



NC SUSTAINABLE  
ENERGY ASSOCIATION

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# North Carolina Clean Energy Industry Census

# 2014







**NC SUSTAINABLE**  
ENERGY ASSOCIATION

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The NC Sustainable Energy Association (NCSEA) is a 501(c)(3) nonprofit membership organization of individuals, businesses, government and nonprofits interested in North Carolina's sustainable energy future. NCSEA drives public policy and market development to create energy jobs, economic opportunities and affordable energy to benefit North Carolina.

Today, our team of clean energy advisors, analysts and advocates works closely with policymakers, consumers and industry leaders to research, inspire and affect clean energy progress statewide.

**Acknowledgements:**

NCSEA would like to thank all of the companies, institutions, and organizations that responded to the 2014 Southeast Clean Energy Industry Census. The willingness of respondents to generously donate their time and insights allows NCSEA to capture and share important data about the clean energy industry in North Carolina with regulators, legislators, and decision makers in the state and beyond.

NCSEA also appreciates the efforts of partner organizations the South Carolina Clean Energy Business Alliance, Southface in Georgia, and the Virginia Energy Efficiency Council on the Southeast Clean Energy Industry Census. Additional thanks are due to Karen Eller, Donna Hughes, and everyone at the Center for Urban Affairs and Community Services at North Carolina State University for their continued support of this project.

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# INTRODUCTION

## About The Census

Since 2008, the NC Sustainable Energy Association (NCSEA) has surveyed companies, institutions, and organizations (collectively referred to as “firms”) in the clean energy industry in order to quantify their impact on the state’s economy. The 2014 North Carolina Clean Energy Industry Census (North Carolina Census) represents the seventh edition of this survey and resulting report.

NCSEA created the Census to help measure the impact of North Carolina’s clean energy policies and identify where policies are or are not achieving the results policymakers, economic developers, and industry envisioned. From 2007-2013, policies such as the Renewable Energy and Energy Efficiency Portfolio Standard<sup>1</sup>, the state Renewable Energy Investment Tax Credit<sup>2</sup> and government energy efficiency goals have allowed a clean energy market to form in North Carolina and our clean energy industry to develop and access the energy market, competing on price and quality, and building out a supply chain to the benefit of the entire North Carolina economy.

This report aims to provide a snapshot of the current state of the clean energy industry in North Carolina by addressing common questions such as:

- How many firms are currently working in the clean energy industry?
- What business sectors are they in, and what kinds of work are they doing?
- How many people are employed by these firms?
- How much revenue are these firms generating?
- What is the business climate surrounding these firms?
- What is going to drive continued growth in this industry going forward?

Presenting analysis on employment, revenues, geographic presence, export activity, and business climate, the North Carolina Census report has become an invaluable resource for stakeholders with a myriad of uses including:

- Benchmarking the overall industry and specific sectors.
- Supporting decision-makers in answering policy questions.
- Promoting the success of clean energy policies, businesses, and industries.
- Identifying policy challenges and possible solutions.
- Tracking the development of clean energy markets in North Carolina.

This is also the second year NCSEA has partnered with the South Carolina Clean Energy Business Alliance, Southface in Georgia, and the Virginia Energy Efficiency Council (collectively referred to as the “Partners”) to produce the Southeast Clean Energy Industry Census (Southeast Census).<sup>3</sup> For the Southeast Census, the Partners surveyed firms to understand employment, revenue, and policy drivers of various sectors within each state and the southeast region clean energy industry. This report presents the survey results and analysis that pertain to North Carolina’s clean energy industry. Please visit [www.cleanenergyindustry.org](http://www.cleanenergyindustry.org) for information on the Southeast Census results.

The 2014 Southeast Census will also be incorporated into the US Department of Energy-funded Southeast Clean Energy Manufacturing Roadmap (Southeast Roadmap), which will provide an assessment of the region’s existing clean energy landscape and present a suite of considerations to grow the North Carolina and Southeast clean energy industry and market. The Southeast Roadmap and North Carolina Roadmap will be issued towards the end of 2015.

## Survey Process

Each Partner compiled a list of firms in its state. Each state-level Census relied on a common questionnaire developed by the Partners, as well as an online survey tool and phone-banking system managed by the North Carolina State University Center for Urban Affairs and Community Services (NC State).

## Data Analysis

NCSEA performed the analysis of all Census data with input from the Partners. NCSEA utilized the self-reported data from responding firms who classified themselves among a selection of clean energy business activities and sectors

(See Table 1 and Table 2, below). This level of granularity allowed for the analysis of the activities being conducted within each clean energy sector of North Carolina's economy. Data in this report is presented in aggregate in order to protect the privacy of responding firms, and includes a conservative modeling of firms that did not respond but are anticipated to be active in North Carolina's clean energy industry. Readers interested in additional analysis on census data and related market intelligence should contact NCSEA staff directly at [info@energync.org](mailto:info@energync.org) with their questions.<sup>4</sup>

For the 2014 analysis, the Partners utilized the approach taken by NCSEA during the first five iterations of the North Carolina Clean Energy Industry Census from 2008 – 2012. This report presents direct findings from self-reported data provided by 567 firms operating within North Carolina. This represents approximately 47% of the estimated 1,208 firms currently conducting clean energy related business in North Carolina. These 567 responding firms and 641 modeled firms represent a significant portion of the state's clean energy industry, but certainly do not cover all activity. The conservative nature of the analysis means that the true economic impact of the clean energy industry in North Carolina is larger than what is presented in the 2014 Census. Please refer to Appendix B for greater detail of survey methodology.

**Table 1. Clean Energy Business Activities**

Activities
Design and Construction of New Buildings
Professional Services, Education, or Consulting
Installation, Design, or Development of Renewable Energy Systems
Installation or Maintenance of Building System Components
Sale of Renewable Energy Systems
Sale of Building System Components
Research and Development
Manufacturing
Power Generation

**Table 2. Clean Energy Business Sectors**

Sectors
Building Efficiency
Solar
Geothermal
Biomass
Storage
Wind
Smart Grid
Alternative Fuel Vehicles
Hydropower/Marine
Fuel Cells

## HIGHLIGHTS

The 2014 North Carolina Census is the seventh annual report released by NCSEA on the status of the clean energy industry in our state. Information about employment, revenue, and the general business climate was provided directly by firms operating in the industry.

The clean energy industry in North Carolina has been a rapidly growing part of the state's economy since the first version of this report in 2008. It now boasts participation by more than 1,200 firms, provides nearly 23,000 full-time equivalent (FTE) jobs, and generates approximately \$4.8 billion in annual gross revenues.

From 2012 to 2014, employment in the industry increased from 15,200 to 22,995 FTE; an annual increase of 25%.

We've also seen a 15% per year increase in revenues generated by clean energy activities in the state since 2012, reaching \$4.8 billion in the 2014 Census. This far outpaces the 2.3% per year increase in gross state product since 2012.<sup>5,6,7</sup>

Additional data shows the \$2.7 billion invested in clean energy infrastructure in North Carolina between 2007 and 2014 is also making a positive economic impact. For each dollar of the Renewable Energy Investment Tax Credit utilized \$1.93 has been returned to state and local governments.<sup>8</sup> This investment has led North Carolina to become the number four state in the nation for solar installations with more than 600MW of available capacity.<sup>9</sup>

**Figure 1. NC Clean Energy Firms, Revenue, and Employment**



**22,995 FTE**



**1,208 Firms**



**\$4.8 Billion  
in Revenue**

# FIRMS

The clean energy industry in North Carolina continues to be dominated by firms involved in the Building Efficiency and Solar sectors, representing a combined 59% of all firms (38% Building Efficiency, 21% Solar). The Geothermal sector is also well represented with another 12% of all firms.

Within all of the clean energy industry sectors, the activities of Design and Construction of New Buildings, and Professional Services, Education, or Consulting are the most numerous, accounting for 22% and 19% of all firms respectively. Various installation activities are also well represented with 15% of all firms engaged in Installation, Design, or Development of Renewable Energy Systems, and 13% involved in Installation or Maintenance of Building System Components.

Figure 2. NC Clean Energy Firms by Sector

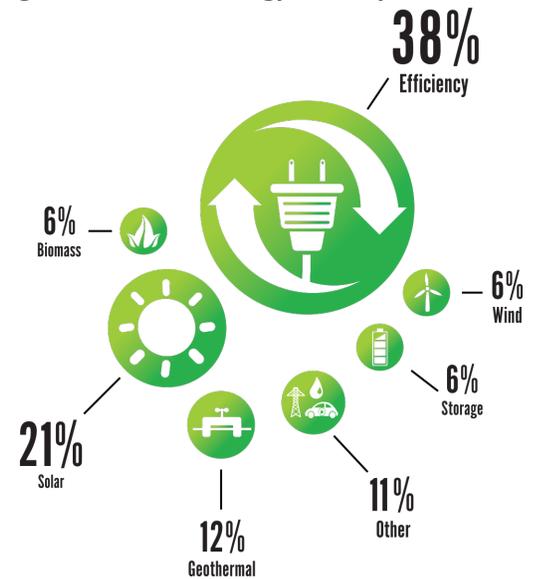


Table 3. NC Clean Energy Firms by Sector

Sector	Clean Energy Firms
Building Efficiency	833
Solar	450
Geothermal	264
Biomass	134
Storage	121
Wind	119
Smart Grid	87
Alternative Fuel Vehicles	83
Hydropower/Marine	55
Fuel Cells	17
<b>Total</b>	<b>2,165</b>

Table 4. NC Clean Energy Firms by Activity

Activity	Clean Energy Firms
Design and Construction of New Buildings	528
Professional Services, Education, or Consulting	454
Installation, Design, or Development of Renewable Energy Systems	360
Installation or Maintenance of Building System Components	305
Sale of Renewable Energy Systems	239
Sale of Building System Components	173
Research and Development	143
Manufacturing	132
Power Generation	102
<b>Total</b>	<b>2,435</b>

# EMPLOYMENT

In light of recurring policy uncertainty, the growth in clean energy employment in North Carolina has been steady and encouraging. The most notable finding in employment from this year's Census is the dominance of the Building Efficiency sector as a clean energy employer. Accounting for nearly one half of all the FTE in the industry, Building Efficiency is certainly the leader in providing clean energy jobs. It is also interesting to note that the majority of jobs in Building Efficiency are currently involved with the Design and Construction of New Buildings. This is promising both as an indicator of broad economic health in the state and as a signal that energy efficient buildings are in high demand. Firms in this sector, however, are not as optimistic about job growth next year as firms in some other sectors. See the Growth section for more information on where industry projects an increase in jobs over the next 12 months.

Also worth noting about 2014 clean energy employment is the rise in jobs in the Storage sector. Up nearly 50% from 2012, there are now 1,306 FTE working on energy storage in North Carolina. More than half of these are involved in Manufacturing, which should bode well for the state as we see a greater utilization of storage technologies over the next several years.

Figure 3. NC Clean Energy Employment by Sector

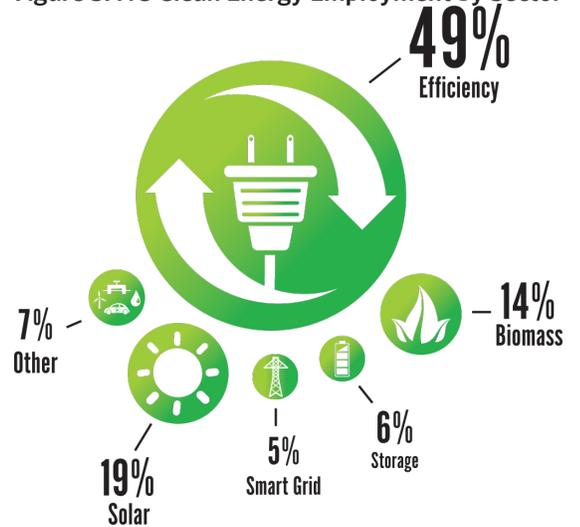


Table 5. NC Clean Energy Employment by Sector

Sector	Clean Energy FTE	% of NC FTE
Building Efficiency	11,277	49%
Solar	4,307	19%
Biomass	3,246	14%
Storage	1,306	6%
Smart Grid	1,045	5%
Hydropower/Marine	585	3%
Geothermal	545	2%
Alternative Fuel Vehicles	403	2%
Wind	248	1%
Fuel Cells	33	0%
<b>Total</b>	<b>22,995</b>	<b>100%</b>

Table 6. NC Clean Energy Employment by Activity

Activity	Clean Energy FTE	% of NC FTE
Design and Construction of New Buildings	5,326	23%
Installation, Design, or Development of Renewable Energy Systems	3,909	17%
Professional Services, Education, or Consulting	3,731	16%
Sale of Renewable Energy Systems	2,345	10%
Sale of Building System Components	2,013	9%
Installation or Maintenance of Building System Components	1,943	8%
Manufacturing	1,766	8%
Power Generation	1,433	6%
Research and Development	530	2%
<b>Total</b>	<b>22,995</b>	<b>100%</b>

# REVENUE

In 2014 the Building Efficiency sector was the top earner bringing in approximately \$1.9 billion, followed closely by the Solar sector with earnings of \$1.6 billion. These top two sectors account for 73% of all clean energy industry revenues (39% and 34% respectively).

As might be expected considering the top grossing sector, Design or Construction of New Buildings was reported as the top revenue generating business activity, accounting for \$1.5 billion and 32% of total industry revenues. Activities that align more closely to the Solar sector, however, take the next two spots with the Sale of Renewable Energy Systems and Installation, Design, or Development of Renewable Energy Systems bringing in \$750 million and \$540 million in total earnings respectively.

Figure 4. NC Clean Energy Revenue by Sector

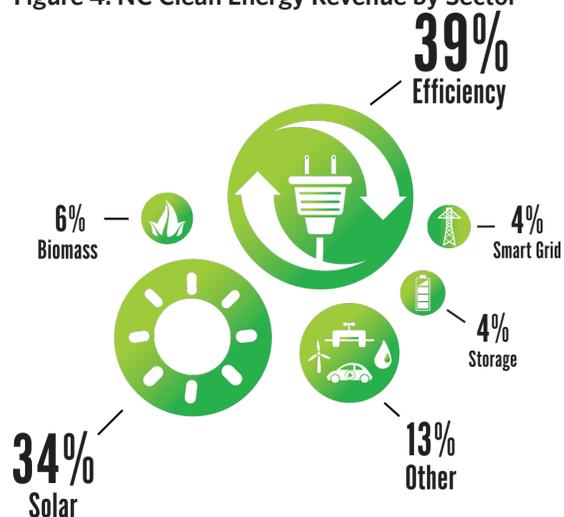


Table 7. NC Clean Energy Revenue by Sector

Sector	Clean Energy Revenue	% of Revenue
Building Efficiency	\$ 1,870,023,812	39%
Solar	\$ 1,640,526,876	34%
Biomass/Biofuels	\$ 298,241,908	6%
Storage	\$ 190,291,576	4%
Smart Grid	\$ 170,148,429	4%
Hydropower/Marine	\$ 169,738,274	4%
Wind	\$ 161,610,963	3%
Alternative Fuel Vehicles	\$ 144,213,168	3%
Geothermal	\$ 143,356,017	3%
Fuel Cells	\$ 7,613,989	0%
<b>Total</b>	<b>\$ 4,795,765,013</b>	<b>100%</b>

Table 8. NC Clean Energy Revenue by Activity

Activity	Clean Energy Revenue	% of Revenue
Design or Construction of New Buildings	\$ 1,533,064,611	32%
Sale of Renewable Energy Systems	\$ 748,709,732	16%
Installation, Design, or Development of Renewable Energy Systems	\$ 542,969,803	11%
Sale of Building System Components	\$ 476,625,308	10%
Power Generation	\$ 447,639,476	9%
Professional Services, Education, or Consulting	\$ 342,721,510	7%
Manufacturing	\$ 282,500,690	6%
Research and Development	\$ 228,039,216	5%
Installation or Maintenance of Building System Components	\$ 193,494,667	4%
<b>Total</b>	<b>\$ 4,795,765,013</b>	<b>100%</b>

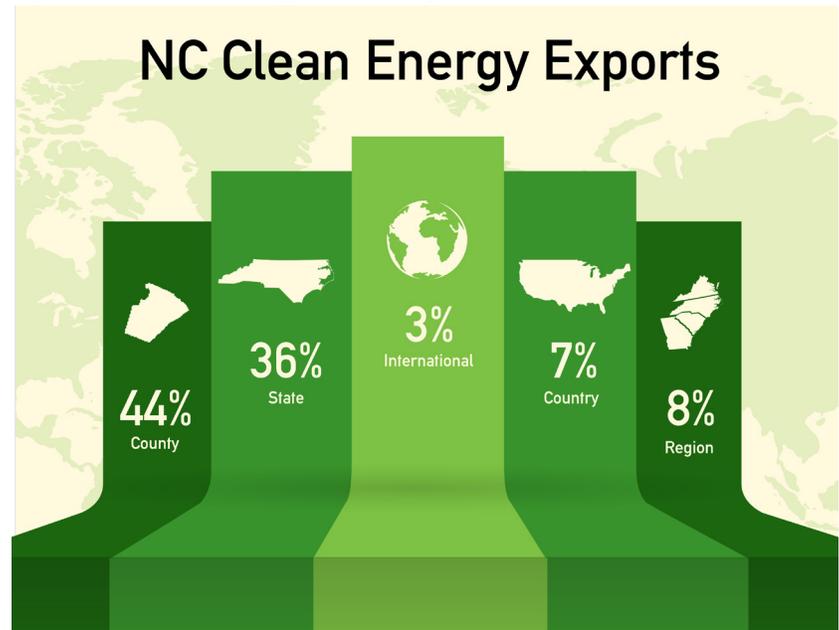
## EXPORTS

While some clean energy goods and services generated in North Carolina remain close to home, 20% of them land in markets outside the state. The products and services that are sold locally likely come from firms in the Building Efficiency sector, whose business activities are conducted close to their physical office locations. Indeed, 87% of all goods and services in the Building Efficiency sector remain in North Carolina. This, of course, is beneficial to the sector as continued growth in the state will likely demand local labor for activities such as Design and Construction of New Buildings, and Installation or Maintenance of Building System Components.

Also worth noting, however, is that North Carolina's leading-edge technology sectors such as Storage and Smart Grid are sending more of their goods and services outside of the state and region. Storage is sending approximately 18% of their products to national and international markets, while Smart Grid firms are seeing 25% of their merchandise and expertise make it out of the Southeast.

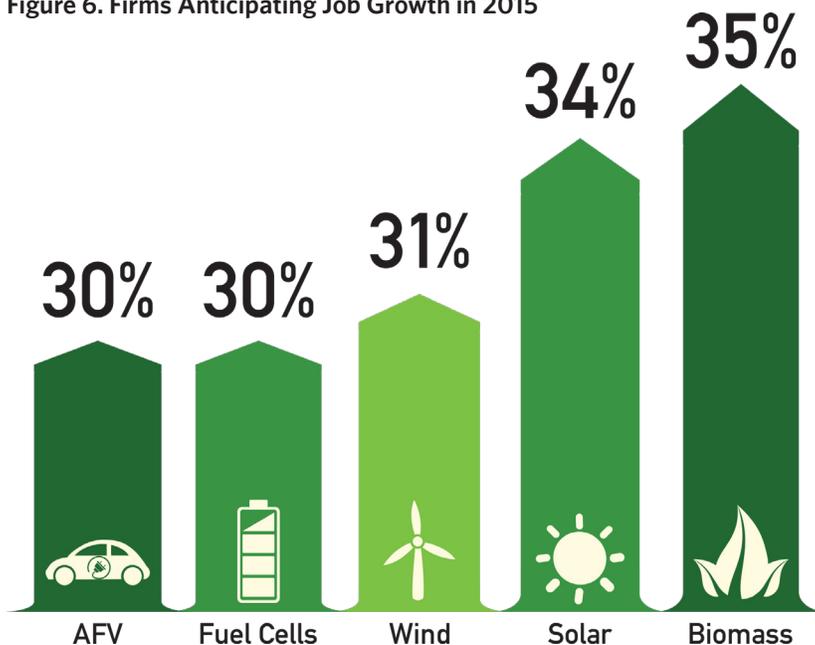
Furthermore, firms engaged in clean energy product Manufacturing sent approximately 40% of their goods out of state this year. This is beneficial for bringing in revenue from outside North Carolina, but it is also important that viable markets for these goods and services remain within the state.

Figure 5. NC Clean Energy Products by Destination Market



## GROWTH

Figure 6. Firms Anticipating Job Growth in 2015



This year saw firms take a less optimistic outlook for hiring in the upcoming year. Last year, more than half the firms in some sectors indicated that they would add jobs over the next 12 months. This year, the Biomass sector was most confident about increases in employment with 35% of firms reporting they anticipated adding jobs next year. It is important to note, however, that firms in all sectors indicated they would be adding jobs, with greater than 30% of Solar, Wind, Fuel Cells, and Alternative Fuel Vehicles firms anticipating employment growth.

When these firms do look to hire, they note several skill areas that will help them succeed. Unsurprisingly, a knowledge of high performance building is among the top skills firms are looking for in potential employees, along with energy auditing and electrical systems/wiring.

## GEOGRAPHY

Clean energy in North Carolina is no longer a niche industry. There are now solar farms, LEED certified buildings, waste-to-energy systems, and electric vehicle fueling stations in every corner of the state. Likewise, the firms that provide the goods and services needed to meet the rising demand for clean energy also occupy every corner of the state, providing jobs and revenues to rural and urban counties alike.

There are, however, some distinct clusters of the clean energy industry in the Triangle, Triad, Charlotte, and Asheville areas. This is an indication of the positive network externalities that these firms are able to utilize in North Carolina's business climate.<sup>10</sup>

Figure 7. Clean Energy across NC



## BUSINESS CLIMATE

Firms in North Carolina's clean energy industry have overcome an uncertain business climate to achieve tremendous growth in jobs and revenues since 2008. Firms indicate factors such as the quality of research and development collaboration, and the impact of renewable portfolio standards are key contributors to this growth.

On the other hand, firms note that there is room for improvement in some of the dynamics of the market environment. These include the lack of interaction among firms from different industries and economic sectors and the partnering of government and academic institutions with private sector firms. These findings show that there is a potential for both greater collaboration between industries, as well as opportunities for additional public-private partnerships that would allow for the development and testing of novel technologies that are paramount in the clean energy industry.

- Renewable Portfolio Standards
- Quality of Educational Institutions
- R&D Collaboration
- Public-Private Partnerships

Firms do, however, rate the Southeast region in general as a good location for them to be successful and anticipate that it will remain a good location for businesses in the clean energy industry over the next five years.

## CONCLUSION

We have known for several years now that North Carolina has a dynamic and growing clean energy industry. The 2014 North Carolina Census results further affirm that point by showing that there are approximately 1,200 clean energy firms providing 22,995 full-time equivalent jobs and generating \$4.8 billion in gross revenue. This represents an annual growth of approximately 25% since 2012, far outpacing the growth seen in other industries.

Clean energy projects reach all corners of the state and bring with them jobs and investment in local communities. Furthermore, income enters the state through the sale of clean energy products and services that originate here and are exported to national and international markets.

Firms in all sectors of the state's clean energy industry anticipate hiring new employees during 2015. Of particular importance going forward will be the Building Efficiency sector, which was the largest in terms of both 2014 employment and revenue. The addition of jobs in the Building Efficiency sector as well as continued growth by the other sectors will bolster North Carolina's clean energy industry and the broader state economy.

Finally, firms in North Carolina recognize the region as being a place where their business can thrive now and in the future. Supported by strong policies such as the Renewable Energy and Energy Efficiency Portfolio Standard and the Renewable Energy Investment Tax Credit, as well as a strong network of internationally recognized colleges and universities, clean energy firms in North Carolina are excited to operate in an environment conducive to the growth shown in this report.

# APPENDIX A: SECTOR DEFINITIONS

## 2014 Southeast Clean Energy Industry Census Sector Definitions

The clean energy industry is inclusive of both energy efficiency and renewable energy technologies and contains the following ten business sectors:

- 1. Alternative Fuel Vehicles** – Alternative Fuel Vehicles are those that run exclusively on alternative fuels, including electricity, or a blend of traditional petroleum fuels and alternative fuels. These include, but are not limited to:
  - Hybrid electric vehicles
  - Electric vehicles
  - Flexible-fuel vehicles
  - Biofuel vehicles, and
  - Natural gas vehicles

This sector also includes firms involved in the conversion of traditional fuel vehicles to run on alternative fuels.

- 2. Biomass/Biofuels** – This sector relates to the generation of heat or electricity from either the combustion of organic and waste materials, or their conversion to biofuels. These organic and waste materials include, but are not limited to:
  - Plant-based sources (e.g., wood, grasses, or natural oils)
  - Municipal wastewater
  - Municipal solid waste

- 3. Building Efficiency** – This sector employs technologies, products, and services that reduce the amount of energy required for processes, tasks, or buildings. Examples of firms in this sector include, but are not limited to:
  - Developers or installers of more efficient lighting technologies or HVAC systems
  - Producers or installers of other energy conservation technologies for buildings
  - Energy Star, LEED, or EarthCraft builders
  - Developers of more efficient manufacturing processes

- 4. Energy Storage** – This sector covers energy storage devices or physical media that are used to store energy, in various forms, for use at a later time. Technologies and products currently included in the sector are:
  - Batteries
  - Mechanical storage mechanisms such as compressed air or flywheels
  - Thermal storage

- 5. Fuel Cells** – This sector includes technologies or devices that convert chemical energy from a fuel source into electricity through an oxidizing reaction. Fuel sources may include:
  - Hydrogen
  - Hydrocarbons such as natural gas, methanol, or other alcohols

- 6. Geothermal** – This sector includes both Geothermal Energy and Ground Source Heat Pump (GSHP) technology. Geothermal Energy utilizes the thermal energy (heat) stored in the Earth to generate electricity, while GSHP are a central heating and cooling system that transfers heat to or from the ground.

- 7. Hydropower/Marine** – Hydropower refers to harnessing the force of falling or flowing water, including marine waves, for useful purposes such as to generating electricity or creating mechanical force.

- 8. Smart Grid** – This sector incorporates technologies and products related to updating the current electricity grid infrastructure with increased multidirectional communication, data collection, and automation. This includes, but is not limited to, digital metering equipment, sensors, controls, and related software.

- 9. Solar** – This sector includes technologies and products related to the conversion of sunlight either directly into electricity through photovoltaic cells or indirectly through concentrated solar power. The sector also includes solar thermal products that harness sunlight to meet thermal requirements for residential, commercial, or industrial processes.

**10. Wind** – The wind sector includes products related to the harnessing of wind energy. This includes, but is not limited to, wind turbines for the creation of electricity, wind pumps for pumping and drainage power, and windmills for mechanical power.

To qualify as being active in a specific sector, a firm must perform at least one of the following nine activities with that sector:

- Design or Construction of New Buildings
- Sale of Building System Components
- Sale of Renewable Energy Systems
- Installation, Design, or Development of Renewable Energy Systems
- Installation or Maintenance of Building System Components
- Manufacturing
- Power Generation
- Professional Services, Education, or Consulting
- Research and Development

# APPENDIX B: METHODOLOGY

The 2014 Southeast Clean Energy Industry Census is a collaboration between the North Carolina Sustainable Energy Association (NCSEA), the South Carolina Clean Energy Business Alliance (SCCEBA), Southface in Georgia, and the Virginia Energy Efficiency Council (VAEEC). These organizations are collectively referred to as the Partners.

Each Partner compiled a list of clean energy companies, organizations, and institutions (collectively referred to as firms) in its state. Each state-level Census relied on a common questionnaire developed by the Partners, as well as an online survey tool and phone-banking system managed by North Carolina State University Center for Urban Affairs and Community Services (NC State). NCSEA performed the data analysis of all Census data with input from the Partners.

Results in this report are specific to clean energy business conducted within North Carolina. Please see [www.cleanenergyindustry.org](http://www.cleanenergyindustry.org) for information regarding all states included in the Southeast Census.

## A Conservative Approach

The Partners utilized the approach taken by NCSEA during the first five iterations of the North Carolina Clean Energy Industry Census from 2008 – 2012. The 2014 North Carolina Clean Energy Industry Report presents direct findings from self-reported data provided by 576 firms, as well as information attributed to an additional 641 modeled firms. Taken together, these represent a significant portion of the state's clean energy industry, but certainly do not cover all activity. Our methodology does not attempt to quantify impacts of this unknown portion of North Carolina's clean energy industry. The conservative nature of the analysis means that the true economic impact of the clean energy industry in North Carolina is larger than what is presented in the 2014 Census.

## Identifying Clean Energy Firms

1. NCSEA compiled a preliminary list of North Carolina firms potentially in the clean energy industry from the following sources:
  - Lists of firms maintained by NCSEA.
  - Publicly available industry websites.
  - Lists maintained by other organizations.
  - Online searches.
2. NCSEA then assessed whether each firm is involved in a clean energy business sector included in the Census.
3. For firms deemed to be within the scope, NCSEA identified primary and secondary contacts and obtained their email and telephone information.
4. NCSEA shared its preliminary list of clean energy firms with other Partners in order to eliminate duplicate entries.
5. NCSEA delivered its preliminary list of North Carolina clean energy firms to NC State. NC State conducted the online survey and follow-up phone interviews.
6. NCSEA delivered additional lists of newly identified clean energy firms to NC State in July and August, 2014.

## Performing the Survey

1. Each North Carolina firm received an email from NCSEA that included a hyperlink to the online survey, as well as unique login and password credentials.
2. NCSEA sent multiple reminder emails to those North Carolina firms that had not completed the survey.
3. NC State conducted phone interviews with North Carolina firms that had not yet completed the online survey.
4. The Partners closed the survey on October 31, 2014.

## Identifying Business Units

Firms were asked to self-identify as being involved in the clean energy industry by indicating they had at least one employee dedicating a portion of their time to one of the nine business activities in one of ten clean energy business sectors. Each activity within a clean energy industry sector is defined as a clean energy business unit (e.g. Research and Development / Solar). The 2014 Census has 90 activity/sector cross-sections resulting from combinations of the following activities and sectors:

### Activities:

1. Design or Construction of New Buildings
2. Sale of Building System Components
3. Sale of Renewable Energy Systems
4. Installation, Design, or Development of Renewable Energy Systems
5. Installation or Maintenance of Building System Components
6. Manufacturing
7. Power Generation
8. Profession Services, Education, or Consulting
9. Research and Development

## Sectors:

- |                              |                      |
|------------------------------|----------------------|
| 1. Alternative Fuel Vehicles | 6. Geothermal        |
| 2. Biomass/Biofuels          | 7. Hydropower/Marine |
| 3. Building Efficiency       | 8. Smart Grid        |
| 4. Energy Storage            | 9. Solar             |
| 5. Fuel Cells                | 10. Wind             |

Through this selection process, each responding firm indicated its clean energy business unit(s). Firms were asked to provide their total full-time equivalent (FTE) employment and total gross annual revenue at all locations. Firms were also asked to complete metrics for each of their clean energy business unit(s), including:

- Percentage of total staff time allocated to each business unit;
- Percentage of that work occurring in Georgia, North Carolina, South Carolina, and/or Virginia;
- Anticipated change in jobs for each business unit;
- Location of any additional offices associated with each business unit; and
- The percentage of goods and services delivered to each geographic market for each business unit.

## **Calculating Full-Time Equivalent Employees of Responding Firms**

The Partners used full-time equivalent employees, or FTEs, as opposed to the number of individual employees. FTE is representational of a single 30 hour per week block of employment. NCSEA calculated clean energy FTE employees by multiplying a firm's total number of FTE employees at the time of the survey by the percentage of total staff time that the firm dedicated to each of its clean energy business units in North Carolina. FTEs provide a high degree of flexibility for accurately modeling the equivalent man-hours spent working on clean energy. For example, two employees who spend 50% of their time on clean energy would be calculated as a clean energy FTE of 1.0.

## **Calculating Annual Revenue of Responding Firms**

The Partners asked firms to report their total gross annual revenue from the most recent fiscal year (2013 in this case) by selecting from the following revenue ranges:

- |   |  |
|---|--|
| 1. Less than \$100,000                    | 9. \$25 million to less than \$50 million    |
| 2. \$100,000 to less than \$250,000       | 10. \$50 million to less than \$100 million  |
| 3. \$250,000 to less than \$500,000       | 11. \$100 million to less than \$250 million |
| 4. \$500,000 to less than \$1 million     | 12. \$250 million to less than \$500 million |
| 5. \$1 million to less than \$2.5 million | 13. \$500 million or more                    |
| 6. \$2.5 million to less than \$5 million | 14. Prefer not to answer                     |
| 7. \$5 million to less than \$10 million  | 15. Do not know                              |
| 8. \$10 million to less than \$25 million |  |

Firms were then assigned a revenue number equal to the median value the range they selected. In other words, a firm falling in the "less than \$100,000" bracket was classified as "\$50,000." Firms in the "\$500 million or more" bracket were classified as \$500 million. To calculate a firm's revenue by clean energy business unit, NCSEA multiplied the firm's total revenue by the percentage of total staff time that the firm dedicated to each business unit active in North Carolina.

## **Modeled Firms**

NCSEA used survey response data to estimate the total number of clean energy firms active in North Carolina. This included firms that responded to the Census survey as well as additional firms that were modeled based on the data from responding firms. NCSEA used the following process for estimating the total number of clean energy firms and assigning them characteristics:

1. NCSEA compiled a list of firms potentially involved in North Carolina's clean energy industry. All of these firms were contacted via email and/or telephone and a percentage of them provided complete survey responses. NC State placed all of the firms, regardless of whether they provided a responses, into the following categories:
  - Completed Interviews - Firms that completed the survey through a phone interview with NC State.
  - Completed Online - Firms that completed the survey online via the email link.
  - Respondent Will Do Online - Firms that indicated to NC State over the phone that they would take the survey online, but did not complete the survey.
  - Respondent Ineligible - Firms that self-identified as not being involved in the clean energy industry.
  - Duplicate ID - Firms that appeared on the initial list twice.
  - Attempts Exhausted - Firms that NC State was unable to contact over the phone and did not complete the survey online.

- Wrong Number - The provided phone number was incorrect.
  - Out of Service - The provided phone number was no longer in service.
  - Refused - Firms that indicated they were not willing to participate in the survey but did not self-identify as being ineligible.
2. NCSEA identified the firms in the Completed Interviews, Completed Online, Respondent Will Do Online, and Refused categories as active in the North Carolina clean energy industry.
  3. NCSEA identified the firms in the Respondent Ineligible, Duplicate ID, Wrong Number, and Out of Service Categories as not active in the North Carolina clean energy industry.
  4. NCSEA estimated the percentage of the remaining firms, those in the Attempts Exhausted category, that are active in the North Carolina clean energy industry using the following calculation:

$$\frac{\text{Completed Interviews, Completed Online, Respondent Will Do Online, and Refused Categories}}{\text{Total Number of Firms Contacted}} \times \text{Attempts Exhausted} = \text{Additional Firms Active in NC Clean Energy Industry}$$

5. NCSEA added the firms in Step 2 and 4 to determine the estimated number of firms active in North Carolina's clean energy industry.
6. NCSEA determined the number of modeled firms by subtracting the number of Completed Interviews and Completed Online responses from the total number of firms in the industry.
7. NCSEA calculated an 80% trimmed mean for the FTE and revenue in each business unit (activity/sector cross-section) by removing the upper and lower 10% of the reported FTE and associated revenue.
8. NCSEA applied the resulting trimmed means of FTE and revenue for the 90 activity/sector cross-sections to the modeled firms based on their relative percentages in the direct response data, i.e., information provided through the Completed Interviews and Completed Online responses.

## A Note About Removed Firms

NCSEA and its partners assessed all responses and identified firms that provided data that grossly overstated employment or revenues. These firms were contacted again in an effort to validate their responses. The Partners kept in the data set corrected responses from firms who retook the Census and eliminated from the dataset responses from firms that could not be reached.

### Endnotes:

1. NC Renewable Energy and Energy Efficiency Portfolio Standard - Available at: [www.ncuc.commerce.state.nc.us/reps/reps.htm](http://www.ncuc.commerce.state.nc.us/reps/reps.htm)
2. N.C. Gen. Stat. § 105-129.15 et seq. Available at: [www.ncleg.net/EnactedLegislation/Statutes/HTML/ByArticle/Chapter\\_105/Article\\_3B.html](http://www.ncleg.net/EnactedLegislation/Statutes/HTML/ByArticle/Chapter_105/Article_3B.html)
3. The Southeast Census is a partnership between NCSEA, South Carolina Clean Energy Business Alliance (SCCEBA), Southface in Georgia, and the Virginia Energy Efficiency Council (VAEEC).
4. Since 2008, NCSEA has expanded its data collection to include over twenty unique datasets measuring a diversity of market factors such as costs, projects, and resources. On a fee-for-service basis, NCSEA can assist private, public and non-profit entities needing more customized intelligence into clean energy market and policy in North Carolina.
5. Revenue collected in the 2014 Census refers to the previous fiscal year (i.e. 2013) and is compared to North Carolina's 2013 GSP growth.
6. Federal Reserve Bank of Richmond. Regional Profiles: North Carolina. [https://www.richmondfed.org/research/regional\\_economy/reports/regional\\_profiles/pdf/nc\\_regional\\_profile.pdf](https://www.richmondfed.org/research/regional_economy/reports/regional_profiles/pdf/nc_regional_profile.pdf)
7. It should be noted that GSP in North Carolina outpaced the national GDP growth of 1.8% in 2013.
8. RTI International. Economic Impact Analysis of Clean Energy Development in North Carolina - 2014 Update. [http://c.ymcdn.com/sites/www.energync.org/resource/resmgr/Resources\\_Page/NCSEA\\_econimpact2014.pdf](http://c.ymcdn.com/sites/www.energync.org/resource/resmgr/Resources_Page/NCSEA_econimpact2014.pdf)
9. Solar Energy Industries Association. State Solar Policy. North Carolina Solar. <http://www.seia.org/state-solar-policy/north-carolina>
10. NCSEA will release analysis of the clean energy clusters identified through the census in sector specific reports later this year.