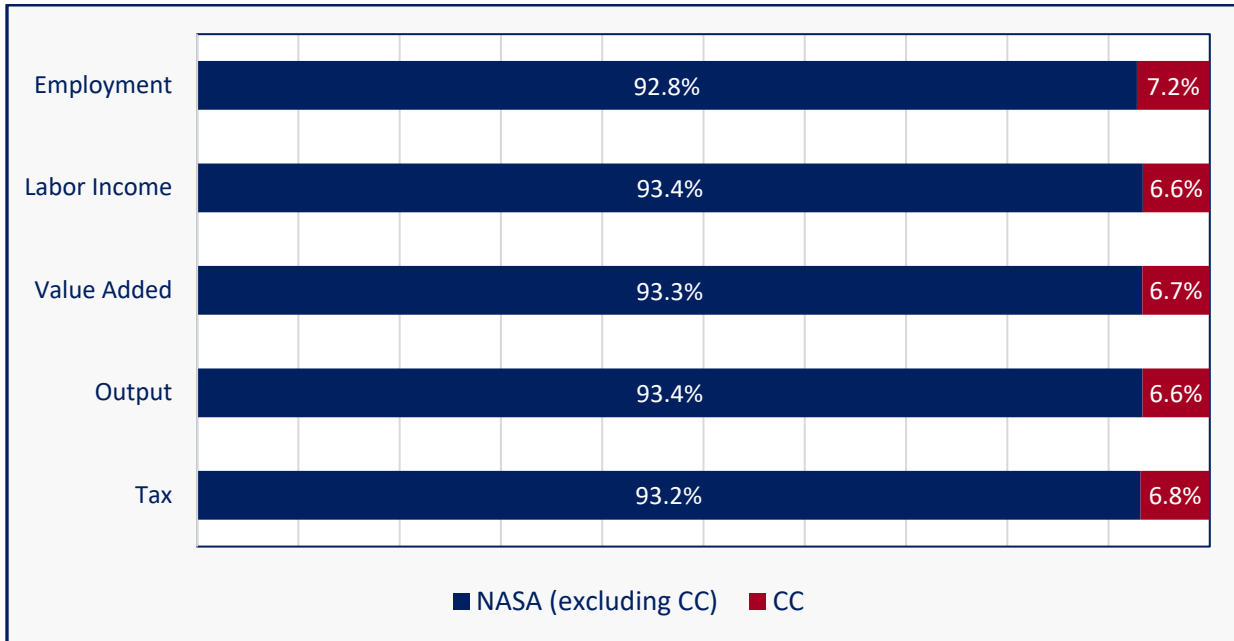
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 7% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 512 and Figure 137). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 512: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	3,247	329,619	550,933	884,031	35,953
CC Portion	234	21,771	36,660	58,707	2,456
CC Share	7.2%	6.6%	6.7%	6.6%	6.8%

Figure 137: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington



Economic Impacts on Washington, D.C. (District of Columbia)

NASA Impacts

In 2023, 371 NASA civil service employees (334 FTEs) residing in D.C. earned \$68.5 million in labor income. NASA procurement sourced in D.C. in the same year totaled \$361.2 million. The total economic impact resulting from these activities is 2,654 jobs, \$385.8 million in labor income, and \$712.4 million in economic output. These economic activities generate \$15.6 million in tax revenues for the local governments in D.C. (Table 513).

The employment multiplier is 8, meaning that for every NASA job located in Washington, D.C., an additional 7 jobs are supported in the district economy. The output multiplier of 4.5 indicates that for every million dollars' worth of economic output generated by NASA employees, an additional \$3.5 million worth of output is sustained throughout the district economy.

Table 513: Summary of NASA Impacts by Types of Impact, Washington, D.C.

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	334	68,523	85,641	156,721	819
Indirect	1,800	265,681	346,837	444,689	8,886
Induced	521	51,611	74,775	111,016	5,900
Total	2,654	385,815	507,253	712,426	15,606
<i>Multiplier</i>	<i>8.0</i>	<i>5.6</i>	<i>5.9</i>	<i>4.5</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the D.C. economy. Table 514 examines the sources of the employment figures in the second column of Table 513. NASA procurement sourced within the region is largely responsible for the overall NASA employment impacts. Approximately 84% of the jobs supported throughout the regional economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 16%.

Table 514: NASA Employment Impacts by Sources of Impact, Washington, D.C.

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	334	78.2	0	0.0	334	12.6	100.0	0.0
Indirect	0	0.0	1,800	80.8	1,800	67.8	0.0	100.0
Induced	93	21.8	428	19.2	521	19.6	17.8	82.2
Total	426	100	2,228	100	2,654	100	16.1	83.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 515 examines the sources of the output figures in the fifth column of Table 513. Procurement spending is responsible for 75% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 25%.

Table 515: NASA Output Impacts by Sources of Impact, Washington, D.C.

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	156,721	88.5	0	0.0	156,721	22.0	100.0	0.0
Indirect	0	0.0	444,689	83.1	444,689	62.4	0.0	100.0
Induced	20,342	11.5	90,674	16.9	111,016	15.6	18.3	81.7
Total	177,063	100	535,363	100	712,426	100	24.9	75.1

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Washington, D.C. had 49 M2M-related civil service employees (25 FTEs) with a corresponding labor income of \$5.1 million. M2M campaign procurement sourced in the region in the same year totaled \$19.4 million. The total Washington, D.C. employment impact is 154 jobs. The labor income and economic output associated with this employment are \$23.6 million and \$45.6 million, respectively. The M2M campaign generates \$965,000 in tax revenues for the local governments in Washington, D.C. (Table 516).

Table 516: Summary of M2M Campaign Impacts by Types of Impact, Washington, D.C.

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	25	5,098	6,498	11,892	61
Indirect	95	15,080	18,354	26,699	531
Induced	33	3,395	4,786	7,026	373
Total	154	23,573	29,638	45,617	965
<i>Multiplier</i>	6.1	4.6	4.6	3.8	n.a.

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Washington, D.C. economy. 79% of the employment impacts and nearly 71% of the output impacts are due to NASA procurement sourced within the region.

Table 517: M2M Campaign Employment Impacts by Sources of Impact, Washington, D.C.

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	25	78.6	0	0.0	25	16.5	100.0	0.0
Indirect	0	0.0	95	78.4	95	62.0	0.0	100.0
Induced	7	21.4	26	21.6	33	21.6	20.8	79.2
Total	32	100	121	100	154	100	21.0	79.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 518: M2M Campaign Output Impacts by Sources of Impact, Washington, D.C.

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	11,892	88.8	0	0.0	11,892	26.1	100.0	0.0
Indirect	0	0.0	26,699	82.9	26,699	58.5	0.0	100.0
Induced	1,501	11.2	5,525	17.1	7,026	15.4	21.4	78.6
Total	13,393	100	32,224	100	45,617	100	29.4	70.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

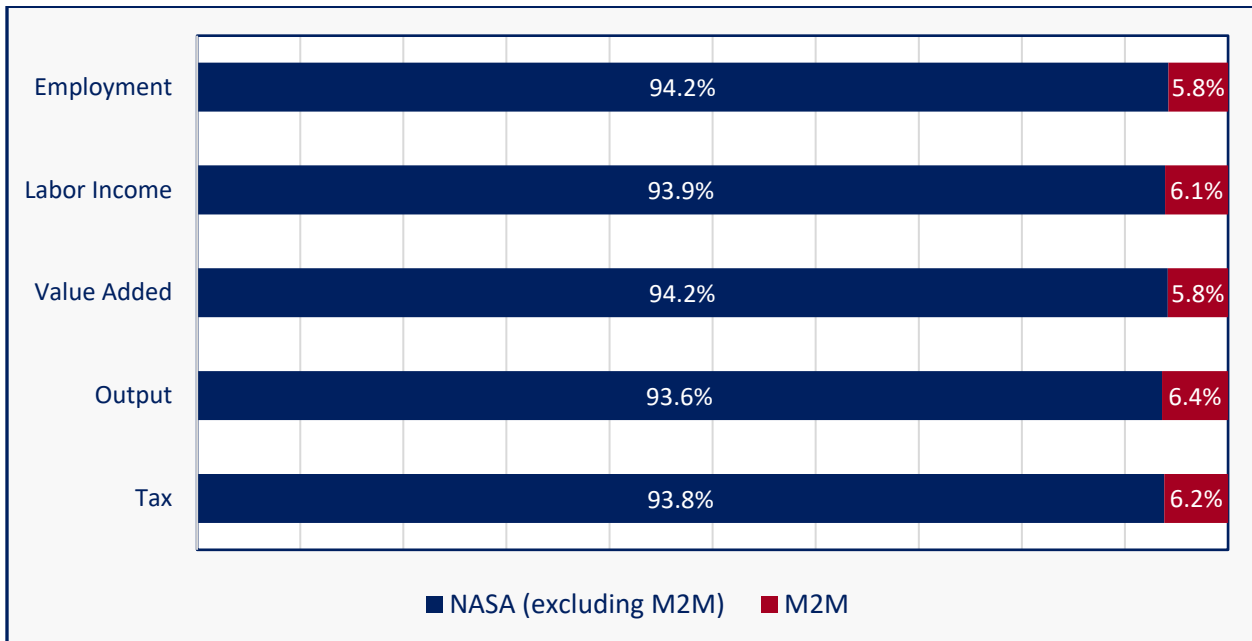
The M2M Campaign's Share of NASA Impacts

Around 6% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 519 and Figure 138). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 519: The M2M Campaign Portion of Overall NASA Impacts, Washington, D.C.

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,654	385,815	507,253	712,426	15,606
M2M Portion	154	23,573,367	29,638	45,617	965
M2M Share	5.8%	6.1%	5.8%	6.4%	6.2%

Figure 138: The M2M Campaign Portion of Overall NASA Impacts, Washington, D.C.



Investments in Climate Change Research and Technology Impacts

In 2023, Washington, D.C. had 76 climate change research and technology-related civil service employees (44 FTEs) with a corresponding labor income of \$9.5 million. Investments in climate change research and technology procurement sourced in the region in the same year totaled approximately \$50.1 million. The total Washington, D.C. employment impact is 398 jobs. The labor income and economic output associated with this employment are \$54 million and \$103.4 million, respectively. Investments in climate change research and technology generate \$2.3 million in tax revenues for the local governments in Washington, D.C. (Table 520).

Table 520: Investments in Summary of Climate Change Research and Technology Impacts by Types of Impact, Washington, D.C.

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	44	9,516	11,239	20,567	114
Indirect	280	37,281	45,902	66,948	1,319
Induced	75	7,199	10,543	15,865	842
Total	398	53,996	67,684	103,380	2,275
<i>Multiplier</i>	<i>9.1</i>	<i>5.7</i>	<i>6.0</i>	<i>5.0</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Washington, D.C. economy. Approximately 86% of the employment impacts and 77% of the output impacts are due to NASA procurement sourced within the region.

Table 521: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Washington, D.C.

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	44	76.6	0	0.0	44	11.0	100.0	0.0
Indirect	0	0.0	280	82.0	280	70.2	0.0	100.0
Induced	13	23.4	61	18.0	75	18.8	17.9	82.1
Total	57	100	341	100	398	100	14.3	85.7

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 522: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Washington, D.C.

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	20,567	87.8	0	0.0	20,567	19.9	100.0	0.0
Indirect	0	0.0	66,948	83.7	66,948	64.8	0.0	100.0
Induced	2,847	12.2	13,018	16.3	15,865	15.3	17.9	82.1
Total	23,413	100	79,966	100	103,380	100	22.6	77.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

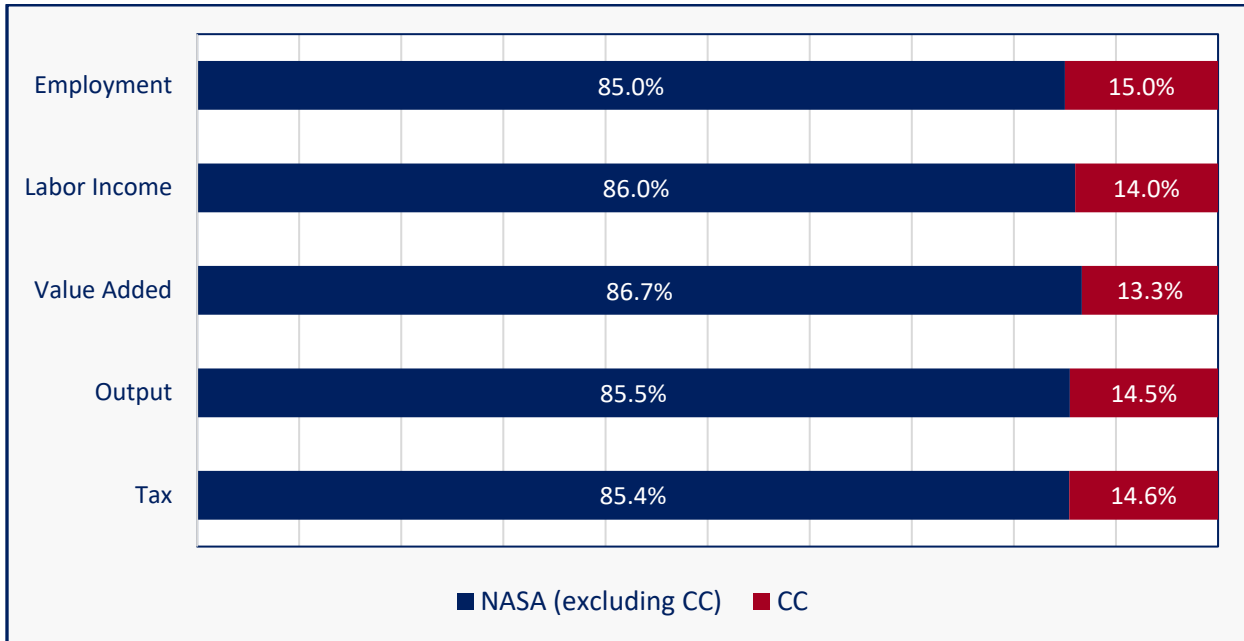
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 14% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 523 and Figure 139). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 523: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington, D.C.

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	2,654	385,815	507,253	712,426	15,606
CC Portion	398	53,996,121	67,684	103,380	2,275
CC Share	15.0%	14.0%	13.3%	14.5%	14.6%

Figure 139: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Washington, D.C.



Economic Impacts on the State of West Virginia

NASA Impacts

In 2023, 68 NASA civil service employees (62 FTEs) residing in West Virginia earned \$11.7 million in labor income. NASA procurement sourced in West Virginia in the same year totaled \$49.3 million. The total economic impact resulting from these activities is 633 jobs, \$49.5 million in labor income, and \$140.9 million in economic output. These economic activities generate \$4.4 million in tax revenues for the state and local governments in West Virginia (Table 524).

Table 524: Summary of NASA Impacts by Types of Impact, West Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	62	11,710	15,805	28,922	310
Indirect	348	26,002	36,853	73,889	1,686
Induced	223	11,745	20,897	38,061	2,402
Total	633	49,457	73,554	140,873	4,398
<i>Multiplier</i>	<i>10.3</i>	<i>4.2</i>	<i>4.7</i>	<i>4.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the West Virginia economy. Table 525 examines the sources of the employment figures in the second column of Table 524. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. Approximately 80% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 20%.

Table 525: NASA Employment Impacts by Sources of Impact, West Virginia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	62	48.3	0	0.0	62	9.7	100.0	0.0
Indirect	0	0.0	348	68.9	348	55.0	0.0	100.0
Induced	66	51.7	157	31.1	223	35.3	29.5	70.5
Total	127	100	506	100	633	100	20.1	79.9

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 526 examines the sources of the output figures in the fifth column of Table 524. Procurement spending is responsible for more than 71% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is approximately 29%.

Table 526: NASA Output Impacts by Sources of Impact, West Virginia

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	28,922	71.8	0	0.0	28,922	20.5	100.0	0.0
Indirect	0	0.0	73,889	73.5	73,889	52.5	0.0	100.0
Induced	11,370	28.2	26,691	26.5	38,061	27.0	29.9	70.1
Total	40,292	100	100,581	100	140,873	100	28.6	71.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, West Virginia had six M2M-related civil service employees (2 FTEs) with a corresponding labor income of \$231,000. M2M campaign procurement sourced in the state in the same year totaled \$2.8 million. The total West Virginia employment impact is 30 jobs. The labor income and economic output associated with this employment are \$2.2 million and \$6.6 million, respectively. The M2M campaign generates \$203,000 in tax revenues for the state and local governments in West Virginia (Table 527).

Table 527: Summary of M2M Campaign Impacts by Types of Impact, West Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	2	231	429	784	6
Indirect	18	1,446	2,076	4,157	93
Induced	10	519	909	1,648	104
Total	30	2,195	3,413	6,589	203
<i>Multiplier</i>	<i>18.0</i>	<i>9.5</i>	<i>8.0</i>	<i>8.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the West Virginia economy. 90% of the employment impacts and 85% of the output impacts are due to NASA procurement sourced within the state.

Table 528: M2M Campaign Employment Impacts by Sources of Impact, West Virginia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	2	55.5	0	0.0	2	5.6	100.0	0.0
Indirect	0	0.0	18	68.3	18	61.5	0.0	100.0
Induced	1	44.5	9	31.7	10	33.0	13.5	86.5
Total	3	100	27	100	30	100	10.0	90.0

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 529: M2M Campaign Output Impacts by Sources of Impact, West Virginia

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	784	78.6	0	0.0	784	11.9	100.0	0.0
Indirect	0	0.0	4,157	74.3	4,157	63.1	0.0	100.0
Induced	213	21.4	1,434	25.7	1,648	25.0	12.9	87.1
Total	997	100	5,592	100	6,589	100	15.1	84.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

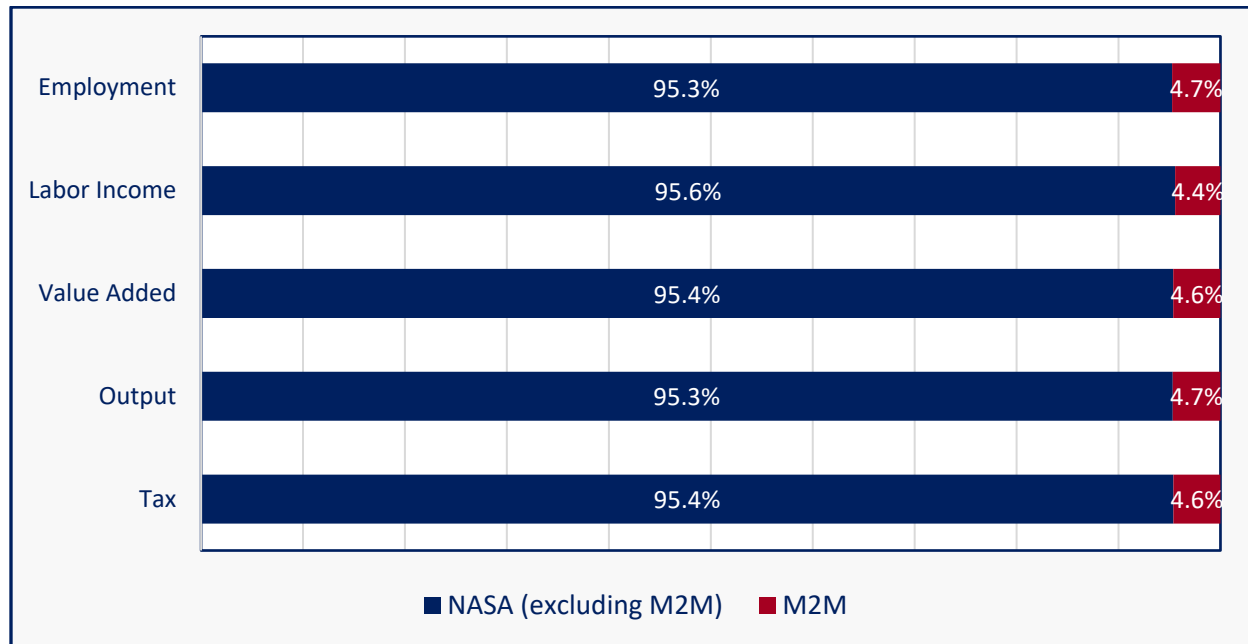
The M2M Campaign's Share of NASA Impacts

Around 5% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 530 and Figure 140). The primary reason the shares are slightly different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 530: The M2M Campaign Portion of Overall NASA Impacts, West Virginia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	633	49,457	73,554	140,873	4,398
M2M Portion	30	2,195	3,413	6,589	203
M2M Share	4.7%	4.4%	4.6%	4.7%	4.6%

Figure 140: The M2M Campaign Portion of Overall NASA Impacts, West Virginia



Investments in Climate Change Research and Technology Impacts

In 2023, West Virginia had three climate change research and technology-related civil service employees (1 FTE) with a corresponding labor income of \$253,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$366,000. The total West Virginia employment impact is 6 jobs. The labor income and economic output associated with this employment are \$572,000 and \$1.5 million, respectively. Investments in climate change research and technology generate \$46,000 in tax revenues for the state and local governments in West Virginia (Table 531).

Table 531: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, West Virginia

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	253	286	523	7
Indirect	2	183	272	560	11
Induced	3	136	247	454	29
Total	6	572	805	1,537	46
<i>Multiplier</i>	<i>5.4</i>	<i>2.3</i>	<i>2.8</i>	<i>2.9</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the West Virginia economy. More than 55% of the employment impacts and nearly 49% of the output impacts are due to NASA procurement sourced within the state.

Table 532: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, West Virginia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	1	41.0	0	0.0	1	18.4	100.0	0.0
Indirect	0	0.0	2	64.2	2	35.4	0.0	100.0
Induced	2	59.0	1	35.8	3	46.2	57.3	42.7
Total	3	100	3	100	6	100	44.9	55.1

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 533: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, West Virginia

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	523	66.6	0	0.0	523	34.1	100.0	0.0
Indirect	0	0.0	560	74.6	560	36.4	0.0	100.0
Induced	263	33.4	191	25.4	454	29.5	57.9	42.1
Total	787	100	751	100	1,537	100	51.2	48.8

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

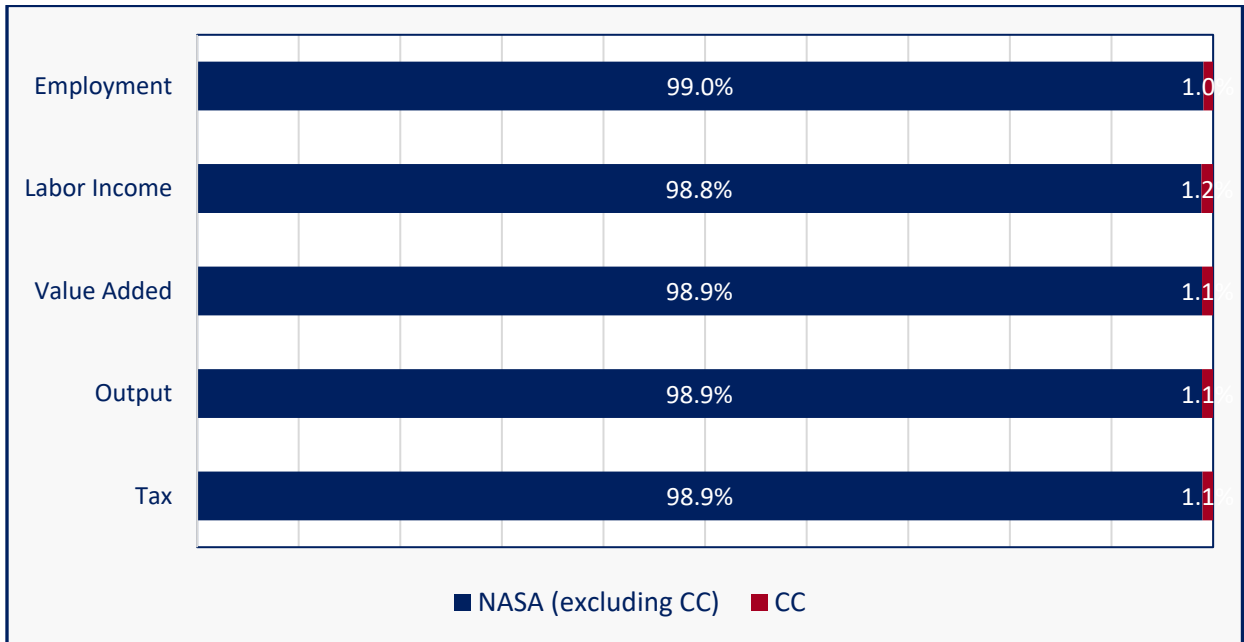
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 1% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 534 and Figure 141).

Table 534: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, West Virginia

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	633	49,457	73,554	140,873	4,398
CC Portion	6	572	805	1,537	46
CC Share	1.0%	1.2%	1.1%	1.1%	1.1%

Figure 141: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, West Virginia



Economic Impacts on the State of Wisconsin

NASA Impacts

In 2023, 10 NASA civil service employees (4 FTEs) residing in Wisconsin earned \$647,000 in labor income. NASA procurement sourced in Wisconsin in the same year totaled \$26.7 million. The total economic impact resulting from these activities is 346 jobs, \$25.9 million in labor income, and \$75.2 million in economic output. These economic activities generate \$2.8 million in tax revenues for the state and local governments in Wisconsin (Table 535).

Table 535: Summary of NASA Impacts by Types of Impact, Wisconsin

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	4	647	1,020	1,867	16
Indirect	208	17,122	23,861	47,120	1,253
Induced	134	8,081	14,320	26,234	1,523
Total	346	25,850	39,200	75,221	2,792
<i>Multiplier</i>	<i>87.0</i>	<i>40.0</i>	<i>38.4</i>	<i>40.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Wisconsin economy. Table 536 examines the sources of the employment figures in the second column of Table 535. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 97% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is nearly 3%.

Table 536: NASA Employment Impacts by Sources of Impact, Wisconsin

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	4	44.6	0	0.0	4	1.1	100.0	0.0
Indirect	0	0.0	208	61.7	208	60.1	0.0	100.0
Induced	5	55.4	129	38.3	134	38.7	3.7	96.3
Total	9	100	337	100	346	100	2.6	97.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 537 examines the sources of the output figures in the fifth column of Table 535. Procurement spending is responsible for more than 96% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 4%.

Table 537: NASA Output Impacts by Sources of Impact, Wisconsin

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,867	65.4	0	0.0	1,867	2.5	100.0	0.0
Indirect	0	0.0	47,120	65.1	47,120	62.6	0.0	100.0
Induced	989	34.6	25,245	34.9	26,234	34.9	3.8	96.2
Total	2,855	100	72,366	100	75,221	100	3.8	96.2

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Wisconsin had three M2M-related civil service employees (1 FTE) with a corresponding labor income of \$274,000. M2M campaign procurement sourced in the state in the same year totaled \$4 million. The total Wisconsin employment impact is 53 jobs. The labor income and economic output associated with this employment are \$4.2 million and \$11.8 million, respectively. The M2M campaign generates \$434,000 in tax revenues for the state and local governments in Wisconsin (Table 538).

Table 538: Summary of M2M Campaign Impacts by Types of Impact, Wisconsin

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	274	320	586	7
Indirect	31	2,607	3,625	6,998	185
Induced	21	1,307	2,309	4,172	242
Total	53	4,188	6,254	11,756	434
<i>Multiplier</i>	<i>42.5</i>	<i>15.3</i>	<i>19.5</i>	<i>20.1</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Wisconsin economy. Nearly 94% of the employment impacts and 92% of the output impacts are due to NASA procurement sourced within the state.

Table 539: M2M Campaign Employment Impacts by Sources of Impact, Wisconsin

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	38.1	0	0.0	1	2.4	100.0	0.0
Indirect	0	0.0	31	61.4	31	57.6	0.0	100.0
Induced	2	61.9	19	38.6	21	40.1	9.6	90.4
Total	3	100	50	100	53	100	6.2	93.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 540: M2M Campaign Output Impacts by Sources of Impact, Wisconsin

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	586	59.2	0	0.0	586	5.0	100.0	0.0
Indirect	0	0.0	6,998	65.0	6,998	59.5	0.0	100.0
Induced	403	40.8	3,768	35.0	4,172	35.5	9.7	90.3
Total	989	100	10,766	100	11,756	100	8.4	91.6

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

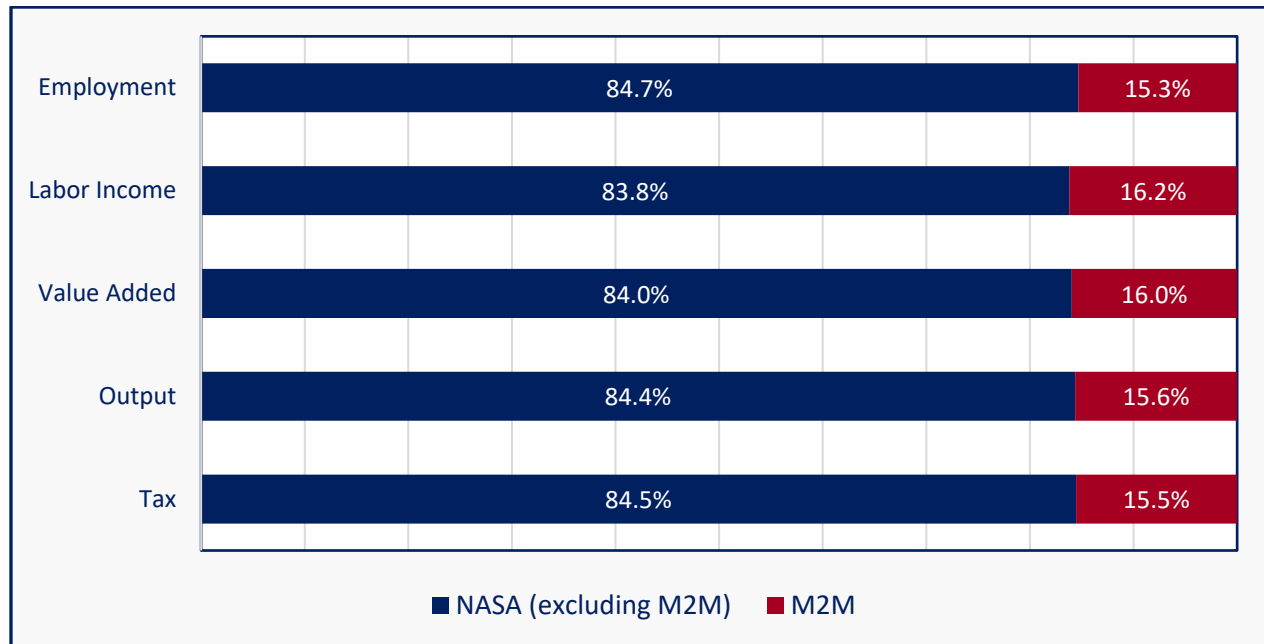
The M2M Campaign's Share of NASA Impacts

Around 16% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 541 and Figure 142). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 541: The M2M Campaign Portion of Overall NASA Impacts, Wisconsin

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	346	25,850	39,200	75,221	2,792
M2M Portion	53	4,188	6,254	11,756	434
M2M Share	15.3%	16.2%	16.0%	15.6%	15.5%

Figure 142: The M2M Campaign Portion of Overall NASA Impacts, Wisconsin



Investments in Climate Change Research and Technology Impacts

In 2023, Wisconsin had one climate change research and technology-related civil service employee (<1 FTE) with a corresponding labor income of \$10,000. Investments in climate change research and technology procurement sourced in the state in the same year totaled \$13.6 million. The total Wisconsin employment impact is 175 jobs. The labor income and economic output associated with this employment are \$12.8 million and \$37.8 million, respectively. Investments in climate change research and technology generate \$1.4 million in tax revenues for the state and local governments in Wisconsin (Table 542).

Table 542: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Wisconsin

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	<1	10	49	90	<1
Indirect	107	8,808	12,419	24,295	646
Induced	68	4,024	7,162	13,415	779
Total	175	12,841	19,631	37,800	1,425
<i>Multiplier</i>	<i>911.4</i>	<i>1328.9</i>	<i>397.6</i>	<i>418.4</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services,

and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Wisconsin economy. Nearly all the employment and output impacts are due to NASA procurement sourced within the state.

Table 543: Investments in Climate Change Research and Technology Employment Impacts by Sources of Impact, Wisconsin

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	CC Emp.	CC Proc.
Direct	<1	71.3	0	0.0	<1	0.1	100.0	0.0
Indirect	0	0.0	107	61.3	107	61.2	0.0	100.0
Induced	<1	28.7	68	38.7	68	38.7	0.1	99.9
Total	<1	100	175	100	175	100	0.2	99.8

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 544: Investments in Climate Change Research and Technology Output Impacts by Sources of Impact, Wisconsin

Type of Impact	Climate Change Employment		Climate Change Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	CC Emp.	CC Proc.
Direct	90	84.9	0	0.0	90	0.2	100.0	0.0
Indirect	0	0.0	23,870	65.6	23,870	65.5	0.0	100.0
Induced	16	15.1	12,492	34.4	12,508	34.3	0.1	99.9
Total	106	100	36,362	100	36,469	100	0.3	99.7

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

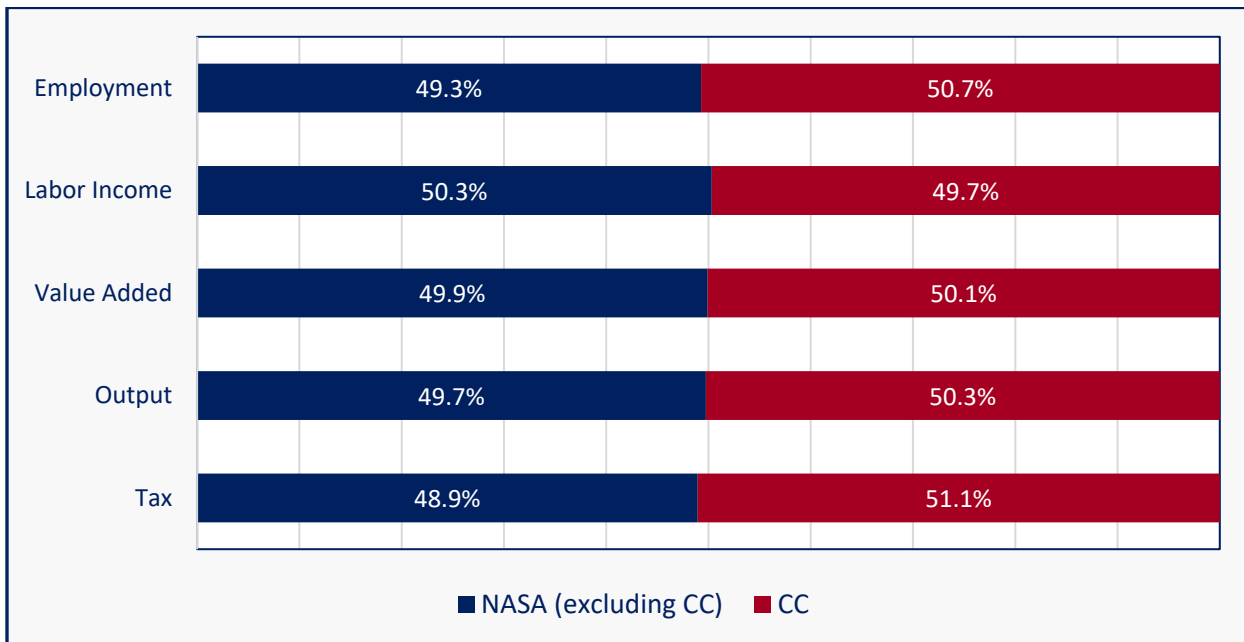
The Investments in Climate Change Research and Technology's Share of NASA Impacts

Around 50% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 545 and Figure 143). The primary reason the shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 545: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wisconsin

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	346	25,850	39,200	75,221	2,792
CC Portion	175	12,841	19,631	37,800	1,425
CC Share	50.7%	49.7%	50.1%	50.3%	51.1%

Figure 143: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wisconsin



Economic Impacts on the State of Wyoming

NASA Impacts

In 2023, four NASA civil service employees (3 FTEs) residing in Wyoming earned \$431,000 in labor income. NASA procurement sourced in Wyoming in the same year totaled \$1.5 million. The total economic impact resulting from these activities is 18 jobs, \$1.4 million in labor income, and \$4.3 million in economic output. These economic activities generate \$91,000 in tax revenues for the state and local governments in Wyoming (Table 546).

Table 546: Summary of NASA Impacts by Types of Impact, Wyoming

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	3	431	650	1,190	7
Indirect	11	737	983	2,226	36
Induced	5	223	437	839	48
Total	18	1,391	2,070	4,255	91
<i>Multiplier</i>	7.2	3.2	3.2	3.6	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Wyoming economy. Table 547 examines the sources of the employment figures in the second column of Table 546. NASA procurement sourced within the state is largely responsible for the overall NASA employment impacts. More than 76% of the jobs supported throughout the state economy by NASA are due to its procurement spending. The share of NASA direct labor force in the overall employment impact is 24%.

Table 547: NASA Employment Impacts by Sources of Impact, Wyoming

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	NASA Emp.	NASA Proc.
Direct	3	59.0	0	0.0	3	13.9	100.0	0.0
Indirect	0	0.0	11	77.4	11	59.2	0.0	100.0
Induced	2	41.0	3	22.6	5	27.0	35.8	64.2
Total	4	100	14	100	18	100	23.5	76.5

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 548 examines the sources of the output figures in the fifth column of Table 546. Procurement spending is responsible for approximately 65% of the increase in output in the state economy arising from NASA. NASA labor force's share of overall NASA output impact is 35%.

Table 548: NASA Output Impacts by Sources of Impact, Wyoming

Type of Impact	NASA Employment		NASA Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	NASA Emp.	NASA Proc.
Direct	1,190	79.6	0	0.0	1,190	28.0	100.0	0.0
Indirect	0	0.0	2,226	80.6	2,226	52.3	0.0	100.0
Induced	304	20.4	535	19.4	839	19.7	36.2	63.8
Total	1,494	100	2,761	100	4,255	100	35.1	64.9

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

M2M Campaign Impacts

In 2023, Wyoming had 1 M2M-related civil service employee (1 FTE) with a corresponding labor income of \$207,000. M2M campaign procurement sourced in the state in the same year totaled \$11,000. The total economic impact attributable to this labor income and procurement spending is 2 jobs, \$252,000 in labor income, and \$630,000 worth of output. These economic activities generate \$12,000 in tax revenues for the state and local governments in Wyoming (Table 549).

Table 549: Summary of M2M Program Impacts by Types of Impact, Wyoming

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	1	207	257	470	3
Indirect	<1	6	8	17	<1
Induced	1	39	76	143	8
Total	2	252	340	630	12
<i>Multiplier</i>	<i>1.9</i>	<i>1.2</i>	<i>1.3</i>	<i>1.3</i>	<i>n.a.</i>

Note: The direct value-added figure represents the economic value-added by NASA employees to products and services they procure for their production and management. It is calculated using the value-added-to-employee ratio in two industries: (1) guided missile and space vehicle manufacturing, and (2) propulsion units and parts for space vehicle and guided missiles manufacturing. Similarly, the direct output figure represents the value of production and management within the NASA program, including the value of intermediary products and services, and is calculated based on the estimated ratios of output-to-employee in the same two industries. Values may not sum exactly due to rounding to the nearest whole number.

The following two tables examine the contribution of different NASA activities to the Wyoming economy. Nearly 95% of the employment impacts and 97% of the output impacts are due to NASA labor force living in the state.

Table 550: M2M Campaign Employment Impacts by Sources of Impact, Wyoming

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Jobs	%	Jobs	%	Jobs	%	M2M Emp.	M2M Proc.
Direct	1	54.7	0	0.0	1	51.8	100.0	0.0
Indirect	0	0.0	<1	77.5	<1	4.1	0.0	100.0
Induced	1	45.3	<1	22.5	1	44.1	97.3	2.7
Total	2	100	<1	100	2	100	94.6	5.4

Note: The direct employment impact consists of NASA jobs (FTEs) while indirect employment impact consists of NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

Table 551: M2M Campaign Output Impacts by Sources of Impact, Wyoming

Type of Impact	M2M Employment		M2M Procurement		Total		Shares (%)	
	Output (\$ 000)	%	Output (\$ 000)	%	Output (\$ 000)	%	M2M Emp.	M2M Proc.
Direct	470	77.2	0	0.0	470	74.6	100.0	0.0
Indirect	0	0.0	17	80.9	17	2.7	0.0	100.0
Induced	138	22.8	4	19.1	143	22.6	97.2	2.8
Total	608	100	21	100	630	100	96.6	3.4

Note: The direct output impact is associated with NASA labor force while indirect output impact is associated with NASA contractor employees and employees in the supply chain of those contractors. Values may not sum exactly due to rounding to the nearest whole number.

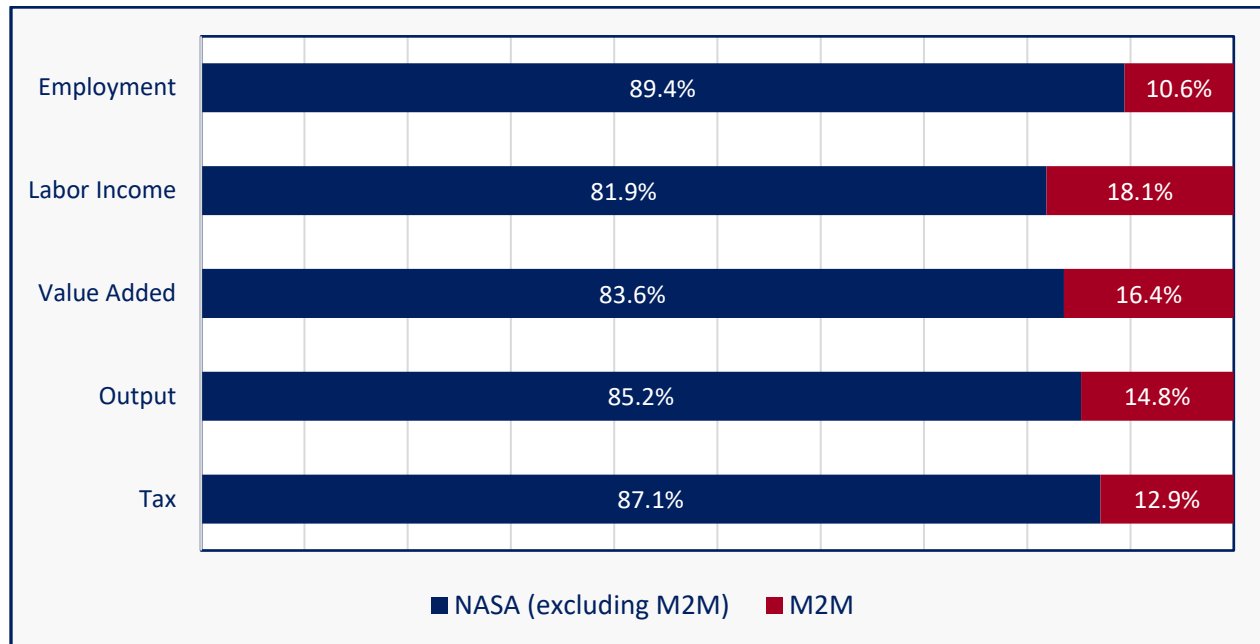
The M2M Campaign’s Share of NASA Impacts

Around 15% of overall NASA agency impacts in the state are attributable to the M2M campaign (Table 552 and Figure 144). The primary reason the shares are different is that the sectoral distribution of procurement spending for the M2M campaign is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 552: The M2M Campaign Portion of Overall NASA Impacts, Wyoming

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	18	1,391	2,070	4,255	91
M2M Portion	2	252	340	630	12
M2M Share	10.6%	18.1%	16.4%	14.8%	12.9%

Figure 144: The M2M Campaign Portion of Overall NASA Impacts, Wyoming



Investments in Climate Change Research and Technology Impacts

There were no climate change research and technology-specific NASA employees in Wyoming in FY 2023, but \$323,000 in investments in climate change research and technology NASA procurement was sourced in the state. The total economic impact attributable to this procurement activity is 3 jobs, \$194,000 in labor income, and \$618,000 worth of output. These economic activities generate \$15,000 in tax revenues for the state and local governments in Wyoming (Table 553).

Table 553: Summary of Investments in Climate Change Research and Technology Impacts by Types of Impact, Wyoming

Impact Type	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
Direct	0	0	0	0	0
Indirect	2	163	221	495	8
Induced	1	32	63	123	7
Total	3	194	284	618	15
<i>Multiplier</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

The Investments in Climate Change Research and Technology’s Share of NASA Impacts

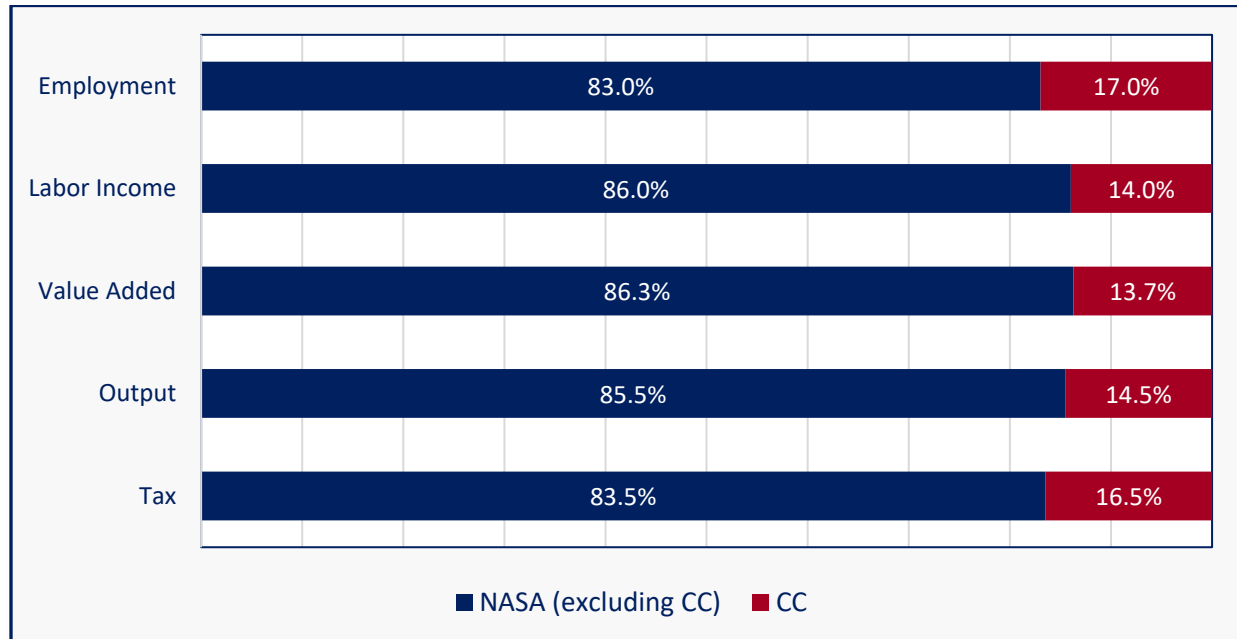
Around 15% of overall NASA agency impacts in the state are attributable to the investments in climate change research and technology (Table 554 and Figure 145). The primary reason the

shares are different is that the sectoral distribution of procurement spending for investments in climate change research and technology is different from the sectoral distribution of procurement spending for NASA as a whole and spending in different industry sectors produce different value-added/output/tax impacts (due to industry-specific multipliers).

Table 554: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wyoming

Impact Component	Employment	Labor Income (\$ thousands)	Value-added (\$ thousands)	Output (\$ thousands)	Tax (\$ thousands)
NASA Total	18	1,391	2,070	4,255	91
CC Portion	3	194	284	618	15
CC Share	17.0%	14.0%	13.7%	14.5%	16.5%

Figure 145: The Investments in Climate Change Research and Technology Portion of Overall NASA Impacts, Wyoming



CONCLUSION

In this study, we examined the economic impacts of National Aeronautics and Space Administration (NASA) and the Moon to Mars (M2M) campaign and the investments in climate change research and technology on the U.S., the fifty (50) states, and Washington, D.C. for the Fiscal Year 2023. We first presented economic impacts of NASA on each region and then examined M2M campaign and investments in climate change research and technology impacts. We distinguished the portion of NASA impacts attributable to the M2M campaign and the investments in climate change research and technology to highlight the relative contribution of these efforts in every state as well as the nation.

The impact estimates reported in this study are the sum of three channels of economic impact: (1) the direct contribution of NASA's own activities; (2) indirect (procurement) activities within NASA's U.S. supply chain; and (3) the induced effect that results as federal civil servants at NASA facilities, employees of contractors, and employees within the supply chain of those contractors spend their wages in the wider consumer economy. The economic impact was examined through a detailed analysis of the changes in employment, output (gross sales), labor income, value-added, and taxes due to NASA's activities.

NASA

At the national level, NASA directly employs 19,752 civil servants (corresponding to 17,821 full-time equivalent (FTE) jobs), paying more than \$3.5 billion in annual wages and benefits (Fiscal Year 2023).⁴³ The \$23.3 billion in procurement activity originating from NASA is very diverse, involving almost every major category of manufacturing or service industry. Taking the domestic portions of these spending streams into account, the total employment impact of NASA across the U.S. is 304,803 jobs (direct, indirect, and induced). The labor income and economic output associated with this total amount of employment are, respectively, \$27.6 billion, and \$75.6 billion. Procurement activities along with NASA's direct employment generated an estimated \$9.6 billion in federal, state, and local tax revenues in 2023.

For every civil service FTE job located at NASA, an additional 16.1 jobs are supported throughout the U.S. economy. The income multiplier is 7.8: for each \$1 million of labor income earned by NASA employees, an additional \$6.8 million in labor income is generated in the U.S. economy. The output multiplier is 9. For each \$1 million's worth of output generated at NASA, an additional \$8 million of output (intermediary and final goods and services) is generated throughout the U.S. economy. These figures are boosted by the large volume of procurement spending administered through NASA.

⁴³ These are the figures used in the national economic impact model. The number of civil servants including those residing in U.S. territories is 19,758 (17,823 FTEs).

NASA’s economic impacts are concentrated both geographically and sectorally. The top ten most impacted states account for 90% of total NASA employment impacts. These states are California, Texas, Florida, Alabama, Maryland, Virginia, Colorado, Ohio, Mississippi, and Washington. The top ten most impacted industries account for 47% of total NASA impacts. Scientific research and development services is the most affected sector—19% of total NASA impacts are concentrated in this sector.

Finally, around 32% of overall NASA agency impacts in the U.S. are attributable to the M2M campaign. The M2M campaign-specific employment accounts for 3% of overall NASA employment impacts while M2M campaign-related procurement accounts for 29% of overall NASA employment impacts. Around 11% of overall NASA agency impacts in the U.S. are attributable to the investments in climate change research and technology. Climate change research and technology specific employment accounts for 2% of overall NASA employment impacts while climate change research and technology-related procurement accounts for 9% of overall NASA employment impacts.

Moon to Mars (M2M) Campaign

At the national level, NASA directly employs 4,649 civil servants (3,749 FTEs) to support the M2M campaign, paying more than \$712 million in annual wages and benefits. The M2M procurement originating from NASA are both large in volume (\$7.7 billion) and diverse. There are indirect effects from the purchases of goods and services by NASA Centers as well as by the firms that supply those centers. Consumption expenditures made by the M2M labor force, by suppliers to the M2M campaign, and by suppliers further upstream within the production chain, create induced effects. Taking the domestic portions of these spending streams into account, the total employment impact of the M2M campaign across the U.S. is 96,479 jobs (including direct, indirect, and induced impacts). The labor income and economic output associated with this total amount of employment are, respectively, \$8.6 billion, and \$23.8 billion. M2M procurement activities along with NASA’s direct employment for the M2M campaign generated an estimated \$2.9 billion in federal, state, and local tax revenues in 2023.

For every (FTE) civil service job located at NASA centers related to M2M, 24.7 additional jobs are supported throughout the U.S. economy. For each million dollars of labor income earned by M2M-assigned NASA employees, an additional \$11.1 million of labor income is generated in the U.S. And for each \$1 million worth of output produced by the M2M campaign, an additional \$12.5 million output—consisting of both intermediary inputs and consumption goods and services—is produced throughout the national economy. These figures are exceptionally large because of the extremely high volume of procurement spending relative to civil service employment.

The M2M campaign related labor and procurement activity is concentrated in certain states, as a result the economic impacts resulting from those activities. Alabama, California, Texas, Colorado, Florida, Virginia, Washington, Utah, Maryland, and Ohio are the most impacted states, respectively. Ten states account for approximately 95% of all M2M-related employment impacts.

As a share of overall NASA impacts, M2M campaign impacts are heavily concentrated in some states. Among the top-ten most impacted states (by the M2M campaign), more than half of overall NASA impacts in Washington, Utah, Colorado, and Alabama are attributable to the M2M campaign.

Investments in Climate Change Research and Technology

At the national level, NASA directly employs 4,156 civil servants (2,009 FTEs) for climate change research and technology, with annual compensation of \$382 million in wages and benefits. Investments in climate change research and technology procurement originating from NASA (\$2.4 billion) are both large in volume and very diverse—involving almost every major category of manufacturing or service activity. There are indirect effects from the purchases of goods and services by NASA Centers as well as by the firms that supply those centers. Consumption expenditures made by the climate change research and technology labor force, by suppliers to the investments in climate change research and technology, and by suppliers further upstream within the production chain, create induced effects. Taking the domestic portions of these spending streams into account, the total employment impact of the investments in climate change research and technology across the U.S. is 32,900 jobs (including direct, indirect, and induced impacts—see Box 1 in Section 1). The labor income and economic output associated with this total amount of employment are, respectively, \$2.9 billion, and \$7.9 billion. The investments in climate change research and technology along with NASA’s direct employment for climate change research and technology generated an estimated \$1 billion in federal, state, and local tax revenues in 2023.

For every (FTE) civil service job located at NASA centers related to climate change research and technology, 15.4 additional jobs are supported throughout the U.S. economy. For each million dollars of labor income earned by climate change research and technology-assigned NASA employees, an additional \$6.7 million of labor income is generated in the U.S. And for each \$1 million worth of output produced by the investments in climate change research and technology, an additional \$7.4 million of output—consisting of both intermediary inputs and consumption goods and services—is produced throughout the national economy.

Climate change research and technology-related labor and procurement activity is concentrated in certain states, as a result the economic impacts resulting from those activities. California, Maryland, Virginia, Colorado, Florida, Ohio, Alabama, Texas, Massachusetts, and New Mexico are the most impacted states, respectively. Ten states account for 81% of all climate change research and technology-related employment impacts. As a share of overall NASA impacts, investments in climate change research and technology impacts are heavily concentrated in some states. Among the top-ten most impacted states (by NASA investments in climate change research and technology), considerable portion of overall NASA impacts (10% or over) in New Mexico, Massachusetts, Ohio, Maryland, Virginia, Colorado, and California are attributable to the investments in climate change research and technology.

NASA, M2M and investments in climate change research and technology impacts in the state and national economies go beyond the dollars they generate and the jobs they support. In addition to the economic benefits they generate, they help drive an innovation-based economy with the infusion of billions of dollars of spending in research and development in the aerospace sector.

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About The Authors

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APPENDIX