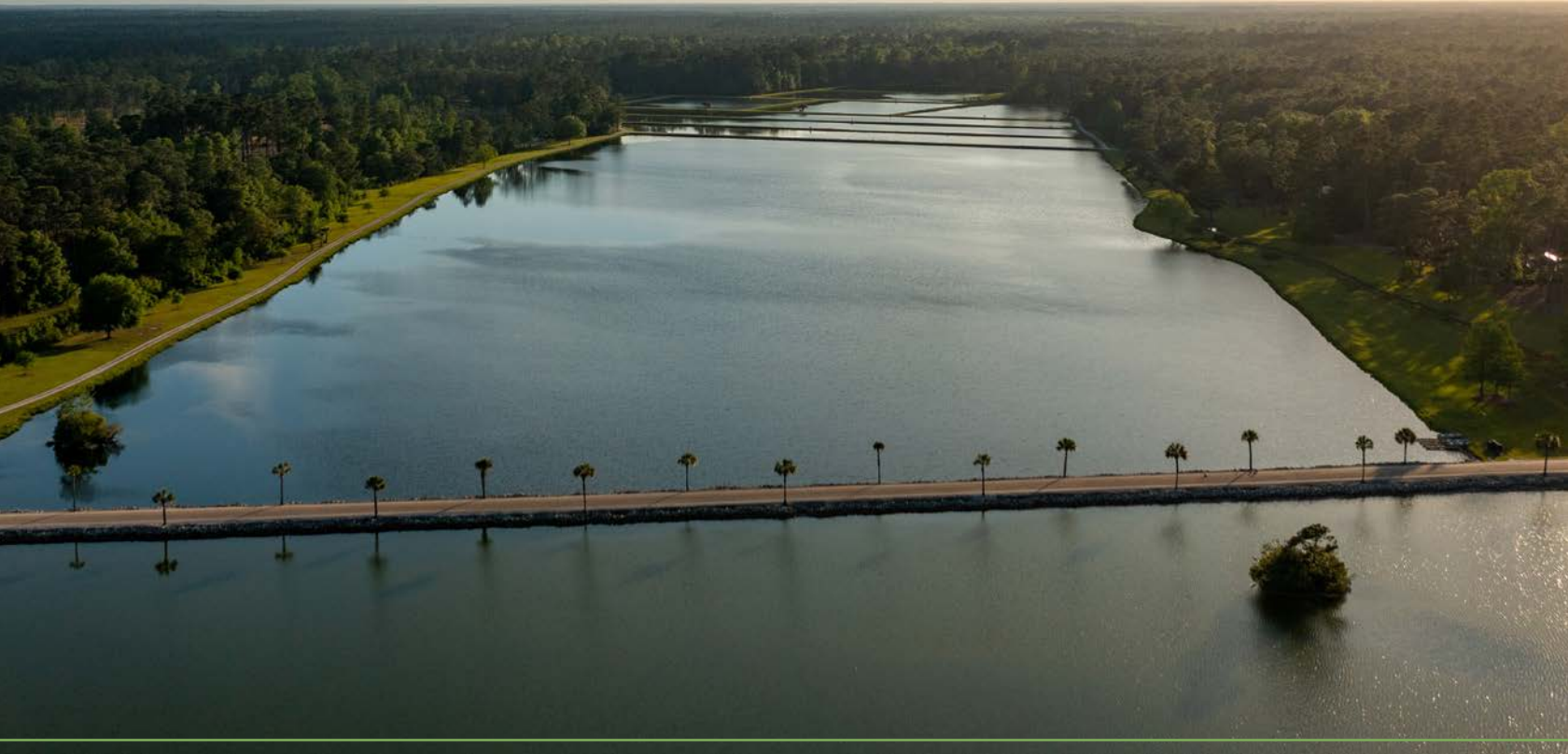


THE ECONOMIC IMPACT OF SUSTAINABILITY



SUSTAIN  **SC**
commerce + conservation

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Commissioned by:



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Executive Summary

Due to rising consumer demand in recent years, business investment in the development of technologies focused on sustainability has grown dramatically throughout the United States. For example, approximately two-thirds of all companies included in the S&P 500 currently maintain carbon emission reduction targets, while roughly 35 percent of the largest publicly traded companies in the United States have specific net zero commitments.

In South Carolina, consumer demand for greater sustainability can perhaps most easily be observed within automotive manufacturing as the industry pivots towards the production of electric vehicles (EVs). In addition to producing vehicles that generate a smaller carbon footprint when being operated, automotive manufacturers are also looking to reduce the carbon footprint associated with the production process itself. This means that automotive manufacturers in South Carolina and their supply chains are increasingly looking to power their facilities using electricity produced from renewables. This latter goal is shared by many other manufacturers in the state as well.

Such trends imply that business' ability to access sustainable technologies will become increasingly important for South Carolina's economic growth over time, with businesses across many industry sectors looking to meet the increasing market demand for consumer goods that fulfill various sustainability targets. Moreover, a lack of access to these technologies may also limit future in-state investments. The purpose of this study is twofold: (1) to conduct a survey of South Carolina businesses in order to determine their specific sustainable technology needs and (2) to then quantify the potential economic benefits that could accrue to the Palmetto State if these needs are met. These benefits represent economic activity generated by South Carolina-based firms that may only occur if firms have the resources necessary to meet their market driven sustainability goals.

The key findings of this study are as follows:

- **Survey respondents are generally optimistic about the future of the South Carolina and United States economies, with firms expecting an average annual revenue growth rate of approximately four percent over the next decade.** This suggests that businesses expect to experience growth at a rate that is historically comparable to South Carolina's economy as a whole, which has averaged 3.9 percent GDP growth annually between 2010 and 2020.
- **Approximately 46 percent of survey respondents indicate that these revenue projections would be negatively impacted without sufficient access to sustainable technologies, with larger companies being the most likely to be affected.** Roughly 62.5 percent of survey respondents with more than 500 employees stated that their revenue projections rely on access to sustainable technologies compared to just 37.5 percent of those with fewer than 500 employees.

Executive Summary

- **The most commonly cited categories of sustainable technology need among all businesses surveyed were Solar Energy, Renewable Natural Gas, Landfill and/or Organic Waste Innovations, and Electric Vehicle Infrastructure.**
- Survey respondents were asked about the extent to which a lack of access to sustainable technologies could lower their future growth rates and in-state investment. Based on the responses provided, **this study estimates that over the next ten years, a lack of sufficient access to sustainable technologies could generate losses of between \$30.2 billion and \$101.2 billion in total economic activity for South Carolina.**
- **These economic losses are not solely isolated to the decrease in business growth among firms needing access to sustainable technologies.** When these firms reduce their purchase activity with in-state suppliers, this sets off a supply-chain “ripple effect,” in which suppliers experience a decrease in demand, which then affects spending activity with their own set of vendors, and so on. Similarly, any reduction in hiring that accompanies this decreased business growth lowers household spending levels, which can negatively impact a variety of industry sectors.
- In addition to reducing in-state investments, **approximately 6.8 percent of survey respondents also indicated that they would be “very likely” to relocate their existing South Carolina facilities elsewhere if they were unable to meet their sustainable technology requirements.**
- **Approximately 67.1 percent of survey respondents reported that their employees will need to have sustainability-related expertise in the future.** While many firms report that their workforce already possesses this expertise, the following specific skillsets were the most likely to be cited as requiring new hires: Engineering & Sustainability, Supply Chain & Sustainable Sourcing, Manufacturing & Sustainability, and Data Analysis & Logistics.



SECTION I

INTRODUCTION

Due to rising industry and consumer demand over the past decade, investments in the development of sustainable innovative technologies have grown dramatically throughout the United States in an effort to help facilitate a long-run transition to an economy that is more focused on sustainability. This can be observed in many ways, including through ongoing investments in renewable energy sources. For example, according to the U.S. Energy Information Administration (EIA), U.S. power generation from renewables will increase from 21 percent in 2022 to 44 percent by 2050. Worldwide, there is expected to be more than \$1.8 trillion invested in clean energy in 2023, according to the International Energy Agency (IEA).¹

Business is responding to consumer demands for more sustainable and environmentally friendly products. A study by NielsenIQ found that 78 percent of U.S. consumers say that a sustainable lifestyle is important to them while a 2020 McKinsey US consumer sentiment survey found that more than 60 percent of respondents said they'd pay more for a product with sustainable packaging.² Thus, goals for sustainability are becoming the norm for many of the nation's largest companies. According to the Harvard Business Review, more than 700 of the largest 2,000 publicly traded companies have made net zero commitments while two-thirds of the S&P 500 have set various emission reduction targets.³

Cleaner energy sources and lower carbon emissions are just two of the areas businesses are looking to tackle in the realm of sustainability. Responsible and more sustainable waste management processes; water use reduction; and sustainable chemical, agricultural, and material use are also part of many firms' goals. Building an industrial ecosystem to collect, reuse, and recycle waste can help to reduce waste sent to landfills while helping to increase the conservation of natural resources such as timber, water, and minerals.



¹ <http://www.iea.org>; <http://www.eia.gov>

² <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets>

³ <https://hbr.org/2022/08/why-companies-arent-living-up-to-their-climate-pledges>



SUSTAINABILITY IN SOUTH CAROLINA

In South Carolina, one of the primary drivers of demand for renewable energy has been the manufacturing industry – including in automotive manufacturing. The U.S. automotive industry is currently undergoing a rapid transformation towards the increased production of electric vehicles (EVs) due to rising global demand. In addition to producing vehicles that generate a smaller carbon footprint when being operated, automotive manufacturers are also looking to reduce the carbon footprint associated with the production process itself.

This means that automotive manufacturers in South Carolina and their supply chains are increasingly looking to power their facilities using electricity produced from renewables. Given that manufacturing is one of the state’s largest industry sectors and supports nearly 30 percent of South Carolina’s total employment base, the availability of renewable energy resources will become increasingly important over time as South Carolina seeks to continue to expand its manufacturing footprint.⁴

Data from the EIA show that energy-related carbon emissions in South Carolina peaked in 2004 at 90.3 million metric tons. However, the state has already experienced a significant reduction in energy-related carbon emissions since that time. As of 2021, energy-related carbon emissions were down 23.2 percent to 69.3 million metric tons. Since the year 2000, South Carolina (-15.5%) has been slightly behind national (-16.2%) declines in energy-related carbon emissions.⁵

⁴ Source: The Economic Impact of Manufacturing in South Carolina, South Carolina Manufacturers Alliance, March 2021

⁵ State energy-related carbon dioxide emissions by year (1970-2021), EIA

Section I

At the same time that consumers and businesses are demanding more renewable energy and other sustainable technologies, there is also an accompanying need for a new talent pipeline. In its 2022 Global Green Skills Report, LinkedIn showed an uptick of “green talent demand” increasing from 9.6 percent in 2015 to 13.3 percent in 2021 (a growth rate of 38.5%). With over 1,200 global companies in South Carolina committed to sustainability goals to become net zero, water positive, and zero waste, it is likely that there will be a steady increase in demand for these skills at the state level.

The purpose of this research effort is to survey South Carolina firms in order to document the potential economic impacts associated with sustainable economic innovation in South Carolina and the demand for a pipeline of workforce skills in sustainable technologies. ***Specifically, this study will focus on quantifying the potential economic benefits that would likely accrue to South Carolina if the state were able to meet the growing demand among businesses and consumers for sustainable technologies and innovation.***

This study begins with a brief overview of the survey methodology and the primary industry feedback that was provided by South Carolina-based firms. Section III then moves to a discussion of the main findings of this study, which primarily focus on the potential economic losses to South Carolina that could accrue over the next decade to the extent that in-state businesses lack sufficient access to sustainable technologies to meet market demand. This will also include a description of the economic impact methodology used. Finally, Section IV offers a brief conclusion.



SECTION II

SURVEY METHODOLOGY AND INDUSTRY FEEDBACK

In order to assess the potential long-run economic impacts on South Carolina associated with access to sustainable technologies, this study began with the development of a survey instrument that was distributed to South Carolina businesses located across the state, which included firms of all sizes and major industry sectors.⁶ The survey was specifically designed with the primary goal of collecting data regarding the extent to which access to various sustainable energies, innovations, and technologies is likely to affect the long-run growth of businesses across the Palmetto State. The survey was administered to Sustain SC members and affiliates over a four-month period between May and August 2023. In addition, a series of follow-up interviews were conducted during September and October 2023 based on the initial feedback of survey respondents. The remainder of this section focuses on describing all elements related to survey construction and dissemination as well as the primary survey results. The survey in its entirety appears in **Appendix I**.

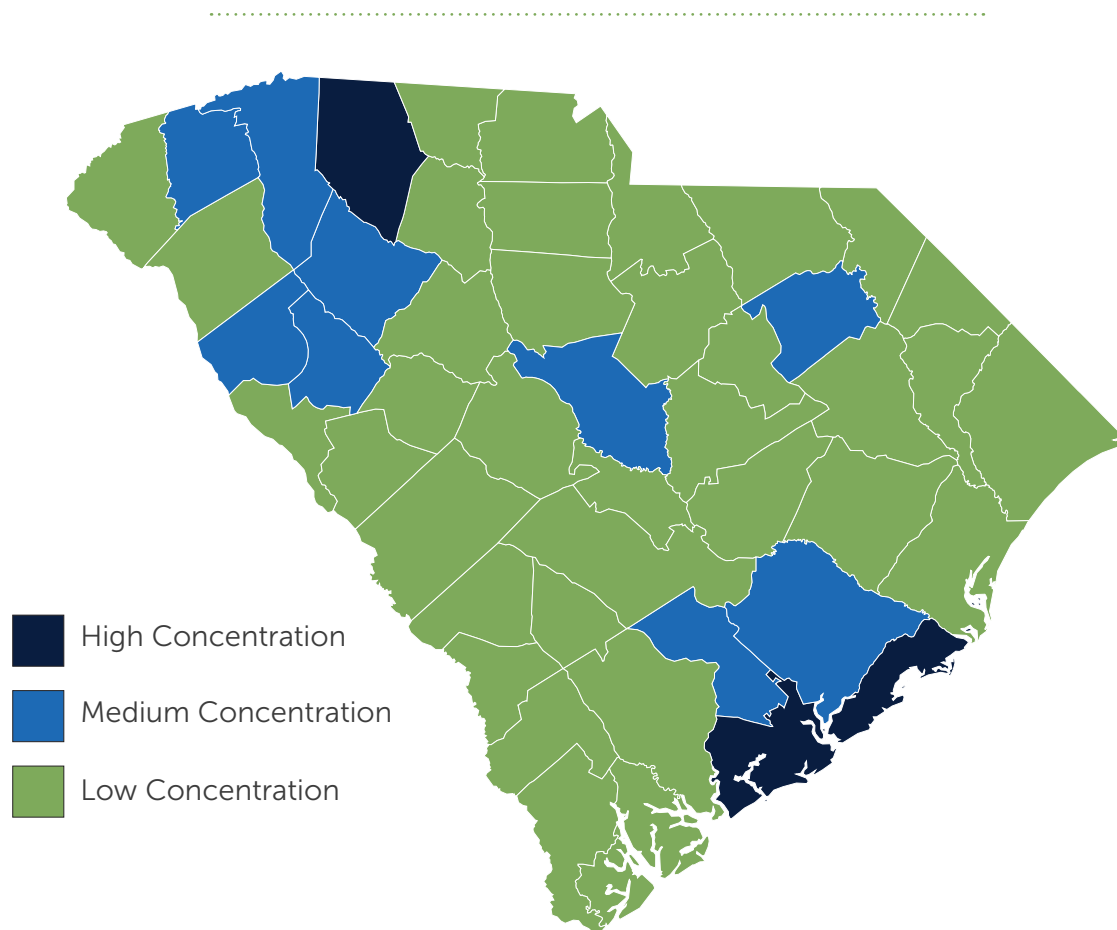


⁶ A majority of firms that received this survey are Sustain SC members.

OVERVIEW OF COMPANY TYPES AND LOCATION

The survey begins by asking respondents to provide basic information about their companies, including categorizing themselves by location, size, and industry. As shown in **Figure 1**, survey respondents were concentrated in the major metropolitan regions of South Carolina, with the highest concentration in the Upstate (Greenville/Spartanburg). This was followed by Charleston, the Pee Dee (Florence/Darlington), and the Midlands (Columbia).

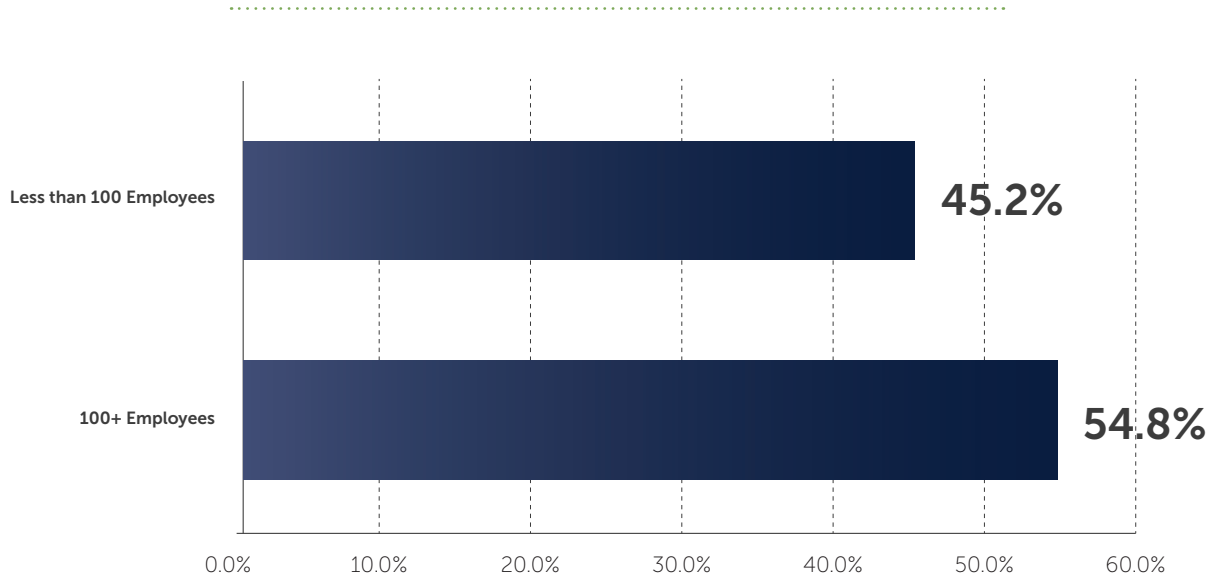
Figure 1 – Survey Responses by South Carolina County





Although firm responses were collected from all major industrial sectors, manufacturers were the most likely to participate, representing about half of all survey respondents (53.5%). This was followed by firms in construction (11.3%) and transportation (5.6%). This high representation of manufacturers is consistent with the aforementioned high representation of firms in the Upstate, as manufacturing is more concentrated in the Upstate region of South Carolina than anywhere else. More specifically, manufacturing represents approximately 19.9 percent of the Upstate employment base, compared to 14.7 percent for the state as a whole.⁷ Survey respondents included firms of all sizes, with roughly half (54.8%) of all respondents reporting a total employment count of more than 100.

**Figure 2 – Percentage of Survey Respondents by Firm Size:
Number of Employees**



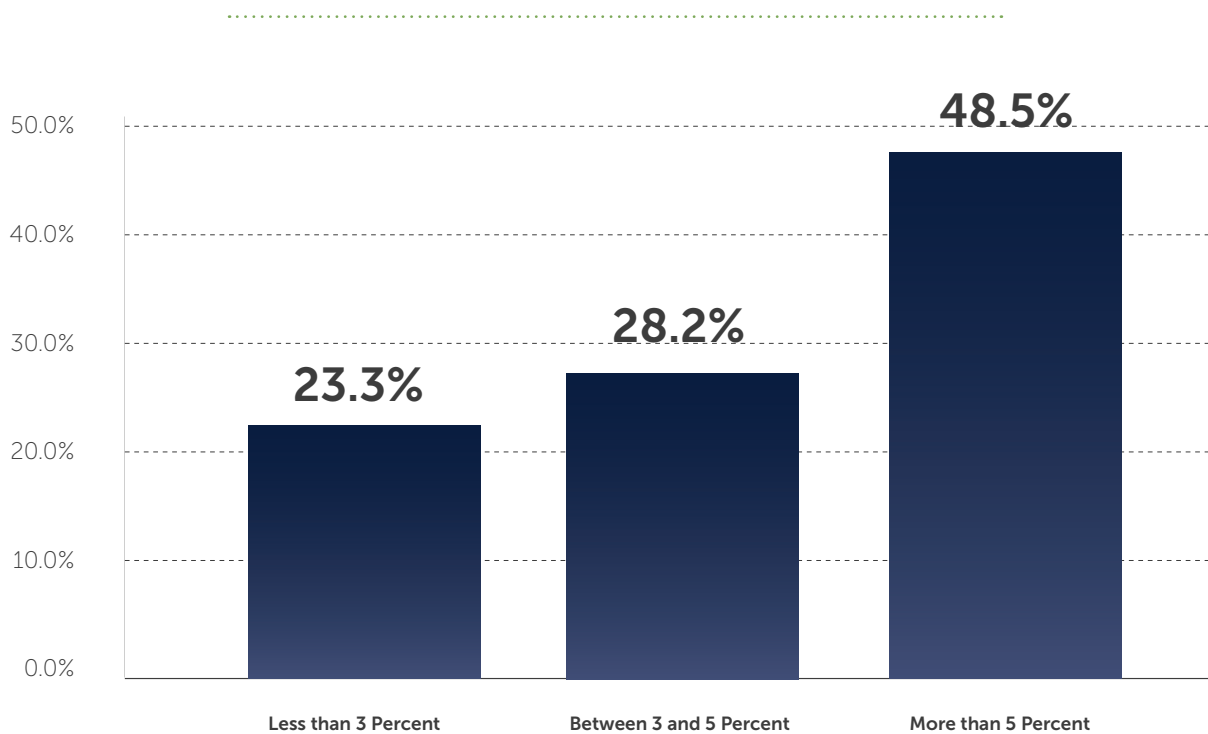
⁷ Source: U.S. Bureau of Labor Statistics

REVENUE EXPECTATIONS AND PROJECTIONS

Survey respondents were next asked to provide specific projections regarding expected revenue growth and the extent to which these projections could be affected by lack of access to various sustainable technologies and innovations.

Regarding total growth rates, survey respondents were generally optimistic about the future of the South Carolina and U.S. economies, with nearly half projecting annual revenue growth of more than five percent. When adjusting for employment size, the average revenue growth across all survey respondents was approximately four percent. This suggests that the average survey respondent expects its firm to experience growth at a rate that is historically comparable to South Carolina’s economy as a whole, which has averaged 3.9 percent GDP growth annually between 2010 and 2020.⁸

Figure 3 – Percentage of Survey Respondents by Annual Revenue Projections

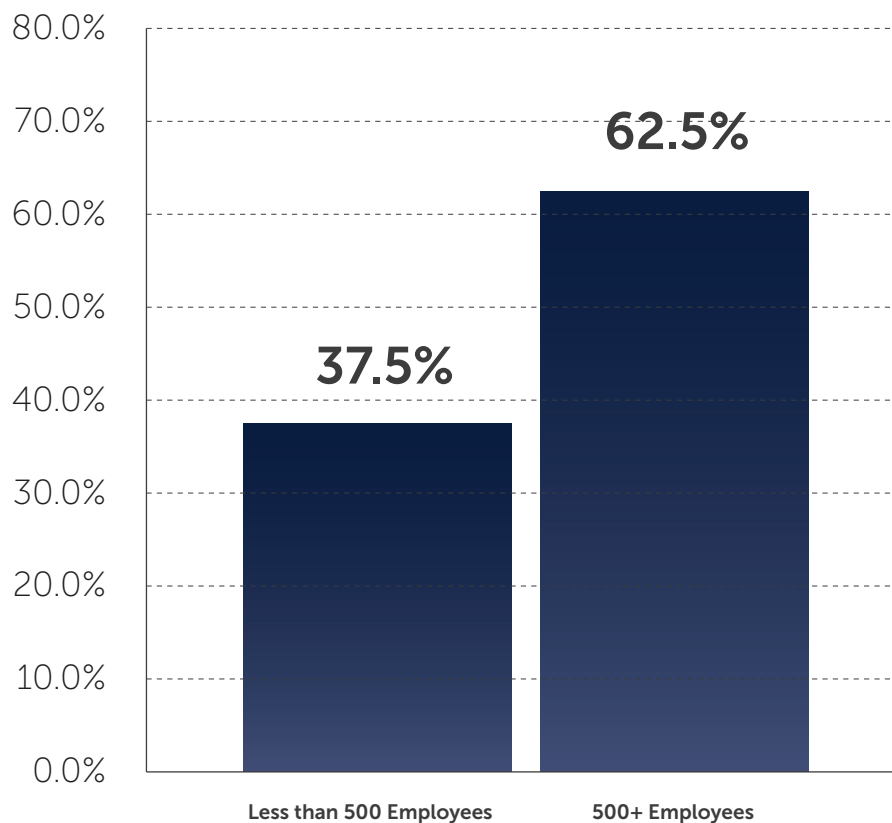


⁸ Source: U.S. Bureau of Economic Analysis

Section II

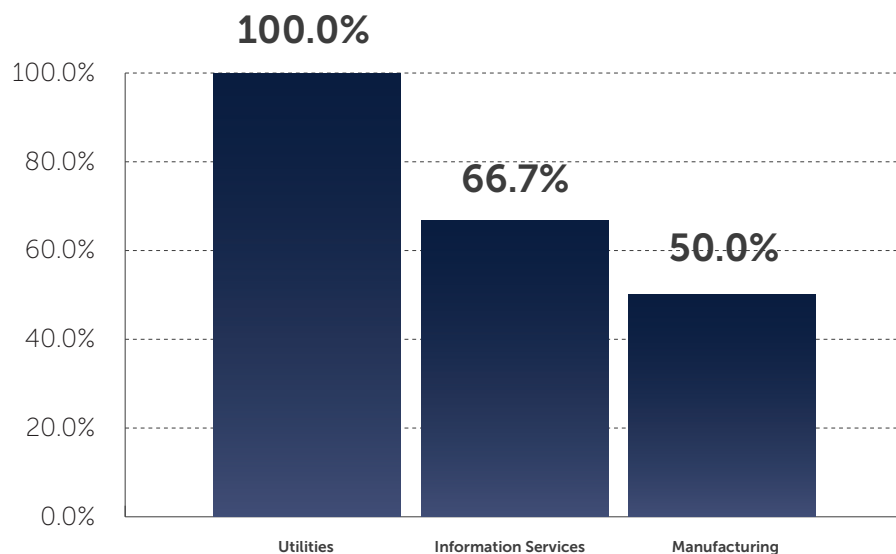
These relatively optimistic projections from survey respondents, however, are largely dependent on access to sustainable technologies. First, note that *nearly 46 percent of respondents indicated that their revenue projections will rely on access to sustainable technologies*. Additionally, larger companies were the most likely to report access to sustainable technologies as a major contributing factor to their growth forecasts. For example, 62.5 percent of survey respondents with more than 500 employees stated that their revenue projections rely on access to sustainable technologies compared to just 37.5 percent for those with fewer than 500 employees, as shown in **Figure 4**.

Figure 4 – Percentage of Survey Respondents Reporting Access to Sustainable Technologies as a Major Contributing Factor to Revenue Growth Forecasts



The need for access to sustainable technologies also varies significantly by industry. **Figure 5** specifically highlights the three sectors that are more likely than any other in South Carolina to report access to it as necessary to meet their projected revenue forecasts: Utilities, Information Services, and Manufacturing. These results are not surprising given the industry trends within each sector. South Carolina utilities are all currently responding to the rapidly increasing demand of both their residential and non-residential customers by adapting their energy portfolios to incorporate different types of clean energy. The Information Services sector, by contrast, engages in significant data processing and distribution services that rely heavily on server capacity, which is energy intensive. Finally, the clean energy needs of Manufacturing are primarily driven by international consumer demand.

Figure 5 – Percentage of Survey Respondents, By Industry, Reporting Access to Sustainable Technologies as a Major Contributing Factor to Revenue Growth Forecasts



Industry Feedback: Healthcare Sector

“Our customers are businesses that want to work with companies that are carbon conscious and they evaluate us on various sustainability measures. And while they don’t have any requirements they are enforcing yet, that day is coming soon and we are preparing for it.”

Source: Quotation provided anonymously as part of a series of company interviews that accompanied administered surveys



Survey respondents reporting revenue forecasts that rely on access to sustainable technologies were next asked to report which clean energy sources they are specifically going to require and thus in which they will likely invest. The most common response was Solar (83.9%) followed by Renewable Natural Gas (48.4%), and Wind (41.9%), as shown in **Table 1**.

Table 1 – Pct. of Survey Respondents Investing in Clean Energy, By Category

Note that results only denote respondents that require access to clean energy to meet revenue forecasts

CLEAN ENERGY CATEGORY	PCT.
Solar	83.9%
Renewable Natural Gas	48.4%
Wind	41.9%
Hydrogen	38.7%
Nuclear	32.3%
Geothermal	19.4%



Industry Feedback: Energy Sector

“We are ready to invest in clean energy infrastructure in South Carolina, but we are looking to minimize our risk. Before moving forward, we need commitments from the utilities industry regarding the specific planned usage of renewables in their energy portfolios.”

Source: Quotation provided anonymously as part of a series of company interviews that accompanied administered surveys



Survey respondents were also asked if their revenue projections depend on continued or increased access to other sustainable technologies and innovations aside from clean energy. **Table 2** summarizes the percentage of respondents answering “yes” to each type of technology or innovation.

Table 2 – Pct. of Survey Respondents Requiring Sustainable Technology/Innovation, By Category

Note that results only denote respondents that require access to technology/innovation to meet revenue forecasts

TECHNOLOGY/INNOVATION CATEGORY	PCT.
Landfill and/or Organic Waste Innovations	51.7%
Electric Vehicle Infrastructure	44.8%
Battery Storage Innovations	39.7%
Water Use Reduction Innovations	39.7%
Technological Innovations in Transport	34.5%
Technological Innovations in Materials Used in Production	31.0%
Digital Infrastructure for Sustainability and Use of Artificial Intelligence	31.0%
Sustainable Development in Goals Reporting	27.6%
Sustainable Chemical Innovations	20.7%
Green Steel/Aluminum	20.7%
Sustainable Agricultural Practices and Technology	12.1%
Green Cement	3.4%



REVENUE EXPECTATIONS AND PROJECTIONS IN THE ABSENCE OF SUSTAINABLE TECHNOLOGIES

Survey respondents were asked to specifically estimate how their revenue projections might change if they were not able to access the sustainable technologies outlined above. **Among all firms reporting that access to sustainable technologies would impact revenue projections, the expected annual growth rate over the next 10 years was 4.8 percent - compared to just 3.1 percent for those for which it would not.**

Survey respondents who reported that access to sustainable technologies would influence their revenue projections were next asked about how any lack of access may influence future location decisions. Specifically, these survey respondents were asked about the possibility of relocating any in-state facilities elsewhere. Just 6.8 percent of respondents reported that any such move would be “very likely.” Another 9.6 percent reported it would be “somewhat likely.” **Figure 6** summarizes these responses.

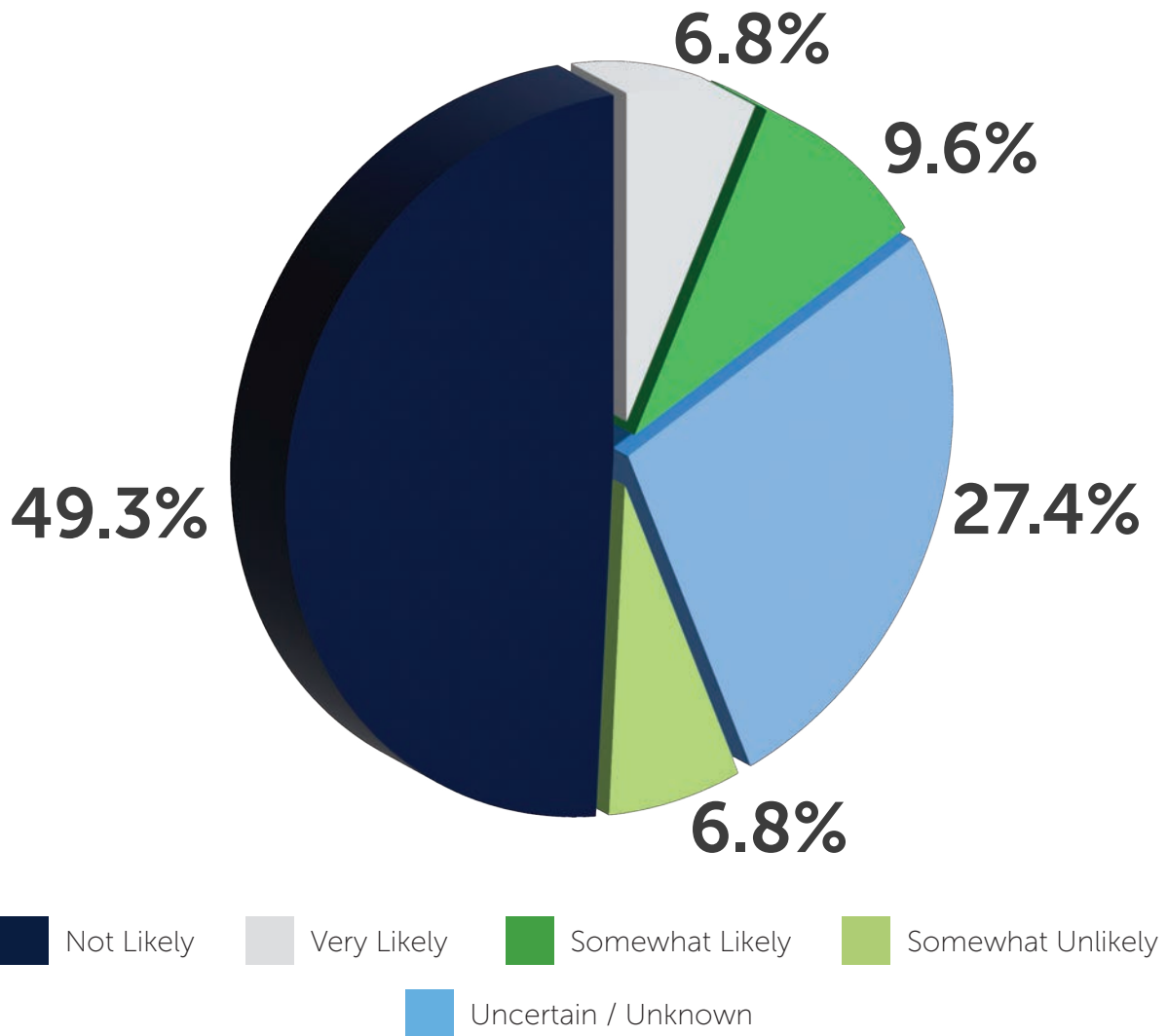


Industry Feedback: Manufacturing Sector

“We’ve invested so much in South Carolina that it’s unlikely we would relocate elsewhere. However, without having access to renewables that would allow us to meet our sustainability goals, our company would probably look outside the state when making future investment decisions.”

Source: Quotation provided anonymously as part of a series of company interviews that accompanied administered surveys

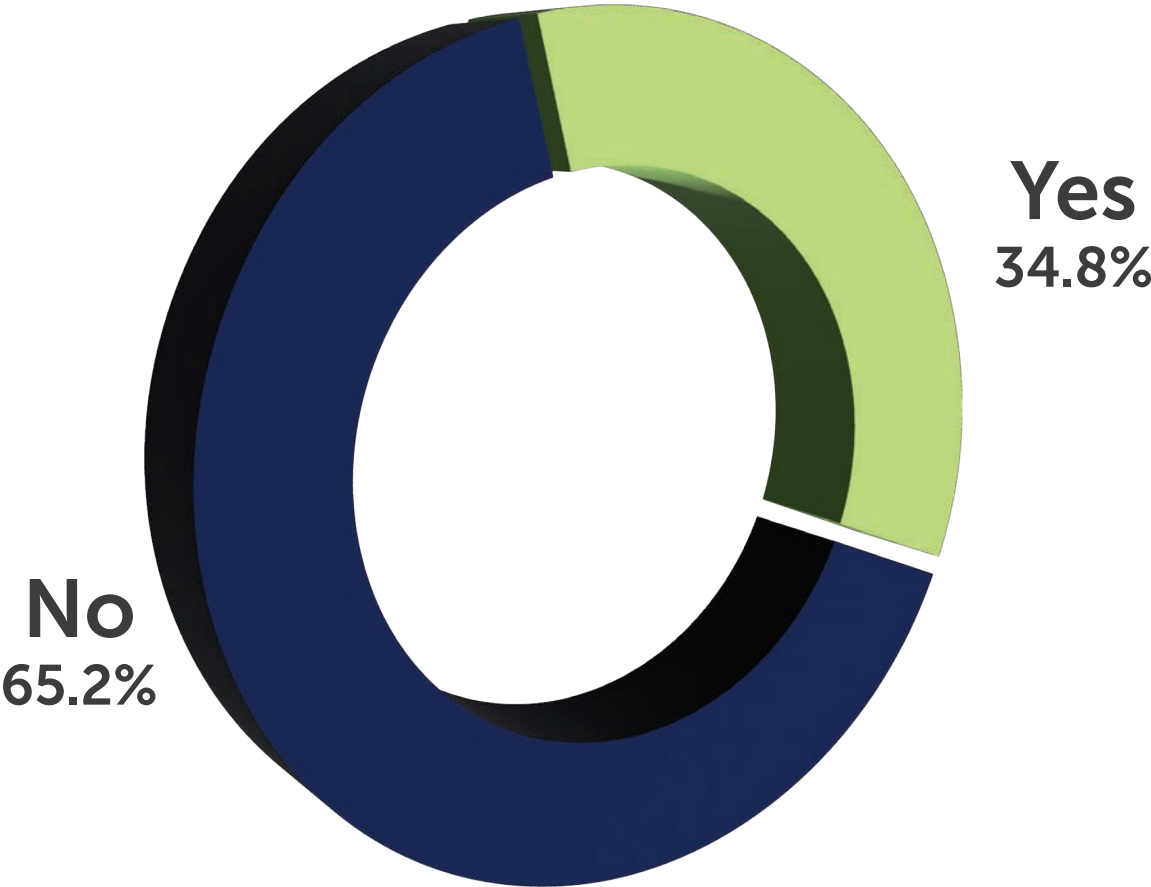
Figure 6 – Likelihood of Firm Relocation Without Access to Sustainable Technologies



Section II

Additionally, more than one-third of all survey respondents said that failing to fulfill their sustainability goals and reporting targets could negatively impact future in-state investments, as **Figure 7** denotes.

Figure 7 – Will Failing to Fulfill Existing Sustainability Goals Negatively Impact Future Business Investments in South Carolina?



EMPLOYMENT NEEDS

Approximately 67.1 percent of survey respondents reported that their employees will need to have sustainability-related expertise in the future. With such expectations, these respondents were also asked how they expected their employees would acquire sustainability related skills within the workplace over the next ten years (to the extent that existing employees do not already have such skills). The following summarizes how each type of sustainability-related expertise would most likely be acquired by survey respondents (if necessary): through new hires or retraining. Note that some skillsets appear in each category, suggesting a broad-based and high level of demand for this type of work.

New hires planned for sustainability-related expertise in:

- Engineering and Sustainability
- Supply Chain and Sustainable Sourcing
- Manufacturing and Sustainability
- Data Analytics and Logistics
- Electrical Engineering
- Sustainability Marketing and Communications

Retraining planned for sustainability-related expertise in:

- Corporate Social Responsibility
- Manufacturing and Sustainability
- Supply Chain and Sustainable Sourcing
- Sustainability Marketing and Communications
- Data Analytics and Logistics

Sustainability-related expertise already in place for current workforce in:

- Occupational Health and Safety
- Corporate Social Responsibility
- Data Analytics and Logistics
- Manufacturing and Sustainability
- Pollution Prevention
- Environmental Policy
- Supply Chain and Sustainable Sourcing
- Environmental Auditing
- Conservation
- Environmental Remediation
- Engineering and Sustainability

Section II

ONGOING TRACKING AND REPORTING OF THE USE OF SUSTAINABLE TECHNOLOGIES

All survey respondents were asked multiple questions about the extent to which they track and report their use of sustainable technologies, the responses to which appear below.

Figure 8 – Does Your Company Have a Publicly Announced Plan to Reduce its Carbon Footprint or to Adopt Sustainable Technologies and Innovations?

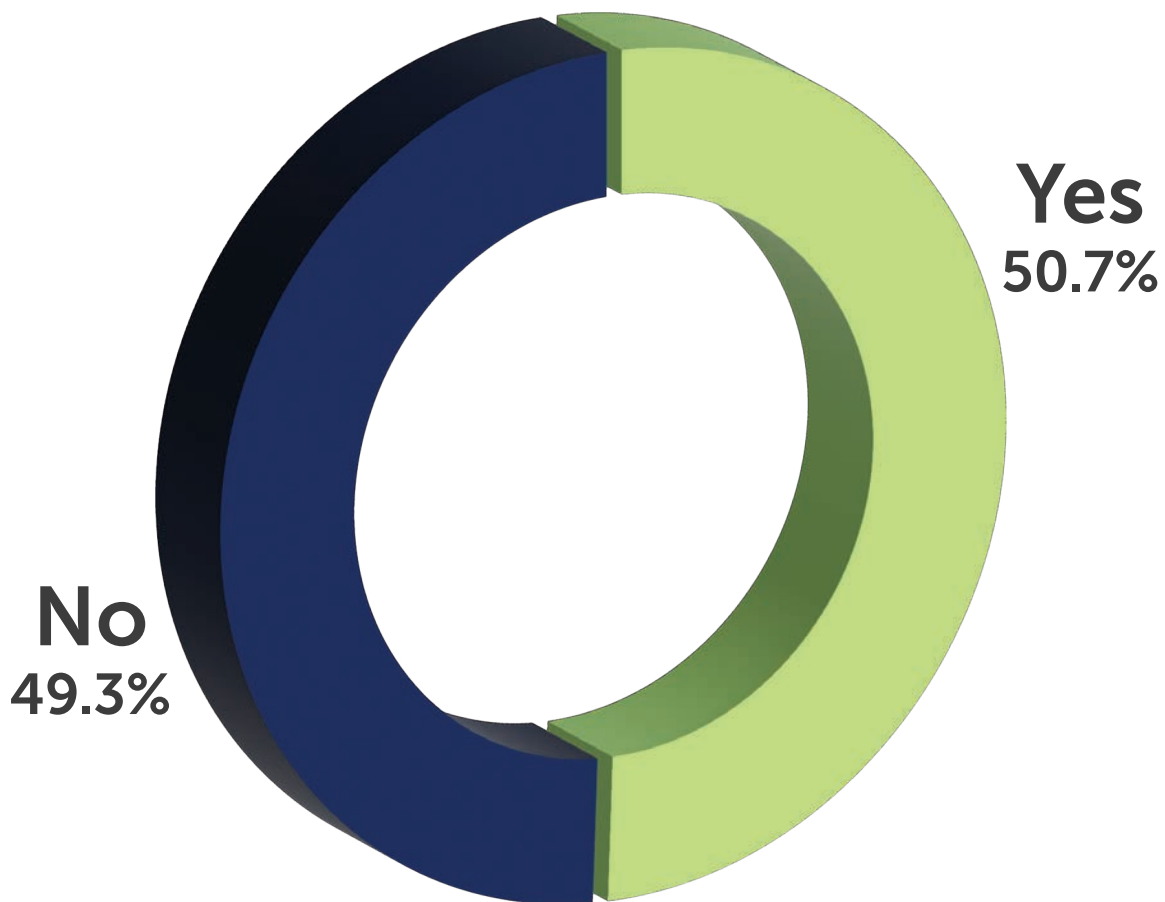
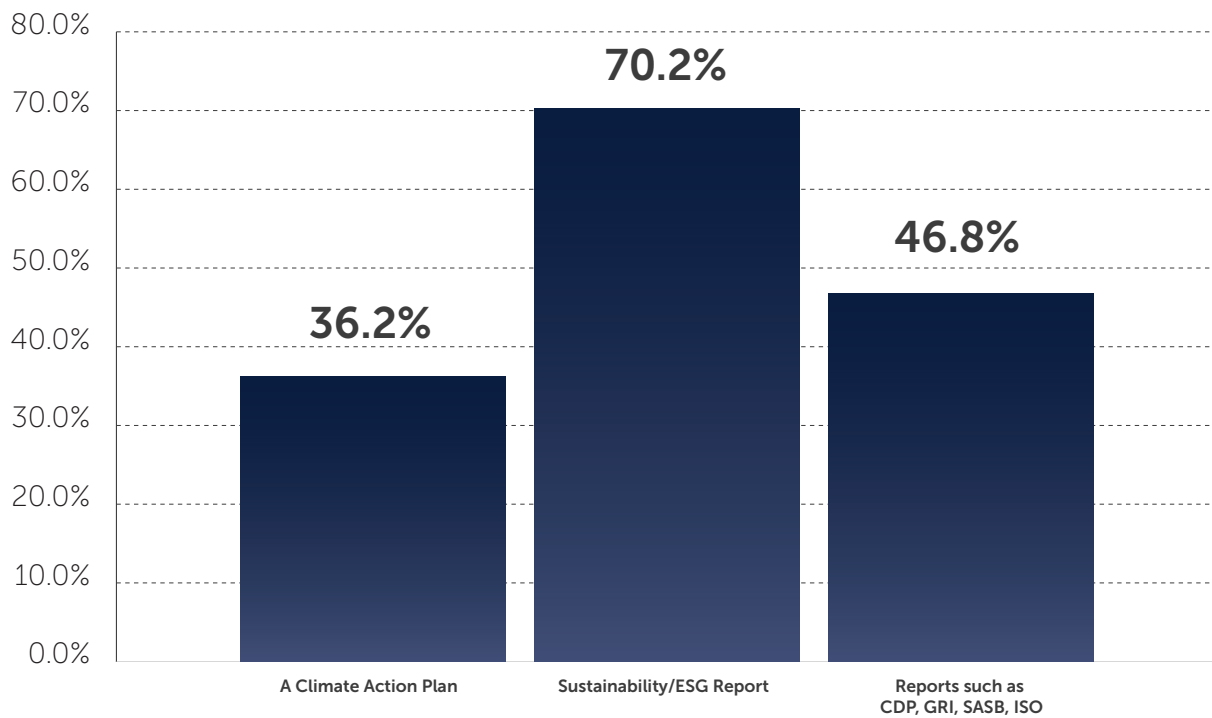




Figure 9 – What Type of Reporting Mechanism Does Your Firm Use to Report Your Carbon Footprint or Other Sustainable Technologies/Innovations?



SECTION III

MEASURING THE ECONOMIC IMPACT OF SUSTAINABILITY IN SOUTH CAROLINA

The survey results described in Section II highlight the fact that although South Carolina companies are generally optimistic about their projected growth over the next decade, approximately 46 percent of respondents report that their current revenue projections would be negatively impacted without sufficient access to sustainable technologies. Moreover, 6.8 percent of survey respondents indicate that they would be “very likely” to relocate their existing South Carolina facilities elsewhere if they were unable to meet their sustainable technology requirements. Using firm-level data provided by survey respondents regarding their expected revenue growth rates both with and without access to sustainable technologies, this study is able to estimate the potential economic losses that could accrue to South Carolina over the next ten years if firms do not have sufficient access to sustainable technologies to meet market demand.

ECONOMIC IMPACT METHODOLOGY

All firms surveyed in this analysis employ a workforce and support an extensive local supply chain network throughout South Carolina in order to facilitate their ongoing operations. The expenditures made by each firm through local suppliers and through the wages and salaries paid to employees introduce new spending activity at the county, regional, and statewide level that would not exist otherwise. As a result, the ongoing business operations of each firm provides a stable base of economic activity within the region in which each firm operates.

Yet this initial spending activity does not provide a complete picture of the impact of each firm in its local region or on the broader regional and statewide economies. The expenditures that occur as part of the ongoing operations of each firm represent direct economic activity. However, these expenditures also lead to additional job creation and economic activity throughout the local region by way of the economic multiplier effect. This means that any increase (or decrease) in economic activity by an individual firm will generate additional economic gains (or losses) for the state’s economy.

Economic multiplier effects can be divided into direct, indirect, and induced impacts. The direct effect represents any initial change in economic activity. This includes, for example, the initial dollars that might be injected into South Carolina directly by a South Carolina manufacturer as part of regular operations at an in-state facility. This would include any employee wages and benefits, raw materials purchased, transportation equipment, or other overhead and administrative costs. This spending increases demand for goods and services and leads to the creation of new jobs and more income for employees and suppliers of the manufacturer.



The indirect effect reflects all of the additional economic impacts resulting from inter-industry linkages between other local businesses in South Carolina. For example, consider an equipment purchase that is made by the aforementioned manufacturer to replace and upgrade its existing facilities as part of standard maintenance. In this situation, the equipment provider would, as a result of the manufacturer's purchase, experience an increase in demand. This would require this equipment provider to purchase additional raw materials to accommodate the new increase in demand and to potentially hire additional employees if the increase in demand were sufficiently high. The vendors of the equipment providers would then experience an increase in demand and have to purchase additional inputs as well, and so on. These indirect effects ripple through the economy of South Carolina.

The induced effect reflects additional economic activity that results from increases in the spending of household income. For example, when the aforementioned equipment provider hires new workers to satisfy an increase in demand, these workers will earn incomes. They will then spend part of this new income locally on, for example, food, entertainment, or housing. These industries will then see an increase in demand for their goods and services, which will lead to higher incomes for some of their employees, part of which will also be spent locally.

These successive rounds of indirect and induced spending do not go on forever, which is why a specific value can be calculated for each of them. In each round, money is "leaked out" for a variety of reasons. For example, firms may purchase some of their supplies from vendors located outside of the local area. In addition, employees will save part of their income or spent part of it with firms located outside of South Carolina. In order to determine the total economic impact that will result from an initial direct impact, economic multipliers are used. An economic multiplier can be used to determine the total impact (direct, indirect, and induced) that results from an initial change in economic activity (the direct impact). Multipliers are different in each sector of the economy and are largely determined by the size of the local supplier network as well as the particular region being examined. In addition, economic multipliers are available to calculate not just the total impact, but also the total employment and income levels associated with the total impact.

To estimate the economic impacts in this study, a detailed structural model (known as an input-output model) of South Carolina that contains specific information on economic linkages between all industries within the state was used. The input-output modeling software IMPLAN was used in conjunction with other customized regional forecasting models that were developed to calculate all estimates. This allowed for the inclusion of additional local data, industry knowledge, and recent economic growth patterns.

Section III

CURRENT ECONOMIC IMPACT OF SURVEY RESPONDENTS NEEDING ACCESS TO SUSTAINABLE TECHNOLOGIES

Surveyed firms reporting that access to sustainable technologies would impact revenue projections over the next decade collectively report employing 40,958 workers within South Carolina, with an accompanying total output estimated to be approximately \$22.0 billion. Expenditures made towards all wages and salaries to support this total employment volume, combined with all associated non-labor expenditures (e.g., capital equipment, professional services, ongoing maintenance, etc...) generate these direct economic impact estimates.

These direct impacts also lead to significant multiplier effects that make the total economic impact of these firms far larger. The structural input-output models used in this analysis estimate impacts in terms of three specific measures: economic output, employment, and labor income. Economic output reflects the dollar value of all final goods and services that can be attributed (directly or indirectly) to the surveyed firms. It can also be thought of as an aggregate measure of total spending activity that results from all direct expenditures within the local economy. Because it includes all spending by consumers and businesses on both goods and services, it is an all-inclusive measure of the impact on total economic activity. Employment measures the total number of workers associated with total economic output. Labor income reflects all employee compensation associated with total employment estimates, including wages, salaries, and benefits. **Table 3** below highlights these estimates.

Table 3 – Current Economic Impact of Survey Respondents Needing Access to Sustainable Technologies

	ANNUAL EMPLOYMENT	ANNUAL LABOR INCOME	ANNUAL TOTAL IMPACT
Direct Effect	40,958	\$3,226,069,231	\$22,049,002,983
Multiplier Effect	59,920	\$2,958,639,670	\$12,292,234,209
Total Impact	100,878	\$6,184,708,901	\$34,341,237,192

As previously noted, the 40,958 employees that work for all surveyed firms reporting a need for access to sustainable generate approximately \$22.0 billion in annual economic output. This level of direct economic activity then subsequently leads to additional rounds of local spending activity – known as the multiplier effect – which totals approximately \$12.3 billion in additional economic output for South Carolina along with 59,920 additional jobs. These multiplier effects reflect the increased demand for goods and services of local suppliers resulting from local expenditures on the part of these firms as well as the local economic activity generated across all industries that is the result of increased household spending. The combination of all direct effects and their subsequent multiplier effects leads to a total annual economic impact of approximately \$34.3 billion, which supports a total of 100,878 total jobs in South Carolina each year.

PROJECTED ECONOMIC IMPACTS RESULTING FROM A LACK OF ACCESS TO SUSTAINABLE TECHNOLOGIES

Based on all survey responses, this study estimated both a lower and upper bound for the potential future economic losses that could result from a lack of access to sustainable technologies among firms that reported needing such access.

All surveyed firms were asked to project their revenue growth rates over the next ten years. Among firms reporting that access to sustainable technologies would be necessary to fulfill these revenue projections, the average annual revenue growth rate reported was 4.8 percent. When subsequently asked how these projections would change if sustainable technologies were not available, the average annual growth rate reported dropped to 3.1 percent. Put another way, **surveyed firms that reported a need for sustainable technologies as part of their ongoing operations estimate that without access to such technologies, annual growth projections would drop by an average of 1.7 percentage points per year over the next decade.** As such, the lower bound of economic losses in this study was calculated by estimating difference between the projected economic impact of these firms over the next decade assuming a growth rate of 4.8 percent per year and the projected economic impact of these firms over the next decade assuming a growth rate of 3.1 percent.

Additionally, a significant subset of respondents also reported that their future investments in South Carolina could be jeopardized if they are unable to meet their sustainability targets. A lack of future investment, in turn, could result in negligible future growth for these firms in South Carolina. Thus, the upper bound of economic losses estimated in this study was modeled under the assumption that a lack of access to sustainable technologies would reduce growth of this subset of firms to zero.



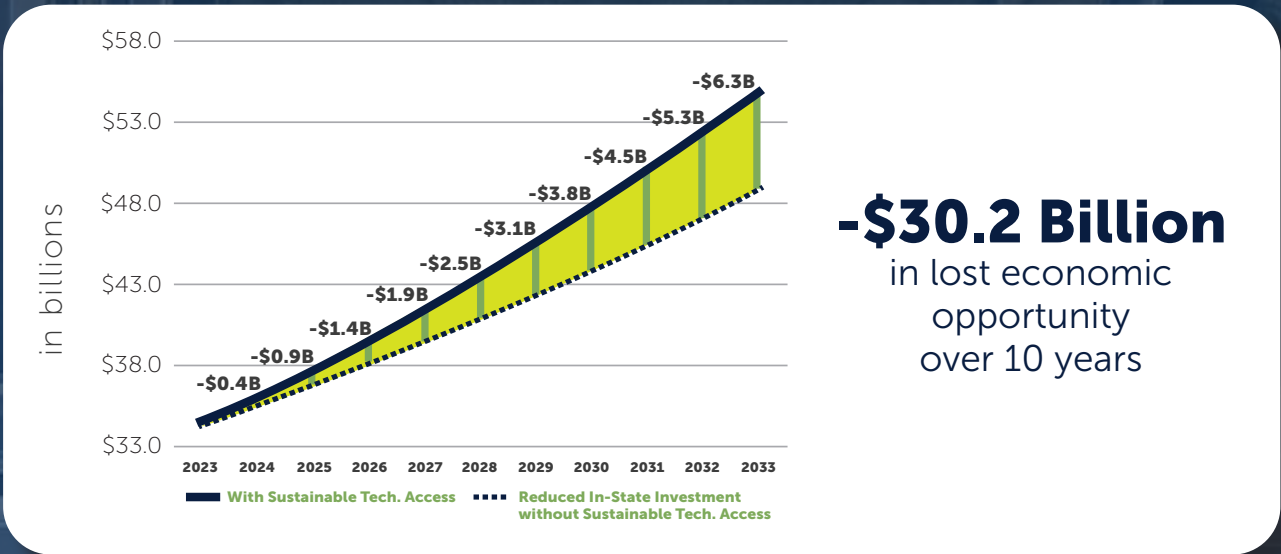
The specific estimates associated with these lower and upper bounds are shown in **Figure 10**. *In sum, over the next decade, this study estimates that a lack of sufficient access to sustainable technologies could generate losses of between \$30.2 billion and \$101.2 billion in total economic activity for the state of South Carolina.* **Figure 10** specifically highlights the annual value of these losses for both the lower and upper bound estimates. The lower bound of \$30.2 billion represents the cumulative economic losses that would result if firm revenue growth were reduced among survey respondents due to lack of access to sustainable technologies at a rate consistent with their expectations. These total economic losses would increase from an annual value of approximately \$0.4 billion in 2024 to \$6.3 billion by 2033.

Similarly, the upper bound of \$101.2 billion, also shown in **Figure 10**, represents the cumulative economic losses that would result if firm revenue growth were reduced to zero among the subset of survey respondents reporting that a lack of access to sustainable technologies would jeopardize their future in-state investments. These total economic losses would increase from an annual value of approximately \$1.6 billion in 2024 to \$19.9 billion by 2033.

One further striking result among survey respondents indicating a need for sustainable technologies was the subset of firms indicating that their future location decisions would be impacted by access to such technologies. Specifically, 6.8 percent of survey respondents indicated that they would be “very likely” to relocate their existing South Carolina facilities elsewhere if they were unable to meet their sustainable technology requirements in-state. Because the likelihood of such a relocation decision is difficult to quantify, the potential economic losses that would result from these companies exiting South Carolina were not estimated as part of this study. However, the fact that any firm would consider a relocation decision based upon access to sustainable technologies clearly reveals the growing importance of such resources to the future growth of firms across the Palmetto State.

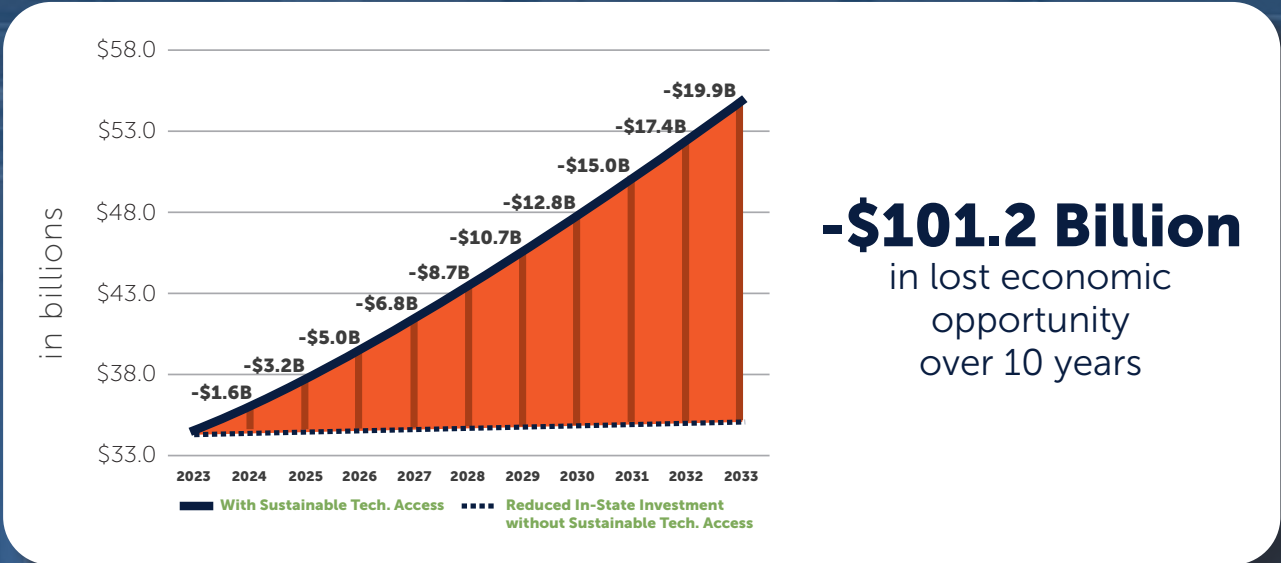
Potential Economic Losses for S.C. Firms in the Absence of Access to Sustainable Technologies

Impacts Resulting from **Potential Reductions in Firm Revenue Growth** Among Existing S.C. Firms



-\$30.2 Billion
in lost economic opportunity over 10 years

Impacts Resulting from **Potential Reductions in Future In-State Investment** Among Existing S.C. Firms



-\$101.2 Billion
in lost economic opportunity over 10 years

In addition to these estimated economic losses, 6.8% of surveyed firms report that they are "very likely" to relocate their existing South Carolina facilities elsewhere if they are unable to meet their sustainable technology requirements.

SECTION IV

CONCLUSION

The demand for sustainable technologies is rising among businesses across the United States and in South Carolina. This is primarily the result of an increase in market demand in which consumers are increasingly likely to prefer to purchase products and services from businesses that meet specific sustainability goals. This study conducted a survey of South Carolina businesses in order to specifically determine their sustainable technology needs and then quantified the potential economic benefits that could accrue to the state if these needs are met.

Among all survey respondents, approximately 46 percent indicate that their revenue projections over the next decade would be negatively impacted without sufficient access to sustainable technologies, with larger companies being the most likely to be affected. More specifically, these survey respondents reported that their expected annual growth rate would be 1.7 percentage points lower (3.1% vs. 4.8%) without an ability to meet their sustainable technology requirements. Using these projections, this study estimates that over the next ten years, a lack of sufficient access to sustainable technologies could generate losses of between \$30.2 billion and \$101.2 billion in total economic activity for South Carolina. Moreover, in addition to these losses, approximately 6.8 percent of survey respondents also indicated that they would be "very likely" to relocate their existing South Carolina facilities elsewhere if they were unable to meet their sustainable technology requirements. The fact that any firm would consider a relocation decision based upon access to sustainable technologies clearly reveals the growing importance of such resources to future growth.

Over the previous decade, South Carolina has consistently maintained economic growth rates in excess of the national average. And with a thriving, globally competitive, export-oriented manufacturing cluster and a rapidly-growing population base, the Palmetto State is poised to continue to outpace the nation in the coming years. As businesses continue to expand in South Carolina and look to maximize their ability to meet market demand, improving access to sustainable technology resources is likely to become an increasingly important component of any statewide economic growth strategy.







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