

North Carolina

Clean Energy Plan

Transitioning to a 21st Century Electricity System



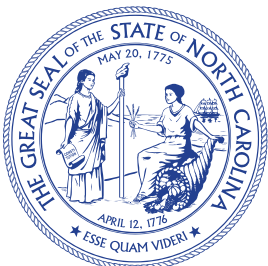
Supporting Document

PART 6

Jobs &
Economic Outlook

DRAFT

August 2019



Preface

This is a draft of North Carolina’s Clean Energy Plan (CEP). The public comment period is open from August 16, 2019 through September 9, 2019. Comments may be submitted online at <https://deq.nc.gov/cleanenergyplan>.

The Clean Energy Plan was written by the Department of Environmental Quality as directed by [Executive Order No. 80](#).¹ DEQ was tasked with the creation of a CEP to encourage the use of clean energy resources and technologies and to foster the development of a modern and resilient electricity system. The purpose of the CEP is to outline policy and action recommendations that will accomplish these goals. The CEP is made up of the main document titled *Policy and Action Recommendations* and six supporting documents.



The purpose of this supporting document (Part 6: Clean Energy Jobs and Economic Outlook) is to demonstrate how clean energy has driven economic development nationally and within North Carolina (NC), and to discuss how clean energy could continue to attract businesses, talent and investment to NC.

¹ <https://files.nc.gov/ncdeq/climate-change/EO80--NC-s-Commitment-to-Address-Climate-Change---Transition-to-a-Clean-Energy-Economy.pdf>





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Acronyms

| | |
|-----------------|--|
| ACEEE | American Council for an Energy-Efficient Economy |
| C3 | cleantech commercialization corridor |
| CA | California |
| CEP | Clean Energy Plan |
| CO ₂ | carbon dioxide |
| E2 | Environmental Entrepreneurs |
| EDF | Environmental Defense Fund |
| EE | energy efficiency |
| EMC | Electric Membership Cooperative |
| EV | electric vehicle |
| EO 80 | Executive Order 80 |
| GDP | Gross Domestic Product |
| GHG | greenhouse gases |
| GIS | geographic information system |
| HB 329 | House Bill 329 |
| IT | Information Technology |
| LLC | limited liability company |
| MA | Massachusetts |
| MW | megawatt |
| NC | North Carolina |
| NC A&T | North Carolina Agricultural and Technical State University |
| NC DEQ | North Carolina Department of Environmental Quality |
| NCSEA | North Carolina Sustainable Energy Association |
| PPA | purchase power agreement |
| RE | Renewable Energy |
| REPS | Renewable Energy and Energy Efficiency Portfolio Standard |
| RPS | renewable portfolio standard |
| RTI | Research Triangle Institute |
| SB3 | Senate Bill 3 |
| US | United States |
| USEER | US Energy and Employment Report |



1. Introduction

The purpose of this section is to demonstrate how clean energy has driven economic development nationally and within North Carolina (NC), and to discuss how clean energy could continue to attract businesses, talent and investment to NC.

The clean energy industry is dynamic and complex, reflecting fundamental changes in energy technologies and business models. Electricity, for instance, has evolved from a highly centralized, capital-intensive industry dominated by vertically integrated regional monopolies to a more de-centralized, distributed industry featuring independent power producers, rooftop solar installers, distributed clean energy aggregators, and other new businesses and business models. This industry has been a key driver of NC's 21st century economy, incubating a wide range of clean technology companies and vaulting NC to second in the nation for installed solar.

In the background of this industry growth, NC has experienced rapid population increase (18.5% from 2000 to 2010,² and another 10% by 2018),³ and a large economic shift over the past 20 years from manufacturing towards a more service-oriented industry. These trends are likely to continue: the NC Department of Commerce projects that the service economy will contribute more than 90% of the new jobs in NC from 2017 to 2026.⁴ However, economic opportunity and economic dislocation live side-by-side in NC. Median household incomes in NC range widely, from as low as \$33,000 in one county to as high as \$69,400 in another.⁵

Economic development across the state can come from both jobs and investments that drive tax revenue in local communities. The key is to understand how these trends affect the state's competitive position to leverage a dynamic and promising industry for the economic benefit of NC's residents and businesses, in both rural and urban markets

2. National Clean Energy Jobs and Economic Outlook

2.1 National Clean Energy Jobs

Assessment of clean energy jobs trends is impacted by technology innovation, expanded clean energy production, and evolving business models which may make changes in clean energy employment hard to track.⁶ These changes require new analytical approaches to measure clean energy employment and investment, including surveys like the one administered to about 30,000 employers for the 2018 US

² US Census Bureau, 2010 Census Briefs: Population Distribution and Change: 2000 to 2010 (March 2011).

³ US Census Bureau, Quick Facts: North Carolina (estimates as of July 1, 2018).

⁴ Movchan, O. (2018, October 10). North Carolina Employment Projections to 2026. Retrieved from <https://www.nccommerce.com/blog/2018/10/10/north-carolina-employment-projections-2026>

⁵ Robert Wood Johnson Foundation, County Health Rankings & Roadmaps, North Carolina: Median Household Income. Retrieved from www.countyhealthrankings.org.

⁶ Energy Futures Initiative (EFI) and National Association of State Energy Officials (NASEO). (2019). The 2019 US Energy and Employment Report. Retrieved from <https://www.usenergyjobs.org>



Energy and Employment Report (USEER), to supplement traditional energy job counts from the US Bureau of Labor Statistics.

According to USEER, the energy sector represents about 4.6% of total US employment with 6.7 million jobs.⁷ The sub-sector of clean energy represents 3.3 million US jobs with 2.3 million in energy efficiency (EE) (71%), 508,484 in renewable energy (RE) (16%) and the remainder in energy storage, grid modernization, clean vehicles and clean fuels as shown in Figure 1.⁸ Almost half of all clean energy jobs are in the construction industry, creating a driver of employment in this sector.⁹

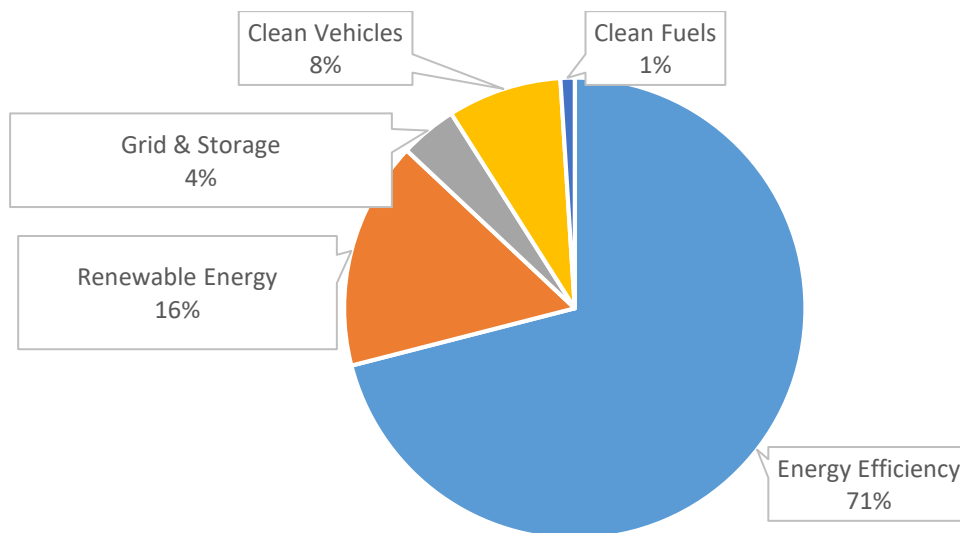


Figure 1: Clean Energy Jobs in the US
(Source: Clean Jobs America, 2019)

2.2 National Growth Trends for Clean Energy

Employment in the general energy sector increased 2.3 percent in 2018, adding 151,700 net new jobs, or nearly 7 percent of all new jobs nationwide.¹⁰ In comparison, clean energy jobs grew 3.6 percent with increases in almost every state in the US for a total of 110,000 net new jobs in 2018.¹¹ Energy storage jobs grew the fastest in 2018 with a 14% increase to 74,569 jobs nationwide.¹² Wind energy-related jobs

⁷ Energy Futures Initiative (EFI) and National Association of State Energy Officials (NASEO). (2019). The 2019 US Energy and Employment Report. Retrieved from <https://www.usenergyjobs.org>

⁸ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁹ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

¹⁰ EFI and NASEO. (2019). The 2019 US Energy and Employment Report. Retrieved from <https://www.usenergyjobs.org>

¹¹ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

¹² E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>



grew 3.5% in 2017, and all but five states saw growth in wind employment in 2018.¹³ Today there are a total of 111,000 wind energy jobs nationwide.¹⁴

The solar workforce grew 159 percent from 2010-2018, adding nearly 150,000 jobs nationwide during this period,¹⁵ but took a pause in the past two years to decline by 6% in 2017 and 3.2% in 2018,¹⁶ driven mostly by slow-downs in the top two solar states: California (CA) and Massachusetts (MA).¹⁷ Partly responsible for the historical growth is the 2006 federal Solar Investment Tax Credit which provides a 30% credit for residential and commercial projects. This tax credit will be ratcheting down through 2021 when it will drop to zero for residential projects and 10% for commercial.¹⁸ Overall, solar now accounts for 334,992 jobs nationwide, representing more than double the number of workers in the coal industry.¹⁹

2.3 National Growth Projections for Clean Energy

Employers in clean energy expect 6% growth in 2019, outpacing historical growth trends.²⁰ Across the broad energy sector, growth projections for 2019 were strongest in the USEER EE category (8%), followed closely by Electric Power Generation (7%) with other energy sectors anticipating 2-3% growth in 2019.²¹ Within the Electric Power Generation sector, most of the growth nationwide is expected in renewables construction.²² Federal tariffs on foreign-made solar panels created a downward impact on solar business in 2018 but is expected to be a relatively short-term impact.²³ The solar industry is optimistic for a rebound, anticipating total US solar industry employment to increase 8% in 2019.²⁴ Looking out longer term, the Bureau of Labor Statistics forecasts solar installers and wind turbine technicians to be the two fastest growing occupations in the nation through 2026 (with 105% and 96% growth, respectively).²⁵

National surveys also suggest that the market for clean energy will continue to grow. To date, 60% of Fortune 100 companies have set goals to increase the use of RE in their operations.²⁶ Regular Americans support these trends: a 2019 national tracking poll showed 67% of respondents believed it was somewhat

¹³ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

¹⁴ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

¹⁵ The Solar Foundation. (2018). Retrieved from <https://www.thesolarfoundation.org/national/>

¹⁶ The Solar Foundation. (2018). Retrieved from <https://www.thesolarfoundation.org/national/>

¹⁷ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

¹⁸ SEIA. (2019). Solar Tax Credit. Retrieved from <https://www.seia.org/initiatives/solar-investment-tax-credit-itc>

¹⁹ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

²⁰ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

²¹ EFI and NASEO. (2019). The 2019 US Energy and Employment Report, 2019. Retrieved from <https://www.usenergyjobs.org>

²² EFI and NASEO. (2019). The 2019 US Energy and Employment Report, 2019. Retrieved from <https://www.usenergyjobs.org>

²³ Downey, J. (2019, February 13). Why are NC, other large solar states losing industry jobs? *Charlotte Business Journal*. Retrieved from <https://www.bizjournals.com/charlotte/news/2019/02/13/why-are-nc-other-large-solar-states-losing.html>

²⁴ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

²⁵ Bureau of Labor Statistics. (2019). Retrieved from <https://www.bls.gov/ooh/fastest-growing.htm>

²⁶ Deign, J. (2019, January 1). Global Renewable Energy Investment on the Rise, 2019. *GreenTech Media*. Retrieved from <https://www.greentechmedia.com/articles/read/global-renewable-energy-investment#gs>



or very important for the US to commit to generating 100% of US power needs with clean, renewable or zero-emission energy sources; 62% believed the US should set a goal to reach net-zero carbon emissions.²⁷ A 2018 survey of financial institutions in the US indicated 70% expect cumulative private investment in US RE to reach \$500 billion by 2030, while 26% projected it would reach \$1 trillion depending on federal and state policies and market reforms.²⁸

2.4 National Workforce Challenges

Critical to continued growth in the energy sector is the availability of skilled workers. About 77 percent of employers across energy-related sectors reported difficulty hiring qualified workers in 2018, showing a negative trend from 2017 when 70% reported difficulty.²⁹

The challenge for hiring is not only related to training and skills, since clean energy jobs have lower educational requirements than overall jobs across the nation.³⁰ Based on a review of opportunities in the workforce, it is evident that clean energy jobs must be stable and well-paying in order to attract interest from qualified prospective workers.³¹ Construction and installation roles ebb and flow with new projects and incentives, while jobs in clean energy research and development may be more stable and higher paid but less plentiful. According to trade organization Environmental Entrepreneurs (E2), an opportunity for the industry is to position critical construction jobs in the context of a larger mission around clean energy and energy independence to increase their appeal in the job market.³²

3. North Carolina Clean Energy Jobs and Economic Outlook

3.1 Landscape for Economic Development in NC

Clean energy has a unique role to play in North Carolina's new service and research and development economy, which features forward-looking industries in biotechnology, aerospace, transportation and information technology (IT).³³ These new businesses have helped make NC the 12th largest economy in the nation with a Gross Domestic Product (GDP) of \$578B (about 2.8% of the national economy).³⁴ Real

²⁷ Morning Consult and Politico. (2019). National Tracking Poll. Retrieved from <https://www.politico.com/f/?id=0000016a-2897-da8e-adfa-2ad734eb0002>

²⁸ Pyper, J. (2018, June 22). What Financiers Need to Unlock \$1 Trillion in Renewable Energy Investment, 2018. *GreenTech Media*. Retrieved from <https://www.greentechmedia.com/articles/read/what-financiers-need-to-unlock-1-trillion-in-renewable-energy-investment#gs.g7pa5v>

²⁹ EFI and NASEO. (2019). The 2019 US Energy and Employment Report, 2019. Retrieved from <https://www.usenergyjobs.org>

³⁰ Muro, M., Tomo, A., Shivaram, R., Kane, J. (2019 April). Advancing Inclusion Through Clean Energy Jobs. *Brookings Metropolitan Policy Program*.

³¹ E2. [webinar] (2019, March 30) and Petrusa, J. [telephone interview] (2019, June 3).

³² E2. [webinar](2019, March 30). Clean Energy Jobs in America 2019.

³³ NC Department of Commerce. (2019). Retrieved from <https://www.nccommerce.com/business/key-industries-north-carolina>

³⁴ BEA. (2019). Retrieved from <https://www.bea.gov/data/gdp/gdp-state>



GDP in North Carolina grew 2.9% in 2018, on par with overall growth in the US and in the middle of the pack compared to other states.³⁵

Despite this growth, NC is slightly above the national unemployment rate at 4.1% in May 2019 compared to the US average of 3.6%, and is unchanged in NC versus last year, while the national rate slightly improved.³⁶ Rural areas of NC are well above average unemployment, with 21 of the state’s 100 counties experiencing unemployment rates over 5% as of May, 2019 and up to 6.8% unemployment in a single county.³⁷

3.2 Clean Energy Jobs in NC

The clean energy industry has been a bright spot for employment in NC. In fact, NC is one of the top 10 top states for clean energy jobs in the nation.³⁸ According to the Clean Jobs NC report, NC is estimated to have a total of 110,913 clean energy jobs in 2018 including solar (8,912), wind (908), clean vehicles (7,280), and energy efficiency (86,559).³⁹ These numbers are estimates (not actual counts) based on the 2019 USEER report supplemented with a nationwide survey of energy-related employment across approximately 30,000 businesses. A more conservative report from the NC Sustainable Energy Association (NCSEA) based on voluntary self-reporting from 61% of firms surveyed showed 43,238 clean energy jobs in NC as of 2018.⁴⁰

According to the 2019 USEER report, energy storage now represents 1,477 jobs in NC and grid technology/other claims 7,607 jobs (note some overlap in total numbers).⁴¹ On par with national data, the majority of NC’s clean energy jobs are in construction (44%) followed by professional services including education and consulting (21%) and manufacturing (17% of total jobs).⁴² Veterans account for 11.4% of the clean energy workforce.⁴³

Clean energy has produced jobs across the state, contributing employment and revenues to both rural and urban counties. According to the Clean Jobs NC report, every single county in NC is home to clean energy jobs and 26 counties have at least 900 clean energy jobs as shown in Figure 2.⁴⁴ Per the report, rural areas account for 25% of clean energy jobs in NC with a total of 29,000 jobs in renewable energy,

³⁵ BEA. (2019). Retrieved from <https://www.bea.gov/news/2019/gross-domestic-product-state-fourth-quarter-and-annual-2018>

³⁶ NC Department of Commerce (2019). Retrieved from https://files.nc.gov/nccommerce/documents/LEAD/NC-Today/2019_06_NCToday.pdf

³⁷ NC Department of Commerce. (2019). NC’s May County and Area Employment Figures. Retrieved from https://files.nc.gov/nccommerce/documents/LEAD/Labor-Market-Conditions-State/2019_05_LMCstate.pdf

³⁸ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

³⁹ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁴⁰ NCSEA. (2019). 2018 Clean Energy Census. Retrieved from https://energync.org/wp-content/uploads/2019/06/2018_NC_Clean_Energy_Industry_Census_Web-1.pdf

⁴¹ EFI and NASEO. (2019). NC State Energy Employment Report, 2019. Retrieved from <https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5c7f41bcee6eb0788d8de498/1551843772441/NorthCarolina.pdf>

⁴² E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁴³ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁴⁴ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>



energy efficiency, storage, clean vehicles and clean fuels, while the urban areas of Charlotte and Raleigh combined have 37,700 clean energy jobs.⁴⁵ It should be recognized that while these statistics are modeled from USEER data, it may be difficult to pinpoint jobs at the county level; however the report shows strong evidence that clean energy jobs are being created in rural NC clusters and as a whole across the state.

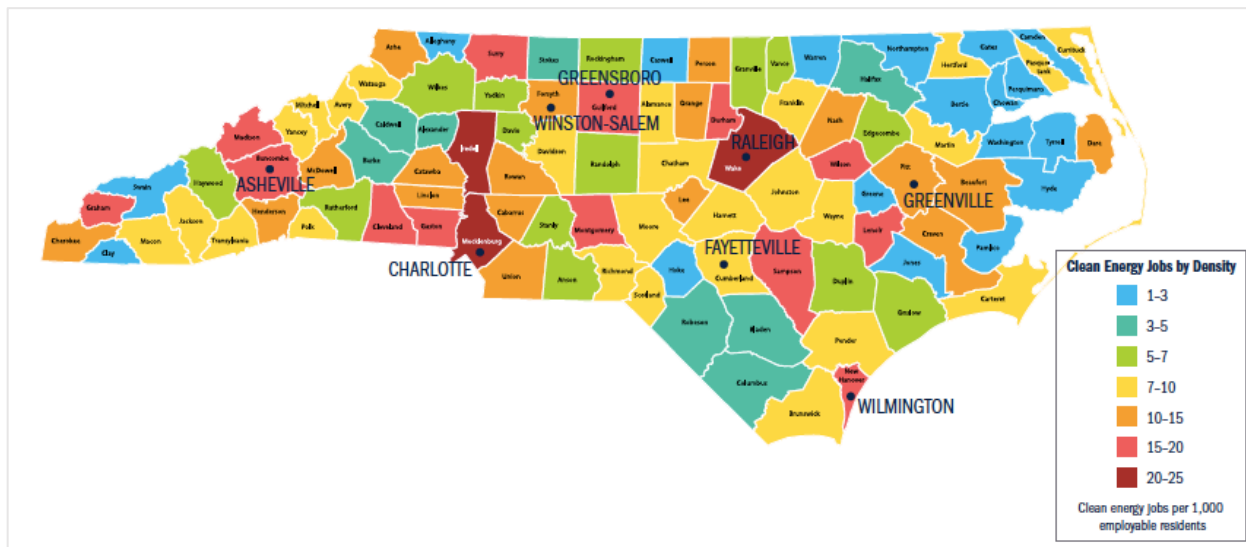


Figure 2: NC Clean Energy by County and Density
(Source: E2, 2019)

3.3 Clean Energy Growth Rates in NC

Based on the Clean Jobs NC report, clean energy jobs in NC grew 3.5% in 2018 over 2017 driven by the state’s leadership in energy efficiency, solar energy and overall clean energy jobs.⁴⁶ Supporting Document Part 1: Energy Sector Profile and Landscape of the Clean Energy Plan (CEP) contains an energy policy section that describes some of NC’s leadership policies, including the only Renewable Energy and Energy Efficiency Portfolio Standard (RPS) in the Southeast, historically generous and long term “avoided cost” contracts for utility scale solar projects, and competitive procurement requirements for renewable energy in 2017 legislation.⁴⁷ The 2018 NCSEA report mentioned above showed 25% growth between 2016-2018 adding 8,706 jobs on top of the 8,000 jobs created in 2016 when renewable energy tax incentives were still available.⁴⁸ According to the 2018 NCSEA study, the number of firms in NC linked to clean energy has quadrupled since 2016 to 1,717 companies.

⁴⁵ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁴⁶ E2. (2019). Clean Jobs America 2019. Retrieved from <https://www.e2.org/reports/clean-jobs-america-2019/>

⁴⁷ NC Solar Now. (2019). Retrieved from <https://ncsolarnow.com/how-purpa-helped-boost-utility-scale-solar-in-north-carolina/>

⁴⁸ NCSEA. (2019). 2018 Clean Energy Census and 2016 Clean Energy Census.



3.3.1 Role of Solar in NC Employment

Solar employment in NC grew 40% in 2017 to 7,622 jobs, then dropped 11.8% in 2018, compared to the 3.2% decline in 2018 nationwide.⁴⁹ Reasons for the decline in NC solar employment are both national and state-related, some short-term and some indicative of fundamental issues. NC was impacted along with other states by Federal trade policy, but more specific to NC is solar regulatory uncertainty, including changes in NC incentives for independent solar projects, limitations of the Green Source Advantage program launched in conjunction with House Bill 589, and the backlog in the Duke Energy interconnection queue. Despite these barriers, The Solar Foundation projects solar industry growth in NC over the next five years depending on NC policies and regulatory actions.⁵⁰

3.4 Hiring Challenges in NC

The expected growth in solar employment over the next few years comes with the challenge of hiring for upfront jobs in solar project design, construction, site preparation, procurement and installation. Once a solar project is in place, the project maintenance requires much fewer jobs, which may be centralized rather than distributed across the state.⁵¹ Solar-related work is also impacted by the timing of federal and state incentives which may concentrate interest in solar projects in particular months or years. For example, Duke Energy’s residential solar rebates in NC were exhausted in two days in 2019.⁵² Employers could benefit by assistance in smoothing out the rebate cycles and hiring demands, as illustrated by the example in Figure 3.

Jay Radcliffe, president of Renu Energy Solutions says the solar rebates have increased awareness and led to a lot of new business. But the “boom and bust” rebate cycle has compressed much of his business into just a few months of the year, making it hard to meet demand when it is high, and then keep people employed when business slows.

“We feel like we are in high-growth mode, in staff and in markets,” he says. “But the cycle makes you give it a second think.”



⁴⁹ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

⁵⁰ Wood Mackenzie/SEIA. (2019). U.S. Solar Market Insight Report, Q2 2019.

⁵¹ Petrusa, J. [telephone interview] (2019, June 3).

⁵² Richardson, R. (2019). CBS17.com. Retrieved from <https://www.cbs17.com/news/local-news/wake-county-news/light-speed-duke-energys-nc-solar-rebates-gone-in-2-days/>



– Jay Radcliffe, CEO Renu Energy Solutions⁵³

Figure 3: Spotlight on Hiring Challenges: Renu Energy Solutions
(Source: Charlotte Business Journal, 2019)

The increase in overall clean energy employers and job opportunities has driven increasing demand for talent and skills in the industry. Coupled with NC’s low unemployment rate, these growth dynamics have led to energy-related firms in North Carolina reporting difficulty in hiring employees in all sectors of the energy industry, particularly in energy efficiency as shown in Table 1.⁵⁴ For solar jobs, 27% of NC employers report it was “very difficult” to hire qualified employees.⁵⁵ NC needs to continue focus on workforce training to help address the hiring challenges cited by NC clean energy employers, including lack of experience, skills or training opportunities (such as internships, apprenticeships programs, etc.); insufficient “soft skills” such as dependability and work ethic; and competition for workers from a small applicant pool.⁵⁶

Table 1: Hiring Difficulty in NC

| Technology | Very Difficult | | Somewhat Difficult | | Total Very/ Somewhat Difficult | |
|--|----------------|----------|--------------------|----------|--------------------------------|----------|
| | NC | National | NC | National | NC | National |
| Electric Power Generation | 17.9 | 20.7 | 64.3 | 54.8 | 82.2 | 75.5 |
| Electric Power Transmission, Distribution and Storage | 14.3 | 21.9 | 28.6 | 46.1 | 42.9 | 68.0 |
| Energy Efficiency | 60.0 | 21.3 | 26.7 | 48.1 | 86.7 | 69.4 |
| Fuels | -- | 37.9 | 50.0 | 43.0 | 50.0 | 80.9 |
| Motor Vehicles | 12.5 | 30.0 | 62.5 | 46.4 | 75.0 | 76.4 |

(Source: Department of Energy, 2019)

The NC Department of Commerce is currently conducting a workforce assessment under Executive Order 80 that considers the existing talent pool, projected growth, minimum education requirements and average wages. The assessment will help identify how NC will meet future demand for workers in clean energy, energy efficiency and clean transportation under various economic scenarios.

⁵³ Downey, J. (2019). Market Heating Up. *The Charlotte Business Journal*. Retrieved from <https://www.bizjournals.com/charlotte/news/2019/06/13/why-the-market-for-rooftop-solar-in-north-carolina.html>

⁵⁴ NASEO and EFI. (2019). Energy Employment by State, 2019. Retrieved from <https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5c7f375515fcc0964aa19491/1551841115357/USEER+Energy+Employment+by+State.pdf>

⁵⁵ The Solar Foundation. (2019). Solar Jobs Census 2018: NC Fact Sheet, 2019. Retrieved from <https://www.thesolarfoundation.org/solar-jobs-census/factsheet-2018-nc/s>

⁵⁶ NASEO and EFI. (2019). Energy and Employment by State, 2019. Retrieved from <https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5c7f375515fcc0964aa19491/1551841115357/USEER+Energy+Employment+by+State.pdf>



3.5 Revenue Impacts of Clean Energy in NC

While jobs are important to all communities, the revenues generated by clean energy investments and infrastructure projects can have even longer lasting benefits. New RE projects and facilities can create ongoing revenue streams in their local communities. For example, most new solar development facilities in NC have been constructed and financed by the private sector, generating new real property taxes and personal property taxes on equipment in rural counties that are often economically challenged. Table 2 shows the impact in NC across a sample of counties:

Table 2: Impact of Solar Development in Five NC Counties

| County | # Solar Projects | Total Solar Capacity | Total Property Taxes Paid on Participating Parcels <u>Before Solar</u> | Total Property Taxes Paid on Participating Parcels <u>After Solar</u> |
|--------------|------------------|----------------------|--|---|
| Caswell | 3 | 15 MW | \$1,366 | \$71,077 |
| Catawba | 13 | 105 MW | \$19,371 | \$469,902 |
| Cumberland | 6 | 93 MW | \$2,135 | \$478,497 |
| Johnston | 15 | 66 MW | \$9,053 | \$377,889 |
| Rutherford | 6 | 91 MW | \$6,228 | \$256,343 |
| Total | 43 | 370 MW | \$38,153 | \$1,653,708 |

**Data represents taxes collected in the year before and after a large solar project was built. Source: County Tax Offices, NC Utilities Commission and NCSEA Renewable Energy Database (Source: NCSEA)*

The local tax revenues generated by clean energy projects generally come with no additional burden on the local services, which helps bolster the community.⁵⁷ As an example, Halifax County was able to invest its new revenues in education, training and summer camps through its new Center for Energy Education non-profit supported by energy partners and local government.

Another example is in Montgomery County, where O2Energy built a 20-megawatt solar farm that paid nearly \$100,000 a year in property taxes in 2017. Before the project was built, the land was generating less than \$1,000 a year in county property taxes.⁵⁸

“Every dollar that’s been spent here generates... revenues for state and local governments,” stated O2Energy CEO Joel Olsen.



⁵⁷ Brookshire, D. [telephone interview] (2019, May 29).

⁵⁸ Murawski, J. (2017, May 3). NC gave out a record \$245M in energy tax breaks. Here’s who benefited. *The News and Observer*. Retrieved from <https://www.newsobserver.com/news/business/article148243849.html>



3.5.1 Exports

Additional revenue can also be generated from exports. More than 20% of the clean energy goods and services generated in NC are exported to other states or nations, bringing new revenue into NC. Firms engaged in clean energy product manufacturing or production lead out of state exports, with approximately 53% going to other markets.⁵⁹ Research and development activities also have a strong out-of-state presence, with 38% of work destined for broader markets.⁶⁰ Moreover, NC is able to reduce its energy imports through RE generation and locally-driven EE projects.

3.6 Total Economic Benefits of Clean Energy in NC

NC’s economy benefits from clean energy in a number of ways including jobs, additional tax revenues and exports as well as direct investments in infrastructure and development, and reduced energy costs for businesses and residents. The total economic impact of clean energy development in NC is estimated at \$28.2 billion over the period of 2007-2018, including direct impact of \$14.8 billion investment in clean energy development (which includes labor costs) and secondary impacts of \$14.5 billion which include \$2.9 billion in energy costs savings (see Table 3).⁶¹ The cumulative contribution to NC’s Gross State Product from 2007-2018 is \$16.9 billion, including \$1.4B tax revenue over this period.⁶²

Clean energy investments were approximately twelve times larger than the state incentives for them over the twelve-year study period.⁶³ Of these investments, 88% were in renewables (primarily solar) and 12% in EE; almost a third came in the last two years 2017-2018.⁶⁴

Table 3: Total Cumulative Economic Impacts of Clean Energy in NC, 2007-2018

| | Total Revenue Received by NC Businesses & Individuals | Gross State Product (cumulative) |
|--|--|-------------------------------------|
| Direct economic impact from clean energy development | \$14.8 billion | \$9.4 billion |
| Change in government spending related to Direct impacts | (\$1.1 billion) | (0.8 billion) |
| Secondary economic impacts | \$14.5 billion | \$8.3 billion |
| Total economic impact | \$28.2 billion | \$16.9 billion |

(Source: RTI, 2019)

3.6.1 Growth Drivers of Clean Energy Economy

Several NC energy policy decisions have been key to the growth of the clean energy economy in the State. NC’s interpretation of the 1978 federal mandate, the Public Utility Regulatory Policies Act

⁵⁹ NCSEA. (2016). 2016 Clean Energy Census. Retrieved from https://energync.org/wp-content/uploads/2017/03/NC_Clean_Energy_Industry_Census_2016.pdf

⁶⁰ NCSEA. (2016). 2016 Clean Energy Census. Retrieved from https://energync.org/wp-content/uploads/2017/03/NC_Clean_Energy_Industry_Census_2016.pdf

⁶¹ RTI. (2019). Economic Impact Analysis of Clean Energy Development in North Carolina—2019 Update.

⁶² RTI. (2019). Economic Impact Analysis of Clean Energy Development in North Carolina—2019 Update.

⁶³ RTI. (2019). Economic Impact Analysis of Clean Energy Development in North Carolina—2019 Update.

⁶⁴ RTI. (2019). Economic Impact Analysis of Clean Energy Development in North Carolina—2019 Update.



(PURPA), provided historically generous and long term “avoided cost” contracts for utility scale solar projects and is cited as a primary growth driver of utility-scale solar in the state.⁶⁵ The Renewable Energy Portfolio Standard (REPS) established through Senate Bill 3 (SB3) in 2007 is also considered a turning point for NC, helping to drive the state to become a national leader in installed solar, second only to CA in this distinction.

NC’s Business and Energy Tax Credits were another growth driver, providing a 35% state tax credit for RE projects. These credits doubled every year after the REPS was established in 2007 and grew to \$245 million in 2016, the last year of the program.⁶⁶ When coupled with a 30 percent federal solar tax credit, project developers could cut the cost of a renewable facility in half. The legislature let the subsidy expire for solar energy and 17 other renewable technologies in 2015, with an extension granted into 2016 for projects already under development.⁶⁷

Then in 2017, the legislature passed the Competitive Energy Solutions for NC bill, also known as HB 589. While the results are still unfolding, the bill is intended to support the next phase of growth in the clean energy sector through new programs for RE procurement, solar rebates and leasing, community solar and energy storage research.

Corporate priorities have also been driving NC’s clean energy economy. Today, 17 of the state’s 30 largest private employers have set targets to procure more RE or reduce their energy consumption; and 39 companies doing business in NC have set goals to be powered by 100% RE, of which 21 of these companies have target dates with the next 6 years or have already achieved 100%.⁶⁸ Companies across a wide range of industries have set clean energy goals, including major technology companies Amazon, Apple, Facebook, Google and SAS as well as American Express, BlueCross Blue Shield NC, Ikea, Kohl’s, New Belgium Brewing and Starbucks as shown in Figure 4.⁶⁹



⁶⁵ EIA. (2019). Retrieved from <https://www.eia.gov/todayinenergy/detail.php?id=27632>

⁶⁶ NCDOR. (2016). Article 3B – Business and Energy Credits. Retrieved from <https://files.nc.gov/ncdor/documents/reports/2-3B-RenEngyProp2016.pdf>

⁶⁷ US Department of Energy. (2019). Expired, Repealed, and Archived NC Incentives and Laws. Retrieved from https://afdc.energy.gov/laws/laws_expired?jurisdiction=NC

⁶⁸ Ceres (2019, May 22). NC Clean Energy Plan Stakeholder Workshop Presentation: Corporate Support for Clean Energy. Presented at CEP Facilitated Workshop #4.

⁶⁹ Ceres. (2019, May 22). NC Clean Energy Plan Stakeholder Workshop Presentation: Corporate Support for Clean Energy. Presented at CEP Facilitated Workshop #4.



Figure 4: Examples of Companies with Major Presence in NC with Clean Energy/Climate Goals

Some of these companies participated in roundtable discussions during 2019 to express firsthand their motivations for adopting clean energy policies. These businesses have moved beyond soft factors such as community relations and good publicity, and now state fundamental strategic drivers for their clean energy goals, including customer and shareholder demand, competitive advantage, attracting and retaining talent, operational efficiency, supply chain disruption, lower costs and core values. Given their large presence in NC, these firms are driving continued demand for clean energy technologies and research, helping to ensure the continued health and growth of these industries.

3.6.2 Case Studies

A few studies help illustrate the strategic motivations for companies in NC to pursue clean energy goals:



Walmart is NC’s largest employer and is investing in clean energy to keep its prices low. Walmart aims to power its facilities with 50% RE by 2025, and the company’s long-term commitment to 100% RE is consistent with its business strategy and mission. The RE deals Walmart has entered into to date are projected to save the company money. These projects benefit not only Walmart’s customers and communities it serves, but also drives meaningful change in promoting widespread adoption of renewables.⁷⁰

⁷⁰ Walmart. (2019). Walmart’s Approach to Renewable Energy. Retrieved from <https://cdn.corporate.walmart.com/cb/80/4c32210b44ccb4e634ddedd18a27/walmarts-approach-to-renewable-energy.pdf>



IBM has a large campus in Research Triangle Park, its third largest site and energy user worldwide. IBM has focused on energy conservation and management since 1974, and the results of this early focus on conservation have been significant. From 1990 through 2017, IBM saved 7.4 million megawatt-hours of electricity consumption, avoided 4.4 million metric tons of carbon dioxide (CO₂) emissions and saved \$616 million through its annual energy conservation actions. IBM also has a goal to source 55 percent of the electricity the company consumes from renewable supplies by 2025.⁷¹



Mars Inc. operates 62 veterinary clinics throughout NC and a pet care factory in Henderson, employing over 1300 people. Mars has a target to reduce greenhouse gas (GHG) emissions from its full value chain by 67 percent by 2050 and to achieve 100% RE. Mars recognizes that emissions reductions are an economic imperative, as climate change stands to impact farmers' ability to grow the raw materials needed for Mars' pet care, confectionary, and food products.

Mars has made significant investments in RE and EE in the US and abroad, which has helped the company save money in its day-to-day operations. Doing the right thing is also important to Mars associates, who care about what the company does to minimize its impact on the earth.⁷²

3.7 Spotlight on Local Government

Many cities and local governments across NC are also setting environmental goals based on the interests of their local constituents. Today 22 local NC governments have adopted the Climate Solutions Coalition 100% Clean Energy Resolution and 14 cities have signed the US Conference of Mayors Climate Protection Agreement. Some municipalities set goals many years ago, such as Wilmington's 2009 resolution to reduce emissions 58% by 2050. Other cities have set goals more recently. For example, in 2018, Asheville passed a resolution to transition municipal operations to 100% RE by 2030 and Charlotte passed a low-carbon resolution and approved a Strategic Energy Action Plan to achieve it. In 2019, Apex set a 100% clean energy goal and Raleigh adopted an 80% greenhouse gas (GHG) emissions reduction target, both goals aiming for 2050.

⁷¹ IBM. (2019). Climate protection. Retrieved from <https://www.ibm.com/ibm/environment/climate/index.shtml>

⁷² Mars. (2019). Climate Action Position Statement. Retrieved from <https://www.mars.com/global/about-us/policies-and-practices/climate-action-position-statement>



In addition to climate change and local air quality concerns, local governments see climate and clean energy goals as drivers of economic development. Raleigh is a good case in point. The Raleigh City Council adopted its first Climate and Energy Action Plan in 2012 as part of a strategy for “expanding the local economy through EE and innovation.”⁷³ When Raleigh began preparing an action plan to support its new goals in 2019, the City was also addressing its second largest operating expense - energy.⁷⁴ Funds freed up by these municipalities through their EE efforts and self-generation of power can be invested in local infrastructure and services.

Over the past 18 months, twelve NC municipalities with public commitments to GHG reduction goals participated in a “Cities Initiative” led by the Environmental Defense Fund (EDF). Participants represented both large and small communities from across the state as shown below:

- Asheville
- Carrboro
- Cary
- Chapel Hill
- Charlotte
- Durham
- Greensboro
- Highlands
- Hillsborough
- Raleigh
- Winston-Salem
- Wilmington

The goals of the “Cities Initiative” were to (1) identify and prioritize common barriers the cities and towns face in efforts to reduce their emissions and (2) identify consensus action items that could create opportunities and foster partnerships for localities to achieve faster, less expensive and deeper GHG reductions.

Over the course of four roundtable discussions led by EDF, the twelve participating local governments agreed on twelve priorities for statewide action. Some of these priorities take direct aim at economic development, seeking to boost investment in clean energy projects through a “Green Energy Bank” and raise revenue to build out transit infrastructure. (For more detail, please see Clean Energy Plan (CEP) Supporting Basis: Stakeholder Engagement.) Phase Two of the initiative, set to unfold late 2019-2020, is to develop implementation goals and strategies. This new phase is open to additional local governments who are interested in joining and is underway with EDF scheduling a series of roundtables over the next two years.

3.8 Spotlight on Agriculture Sector

As a major contributor to NC’s economy, the agriculture sector has a unique role to play in the evolution of NC’s clean energy economy. NC's agricultural industry, including food, fiber and forestry, contributes \$91.8 billion to the state's economy, accounts for more than 17 percent of the state's income, and employs

⁷³ City of Raleigh Renewable Energy Overview: Background, Assessment & Recommendations, submitted to the City of Raleigh Office of Sustainability by the NC Sustainable Energy Association (Jan. 2016).

⁷⁴ City of Raleigh Renewable Energy Overview: Background, Assessment & Recommendations, submitted to the City of Raleigh Office of Sustainability by the NC Sustainable Energy Association (Jan. 2016).



17 percent of the work force.⁷⁵ The state ranks seventh nationally in farm profits with a net farm income of over \$2.8 billion.⁷⁶

Along with peers across the country, farmers in NC are working to minimize energy costs and maintain voluntary conservation plans with technical support from federal and state agencies. However, farms and food production systems are under stress nationwide due to increased temperatures, precipitation changes, more frequent severe storms, population growth, federal trade policies and real estate development pressures. In NC, the number of farms has declined to 46,418 farms in 2017 from 52,913 in 2007, although total farm land held steady reflecting consolidation.⁷⁷ These trends create new risks and opportunities for NC's agriculture sector.

Opportunities voiced by the NC agriculture stakeholders during the CEP development process revolved around responsible farmland management and ensuring value to the farmer.

3.8.1 Responsible Farmland Management

RE projects are often developed in the rural areas of NC, offering economic development through supplemental income to farmers, along with a diversified economy through a shift in the use of farmland. As of 2015, Tier 1 counties received over \$1.6 billion and Tier 2 counties received over \$2.0 billion in major solar investment projects (those greater than \$1 million) for a combined 87% of total solar investments in the state.⁷⁸

Despite this potential for converting farm assets, there is some concern that RE projects may take away from food production. So far, the impact on crops is limited as only 0.19% of NC cropland has been repurposed from agriculture to utility-scale solar installations.⁷⁹ To put these numbers in perspective: within the last decade, there has been a million-acre loss of cropland in NC from development and housing, yet solar energy projects contribute only about 1% of that total.⁸⁰

Even if the impact of solar development on farmland is small, the impact should be considered to avoid sub-optimal land use and financial risk to the farmer. A good example of optimal land use is the partnership between Sun-Raised Farms and solar developer O2 emc where “electricity is successfully

⁷⁵ Walden, M. (2019). Agriculture and Agribusiness. Retrieved from <https://cals.ncsu.edu/agricultural-and-resource-economics/wp-content/uploads/sites/12/2017/07/agribusiness2019Brochure-1.pdf>

⁷⁶ NCSU. (2019). NC Agriculture Overview. Retrieved from <https://www.ncagr.gov/stats/general/overview.htm>

⁷⁷ USDA. (2019). Historical Highlights: 2017 and Earlier Census. Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/North_Carolina/st37_1_0001_0001.pdf

⁷⁸ RTI International. (2016). Economic and Rate Impact Analysis of Clean Energy Development in North Carolina - 2016 Update. Retrieved from: https://c.yimcdn.com/sites/energync.site-ym.com/resource/resmgr/Docs/RTI_2016_FINAL_4-18.pdf

⁷⁹ NCSEA. (2017). North Carolina Solar and Agriculture. Retrieved from https://energync.org/wp-content/uploads/2017/04/NCSEA_NC_Solar_and_Agriculture_4_19.pdf

⁸⁰ NCSEA. (2017). North Carolina Solar and Agriculture. Retrieved from https://energync.org/wp-content/uploads/2017/04/NCSEA_NC_Solar_and_Agriculture_4_19.pdf



generated on the same land on which sheep are raised.”⁸¹ According to stakeholder input, the most sustainable solar power facilities allow dual use of the land so that the utility of the farmland is maintained.

3.8.2 Value to the Farmer

Transfer of land from agricultural use may result in additional or deferred tax liability, greater insurance requirements, personal injury/liability issues, potential future environmental mitigation, or the inability to transfer lands into other uses.

The opportunity to transfer or share land use from agricultural production into solar energy production offers a stable revenue source that usually exceeds income from farmland rental.⁸² In some cases farmers may feel the returns are not adequate, especially if the farmer or landowner bears responsibility for decommissioning in the event the solar project fails or is damaged, or if the solar developer goes bankrupt. The farmer must understand the financial and legal implications of having a solar energy facility on their property and negotiate these issues in the lease agreement between the farmer and the solar developer.⁸³ Stakeholders indicated that the most sustainable solar power facilities are owned (or co-owned) by the farmer to maintain the value of the farmland and preserve the farm tax credit.

During the 2019 NC Legislative Session, House Bill 329 (HB 329) was passed.⁸⁴ This law requires that DEQ establish a stakeholder process for developing a regulatory program governing end-of-life and decommissioning of energy storage equipment (and other renewable equipment). This stakeholder process will examine issues like determining if renewable energy equipment is hazardous waste, recycling and disposal options, analyzing productive life of equipment, establishing the volume of renewable equipment in the state, and understanding approaches used in other states for end-of-life issues with renewable energy equipment. The NC Environmental Management Commission (EMC) will approve rules developed by DEQ covering the issues outlined in HB329 by January 1, 2021. When rules for this legislation are finalized, there will be implications for project developers, farmers and land owners that may impact project costs.

Separately, since the 2007 moratorium on new swine farms in NC halted swine-farm expansion, RE projects have the potential to give swine farmers a new use for their products. For example, the Optima BioEnergy system in Duplin County, NC has harnessed biogas from five hog farms for delivery to Piedmont Natural Gas pipelines, a small pilot that demonstrates waste-to-energy recovery potential.⁸⁵ For these types of projects, value to the farmer may depend on “production methods, the size of the farms,

⁸¹ NCSEA. (2017). North Carolina Solar and Agriculture. Retrieved from https://energync.org/wp-content/uploads/2017/04/NCSEA_NC_Solar_and_Agriculture_4_19.pdf

⁸² NCSEA. (2017). North Carolina Solar and Agriculture. Retrieved from https://energync.org/wp-content/uploads/2017/04/NCSEA_NC_Solar_and_Agriculture_4_19.pdf

⁸³ NCSEA. (2017). North Carolina Solar and Agriculture. Retrieved from https://energync.org/wp-content/uploads/2017/04/NCSEA_NC_Solar_and_Agriculture_4_19.pdf

⁸⁴ NC General Assembly HB 329, <https://www.ncleg.gov/Sessions/2019/Bills/House/PDF/H329v5.pdf>

⁸⁵ Business North Carolina. (2018). North Carolina’s renewable-energy industry is positioned for success. Retrieved from <https://businessnc.com/north-carolinas-renewable-energy-industry-positioned-success/>



how the swine are raised and how the waste is maintained” according to the North Carolina Pork Council.⁸⁶ Additional information on swine waste-produced biogas is provided in “CEP Supporting Basis Part: Energy Resources.

3.9 How NC Compares to Other States

Every state competes for businesses, employees and residents to maintain a healthy tax base and vibrant economy. Clean energy plays a role in various industries that NC strives to attract and retain, such as Information Technology (IT), advanced manufacturing, consumer brands and other emerging fields in our new economy. For example:

- NC boasts the second-fastest growing IT industry in the US partly due to attracting Google, Apple, Cisco and SAS – all companies that are setting ambitious clean energy goals and expect policies and platforms that will support those goals.⁸⁷
- NC ranks second in turbine manufacturing and fifth in semiconductor manufacturing in the US largely driven by nuclear energy, cleantech and smart grid businesses in the state.⁸⁸
- Big consumer brands in NC such as Mars, Unilever and Wrangler are setting sustainability goals to attract and retain talent and stay competitive in their industries.
- Emerging industries in NC such as breweries are looking at RE to offset their carbon footprints to increase customer and employee satisfaction.

These types of businesses are calling for more access to clean energy and note it as factor in choosing where to do business.⁸⁹ While NC is attracting corporate leaders, NC is falling behind in meeting their expectations around clean energy. NC ranks 25th in the 2017 US Clean Energy Leadership Index which tracks and ranks the clean-tech activities of all 50 states and the 50 largest metropolitan areas in the US from electric vehicles (EV) and renewables adoption to policy and investment activity.⁹⁰ Likewise, NC is 23rd on EE program spending per capita and ranks 26th overall in the ACEEE Energy Efficiency Report Card which ranks states in six categories—utility programs, transportation, building energy codes, combined heat and power, state initiatives, and appliance standards.⁹¹ While NC continues to be the only state in the southeast with a Renewable Portfolio Standard (RPS), today 30 states have such standards and all but two of them (Wisconsin and Ohio) are higher than NC’s, with standards ranging from 10% to 100%.⁹²

⁸⁶ Business North Carolina. (2018). North Carolina’s renewable-energy industry is positioned for success. Retrieved from <https://businessnc.com/north-carolinas-renewable-energy-industry-positioned-success/>

⁸⁷ NC Department of Commerce. (2019). Key Industries in NC. Retrieved from <https://www.nccommerce.com/business/key-industries-north-carolina>

⁸⁸ NC Department of Commerce. (2019). Key Industries in NC. Retrieved from <https://www.nccommerce.com/business/key-industries-north-carolina>

⁸⁹ Ceres. (2019). Corporate Buyers Principles. Retrieved from <https://buyersprinciples.org/principles/>

⁹⁰ Clean Edge. (2017). 2017 Clean Energy Leadership Index. Retrieved from <https://cleanedge.com/reports/2017-US-Clean-Tech-Leadership-Index>

⁹¹ ACEEE. (2018). The 2018 State Energy Efficiency Scorecard. Retrieved from <https://aceee.org/research-report/u1808>

⁹² National Conference of State Legislatures. (2019). State Renewable Portfolio Standards and Goals. Retrieved from <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>



3.9.1 Comparative Solar Job Growth

NC has established a leadership position as second in the nation for installed solar, yet ranks ninth in the nation for total solar jobs.⁹³ CA is a clear leader in solar employment with over 76,000 workers, and not-so-sunny MA ranks second with over 10,000 jobs, driven by policies that support net metering and a strong RPS.⁹⁴

Despite overall leadership in solar employment, both CA and MA saw declines in solar jobs last year and together drove 89% of the national drop-off in solar employment.⁹⁵ NC was one of 21 states to suffer declines in solar jobs in 2018, while 29 states experienced growth in solar jobs in the same period (Figure 5).⁹⁶ Some states grew jobs by more than 20% in 2018, with two of the leaders adding over 1,000 net jobs. Florida solar employment grew 71% from 2017-2018 with 1,769 new jobs.⁹⁷ fueled by a Public Service Commission decision to support residential solar leases.⁹⁸ In Illinois, an updated Renewable Portfolio Standard⁹⁹ stimulated the state's solar market which added 1,308 solar jobs in 2018.¹⁰⁰

⁹³ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

⁹⁴ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

⁹⁵ Clean Jobs America, 2019. pdf

⁹⁶ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

⁹⁷ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

⁹⁸ State of Florida Public Services Commission. (2018). PSC Declaratory Statement Allows Residential Solar Equipment Leases. Retrieved from <http://www.floridapsc.com/Home/NewsLink?id=11614>

⁹⁹ DSIRE. (2018). Renewable Portfolio Standard. Retrieved from <http://programs.dsireusa.org/system/program/detail/584>

¹⁰⁰ The Solar Foundation. (2019). National Solar Jobs Census. Retrieved from <https://www.thesolarfoundation.org/national/>

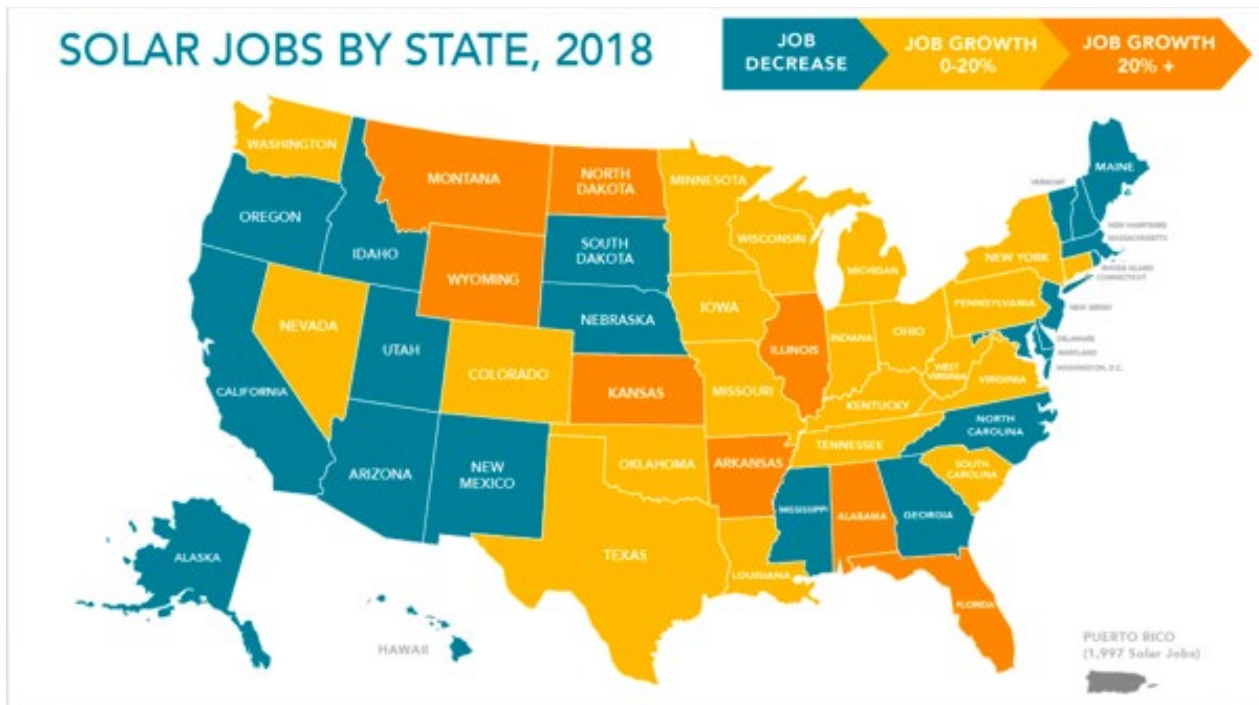


Figure 5: Solar Job Growth by State
 (Source: Solar Jobs Census, 2018. Solar Foundation)

3.10 Projections and Future Growth Drivers of NC’s Clean Energy Economy

In the general energy sector, employers in NC are projecting 5% growth in employment over the next twelve months, driven largely by 8.3% growth in the energy efficiency sector. NC projections are slightly more robust than the national projections of 4.1% for the overall energy sector.¹⁰¹ Specific to solar, NC ranks fourth in national growth projections over the next five years expecting 3.9 additional gigawatts installed, which industry groups translate to a range of 8,000-20,000 estimated new jobs in NC.¹⁰²

Through the CEP stakeholder engagement process and collaborative partnership efforts, businesses expressed a number of factors they deem important to achieve robust growth of NC’s clean energy economy, and the role that clean energy and clean transportation play in attracting talent and industry to the state.

Business interest in clean energy aligns with the need for cost savings, return on investments, risk management, attracting talent, meeting shareholder and customer expectations, driving innovation and staying competitive.¹⁰³ In April, 2019 a group of businesses delivered a letter to Governor Cooper that called for increased investment in EE programs, increased customer access to RE, accelerated deployment

¹⁰¹ NASEO and EFI. (2019). NC Energy and Employment – 2019. Retrieved from <https://static1.squarespace.com/static/5a98cf80ec4eb7c5cd928c61/t/5c7f41bcee6eb0788d8de498/1551843772441/NorthCarolina.pdf>

¹⁰² Wood Mackenzie/SEIA. (2019). US Solar Market Insight Report, Q2 2019.

¹⁰³ Ceres. (2019, April 2). Letter to Governor Cooper.



of EVs and advanced development of energy storage (please see referenced letter in “CEP Supporting Basis: Stakeholder and Public Engagement Process”). The same group met with a DEQ CEP development team to express their interest in action. These companies believe that NC can leverage their recommended actions to attract new investment to the state, spur innovation, save money for ratepayers, attract new businesses and create jobs in NC.¹⁰⁴

Polling data indicate bipartisan support in NC for RE policies and investments. The March 2019 Conservatives for Clean Energy survey showed that 76.7% respondents, including 66% of Republicans, 88% of Democrats and 71% of unaffiliated voters, believe solar and wind energy should be expanded to help meet North Carolina’s future energy needs.¹⁰⁵ The same study showed that 74.7% of respondents believe NC needs to modernize the state’s energy system by relying more on microgrids and RE sources.¹⁰⁶ In addition, a 2015 bipartisan poll by ClearPath showed that 83% of NC respondents support taking action to accelerate the development and use of clean energy in the US.¹⁰⁷ When asked why they support clean energy, 91% of the ClearPath respondents said to have cleaner and healthier air, 88% said to drive economic growth and jobs at home, 87% indicated for energy independence and 82% to address global environmental issues.¹⁰⁸ This suggest that the residents of NC see clean energy policies as environmental *and* economic development tools.

3.11 Brief Summaries of Related Efforts

Throughout NC, a number of organizations have mobilized efforts to spur economic development through clean energy initiatives, education and advocacy, while preserving NC’s business friendly advantages. Examples of these efforts are summarized below.

3.11.1 CleanTech Commercialization Corridor (Joules Accelerator and RTCC)

The Joules Accelerator and the Research Triangle Cleantech Cluster (RTCC) partnered to win an i6 Challenge matching grant from the US Department of Commerce for \$748 thousand over three years (total of \$1.5 million) to create a cleantech commercialization corridor (“C3”) across NC to provide a platform for cleantech startups to deliver technology solutions to NC communities.¹⁰⁹

¹⁰⁴ Ceres. (2019, April 2). Letter to Governor Cooper.

¹⁰⁵ Conservatives for Clean Energy (2019). Retrieved from <https://www.cleanenergyconservatives.com/wp-content/uploads/2019/02/Clean-Energy-March-Presentation-Final.pdf>

¹⁰⁶ Conservatives for Clean Energy (2019). Retrieved from <https://www.cleanenergyconservatives.com/wp-content/uploads/2019/02/Clean-Energy-March-Presentation-Final.pdf>

¹⁰⁷ ClearPath. (2015). Polling. Retrieved from <https://clearpath.org/polling/>

¹⁰⁸ ClearPath. (2015). Polling. Retrieved from <https://clearpath.org/polling/>

¹⁰⁹ US Economic Development Administration. Retrieved August 2019 from <https://www.eda.gov/oie/ris/i6/2018/awardees/clt-joules.htm>



Spotlight on ZapGo

April 2019 – Joules Accelerator participant ZapGo chose Charlotte for a new battery research lab. The UK-based energy storage startup also chose NC for its North American headquarters and plans to hire 25 people locally for the new facility.

3.11.2 Clean Cities Initiative (Duke Energy)

Duke Energy and NC local governments are working to jointly advance sustainability efforts of mutual interest. A number of priority efforts are under consideration including: a new green tariff for municipal customers; advancing EV charging infrastructure; RE programs that leverage city-owned assets and allow cities to retain the RE certificates; pilots or programs specifically aimed at reducing the energy burden for low-income and disadvantaged communities; collaboration on public outreach and education. The team will continue to explore the best mechanisms to move forward on these various projects, including an agreed upon collaborative between Duke Energy and local governments with specific carbon reduction goals.

3.11.3 Southeast Urban Sustainability Summit (NC A&T State University)

NC Agricultural and Technical State University (NC A&T) secured a National Science Foundation grant to produce this conference in 2019 to develop a research collaborative comprised of academics, municipalities, industries, and non-governmental organizations to advance research on urban sustainability specific to NC.



4. Conclusions

The purpose of this chapter is to demonstrate how clean energy has driven economic development nationally and within NC, and how clean energy can continue to attract businesses, talent and investment to the State.

Across the US, clean energy is an important contributor to job growth, with sector jobs increasing 3.6% in the past year and representing approximately 5% of all net new jobs in the nation. National trends indicate continued growth in clean energy, and employers in the sector expect job growth to outpace prior years with a 6% increase in 2019.

North Carolina has contributed to this national growth trend and is now a top 10 state for clean energy jobs. The state has benefitted from this leadership with \$28.2 billion estimated total economic impact in the State over the period of 2007-2018. The investments, jobs and tax revenue that NC has enjoyed were enabled by foresighted policies around PURPA, REPS established in 2007, the Competitive Energy Solutions bill passed in 2017 and visionary business leaders and entrepreneurs. Recent polls show that regardless of political party, the majority of citizens across the State now recognize clean energy as an economic driver for the state.



Today many states are surpassing NC with more aggressive RPS standards, renewables adoption, EE policies, utility regulatory reforms, and investment activity. NC was one of 21 states to lose solar jobs in 2018 while 29 other states gained those jobs, and now ranks ninth in solar jobs despite the state's number two position in installed solar. Of the state's 30 largest private employers, 17 have set renewable energy or energy conservation targets, and 37 companies doing business in NC have set a goal to be powered by 100% renewable energy. The corporate drivers alongside the national rankings create an opportunity for NC to take new steps to sustain and grow the economic benefits that clean energy can afford.