

# *Economic and Fiscal Impacts of the Sanford Underground Research Facility*

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<i>I. Executive Summary.....</i>	<i>1</i>
Purpose of Report .....	1
Overview of Approach .....	1
Overview of Findings .....	3
About Anderson Economic Group .....	5
 <i>II. Net Economic Impact of SURF in South Dakota and Western South Dakota .....</i>	 <i>6</i>
SURF Background .....	6
Net Economic Impact Defined .....	7
Operations Impact .....	9
Capital Spending Impact .....	11
Visitor Impact .....	12
Overall Net Economic Impact .....	14
 <i>III. Net Fiscal Impact of SURF in South Dakota ...</i>	 <i>17</i>
Net Fiscal Impact Defined .....	17
Excise Tax Impact .....	18
State Sales Tax Impact .....	18
Municipal Sales Tax Impact .....	19
Other Government Revenues .....	19
Overall Net Fiscal Impact .....	20
 <i>Appendix A. Methodology .....</i>	 <i>A-1</i>
Net Economic Impact Analysis .....	A-1
Net Fiscal Impact Analysis .....	A-4
Data Tables .....	A-7
 <i>Appendix B. Works Consulted .....</i>	 <i>B-1</i>
 <i>Appendix C. About Anderson Economic Group ....</i>	 <i>C-1</i>
Authors .....	C-2

## *I. Executive Summary*

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**PURPOSE OF REPORT** The Sanford Underground Research Facility (SURF) is a leading multidisciplinary underground science research laboratory located in Lead, South Dakota. It is managed by the South Dakota Science and Technology Authority (SDSTA). SURF will soon host part of the Long-Baseline Neutrino Facility (LBNF) and the experiment it houses—the Deep Underground Neutrino Experiment (DUNE). DUNE will beam neutrinos from Fermi National Accelerator Laboratory (Fermilab) in Illinois through the earth to a state-of-the-art particle detector at SURF. SDSTA retained Anderson Economic Group (AEG) to quantify the combined economic and fiscal impacts of SDSTA operations and Fermilab spending for LBNF/DUNE in South Dakota and Western South Dakota.

**OVERVIEW OF  
APPROACH**

In this report, we estimate the net economic and fiscal impacts of SURF in South Dakota and Western South Dakota, which includes the Counties of Bennett, Butte, Custer, Fall River, Haakon, Harding, Jackson, Lawrence, Meade, Oglala Lakota, Pennington, Perkins, and Ziebach.

### *Net Economic Impact*

Our analysis quantifies the “net new” economic activity that occurs in South Dakota and Western South Dakota because of SURF. This includes SDSTA’s operations and capital spending for SURF, Fermilab’s operations and capital spending for LBNF/DUNE, and visitor spending. We estimate impacts in both South Dakota and Western South Dakota because the new spending generated by SURF occurs not just in the surrounding region, but also in other parts of the state. We exclude from our analysis any economic activity that would have occurred even if SURF did not exist. We quantify the economic impact of SURF in terms of increased output (sales by businesses), employment, and household earnings.

**Net Economic Impact of Operations and Capital Spending.** We took the following steps to quantify the economic impact of operations and capital spending at SURF:

- We collected data on operations and capital spending by SDSTA and Fermilab in South Dakota and Western South Dakota in Fiscal Year 2020, as well as projected future spending in each area for Fiscal Years 2021 through 2029.
- After collecting the data, we identified the portion of SDSTA and Fermilab spending that constitutes “net new” spending in South Dakota and Western South Dakota, since not all economic activity associated with SURF is new. For example, a portion of SDSTA spending is funded by the State. If SURF did not exist, the State would likely still spend these funds elsewhere in South Dakota, meaning that State funding for SURF is not necessarily “new” to the South Dakota economy.

- Next, we applied U.S. Bureau of Economic Analysis RIMS II multipliers to SDSTA and Fermilab’s net new spending totals to determine the indirect economic impact of this spending. Indirect impacts occur as SDSTA and Fermilab suppliers purchase inputs and services to fulfill SURF’s demands, and those suppliers purchase inputs and services, and so on. We summed the direct and indirect economic impacts of SDSTA and Fermilab operations and capital spending to determine the overall net economic impact of this spending in South Dakota and Western South Dakota.

**Net Economic Impact of Visitor Spending.** We took the following steps to determine the net economic impact of SURF visitor spending:

- We collected data from SDSTA and Fermilab on visiting researchers at SURF, including information on their length of stay. We also collected data on per diem expenditures from the U.S. General Services Administration.
- Next, we used this data to estimate the net new spending by visitors in South Dakota and Western South Dakota to quantify their direct economic impact.
- We then applied U.S. Bureau of Economic Analysis RIMS II multipliers to this net new visitor spending to determine the indirect economic impact of visiting researchers in each study area. We summed the direct and indirect economic impacts to determine the total economic impact of visitor spending.

### *Net Fiscal Impact*

We built a tax impact model to quantify the new tax revenues that occur as a result of SURF increasing economic activity in each study area. Our tax impact model quantifies additional state sales tax, state construction excise tax, and municipal sales tax revenues generated due to SURF, as well as SDSTA’s direct payments to state and local governments for permits and services.

For a full description of our methodology, see “Appendix A. Methodology” on page A-1.



*The Yates Shaft at the Sanford Underground Research Facility in Lead, South Dakota. Source: South Dakota Science and Technology Authority.*

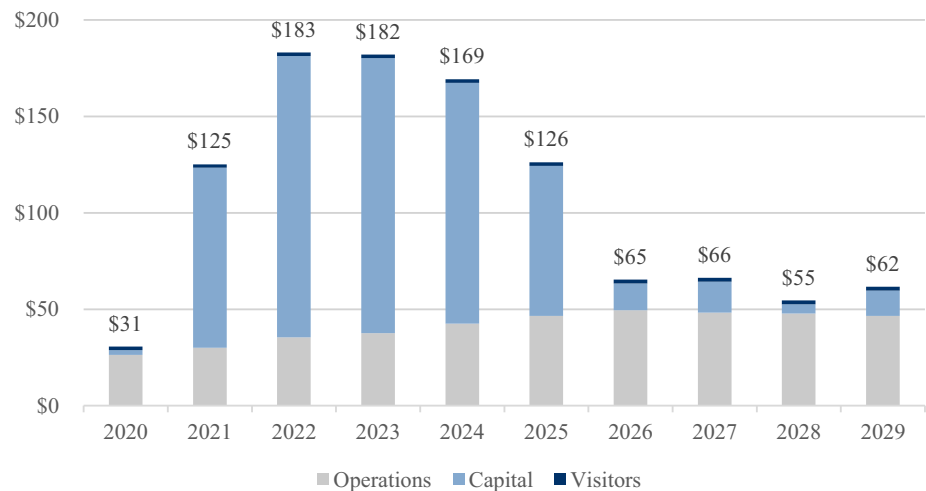
## OVERVIEW OF FINDINGS

Using the information available to us and the methodology described above, we concluded the following:

*1. SURF's net economic impact in South Dakota over the next decade will total \$1.06 billion in increased output, \$572 million in increased household earnings, and an average of 1,053 jobs annually.*

Over the next decade, SURF's presence in South Dakota will result in a net increase in sales by South Dakota businesses of \$1.06 billion. We show the breakdown of sales impacts each year in Figure 1 below.

**FIGURE 1. SURF Net Economic Impact on Output in South Dakota, by Impact Source, 2020 to 2029 (Millions)**



*Source: AEG analysis of base data from SDSTA, Fermilab, and U.S. General Services Administration; U.S. Bureau of Economic Analysis RIMS II multipliers.*

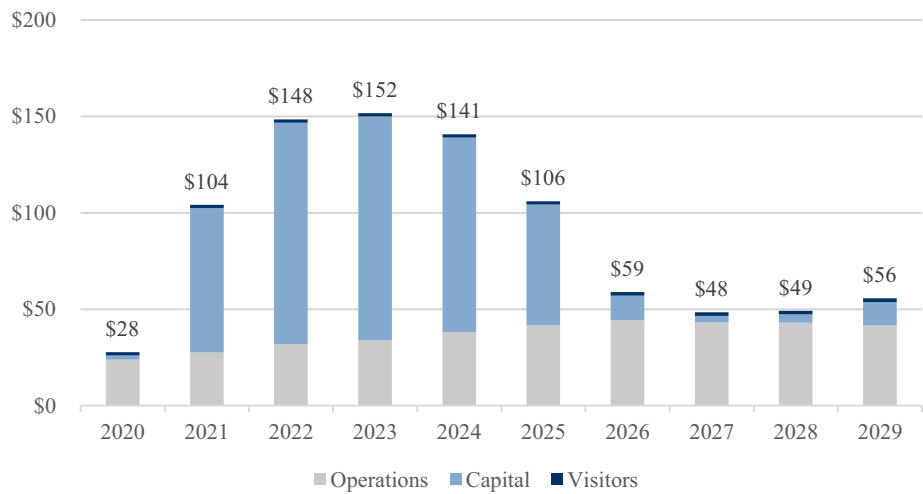
Spending at SURF will also increase household earnings for South Dakota residents by a cumulative \$572 million between 2020 and 2029. Total employment attributable to SURF will average 1,053 jobs annually.

For more information about SURF's net economic impact, see "Net Economic Impact of SURF in South Dakota and Western South Dakota" on page 6.

*2. SURF’s net economic impact in Western South Dakota over the next decade will total \$891 million in increased output, \$526 million in household earnings, and average 962 jobs annually.*

Over the next ten years, SURF’s presence in Western South Dakota will increase sales by Western South Dakota businesses by \$891 million. We show the breakdown of this impact by source and year in Figure 2 below.

**FIGURE 2. SURF Net Economic Impact on Output in Western South Dakota, by Impact Source, 2020-2029 (Millions)**



*Source: AEG analysis of base data from SDSTA, Fermilab, and U.S. General Services Administration; U.S. Bureau of Economic Analysis RIMS II multipliers.*

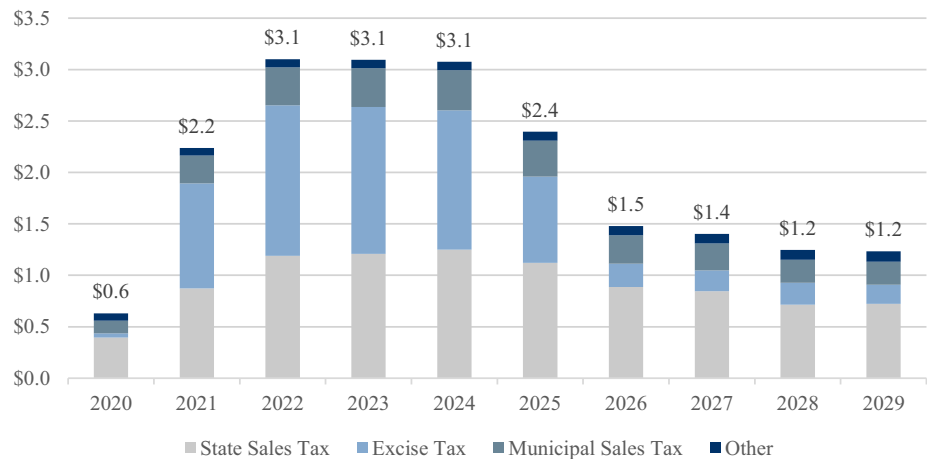
SURF visitor spending will also increase Western South Dakota household earnings by \$526 million, and support an average of 962 jobs per year.

For more information about SURF’s net economic impact, see “Net Economic Impact of SURF in South Dakota and Western South Dakota” on page 6.

*3. SURF’s net fiscal impact in South Dakota from 2020 to 2029 will total \$19.9 million in state and local tax revenues.*

Although SDSTA and Fermilab are tax exempt organizations, a portion of the increased economic activity created by SURF will be subject to state and local taxes. Over the next decade, SURF will generate a total of \$9.2 million in additional state sales tax revenue, \$2.9 million in additional municipal sales tax revenue, \$7.0 million in state contractor’s excise tax revenue, and \$850,000 in other revenues, including state tourism tax revenue and payments for permit fees and government services. This new revenue will grow from approximately \$600,000 in 2020 to over \$1.2 million in 2029, as shown in Figure 3 below.

**FIGURE 3. SURF Net Fiscal Impact by Revenue Source, 2020-2029 (Millions)**



*Source: AEG analysis of base data from SDSTA, Fermilab, U.S. Bureau of Labor Statistics Consumer Expenditure Survey, U.S. Census Bureau, and South Dakota Department of Revenue; U.S. Bureau of Economic Analysis RIMS II multipliers.*

For more information about SURF’s net fiscal impact, see “Net Fiscal Impact of SURF in South Dakota” on page 17.

**ABOUT ANDERSON  
ECONOMIC GROUP**

Founded in 1996, Anderson Economic Group is a boutique research and consulting firm, with offices in East Lansing, Michigan, and Chicago, Illinois. The experts at AEG have conducted nationally-recognized economic and fiscal impact studies for private, public, and non-profit clients across the United States. Past AEG clients include Fermi National Accelerator Laboratory, Argonne National Laboratory, and the University of Chicago. Our work has been used in legislative hearings, legal proceedings, and public debates, as well as major planning exercises and executive strategy discussions. For more information, please see “Appendix C. About Anderson Economic Group” on page C-1 or visit [www.AndersonEconomicGroup.com](http://www.AndersonEconomicGroup.com).

## *II. Net Economic Impact of SURF in South Dakota and Western South Dakota*

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In this section, we discuss the net economic impact of the Sanford Underground Research Facility (SURF) on the South Dakota and Western South Dakota economies. SURF is a leading center for multidisciplinary underground science research and hosts some of the world's most prominent science experiments.

The South Dakota Science and Technology Authority (SDSTA), which manages SURF, employs hundreds of people and spends millions of dollars each year to sustain its operations. SDSTA's capital expenditures to expand SURF's capacity for new experiments also inject money into the state and local economies. Additionally, a partnership with Fermi National Accelerator Laboratory (Fermilab) to construct and operate part of the Long-Baseline Neutrino Facility (LBNF) at SURF will result in significant spending and employment in South Dakota in the coming decades.

SURF also hosts a number of visiting researchers who contribute to the facility's economic impact when they spend money on meals and accommodation during their stay. In this chapter we quantify the net economic impact of each type of spending—operations, capital expenditures, and visitor spending—to determine SURF's total economic impact.

### **SURF BACKGROUND**

SURF is a leading multidisciplinary science research laboratory in Lead, South Dakota. Located in the former Homestake Gold Mine—once the largest and deepest gold mine in the Western Hemisphere—the facility's unique subterranean environment shields physics experiments from interference caused by cosmic radiation. For this reason, the mine has been sought out for physics research since the 1960s, when future Nobel Prize recipient Dr. Ray Davis began conducting his solar neutrino experiment there. The Homestake Gold Mine closed in 2002, and in 2004, SURF and SDSTA were established with philanthropic support from T. Denny Sanford, a land donation from the Barrick Gold Corporation, and funding from the State of South Dakota. Today SURF is home to a number of major experiments including two—LUX-ZEPLIN and LBNF/DUNE—that the U.S. Department of Energy has prioritized among its top five physics experiments.<sup>1</sup> SURF also hosts the Majorana Demonstrator experiment, a collaboration of over 100 researchers from around the world working to determine whether neutrinos are their own antiparticles—a question whose answer could fundamentally change scientists' understanding of particle physics.

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1. LUX-ZEPLIN is a dark matter detector built to search for theoretical particles known as WIMPs (weakly interacting massive particles). LBNF/DUNE is an experiment aiming to increase our understanding of neutrinos and their role in the creation of the universe.



Beyond SURF’s extensive scientific contributions, the facility is also an economic anchor in Western South Dakota, where SDSTA and Fermilab employ over 200 people and spend millions of dollars on local goods and services each year. This spending not only supports Western South Dakota businesses, but also spurs additional economic activity as those businesses use revenue from SDSTA and Fermilab to pay their employees and purchase inputs from other businesses in the region. SDSTA and Fermilab employees also support local economic activity as they spend their earnings in the region.



*The Sanford Underground Research Facility in Lead, SD, houses world-leading research. This image features an aerial view of the Yates Complex. Source: South Dakota Science and Technology Authority.*

## **NET ECONOMIC IMPACT DEFINED**

We define the net economic impact of SURF as the new economic activity in South Dakota and Western South Dakota that is caused by SDSTA and Fermilab’s operations and capital expenditures at the facility, as well as SURF visitor spending. We refer to this activity as “net new” economic activity. We quantify SURF’s economic impact in terms of increased output (sales by businesses), employment, and household earnings.

### *Direct and Indirect Impacts*

SURF makes a *direct* impact on the South Dakota and Western South Dakota economies when SDSTA and Fermilab purchase goods and services from local vendors and employ workers. SURF vendors and employees, in turn, increase their own expenditures, recirculating funds through the economy and generating *indirect* economic impacts. We account for both direct and indirect impacts in our analysis.

See “Net Economic Impact Analysis” on page A-1 for a complete description of our methodology.

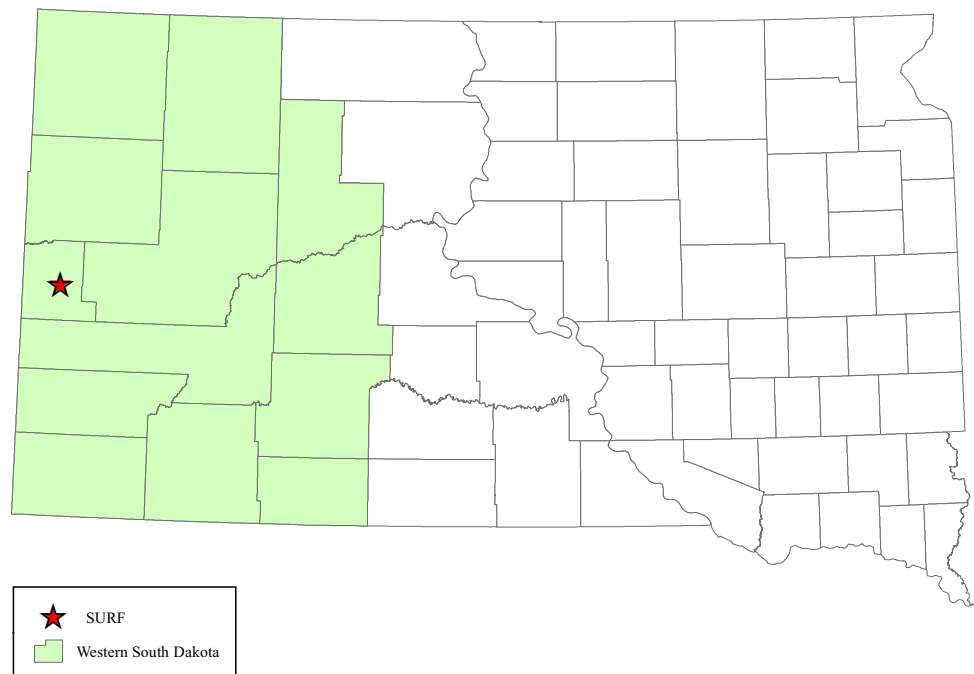
### *Impact Areas*

We estimate SURF’s net economic impact for two distinct geographic areas:

- Western South Dakota, including the counties of Bennett, Butte, Custer, Fall River, Haakon, Harding, Jackson, Lawrence, Meade, Oglala Lakota, Pennington, Perkins, and Ziebach (see Map 1 below); and
- South Dakota.

**MAP 1. Western South Dakota Impact Area**

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Source: Anderson Economic Group, Esri Inc.

## OPERATIONS IMPACT

Operating a leading research laboratory like SURF requires millions of dollars in spending each year. Examples of these operational expenditures include:

- Salaries, wages, and benefits for SDSTA and Fermilab employees;
- Equipment and supplies used to conduct experiments;
- Facility maintenance;
- Office supplies; and
- Utility costs.

In Fiscal Year 2020, SDSTA and Fermilab purchased \$9.8 million in goods and services from South Dakota businesses to support SURF's operations. They also spent \$14.4 million on salaries, wages, and health benefits for 205 South Dakota-based employees. SDSTA and Fermilab makes these expenditures using funds from a variety of sources, including funding from the federal government, state government, and private philanthropy.

In our analysis, we count a portion of this funding as “net new” to South Dakota and Western South Dakota. It is unlikely that SDSTA and Fermilab's federal funding would be spent in South Dakota if SURF did not exist; therefore it is “new” to the state and to Western South Dakota. The state funding SDSTA receives, however, would likely be spent elsewhere in South Dakota if SURF did not exist. Therefore, not all SURF operations spending is considered “net new” to South Dakota. In 2020, for example, we estimate that \$8.9 million of the spending for SURF operations was net new to the state, as were 187 of the jobs at SURF. In the following section, we discuss the economic impacts stemming from this net new activity in South Dakota and Western South Dakota.



*SURF's Majorana Demonstrator Project uses ultrapure copper and enriched germanium detectors to search for a rare form of decay that could explain why matter exists. Source: South Dakota Science and Technology Authority.*

### *South Dakota*

After accounting for net new funding, we estimate that, over the next ten years, SDSTA and Fermilab spending for SURF operations will increase sales by South Dakota businesses by \$410 million. Operations spending will also increase earnings for South Dakota residents by nearly \$333 million and will sustain an average of 537 jobs per year that would otherwise not exist if SURF was not located in South Dakota. We show these impacts in Table 1 below.

**TABLE 1. Net Economic Impact of SURF Operations in South Dakota, Fiscal Years 2020 to 2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$137	\$212	248 <sup>a</sup>
Indirect	\$274	\$121	290
<b>Total:</b>	<b>\$410</b>	<b>\$333</b>	<b>537</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

a. Direct employment figure includes 16 part-time employees.

### *Western South Dakota*

Spending for SURF operations will increase sales by Western South Dakota businesses by \$369 million over the next decade. Operations spending will also increase earnings for Western South Dakota residents by \$326 million, and sustain an average of 525 jobs per year that would otherwise not exist if SURF was not located in Western South Dakota. We show these impacts in Table 2 below.

**TABLE 2. Net Economic Impact of SURF Operations in Western South Dakota, Fiscal Years 2020 to 2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$131	\$214	247 <sup>a</sup>
Indirect	\$238	\$112	277
<b>Total:</b>	<b>\$369</b>	<b>\$326</b>	<b>525</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

a. Direct employment figure includes 14 part-time employees.

Because most of SDSTA and Fermilab's operations spending for SURF will occur in Western South Dakota, where the facility is located, the facility's direct impact on Western South Dakota is only slightly less than its direct impact on the state overall. SURF's indirect impact on Western South Dakota is much smaller, however, due to the fact that more spending leaks out of Western South Dakota as it recirculates through the economy, relative to the entire state overall.

For detailed estimates of the economic impact of SURF operations by fiscal year, see "Data Tables" on page A-7.

## **CAPITAL SPENDING IMPACT**

In addition to its regular operating expenditures, SDSTA and Fermilab also spend money on construction and capital equipment to accommodate new experiments. For example, 800,000 tons of rock is currently being excavated at SURF to house the particle detection system for LBNF/DUNE. We discuss the economic impact of SURF capital expenditures below.

### *South Dakota*

SDSTA and Fermilab's capital expenditures at SURF will increase sales by South Dakota businesses by \$635 million over the next decade, spurred largely by construction spending. This spending will also increase the wages of South Dakota residents by \$234 million and create an average of 497 jobs per year, as shown in Table 3 below.

**TABLE 3. Net Economic Impact of SURF Capital Expenditures in South Dakota, Fiscal Years 2020 to 2029**

<b>Impact Type</b>	<b>Output (millions)</b>	<b>Earnings (millions)</b>	<b>Average Annual Employment</b>
Direct	\$350	\$0	0
Indirect	\$285	\$234	497
<b>Total:</b>	<b>\$635</b>	<b>\$234</b>	<b>497</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

### *Western South Dakota*

SDSTA and Fermilab's capital expenditures at SURF will increase sales by Western South Dakota businesses by \$504 million. These expenditures will also



create \$195 million in new earnings for Western South Dakota households and will sustain an average of 418 jobs annually, as shown in Table 4 below.

**TABLE 4. Net Economic Impact of SURF Capital Expenditures in Western South Dakota, Fiscal Years 2020 to 2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$304	\$0	0
Indirect	\$200	\$195	418
<b>Total:</b>	<b>\$504</b>	<b>\$195</b>	<b>418</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

For detailed estimates of the economic impact of SURF capital expenditures by fiscal year, see “Data Tables” on page A-7.

## VISITOR IMPACT

SURF hosts visiting researchers from around the world who carry out experiments at the laboratory. Because these visiting researchers would not likely visit South Dakota if SURF did not exist, the money they spend on accommodations and meals during their stay constitutes new funds flowing into the South Dakota economy. We discuss the impacts of this spending below.



*Researchers with the LUX-ZEPLIN dark matter experiment installed the inner cryostat in a surface cleanroom, then worked with SDSTA crew to prepare for transport to the underground laboratory. Source: South Dakota Science and Technology Authority.*

### *South Dakota*

We estimate that SURF's visiting researchers will spend a total of \$11 million on accommodations and meals in South Dakota between 2020 and 2029. This spending will result in increased sales by South Dakota businesses of \$19 million in the next decade. Visitor spending will also increase the earnings of South Dakota households by \$6 million and will create an annual average of 19 jobs per year, as shown in Table 5 below.

**TABLE 5. Net Economic Impact of SURF Visitor Spending on South Dakota, Fiscal Years 2020-2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$11	\$0	0
Indirect	\$8	\$6	19
<b>Total:</b>	<b>\$19</b>	<b>\$6</b>	<b>19</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers, U.S. General Services Administration.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

### *Western South Dakota*

All estimated visitor spending will take place in Western South Dakota, where SURF is located. As a result, the estimated direct impact of visitor spending is the same for both South Dakota and Western South Dakota. However, the indirect impacts of visitor spending are less in Western South Dakota because a greater proportion of this spending leaks out of the region as it recirculates through Western South Dakota, relative to the state overall. The indirect output resulting from SURF visitor spending in Western South Dakota will total \$6 million between 2020 and 2029, for a total estimated output of \$18 million. This spending will also result in \$5 million in increased earnings for Western South Dakota residents and an annual average of 19 jobs, as shown in Table 6 below.

**TABLE 6. Net Economic Impact of SURF Visitor Spending on Western South Dakota, Fiscal Years 2020-2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$11	\$0	0
Indirect	\$6	\$5	19
<b>Total:</b>	<b>\$18</b>	<b>\$5</b>	<b>19</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers, U.S. General Services Administration.*

*Note: Direct and indirect figures may not sum to total figures due to rounding.*

For detailed estimates of the economic impact of SURF visitor spending by fiscal year, see “Data Tables” on page A-7.

## OVERALL NET ECONOMIC IMPACT

SURF’s net economic impact consists of the impacts resulting from SDSTA and Fermilab’s spending on SURF operations, capital expenditures, and SURF visitor spending.

### *South Dakota*

SDSTA and Fermilab’s spending on SURF operations and capital expenditures, combined with SURF visitor spending, will increase sales by South Dakota businesses by \$1.06 billion between Fiscal Years 2020 to 2029. This spending will also increase South Dakota household earnings by \$572 million and will sustain an average of 1,053 jobs per year, as shown in Table 7 below.

**TABLE 7. Total Net Economic Impact of SURF on South Dakota, Fiscal Years 2020 to 2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment
Direct	\$498	\$212	248 <sup>a</sup>
Indirect	\$566	\$360	805
<b>Total:</b>	<b>\$1,064</b>	<b>\$572</b>	<b>1,053</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

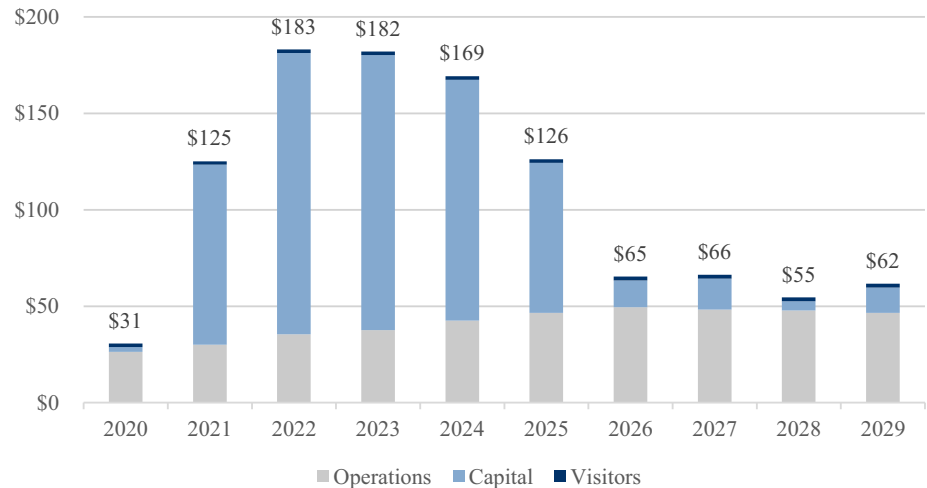
*Note: Direct and indirect figures may not sum to total figures due to rounding.*

a. Direct employment figure includes 16 part-time employees.

Figure 4 on page 15 summarizes SURF’s projected net economic impact on South Dakota in terms of output by year. The trajectories of employment and earnings impacts over time are similar.



**FIGURE 4. SURF Net Output in South Dakota, Fiscal Years 2020 to 2029 (Millions)**



Source: AEG analysis of base data from SDSTA and Fermilab, U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.

### Western South Dakota

SDSTA and Fermilab's spending on SURF operations and capital expenditures, combined with SURF visitor spending, will increase sales by Western South Dakota businesses by \$891 million between Fiscal Years 2020 to 2029. This spending will also increase Western South Dakota household earnings by \$526 million and sustain an average of 962 jobs per year, as shown in Table 8 below.

**TABLE 8. Total Net Economic Impact of SURF on Western South Dakota Region, Fiscal Years 2020 to 2029**

Impact Type	Output (millions)	Earnings (millions)	Average Annual Employment <sup>a</sup>
Direct	\$446	\$214	247
Indirect	\$445	\$313	714
<b>Total:</b>	<b>\$891</b>	<b>\$526</b>	<b>962</b>

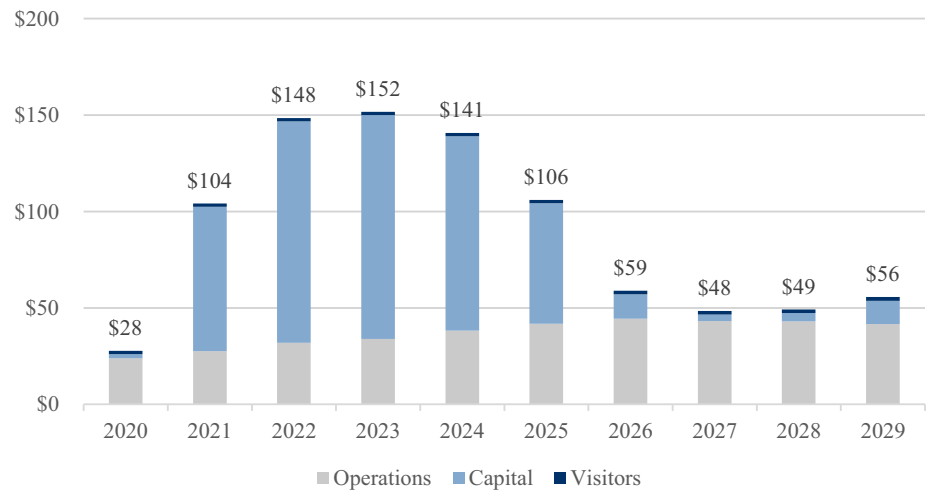
Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers.

Note: Direct and indirect figures may not sum to total figures due to rounding.

a. Direct employment figure includes 14 part-time employees.

Figure 5 below summarizes SURF’s projected net economic impact on Western South Dakota in terms of output by year. The trajectory of employment and earnings impacts over time are similar.

**FIGURE 5. Total Projected Output in Western South Dakota Due to SURF, Fiscal Years 2020 to 2029 (Millions)**



*Source: AEG analysis of base data from SDSTA and Fermilab, U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.*

For detailed estimates of SURF’s total economic impact by fiscal year, see “Data Tables” on page A-7.

### *III. Net Fiscal Impact of SURF in South Dakota*

In this section, we discuss the net tax revenue impact of SURF on state and local governments in South Dakota.

Although SDSTA and Fermilab are tax-exempt organizations, SURF generates tax revenue through:

- State contractor's excise taxes paid by SDSTA and Fermilab contractors;
- SDSTA's payments to state and local governments for permits and services;
- State sales taxes paid by SDSTA and Fermilab employees;
- State sales taxes paid by workers whose jobs are indirectly supported by SURF;
- State tourism taxes paid by SURF's visiting researchers;
- Municipal sales taxes paid by SDSTA and Fermilab employees; and
- Municipal sales taxes paid by workers whose jobs are indirectly supported by SURF.

#### **NET FISCAL IMPACT DEFINED**

We define the net fiscal impact of SURF as the amount of additional excise and sales tax revenues collected by the State of South Dakota and municipal governments because of SURF's existence, plus SDSTA's direct payments to state and local governments for permits and services.

See "Net Fiscal Impact Analysis" on page A-4 for a complete description of our methodology.



*The Ross Headframe at SURF is an iconic local landmark that will play an important role in LBNF/DUNE excavation and construction. Source: South Dakota Science and Technology Authority.*

## EXCISE TAX IMPACT

SDSTA and Fermilab’s construction spending at SURF is subject to South Dakota’s 2% construction excise tax. Between Fiscal Years 2020 and 2029, SDSTA and Fermilab are projected to spend \$349 million in net new taxable construction costs. As a result, SURF will generate \$7.0 million in new state excise tax revenues during this time period.

## STATE SALES TAX IMPACT

SURF generates sales tax revenues as SDSTA and Fermilab employees spend their earnings on taxable goods and services. We estimate that SDSTA and Fermilab employees spend approximately 89% of their salaries in South Dakota, and that 56% of this amount of their spending goes toward taxable goods and services. South Dakota’s state sales tax rate is 4.5%, resulting in an estimated \$4.7 million direct sales tax impact from Fiscal Years 2020 to 2029.

As SDSTA’s spending recirculates through the state economy, the spending generates additional indirect earnings, which are then also spent on taxable goods and services. We estimate that approximately 50% of these indirect earnings are spent in South Dakota, and that 56% of this amount is spent on taxable goods and services, resulting in an estimated indirect sales tax impact of \$4.5 million. The total state sales tax impact from increased earnings during this time period will be \$9.2 million, as shown in Table 9 below.

**TABLE 9. SURF State Sales Tax Revenue Impact from Increased Earnings, Fiscal Years 2020 to 2029**

Impact Source	Increase in Household Earnings (Millions)	Percent of Earnings Spent in SD	Spending Subject to Sales Tax	Total Sales Tax Revenue (Millions)
Direct	\$212	88.6%	55.9%	\$4.7
Indirect	\$358	50.0%	55.9%	\$4.5
<b>Total:</b>	<b>\$570</b>	<b>N/A</b>	<b>N/A</b>	<b>\$9.2</b>

*Source: Anderson Economic Group analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II Multipliers, U.S. Bureau of Labor Statistics Consumer Expenditure Survey.*

*Note: Direct and indirect figures may not sum to total figures due to rounding*

For detailed estimates of SURF’s state sales tax impact by fiscal year, see “Data Tables” on page A-7.

## MUNICIPAL SALES TAX IMPACT

In addition to generating state sales tax revenue, spending by SDSTA and Fermilab employees also generate municipal sales tax revenue. Municipal sales tax rates in South Dakota vary across the state, ranging from 0% to 2%. Using municipal population and tax rate data for municipalities near SURF, we estimated that employee spending is subject to an average municipal tax rate of 1.41%, resulting in an estimated \$1.5 million in direct municipal sales tax impact between Fiscal Years 2020 and 2029. We estimated that indirect earnings are subject to an average municipal tax rate of 1.40%, generating \$1.4 million in indirect municipal sales tax revenue during this time period. The total municipal sales tax impact during the next decade will be \$2.9 million, as shown in Table 10 below.

**TABLE 10. SURF Municipal Sales Tax Revenue Impact from Increased Earnings, Fiscal Years 2020 to 2029**

Impact Source	Increase in Household Earnings (Millions)	Percent of Earnings Spent in SD	Spending Subject to Sales Tax	Average Sales Tax Rate	Total Sales Tax Revenue (Millions)
Direct	\$212	88.6%	55.9%	1.41%	\$1.5
Indirect	\$358	50.0%	55.9%	1.40%	\$1.4
<b>Total:</b>	<b>\$570</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>\$2.9</b>

*Source: Anderson Economic Group analysis of base data from SDSTA, Fermilab, the South Dakota Department of Revenue, and the U.S. Bureau of Labor Statistics Consumer Expenditure Survey; U.S. Bureau of Economic Analysis RIMS II Multipliers.*

*Note: Direct and indirect figures may not sum to total figures due to rounding*

For detailed estimates of SURF’s net municipal sales tax impact by fiscal year, see “Data Tables” on page A-7.

## OTHER GOVERNMENT REVENUES

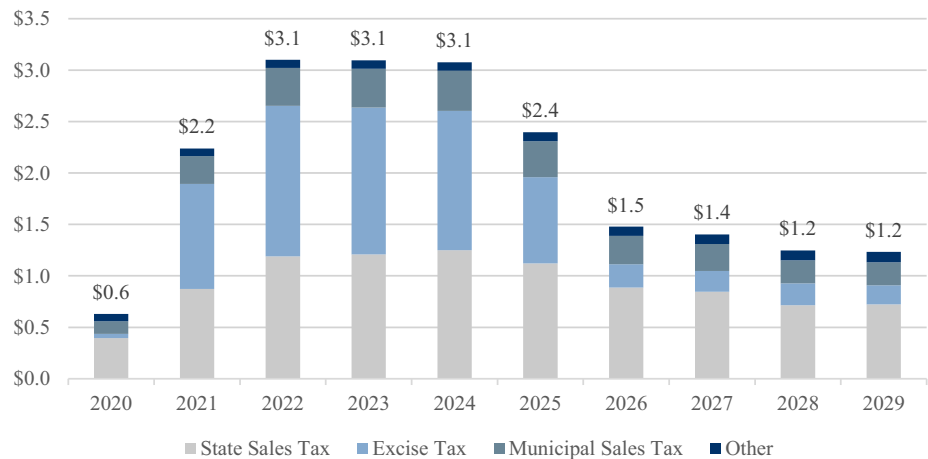
In addition to generating excise and sales tax revenues for state and local governments, SURF also generates state tourism taxes when its visiting researchers spend money on accommodations. Additionally, SDSTA makes direct payments to state and local governments for permits and services for SURF, including payments for SURF’s water release permit and annual audits conducted by the state government. Between Fiscal Years 2020 and 2029, SURF is projected to generate \$851,000 in state and local government revenues from tourism taxes and direct payments.

## OVERALL NET FISCAL IMPACT

SDSTA's direct payments for permits and government services, combined with government revenues SURF generates through state and municipal sales taxes, the contractor's excise tax, and the state tourism tax, will result in a total net fiscal impact of \$19.9 million from Fiscal Years 2020 to 2029.

We show SURF's future net fiscal impact on South Dakota by year and source in Figure 6 below.

**FIGURE 6. SURF Net Fiscal Impact, Fiscal Years 2020 to 2029 (Millions)**



*Source: AEG analysis of base data from SDSTA, U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. Bureau of Labor Statistics Consumer Expenditure Survey, U.S. Census Bureau, South Dakota Department of Revenue.*

For detailed estimates of SURF's total net fiscal impact by fiscal year, see "Data Tables" on page A-7.

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## *Appendix A. Methodology*

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In this section we provide a detailed discussion of our economic and fiscal impact analyses.

### **NET ECONOMIC IMPACT ANALYSIS**

We estimated SURF's net economic impact by analyzing employment counts, payroll and non-payroll expenditures, capital expenditures, and visitor data provided by SDSTA and Fermilab.

SDSTA and Fermilab provided us with the following data:

- Headcount of SDSTA and Fermilab employees by geography;
- Total payroll spending by geography;
- Non-payroll spending by geography and vendor industry;
- Capital spending by geography and industry; and
- Visiting researcher headcount and length of stay data.

Employee headcount, earnings, capital expenditures, and visitor data were provided for Fiscal Year 2020, and projected employee headcount, earnings, and expenditures data were provided for Fiscal Years 2021 through 2029.

### *Methodology*

In our analysis, we identify two distinct impacts of SURF—direct and indirect. Direct impacts are those economic impacts caused directly by SURF. This includes payments made by SDSTA and Fermilab to suppliers and employees directly hired and paid by SDSTA and Fermilab. Indirect impacts occur as money spent by SDSTA and Fermilab recirculates throughout the region and state economies.

**Direct Impact of Operations and Capital Expenditures.** We took the following steps to assess the direct economic impact of SDSTA and Fermilab's operations and capital expenditures for SURF:

1. Identified expenditures that occurred in each study area. We used location information provided in SDSTA and Fermilab expenditure data to quantify operations and capital expenditures that took place in South Dakota and Western South Dakota. For Fermilab capital expenditures, for which detailed location information was not available, we estimated that 50% of soft construction costs and 70% of hard construction costs would be spent at South Dakota businesses and that 45% of soft construction costs and 60% of hard construction costs would be spent at Western South Dakota businesses. We excluded some categories of expenditures, such as employee travel reimbursements, for which the actual spending was unlikely to have taken place in the study areas.
2. Estimated substitution rates to determine net new spending. Fermilab's spending at SURF is entirely funded by the federal government. Because this federal

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funding would almost certainly have been spent elsewhere in the absence of SURF, we estimated a substitution rate of 0% for Fermilab spending in South Dakota and Western South Dakota.

SDSTA's funding comes from three main sources:

- Federal funds;
- State funds; and
- Philanthropic funds.

Most of the funding for SDSTA operations and capital expenditures comes from federal funds which would not likely be spent in South Dakota or Western South Dakota if SURF did not exist. For these funds, we estimated a substitution rate of 0%.

For state funding, we estimated a high substitution rate based on the fact that, if SURF did not exist, the State of South Dakota would very likely spend these funds on other projects in South Dakota.

We also estimated a higher substitution rate for philanthropic funding. We based this estimate on the fact that it is likely that some of these philanthropic donations would still be made in South Dakota or Western South Dakota even if SURF did not exist.

Our overall substitution rates for South Dakota and Western South Dakota differ slightly since it is less likely that SDSTA's state and private philanthropic funding would be spent in Western South Dakota if SURF did not exist, compared to South Dakota overall.

Our estimated substitution rates for SDSTA spending in each area are shown in Table A-1 below.

**TABLE A-1. Substitution Rates for SDSTA Operations and Capital Expenditures in South Dakota and Western South Dakota, Fiscal Years 2020 to 2029**

<b>Fiscal Year</b>	<b>South Dakota</b>	<b>Western South Dakota</b>
2020	9.3%	6.9%
2021	13.4%	9.9%
2022	2.8%	1.7%
2023	2.8%	1.7%
2024	2.2%	1.4%
2025	2.2%	1.3%
2026	2.2%	1.3%
2027	1.8%	1.0%
2028	1.7%	1.0%
2029	1.7%	1.0%

*Source: Anderson Economic Group analysis of base data from SDSTA.*



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3. Determined trade margins for wholesale and retail spending. After determining the net new spending in each region, we calculated trade margins for spending on wholesale and retail trade goods. We calculated these trade margins to account for the fact that most wholesale and retail trade goods purchases are not actually made in South Dakota. Calculating retail and wholesale margins allows us to isolate only the portion of wholesale and retail trade transactions that actually happen in each respective geography. We used trade margin data from the U.S. Bureau of Economic Analysis Use Tables to calculate these margins.
  4. Summed employment and expenditure numbers to determine direct economic impact. After calculating substitution rates and trade margins, we multiplied SDSTA and Fermilab's spending in South Dakota and Western South Dakota by our substitution rates and trade margin estimates to determine the total direct economic impact of SURF in each year.

**Indirect Impact of Operations and Capital Expenditures.** We took the following steps to estimate the indirect economic impact of SDSTA and Fermilab's operations and capital expenditures:

1. Assigned net new SDSTA and Fermilab expenditures to economic impact multipliers. We used expense categories provided by SDSTA and expense descriptions from Fermilab to assign SURF-related expenditures in each study area to an appropriate economic impact multiplier.
2. Applied multipliers to determine indirect impact. After assigning multipliers to each type of expenditure, we multiplied the total direct impacts by each multiplier, and then subtracted out the direct impact to determine SURF's total indirect economic impact.

**Direct Impact of Visitor Spending.** We took the following steps to estimate the direct impact of spending by SURF's visiting researchers.

1. Determined the total number of visiting researchers and their average length of stay. We multiplied the total number of visitor days spent on-site (provided by SDSTA and Fermilab) by 1.15 to estimate the total number of visitor-days (both on- and off-site) spent in Western South Dakota in Fiscal Year 2020. We multiplied visitor days by 1.15 to account for travel time and weekend activity where visitors were likely in South Dakota or Western South Dakota but were not actively visiting SURF.

For future years, we assumed that visiting researcher trends would be the same in Fiscal Years 2021 to 2029. We also assumed that none of these visitors would have spent money in South Dakota or Western South Dakota if SURF did not exist (no substitution).

2. Determined total visitor spending on accommodations and meals. We multiplied the total number of visitor days spent in Western South Dakota by the U.S. General Services Administration per diem rates for Deadwood/Spearfish, South Dakota to estimate total visitor spending on accommodations and meals in Fiscal Year 2020. We assumed a 2% inflation rate to estimate per diem rates in future years and in turn used those estimates to determine visitor spending in Fiscal Years 2021 to 2029.

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**Indirect Impact of Visitor Spending.** We took the following steps to estimate the indirect impact of spending by SURF’s visiting researchers.

1. Assigned visitor expenditures to economic impact multipliers. We assigned economic impact multipliers for accommodations and food expenditures to our estimates of visitor spending in each category.
2. Applied multipliers to determine indirect impact. After assigning multipliers, we multiplied the total direct impacts by each multiplier, and then subtracted out the direct impact to determine the total indirect economic impact of visiting researcher spending.

### *COVID-19*

Our economic impact analysis utilizes RIMS II economic impact multipliers from the U.S. Bureau of Economic Analysis. The COVID-19 pandemic and related state-imposed restrictions on business activity, such as stay-at-home orders, have resulted in supply shortages and changes in consumer spending that do not align with several of the key assumptions underlying the RIMS II model. As a result, our economic impact estimates may differ from observed impacts.<sup>2</sup>

## **NET FISCAL IMPACT ANALYSIS**

We measured SURF’s net fiscal impact on South Dakota state excise and sales tax revenue, as well as its impact on municipal sales tax revenue in South Dakota. Our net fiscal impact analysis also includes direct payments by SDSTA to state and local governments for permits and services.

### *Methodology*

**State Contractor’s Excise Tax Impact.** We quantified SURF’s impact on state contractor’s excise tax revenue by multiplying the tax rate of 2% by SDSTA and Fermilab’s construction spending in Fiscal Year 2020 and its projected future construction spending in Fiscal Years 2021 through 2029.

**Direct Payments and Tourism Tax Impact.** We used data from SDSTA on its direct payments to state and local governments for permits and government services in Fiscal Year 2020 and its projected direct payments in Fiscal Years 2021 through 2029 to quantify SURF’s impact on government revenues from direct payments. To quantify SURF’s impact on state tourism tax revenues, we first used the results of our SURF visitor spending economic impact analysis to determine total estimated visitor spending on hotels in June through September (the months when the tax is levied) for Fiscal Years 2020 through 2029. We then multiplied this estimated hotel spending by the tourism tax rate of 1.5% to determine the amount of tourism tax revenue generated by SURF’s visiting researchers.

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2. For more information, see U.S. Bureau of Economic Analysis, “Use of RIMS II Multipliers—COVID-19,” <https://www.bea.gov/>.

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**Direct State Sales Tax Impact.** We took the following steps to estimate SURF's direct state sales tax impact:

1. Estimated the percentage of net new earnings that are spent by SDSTA and Fermilab employees. We used U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES) data and payroll spending data provided by SDSTA and Fermilab to estimate the proportion of earnings spent by employees. SDSTA's \$11.5 million in net new payroll expenditures in South Dakota in Fiscal Year 2020 was distributed across 174 net new employees, for an average earnings of \$66,122 per employee. Fermilab's \$1.7 million in net new payroll expenditures in South Dakota in Fiscal Year 2020 was distributed across 13 net new employees, for an average earnings of \$132,279 per employee. We consulted CES data and determined that individuals earning \$50,000 to \$69,999 annually spend 91.4% of their income and individuals earning \$100,000 to \$149,999 annually spend 70.0% of their income.
2. Determined the proportion of spending subject to sales tax in South Dakota, and then multiplied by consumer spending. We estimate that 55.9% of this spent income is subject to sales tax, based on our analysis of Consumer Expenditure Survey data and data on what types of goods and services are taxable according to the 2019 State Tax Handbook from CCH Publications. We then multiplied the proportion of spending that is subject to sales tax by the state sales tax rate of 4.5% to estimate the total direct sales tax impact.

**Indirect State Sales Tax Impact.** We took the following steps to estimate SURF's indirect state sales tax impact:

1. Estimated the percentage of indirect earnings that are spent. Estimating the percentage of indirect earnings that are spent is challenging as there is limited information available about the industries that new indirect earnings are spent on. Additionally, if indirect earnings create new jobs, then a larger portion of those earnings will be spent, as opposed to indirect earnings that are added to the income of individuals who are already employed. Because we cannot determine how indirect earnings are distributed, we made the simplifying assumption that the new indirect incremental earnings attributed to SURF would go to middle income households making \$50,000 to \$99,999. For this income bracket, we estimated that approximately 50% of these new marginal earnings would be spent (rather than saved) based on our analysis of Consumer Expenditure Survey data.
2. Multiplied the portion of new indirect earnings spent by the portion of spending subject to state sales tax, and the state sales tax rate. We multiplied total indirect earnings by 55.9% to determine total taxable spending, and then multiplied this amount by the state sales tax rate of 4.5% to determine a total indirect state sales tax impact.

**Direct Municipal Sales Tax Impact.** We took the following steps to estimate SURF's direct municipal sales tax impact:

1. Estimated the proportion of SDSTA and Fermilab employee earnings that are spent in municipalities in South Dakota. Using the methodology described

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above, we estimate that SDSTA employees spend 91.4% of their income in South Dakota municipalities and Fermilab employees spend 70.0%.

2. Determined the proportion of spending subject to municipal sales tax in South Dakota, and then multiplied by consumer spending. In South Dakota, transactions subject to state sales tax are also subject to municipal sales tax. We therefore estimated that 55.9% of this spent income is subject to municipal sales tax using the same methodology employed in our direct state sales tax impact analysis.
3. Estimated the average municipal sales tax rate paid by SDSTA and Fermilab employees. Municipal sales tax rates in South Dakota vary across the state, ranging from 0% to 2%. To estimate the average municipal tax rate SURF employee spending would be subject to, we first assumed that most of this spending would occur in Lawrence County, where SURF is located, and the surrounding counties of Butte, Meade, and Pennington. We then calculated an average municipal sales tax rate for this area by weighting each municipality's sales tax rate (as reported by the South Dakota Department of Revenue) by the municipality's proportion of the area's total population. We calculated the weighted average tax rate to be 1.41%.
4. Estimated the total direct municipal sales tax impact. We multiplied the proportion of employee spending subject to sales tax by the weighted municipal sales tax rate of 1.41% to determine the total direct municipal sales tax impact.

**Indirect Municipal Sales Tax Impact.** We took the following steps to estimate SURF's indirect municipal sales tax impact:

1. Estimated that approximately 50% of indirect earnings are spent using the same methodology employed in our indirect sales tax impact analysis.
2. Multiplied the portion of new indirect earnings spent by the portion of spending subject to municipal sales tax. We multiplied total indirect earnings by 55.9% to determine the amount of spent indirect earnings subject to municipal sales tax.
3. Estimated the average municipal sales tax rate in South Dakota. As discussed above, municipal sales tax rates vary across the state, ranging from 0% to 2%. Indirect earnings result from SDSTA and Fermilab's initial direct spending recirculating throughout the state. Those indirect earnings may therefore be spent throughout the state. We calculated an average municipal sales tax rate across South Dakota by weighting each municipality's sales tax rate by the municipality's proportion of the state's total population. We calculated the weighted average tax rate to be 1.40%.
4. Estimated the total indirect municipal sales tax impact. We multiplied the total amount of spent indirect earnings subject to municipal sales tax by the state's weighted municipal sales tax rate of 1.40% to determine the total indirect municipal sales impact.

## DATA TABLES

### South Dakota Economic Data Tables

**TABLE A-2. Net Economic Impact of SURF Operations in South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$8,892	\$17,350	\$26,242	\$13,258	\$7,835	\$21,093	187	189	376
2021	\$10,485	\$19,479	\$29,964	\$14,759	\$8,763	\$23,522	194	209	403
2022	\$12,554	\$22,806	\$35,360	\$17,076	\$10,306	\$27,382	216	245	462
2023	\$13,244	\$24,362	\$37,607	\$18,304	\$10,963	\$29,267	223	261	485
2024	\$13,689	\$28,829	\$42,518	\$22,969	\$12,513	\$35,483	272	302	574
2025	\$14,281	\$32,278	\$46,559	\$26,419	\$13,751	\$40,170	304	334	638
2026	\$14,818	\$34,698	\$49,516	\$28,687	\$14,657	\$43,344	325	357	682
2027	\$15,205	\$33,009	\$48,214	\$26,289	\$14,244	\$40,534	292	345	637
2028	\$16,835	\$31,009	\$47,845	\$22,934	\$13,915	\$36,848	242	331	573
2029	\$16,703	\$29,773	\$46,476	\$21,295	\$13,564	\$34,859	223	322	545
Total*	\$136,707	\$273,593	\$410,300	\$211,992	\$120,511	\$332,503	248	290	537

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers.

\*Total employment figures represent annual averages.

**TABLE A-3. Net Economic Impact of SURF Capital Expenditures in South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$1,432	\$1,178	\$2,609	\$0	\$955	\$955	0	20	20
2021	\$51,419	\$42,021	\$93,439	\$0	\$34,339	\$34,339	0	730	730
2022	\$80,323	\$65,652	\$145,975	\$0	\$53,640	\$53,640	0	1,140	1,140
2023	\$78,432	\$64,157	\$142,590	\$0	\$52,369	\$52,369	0	1,113	1,113
2024	\$68,744	\$56,131	\$124,875	\$0	\$45,917	\$45,917	0	976	976
2025	\$42,876	\$34,819	\$77,695	\$0	\$28,670	\$28,670	0	609	609
2026	\$7,742	\$6,141	\$13,883	\$0	\$5,201	\$5,201	0	110	110
2027	\$8,947	\$7,178	\$16,125	\$0	\$5,997	\$5,997	0	127	127
2028	\$2,607	\$2,059	\$4,666	\$0	\$1,753	\$1,753	0	37	37
2029	\$7,203	\$5,957	\$13,160	\$0	\$4,799	\$4,799	0	102	102
Total*	\$349,726	\$285,292	\$635,018	\$0	\$233,640	\$233,640	0	497	497

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers.

\*Total employment figures represent annual averages.

**TABLE A-4. Net Economic Impact of SURF Visitor Spending in South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$1,066	\$703	\$1,769	\$0	\$523	\$523	0	18	18
2021	\$1,060	\$699	\$1,759	\$0	\$520	\$520	0	18	18
2022	\$1,081	\$713	\$1,794	\$0	\$530	\$530	0	18	18
2023	\$1,103	\$728	\$1,830	\$0	\$541	\$541	0	18	18
2024	\$1,125	\$742	\$1,867	\$0	\$551	\$551	0	19	19
2025	\$1,147	\$757	\$1,904	\$0	\$562	\$562	0	19	19
2026	\$1,170	\$772	\$1,942	\$0	\$574	\$574	0	20	20
2027	\$1,193	\$788	\$1,981	\$0	\$585	\$585	0	20	20
2028	\$1,217	\$803	\$2,021	\$0	\$597	\$597	0	20	20
2029	\$1,242	\$820	\$2,061	\$0	\$609	\$609	0	21	21
Total*	\$11,403	\$7,527	\$18,930	\$0	\$5,591	\$5,591	0	19	19

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.

\*Total employment figures represent annual averages.

**TABLE A-5. Overall Net Economic Impact of SURF in South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$11,389	\$19,231	\$30,620	\$13,258	\$9,313	\$22,571	187	227	414
2021	\$62,963	\$62,199	\$125,162	\$14,759	\$43,621	\$58,380	194	957	1,151
2022	\$93,958	\$89,171	\$183,130	\$17,076	\$64,476	\$81,553	216	1,404	1,620
2023	\$92,779	\$89,247	\$182,026	\$18,304	\$63,873	\$82,177	223	1,393	1,616
2024	\$83,558	\$85,703	\$169,260	\$22,969	\$58,982	\$81,951	272	1,297	1,569
2025	\$58,305	\$67,854	\$126,159	\$26,419	\$42,983	\$69,403	304	962	1,267
2026	\$23,730	\$41,611	\$65,341	\$28,687	\$20,432	\$49,119	325	487	812
2027	\$25,345	\$40,975	\$66,320	\$26,289	\$20,826	\$47,116	292	492	785
2028	\$20,660	\$33,872	\$54,532	\$22,934	\$16,265	\$39,198	242	389	630
2029	\$25,148	\$36,549	\$61,698	\$21,295	\$18,971	\$40,267	223	445	668
Total*	\$497,837	\$566,411	\$1,064,248	\$211,992	\$359,742	\$571,734	248	805	1,053

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.

\*Total employment figures represent annual averages.

**Western South Dakota Economic Data Tables**

**TABLE A-6. Net Economic Impact of SURF Operations in Western South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$8,569	\$15,223	\$23,792	\$13,519	\$7,358	\$20,877	188	183	371
2021	\$10,253	\$17,311	\$27,564	\$15,201	\$8,332	\$23,533	197	204	402
2022	\$12,001	\$19,818	\$31,819	\$17,226	\$9,580	\$26,806	216	234	450
2023	\$12,669	\$21,176	\$33,845	\$18,465	\$10,195	\$28,660	223	250	472
2024	\$13,062	\$25,085	\$38,148	\$23,101	\$11,628	\$34,730	271	289	560
2025	\$13,633	\$28,134	\$41,767	\$26,558	\$12,791	\$39,349	303	320	623
2026	\$14,145	\$30,252	\$44,397	\$28,828	\$13,637	\$42,464	323	342	666
2027	\$14,495	\$28,665	\$43,160	\$26,418	\$13,222	\$39,640	291	330	621
2028	\$16,099	\$26,832	\$42,932	\$23,062	\$12,908	\$35,970	240	316	556
2029	\$15,946	\$25,665	\$41,611	\$21,429	\$12,558	\$33,987	221	306	528
Total*	\$130,873	\$238,163	\$369,036	\$213,808	\$112,209	\$326,017	247	277	525

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers

\*Total employment figures represent annual averages.

**TABLE A-7. Net Economic Impact of SURF Capital Expenditures in Western South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$1,350	\$902	\$2,253	\$0	\$862	\$862	0	19	19
2021	\$45,065	\$29,766	\$74,831	\$0	\$28,933	\$28,933	0	620	620
2022	\$69,230	\$45,725	\$114,955	\$0	\$44,450	\$44,450	0	953	953
2023	\$69,875	\$46,186	\$116,062	\$0	\$44,848	\$44,848	0	962	962
2024	\$60,699	\$40,071	\$100,770	\$0	\$38,981	\$38,981	0	836	836
2025	\$37,672	\$24,776	\$62,449	\$0	\$24,238	\$24,238	0	519	519
2026	\$7,698	\$4,997	\$12,696	\$0	\$4,984	\$4,984	0	107	107
2027	\$2,100	\$1,285	\$3,385	\$0	\$1,396	\$1,396	0	30	30
2028	\$2,622	\$1,698	\$4,320	\$0	\$1,700	\$1,700	0	36	36
2029	\$7,256	\$4,830	\$12,086	\$0	\$4,641	\$4,641	0	100	100
Total*	\$303,568	\$200,238	\$503,805	\$0	\$195,033	\$195,033	0	418	418

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers.

\*Total employment figures represent annual averages.

**TABLE A-8. Net Economic Impact of SURF Visitor Spending in Western South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$1,066	\$600	\$1,666	\$0	\$504	\$504	0	18	18
2021	\$1,060	\$597	\$1,656	\$0	\$501	\$501	0	17	17
2022	\$1,081	\$608	\$1,689	\$0	\$511	\$511	0	18	18
2023	\$1,103	\$621	\$1,723	\$0	\$521	\$521	0	18	18
2024	\$1,125	\$633	\$1,758	\$0	\$531	\$531	0	19	19
2025	\$1,147	\$646	\$1,793	\$0	\$542	\$542	0	19	19
2026	\$1,170	\$659	\$1,829	\$0	\$553	\$553	0	19	19
2027	\$1,193	\$672	\$1,865	\$0	\$564	\$564	0	20	20
2028	\$1,217	\$685	\$1,903	\$0	\$575	\$575	0	20	20
2029	\$1,242	\$699	\$1,941	\$0	\$587	\$587	0	20	20
Total*	\$11,403	\$6,419	\$17,822	\$0	\$5,388	\$5,388	0	19	19

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.

\*Total employment figures represent annual averages.

**TABLE A-9. Overall Net Economic Impact of SURF in Western South Dakota, Fiscal Years 2020 to 2029**

Fiscal Year	Output (Thousands)			Earnings (Thousands)			Employment		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
2020	\$10,985	\$16,726	\$27,711	\$13,519	\$8,724	\$22,243	188	219	407
2021	\$56,377	\$47,674	\$104,051	\$15,201	\$37,766	\$52,967	197	842	1,040
2022	\$82,312	\$66,152	\$148,464	\$17,226	\$54,540	\$71,767	216	1,205	1,421
2023	\$83,647	\$67,983	\$151,630	\$18,465	\$55,564	\$74,029	223	1,230	1,452
2024	\$74,885	\$65,790	\$140,675	\$23,101	\$51,141	\$74,242	271	1,143	1,414
2025	\$52,453	\$53,556	\$106,009	\$26,558	\$37,571	\$64,129	303	858	1,162
2026	\$23,014	\$35,907	\$58,921	\$28,828	\$19,173	\$48,001	323	468	792
2027	\$17,788	\$30,622	\$48,410	\$26,418	\$15,182	\$41,601	291	379	670
2028	\$19,939	\$29,216	\$49,155	\$23,062	\$15,183	\$38,245	240	372	612
2029	\$24,444	\$31,194	\$55,638	\$21,429	\$17,785	\$39,215	221	427	648
Total*	\$445,844	\$444,819	\$890,663	\$213,808	\$312,630	\$526,438	247	714	962

Source: AEG analysis of base data from SDSTA and Fermilab; U.S. Bureau of Economic Analysis RIMS II multipliers, U.S. General Services Administration.

\*Total employment figures represent annual averages.



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**Fiscal Impact Table**

**TABLE A-10. Net Fiscal Impact of SURF in South Dakota, Fiscal Years 2020 to 2029**

<b>Fiscal Year</b>	<b>State Sales Tax</b>	<b>Municipal Sales Tax</b>	<b>Excise Tax</b>	<b>Other</b>	<b>Total</b>
2020	\$412,299	\$128,708	\$40,317	\$70,878	\$652,202
2021	\$874,173	\$272,297	\$1,018,837	\$73,723	\$2,239,030
2022	\$1,189,230	\$370,307	\$1,462,979	\$76,965	\$3,099,480
2023	\$1,208,622	\$376,386	\$1,428,884	\$80,352	\$3,094,245
2024	\$1,250,373	\$389,565	\$1,353,079	\$83,744	\$3,076,761
2025	\$1,120,987	\$349,500	\$839,635	\$86,816	\$2,396,937
2026	\$885,312	\$276,358	\$226,623	\$89,922	\$1,478,216
2027	\$844,528	\$263,593	\$202,146	\$93,057	\$1,403,325
2028	\$713,842	\$222,837	\$214,512	\$96,165	\$1,247,356
2029	\$723,281	\$225,722	\$184,098	\$99,279	\$1,232,380
Total	\$9,222,647	\$2,875,272	\$6,971,111	\$850,901	\$19,919,931

*Source: AEG analysis of base data from SDSTA, Fermilab, U.S. Bureau of Labor Statistics Consumer Expenditure Survey, U.S. Census Bureau, South Dakota Department of Revenue; U.S. Bureau of Economic Analysis RIMS II multipliers.*

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## *Appendix B. Works Consulted*

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CCH Publications, *State Tax Handbook (2019)*, Dec. 28, 2018.

South Dakota Department of Revenue, “Municipal Tax Guide,” July 2019, <https://dor.sd.gov/>.

South Dakota Science and Technology Authority data on actual operations and capital expenditures for Fiscal Year 2020 and projected operations and capital expenditures for Fiscal Years 2021 to 2029.

South Dakota Science and Technology Authority data on actual employee headcount for Fiscal Year 2020 and projected employee headcount for Fiscal Years 2021 to 2029.

South Dakota Science and Technology Authority data on number of visiting researchers and length of stay in Fiscal Year 2020.

South Dakota Science and Technology Authority data on payments subject to state construction excise tax in Fiscal Year 2020 and projected payments subject to state construction excise tax for Fiscal Years 2021 to 2029.

South Dakota Science and Technology Authority data on funding sources.

U.S. Bureau of Economic Analysis RIMS II Economic Impact Multipliers for South Dakota and the Bennett-Butte-Custer-Fall River-Haakon-Harding-Jackson-Lawrence-Meade-Oglala Lakota-Pennington-Perkins-Ziebach region.

U.S. Bureau of Labor Statistics Consumer Expenditure Survey.

U.S. Census Bureau American Community Survey.

U.S. General Services Administration Per Diem Rates.

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## *Appendix C. About Anderson Economic Group*

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Anderson Economic Group is a boutique consulting firm founded in 1996, with offices in East Lansing, Michigan and Chicago, Illinois. With over two decades of experience, our firm is among the leading experts in market analyses, strategy, business valuation, and public policy. Our team has a deep understanding of advanced economic modeling techniques and extensive experience in multiple industries across most states and many countries.

The consultants at Anderson Economic Group are often published on topics within their respective fields of expertise. Publications from our team include:

- *Economic and Fiscal Impact of Fermilab*, published in 2019.
- *Economic, Social, and Cultural Contributions of Chicago's Colleges and Universities*, published in 2014 and 2018.
- *Economic Impact of Michigan Technological University*, published in 2018.
- *Economic and Fiscal Impact of the McDonald's Headquarters Relocation and Economic Footprint of Chicago Restaurant Operations*, 2018.
- *Economic and Fiscal Impact of Fort Custer Industrial Park*, 2018.
- *Economic Impact of Fermilab's Long-Baseline Neutrino Initiative*, published in 2016.
- *Economic Impact of the Barack Obama Presidential Library in Chicago*, published in 2015.
- *Economic Impact of Fermilab and Argonne National Laboratory*, published in 2011.

Past clients of Anderson Economic Group include:

- *Governments*: The government of Canada; the states of Michigan, North Carolina, and Wisconsin; the cities of Detroit, Cincinnati, and Sandusky; counties such as Oakland County, and Collier County; and authorities such as the Detroit-Wayne County Port Authority.
- *Corporations*: Bank of America Merrill Lynch, InBev USA, ITC Holdings Corp., Ford Motor Company, First Merit Bank, Labatt USA, Lithia Motors, Meijer, Inc., National Wine & Spirits, Nestle, and Relevant Sports; automobile dealers and dealership groups representing Toyota, Honda, Chrysler, Mercedes-Benz, General Motors, Kia, and many other brands.
- *Nonprofit organizations*: Convention and visitor bureaus of several major cities; higher education institutions including Michigan State University, Wayne State University, and University of Michigan; trade associations such as the Michigan Manufacturers Association, Service Employees International Union, Automation Alley, and Business Leaders for Michigan.

Please visit [www.AndersonEconomicGroup.com](http://www.AndersonEconomicGroup.com) for more information.

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## AUTHORS

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Brian R. Peterson is a consultant and the director of the public policy and economic analysis practice area at Anderson Economic Group. In addition to conducting economic and fiscal impact analyses, Mr. Peterson works with public and private clients across the country on projects that include pension reform and compensation analysis, housing policy, and environmental economics.

Mr. Peterson holds a Master of Urban Planning from the University of Wisconsin—Milwaukee and a Bachelor of Arts in economics and urban studies from the University of Minnesota—Twin Cities.

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