Energy Policy Council
2020 Biennial Report

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FOR PUBLIC COMMENT

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Transmittal Page

Pursuant to N.C.G.S. §113B-12, this comprehensive report providing a general overview of the energy conditions of the State of North Carolina is hereby transmitted to the Governor, the Speaker of the North Carolina House of Representatives, the President Pro Tempore of the North Carolina Senate, the Environmental Review Commission, the Joint Legislative Commission on Energy Policy, and the chairman of the Utilities Commission.

Respectfully submitted,

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Dan Forest, Lieutenant Governor
Chair, Energy Policy Council

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List of Abbreviations

Btu	British thermal units
CHP	Combined Heat and Power
CME	Coronal Mass Ejection
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
DEC & DEP	Duke Energy Carolinas and Duke Energy Progress
DEQ	North Carolina Department of Environmental Quality
E85	Flex Fuel (high percent ethanol)
EA	Energy Assurance
EE	Energy Efficiency
EERS	Energy Efficiency Resource Standard
EI	Energy Infrastructure
EIA	Energy Information Agency
EMC	Electric Membership Cooperative
EMP	Electromagnetic Pulse
EOP	Emergency Operations Plan
EPC	North Carolina Energy Policy Council
EPRI	Electric Power Research Institute
EV	Electric Vehicle
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
GHG	Greenhouse Gases
IRP	Integrated Resource Plan
KW	Kilowatt
KWh	Kilowatt-hour
MMBtu	Million British Thermal Unit
MW	Megawatt
NCDOT	NC Department of Transportation
NCUC	North Carolina Utilities Commission
NERC	North American Electric Reliability Corporation
NO_X	Oxides of Nitrogen
O_3	Ozone
PC	Performance Contracting
PURPA	Federal Public Utilities Regulatory Policy Act of 1978
PV	Photovoltaic
RE	Renewable Energy
REPS	Renewable Energy Portfolio Standard
RNG	Renewable Natural Gas

SO_2	Sulfur Dioxide
T&D	Transmission and Distribution
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USI	North Carolina Utility Savings Initiative
VOCs	Volatile Organic Compounds
WAP	North Carolina Weatherization Assistance Program

1. Energy Policy Council Overview

1.1 Overview of the Energy Policy Council

Under the North Carolina Energy Policy Act of 1975[1], the General Assembly determined that energy is essential to the health, safety and welfare of the people of this State and to the workings of the State economy. It further recognized that it is in the State's best interest to support the development of a reliable and adequate supply of energy for North Carolina that is secure, stable, and predictable in order to facilitate economic growth, job creation, and expansion of business and industry opportunities. The Act created the Energy Policy Council ("Council") to advise the Governor and the General Assembly about legislation and regulations to protect the environment, advance domestic energy exploration and development, and encourage economic development in North Carolina. The Council's responsibilities include the preparation of comprehensive energy policy that addresses present and future energy needs while positioning North Carolina and the nation towards achieving energy independence.

Members of the Council possess expertise in areas such as: research and policy; the utility industry; environmental management; and a diverse suite of energy resources and delivery practices. The Council also develops contingency and emergency plans to address possible energy shortages in order to protect the public's health, safety, and welfare, and makes recommendations about energy efficiency and conservation programs. The Council is an independent body that is supported by staff in the North Carolina Department of Environmental Quality.

Pursuant to Chapter 113B of the North Carolina General Statutes, the Council's responsibilities include:

- Developing a comprehensive State Energy Policy for the Governor and the General Assembly that addresses energy requirements in the short- (10 years), mid- (25 years), and long-term (50 years) in order to achieve maximum effective management and use of present and future sources of energy.
- Conducting an ongoing assessment of the opportunities and constraints presented by various uses of all forms of energy to facilitate the expansion of domestic energy supplies and to encourage the efficient use of energy.
- Reviewing and coordinating energy-related research, education, and management programs that inform the public, and actively engage in discussions with the federal government to identify opportunities to increase domestic energy supply within North Carolina and its adjacent offshore water.

[1] North Carolina Energy Policy Act of 1975, North Carolina General Statues § 113B-1, https://www.ncleg.gov/EnactedLegislation/Statutes/HTML/ByChapter/Chapter_113B.html

- Recommending to the Governor and the General Assembly, legislation, rulemaking, and any necessary modifications to energy policy, plans, and programs.
- Recommending an energy efficiency program that is designed to protect the public health and safety of the citizens of North Carolina, and considering the conservation of energy through reducing wasteful, inefficient, or uneconomical use of energy resources.
- Developing contingency and emergency plans to protect the public from possible shortages of energy, to be compiled into an emergency energy program.

In order to fulfill its statutory directives, the full Council meets quarterly. The three committees of the Council, which include Energy Infrastructure, Energy Assurance, and Energy Efficiency, meet more frequently to receive information pertinent to their charge and to develop recommendation for the full Council's consideration.

Since the Council convened after the last 2018 Biennial report, full Council meetings were held in 2018 on May 16 and August 15; in 2019 full Council meetings were held on February 20, May 15, August 21 and November 18; and in 2020 the full Council met on February 19 with an upcoming meeting on August 19. The agendas, minutes, and associated presentations and materials from these meetings are available on the Council's Web Page.

1.2 Energy Policy Council Members and Committees

The Council is chaired by the Lieutenant Governor or his designee Steven Walker and supported by 12 additional members appointed according to §113B-3. Together, the Council works to identify and utilize all domestic energy resources in order to ensure a secure, stable, and predictable energy supply and to protect the economy of the State, promote job creation, and expand business and industry opportunities while ensuring the protection and preservation of the State's natural resources, cultural heritage, and quality of life. The Council anticipates that much of the work it will perform going forward will be completed by the committees as described below. Steven Walker (acting for Lt. Governor Forest) serves on each committee but only votes in the case of a tie.

1. The Energy Assurance (EA) Committee focuses on: energy supply networks and disruptions; system security (both physical and cyber vulnerabilities); microgrid deployment; distributed generation (small-scale renewable, combined heat and power); alternative fuels; and resiliency in building codes. The members of the EA Committee are:
    - Paul Worley (Chair)
    - Herb Eckerlin
    - John Hardin, acting for Secretary of Commerce Copeland
    - Jenny Kelvington
    - Steven Walker, acting for Lt. Governor Forest

2. The Energy Infrastructure (EI) Committee focuses on: utility-scale generation, transmission, and distribution; exploration for and penetration of traditional and renewable energy resources; identifying new energy resources; smart grid technology deployment; and grid

modernization. The members of the EI Committee are:

- Gus Simmons (Chair)
- Bruce Barkley
- Rob Caldwell
- Rachael Estes
- Steven Walker, acting for Lt. Governor Forest

3. The Energy Efficiency (EE) Committee focuses on: life-cycle cost analyses for new and existing development; performance contracting; expansion of existing programs to all sectors; transportation applications; energy efficiency building code adoption; and synergies across State and other programs. The members of the EE Committee are:
    - Scott Tew (Chair)
    - Paolo Carollo
    - Richard Feathers
    - Sushma Masemore, acting for DEQ Secretary Regan
    - Steven Walker, acting for Lt. Governor Forest

1.3 Purpose of this Report

This 2020 biannual report has been prepared by the Council for transmittal to the Governor, the Speaker of the House of Representatives, the President Pro Tempore of the Senate, the Environmental Review Commission, the Joint Legislative Commission on Energy Policy, and the chairman of the Utilities Commission pursuant to § 113B-12. The report contains policy and program recommendations prioritized by the Energy Infrastructure Committee, Energy Assurance Committee, and the Energy Efficiency Committee (Chapter 2). Chapter 3 summarizes key findings and energy landscape discussion that support the committees' recommendations. Chapter 4 provides North Carolina's energy profile statistics including a general overview of the energy resources utilized in the State, projected trends in energy consumption and environmental emissions, demographic data, and economic trends. The chapter concludes with recent legislative and regulatory actions that could shape the state's energy profile in the future.

The 2020 biannual report has undergone a public review process from July x to July y prior to adoption or discussion by the full Energy Policy Council. The Council considered the public comments, discussed, and voted on the final recommendation at its August 19, 2020 joint meeting.

2. Energy Policy Council Recommendations

2.1 Energy Infrastructure Committee

The Energy Infrastructure (EI) Committee focuses on: electricity generation, transmission, and distribution; exploration for and penetration of traditional and renewable energy resources; identifying new energy resources; smart grid technology deployment; and grid modernization. The EI Committee is chaired by Gus Simmons of Cavanaugh & Associates, P.A., and its members are: Bruce Barkley of Piedmont Natural Gas, Rachael Estes of Apex Clean Energy, Rob Caldwell of Duke Energy and Steven Walker, acting for Lt. Governor Forest.

Following are the EI Committee's recommendations related to energy infrastructure planning, bioenergy, and renewable energy.

Energy Infrastructure Planning

Recommendation #EI 1

Electric utilities in North Carolina should continue to invest in their generation, transmission, and distribution infrastructure in order to support future load and economic growth in the State, while providing the highest levels of reliability and customer service in a safe, cost effective manner. North Carolina's legislative and regulatory bodies should provide legislation and policies that support these investments.

Recommendation #EI 2

Electric utilities in North Carolina should continue to further reduce carbon dioxide (CO_2) emissions and adjust to evolving and innovative technologies in a way that properly reflects reliability and affordability of electric service. The State's legislative and regulatory bodies should continue supporting policies that sustain a balanced generation portfolio mix in a cost-effective and equitable manner. Specific system investments to advance these goals should be addressed in future utility integrated resource plans.

Recommendation #EI 3

North Carolina should consider adopting legislation, similar to that recently approved in Tennessee and Arizona, that prevents local governmental entities from banning energy choices. Energy policy should be enacted by the General Assembly and implemented by the North Carolina Utilities Commission. Integrated resource planning, conducted in the best interest of all

North Carolina consumers, cannot be optimally accomplished in a fractured, uncoordinated basis that varies by county or municipality.

Bioenergy

Recommendation #EI 4:

Develop North Carolina's Bioenergy Resources Related to Biogas/Biomethane/Renewable Natural Gas Production. North Carolina holds significant bioenergy production potential to generate biogas. External demand for renewable natural gas (RNG), through policies such as the federal Renewable Fuel Standard and state Low Carbon Fuel Standards, has placed a premium on RNG production, with livestock waste-derived biogas being some of the most valuable. The use of biogas as an energy resource offers a way to achieve state carbon emission reduction targets while simultaneously offering advanced and alternative ways of managing the organic wastes created within our State. The resource can fulfill thermal energy needs as well as be used to create electricity and transportation fuel, all of which offer energy supply resiliency benefits. Further efforts and leadership are needed to develop a cohesive strategy related to in-state biogas and RNG development, including but not limited to standards and policies aimed at cultivating and facilitating the ability of biogas utilization to reach its full potential. The following actions are recommended to further and more comprehensively develop the State's biogas resource potential. They are intended to build upon recommendations and ongoing work stemming from the EPC's 2018 recommendations related to North Carolina's biogas production potential and effects.[2]

A. **Evaluate and quantify potential economic and environmental benefits related to the capture and commercial use of biogas.** In addition to the analysis recommended in the 2018 EPC Report,[3] further analyses should include consideration of options for building biogas production capacity and ways by which the state could facilitate ongoing production and maintenance of production supply chains to maximize economic and

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[2] The 2018 Energy Policy Council's report included the following recommendations:

1. Developing a bioenergy resource inventory and economic impact analysis related to North Carolina's biogas potential; establish goals for the capture and refining of biogas into renewable natural gas for distribution; and goals for incorporation of biogas-derived natural gas into the State's transportation fuels program for State fleets and public transportation.
2. Conducting economic impact analysis including analyses of environmental and community benefits and impacts, for the beneficial and optimum utilization of the State's bioenergy resources.
3. Creating a bioenergy resource inventory for North Carolina based on input from industry, regulatory and academic sources that are current and specific to North Carolina.
4. Completing and summarizing the results of this work in the 2020 Biennial report of the EPC.

Note that the results of a collaborative research project underway to carry out the 2018 recommendations will be provided via the forthcoming public comment period for the 2020 EPC Biennial Report.

[3] NC DEQ Energy Policy Council. (2018) *Energy Policy Council Biennial Report*. Retrieved from https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Energy/Energy%20Policy%20Council/2018%20EPC%20Biennial%20Report%20-%20FINAL.pdf

environmental benefits. The economic value of incorporating the state's biogas and the renewable natural gas that results from the processing and upgrading of biogas should be determined to better inform its energy resource planning. The economic and environmental benefits of greater incorporation of biogas should be compared with the use of other lower carbon intensity energy resources, as part of efforts to analyze options for implementing the state's clean energy plan. Any such data regarding resource potential, availability and viability of biogas resources as well as other bioenergy resources (as such data become available) should be presented with and alongside other energy resources evaluated by the State in any efforts related to energy resource planning and carbon emission reduction plans and strategies.

B. **Develop a comprehensive and implementable plan to incorporate biogas and renewable natural gas into the State's 2022 energy resource planning.** Incorporating results of the State Biogas Analysis recommended in the 2018 EPC Report, the goal of this plan is to implement a renewable natural gas standard or program and associated regulations for the plan's implementation by 2022. An evaluation should be conducted in support of 2022 implementation of the costs and benefits of establishing renewable natural gas goals and requirements necessary for incorporation of such goals into local distribution companies ("gas utilities") that serve North Carolina customers, and options for the establishment of a means for such gas utilities to recover reasonable costs associated with any necessary infrastructure improvements and/or costs associated with incorporating and procuring renewable natural gas derived from in-state resources;

C. **Expand evaluation and development efforts related to biogas associated with the diversion of food waste and other organics from landfills and use of biogas generated from municipal wastewater treatment plants.** Building upon knowledge of and progress towards biogas development from animal waste, the state should similarly make progress relative to wastewater treatment plants and diversion of food waste and other organics from landfills. Evaluation should center on available production methods and the costs and net benefits of each method. Particular attention should be given to landfills that currently flare or vent landfill gas and to landfills that service more populated areas of the state. The evaluation should include recommendations for the implementation of a state-supported food waste diversion program, including recommendations for regulatory changes necessary to support such a program, with a goal of implementing a statewide food waste diversion program, policies and/or regulations by 2025, to be incorporated into state renewable natural gas standards to be developed by 2022, as recommended in Recommendation B, above.

D. **Develop support programs, such as grant and loan programs, to aid North Carolina's smaller municipalities and smaller farming operations implement systems and processes to produce renewable natural gas from organic wastes**, all of which should be incorporated and/or considered in developing the 2022 plan described above; and

E. **Examine the existing North Carolina General Statutes, Rules, and Policies for inappropriate barriers to bioenergy use.** The existing North Carolina General Statutes, Rules, and Policies regarding the use and management of conventional fossil-derived energy resources should be examined for applicability and consistency of outcomes as pertains to the incorporation of North Carolina's bioenergy resources generally, biogas, and renewable natural gas resources in particular. The examination will identify policy and regulatory changes that should be enacted by or before 2022 necessary for the development of North Carolina's bioenergy resources as they relate to biogas in particular.

Renewable Energy

Recommendation # EI 5:

Adopt legislation requiring North Carolina's electricity generating utilities to use net-zero emissions energy resources by 2050 similar to those adopted by other states including neighboring states, such as Virginia. The General Assembly should invest in North Carolina's carbon-free future by increasing the deployment of net zero-emission clean energy sources that would provide the State with the least expense generation mix, as the levelized cost of renewables has recently dropped below those of non-renewable forms of energy, like natural gas and coal.[4] The use of clean energy resources has already resulted in significant job and economic growth for the state. Further expansion of homegrown clean energy resource has the potential to put North Carolinians back to work, create significant tax revenue, and invigorate economic activity in both urban and rural parts of the State while preserving our environment for future generations.

2.2 Energy Assurance Committee

North Carolina's energy infrastructure, consisting of diversified generating plants, transmission and distribution lines, petroleum pipeline systems, and renewable resources, is susceptible to both natural and man-made occurrences that may result in local or statewide energy emergency events. As stated on the National Association of Energy Officials website, we work to "achieve a robust, secure and reliable energy infrastructure that is also resilient - able to restore services rapidly in the event of any disaster."[5] The Energy Assurance (EA) Committee engages with energy providers and other stakeholders to address energy assurance in the State's electric sector, and its natural gas, petroleum and propane pipelines to consider threats for disruption and any

[4] "Lazard's Levelized Cost of Energy Analysis – Version 12.0", Nov 2018, accessed at https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf

[5] National Association of Energy Officials (NASEO) (2020) *Energy Assurance Planning*. Retrieved February 6, 2020 from https://www.naseo.org/energyassurance/

other occurrences or issues that may jeopardize North Carolina's energy supply and public safety.

The EA Committee is chaired by Paul Worley of Mott MacDonald and its members are: Herb Eckerlin of NC State University, Steven Walker from the Lieutenant Governor's Office, Jenny Kelvington from NC State University, and John Hardin representing Secretary Copeland of the NC Department of Commerce. The EA Committee focuses on identifying and planning for potential energy emergency threats, preparing for them and mitigating their impacts. Following are the EA Committee's recommendations.

Recommendation #EA 1:

Encourage redundancy in North Carolina's fossil fuel supply chain to mitigate long-term outages (3+ days) by conducting a statewide tabletop exercise for natural gas and motor fuels that addresses fuel supply disruptions, curtailment actions, and adequate storage. We recommend that the North Carolina Department of Environmental Quality's Energy Office collaborate with the North Carolina Department of Public Safety's Division of Emergency Management to develop and execute the exercise. Participants in the tabletop exercise should include energy suppliers, Federal, State and local officials, and other stakeholders. The tabletop exercise (held during calendar year 2020) should help to identify potential fuel redundancy improvement options for North Carolina, including the development of in-state fuel resources.

Recommendation #EA 2:

Investigate electric grid reliability and resiliency impacts on North Carolina's economy and citizens. Consideration should be given to the impacts on electric generation providers as they transition from existing coal-fired generation to increased natural gas generation, add renewable generation, provide added security from cyber and physical attacks, and invest in grid modernization to mitigate future interruptions. Two existing initiatives, the (1) E4 Carolinas' and the North Carolina Office of Science, Technology & Innovation's Southeast Innovation Collaborative and (2) a U.S Department of Energy Grant on "Planning an Affordable, Resilient, and Sustainable Grid" in North Carolina, that address grid resilience/reliability may offer insight about this recommendation. The findings of this study should be shared with the North Carolina Climate Change Interagency Council for their consideration in developing resiliency plans specified in the Governor's Executive Order 80.

2.3 Energy Efficiency Committee

The Council's Energy Efficiency committee is chaired by Scott Tew of Trane Technologies and its members are: Paolo Carollo of Geocycle, Richard Feathers with the North Carolina Association of Electric Cooperatives, Sushma Masemore representing Secretary Michael Regan of the Department of Environmental Quality, and Steven Walker representing Lt. Governor

Forest. The Committee has focused on reducing wasteful and inefficient uses of energy resources through state policy and practice, along with consideration of policies to advance energy efficiency in State-owned buildings, minimize fuel consumption by motor vehicles, and to otherwise maximize efficient use of energy resources in the State.

As its starting point, the Committee assessed which prior Committee recommendations, previously approved by the EPC, had been implemented by either legislative or executive action. The Committee also subsequently reviewed recommendation in the state's new Clean Energy Plan[6] released in October 2019 and the Duke Nicholas Institute's new Energy Efficiency Roadmap[7] released in August 2019.

Following are the EE Committee's decisions on past recommendations and revised slightly to reflect the current state of knowledge.

Past Recommendations for Reapproval in 2020 *[initially approved 11/19/2014]*

Recommendation #EE 1:

Increase the state buildings energy use reduction goal from 30% to 40% by 2025, thereby potentially saving an additional $2 billion in reduced utility costs. In 2015, North Carolina agencies and universities achieved the 30% energy use reduction goal established in G.S. §143-64.12. In 2019, the reduction level has essentially remained the same.[8] The proposed increase to 40% percent energy use reduction from the 2002–2003 baseline year will enhance the state's competitiveness for federal grant funding opportunities and encourage further energy savings.

Recommendation #EE 2:

Strengthen and support the state's Utility Savings Initiative (USI) for public facilities by providing a 1% pass-through of the annual avoided utility costs realized by the USI program. The USI program has supported state agencies and universities in avoiding $1.3 billion in utility

[6] North Carolina Clean Energy Plan – Transitioning to a 21st Century Electricity System, Policy and Action Recommendations, North Carolina Department of Environmental Quality, October 2019. Retrieved from https://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council/climate-change-clean-energy-16

[7] North Carolina Energy Efficiency Roadmap, Duke University Nicholas Institute for Environmental Policy Solutions, August 2019, Retrieved from www.nicholasinstitute.duke.edu/publications/north-carolina-energy-efficiency-roadmap

[8] Comprehensive Program to Manage Energy, Water, and Other Utility Use for State Agencies and State Institutions of Higher Learning - Program Update and Energy Data Legislative Report, Department of Environmental Quality, December 1, 2019. Retrieved from https://files.nc.gov/ncdeq/Environmental%20Assistance%20and%20Customer%20Service/Utility%20Savings%20Initiative/comprehensive-reports/DEQ-Comprehensive-Energy-Program-Report-2019-12-01.pdf

expenses since the 2002 – 2003 baseline year.[9] To assist state facilities in meeting the proposed 40% percent energy use reduction goal from the 2002 – 2003 baseline year, USI will use the proposed 1% pass-through budget (approximately $1.14 million) to support training, engineering and technical assistance, outreach, and incentives for energy project investments.

Recommendation #EE 3:

Establish a program with state governmental entities to allow utility savings to be reinvested in short duration, rapid payback, and energy conservation measures. Reinvesting energy cost reductions incentivizes state agencies and universities to re-commission buildings, optimize building automation systems, and upgrade equipment. One such measure is to allow state governmental entities flexibility in how to fund EE projects including the ability to carry an EE reserve fund. Another is to allow for annual Office of State Budget and Management (OSBM) increases that reflect known utility rate increases and utilize utility savings realized by state entities to remain available to the agency for additional EE projects.

Recommendation #EE 4:

Pursue a system of electronic data transfer from utility providers to customer's/owner's data collection and analysis systems with a focus on deploying a system such as the USEPA Portfolio Manager. Accessing electronic utility data will assist state agencies, municipalities, universities, and retail, commercial and industrial institutions to better manage energy and water use and costs and identify the best opportunities for energy savings.

Recommendation #EE 5:

Establish a policy that provides for initial and ongoing staff training, resources, and retention to institutionalize the skills needed to maintain state buildings in an energy-efficient manner. This can be accomplished by building on the existing USI structure to create a statewide energy manager program, providing technical support and training to K–12 school districts and community colleges lacking in-house energy management.

Recommendation #EE 6:

Require commissioning of all new state buildings to ensure they are brought online in optimal performance, thereby saving taxpayers on long-term costs of building operations.

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[9] Comprehensive Program to Manage Energy, Water, and Other Utility Use for State Agencies and State Institutions of Higher Learning - Program Update and Energy Data Legislative Report, Department of Environmental Quality, December 1, 2019. Retrieved from https://files.nc.gov/ncdeq/Environmental%20Assistance%20and%20Customer%20Service/Utility%20Savings%20Initiative/comprehensive-reports/DEQ-Comprehensive-Energy-Program-Report-2019-12-01.pdf

Commissioning a new building adds roughly 0.6% to the total construction cost, but with the energy savings, the payback period can be less than 5 years.

2020 Recommendations by Sector

Public Buildings

Recommendation #EE 7:

Revert from the current bi-annual energy reporting period to an annual energy reporting period for public buildings and institutions under the USI program.

Recommendation #EE 8:

Strengthen the USI Public Buildings programs by:

a. Funding the Energy Management Diploma training.
b. Requiring commissioning for North Carolina Connect Bond projects per S.L. 2015-280.
c. Providing commissioning training using a state commissioning working group.
d. Exploring expansion of annually reporting utility data to K-12 schools.

Commercial Energy Efficiency

Recommendation #EE 9:

Examine the costs and benefits associated with adopting a minimum requirement for commercial buildings to require third-party commissioning and/or promote training, awareness, and incentives related to improving energy efficiency in the commercial energy sector.

Recommendation #EE 10:

Investigate state-level support for consumer financing programs such as on-bill financing and Property Assessed Clean Energy (PACE) financing for both commercial and residential sectors. The legislature should re-authorize the enabling NC renewable energy and energy efficiency legislation, as the sunset for cities and towns is July 1, 2020 and July 1, 2022 for counties.[10,11]

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[10] NC Session Law 2009-525 (SB 97), Critical Infrastructure Assessment Changes (2009). Retrieved from https://www.ncleg.gov/Sessions/2009/Bills/Senate/PDF/S97v6.pdf

[11] The law allows board of commissioners of a county or a city council to make special assessments against benefited property for the purpose of financing the installation of distributed generation renewable energy sources or energy efficiency improvements that are permanently fixed to residential, commercial, industrial, or other real property. The legislation made changes to critical infrastructure assessment laws to allow for both project debt financing and renewable energy and energy efficiency improvements to be added on as part of existing special

The legislature should also consider improvements in the existing legislation by giving local governments the authority to delegate the development and administration of a PACE program to a statewide or regional third-party entity and by easing the requirement for state level approval of local debt.

Residential Energy Efficiency

Recommendation #EE 11:

Support North Carolina Weatherization Assistance Program (WAP) proposals to integrate two new components for greater energy reduction through: (i) improved priority scoring and (ii) measurement & verification practices. One example is to create a unified, standardized waiver for applicant/homeowners that allows energy consumption data to be shared with multiple state agencies. The waiver would enable agencies to market programs in more targeted fashion, measure the efficacy of certain interventions, identify need for follow-up or continued support, and in the aggregate, understand which programs are most effective at reducing energy burden for beneficiaries.

Recommendation #EE 12:

Create statewide project management coordination system for delivery of EE, urgent repair, and weatherization programs. North Carolina energy efficiency, urgent repair, and weatherization programs are administered separately by multiple agencies, creating significant inefficiencies, and falling short of their goals. A coordinated communication between the participating agencies and building an effective and efficient energy services delivery mechanism is needed to relieve or eliminate energy burden and improve housing conditions.

Recommendation #EE 13:

Research new programs and incentives for improving the energy efficiency of manufactured housing.

Recommendation #EE 14:

Assess the costs and benefits of measures intended to encourage builders or owners to exceed code standards, including programs such as Duke Energy Progress' incentive for new construction built to or above the Energy Conservation Code's High Efficiency Residential Option ("HERO"), or programs offered by electric and natural gas utilities that provide discounts for Energy Star rated homes.

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assessment laws. In other words, it amends existing general statutes (G.S. 153A sections 210.2 (section 1a), 210.4 (section 1b), 210.7 (project implementation), 160A-239.2 (Section 2 a), 160A-239.4 (section 2b), 160A-239.7 (project implementation), and 159-11 (section 3 of SB97)) that deal with special assessment laws to add RE and EE to the list of approved projects.

Recommendation #EE 15:

Consider the value of initiatives designed to promote the competitive advantage of energy efficient homes, including educating consumers and realtors about metrics to assess residential EE, such as the Home Energy Rating System ("HERS") Index.

Recommendation #EE 16:

Increase funding to the North Carolina Housing Trust Fund, which has a long history of creating high-quality multi- and single-family affordable housing opportunities for low-income communities. The legislature should provide additional funding to improve energy efficient affordable housing options. By investing in the Housing Trust Fund, the state can meet many challenges of EE in low-income communities while also creating jobs and new economic opportunities that healthy housing provides.

Energy Codes

Recommendation #EE 17:

Monitor developments at the General Assembly, particularly those legislative proposals that support or discourage energy efficiency requirements for buildings and support improvements in the legislative process for building codes. When the North Carolina legislature makes building and energy code changes, the NC Building Code Council (NCBCC) should be given the opportunity to formally review and analyze the proposed changes, especially when they impact energy usage, health, and life safety.

Recommendation #EE 18:

Monitor developments at the NCBCC, particularly those that consider balancing issues of cost and policy in advancing energy efficient residential construction.

Recommendation #EE 19:

Explore whether a return to a code cycle of 3 years, instead of recently-adopted change to a 6-year cycle, would be unduly burdensome from a regulatory perspective in light of the potential benefits to more frequent consideration of code provisions.

Recommendation #EE 20:

Improve the NCBCC by adding energy efficiency expertise to the Council's makeup, increasing the EE education of all existing members and establishing new actionable goals that prioritize EE in North Carolina's current and future building codes.

Recommendation #EE 21:

Establish a defined pathway to net-zero energy ready targets for new buildings by 2042 by considering costs and benefits. North Carolina's most current residential and commercial energy codes most closely follow the 2012 International Energy Conservation Code. The latest energy codes are between 1–2 percent more energy efficient than the prior 2012 North Carolina Energy Conservation Code. The EE Roadmap contains several elements for a pathway to net-zero energy ready new buildings that should be considered, including code updates or shorter code cycles to ensure a closer alignment to national and international standards.

Codes: Electric Vehicles

Recommendation #EE 22:

Support the burgeoning electric vehicle (EV) industry in the transportation sector of the North Carolina economy. The Council encourages the state to adopt measures and implement programs that (i) promote electric vehicle adoption, (ii) increase the availability and public's knowledge of electric vehicles, and (iii) ease the transition to an electrified transportation economy for all North Carolinians. The Council recommends consideration, by elected officials and regulatory agencies, of measures intended to address perceived barriers to EV deployment, including examples such as:

a. Residential building codes for the feasibility of required or recommended pre-wiring for Level 2 EV charging.
b. Commercial building codes for the feasibility of requiring or recommending that parking lot construction is EV Ready, and identification of what constitutes "EV Ready."
c. Americans with Disabilities Act guidelines for EV charging stations.
d. A standardized and streamlined processing for permitting new construction that incorporates EV Ready infrastructure.
e. Local government authorization to establish codes that encourage EV ready construction.

Industrial Energy Efficiency

Recommendation #EE 23:

Consider measures intended to encourage adoption of prevailing energy efficiency technology in industrial settings. Possible areas to consider would include the following:

a. Lighting upgrades from less efficient technology to more efficient Light Emitting Diodes (LED)
b. Use of occupancy sensors in lightly used areas to automate efficiency
c. Transition to air compression technologies with variable frequency drives (VFD) and use of the correct size compressor for the right application (i.e., small units at night during lower demand).
d. Lower compressor pressure settings, use of metered storage for high intermittent use applications

e. Ensuring industrial boilers are properly maintained and served including proper insulation of steam/hot water lines

Recommendation #EE 24:

Conduct an analysis of the costs and benefits of using electrification to reduce energy burden and greenhouse gas emissions in consumer end-use sectors in NC, such as in homes, buildings, transportation, industrial and agricultural operations and initiate an analysis of the costs and benefits of electrification of these end-use sectors.

Recommendation #EE 25:

Identify and create opportunities to engage industrial firms to design energy efficiency programs for industrial application that would improve the number of industrial customers' participation in the electric utility programs adopted pursuant to the state Renewable Energy and Energy Efficiency Portfolio Standard (REPS).

Recommendation #EE 26:

Further evaluate opportunities that would expand Combined Heat and Power (CHP) deployment for both industrial and large commercial and public buildings.

Transportation Efficiency

Recommendation #EE 27:

Investigate potential for improved traffic flow strategies and best practices implemented in other states, such as traffic circles.

a. Support NC Department of Transportation (NCDOT) and other stakeholders to provide knowledge and training for community planners who must plan for increasing population in both large urban areas and small rural communities. In many areas, the lack of planning to address population demands impedes efficient traffic infrastructure.
b. Focus efforts on education, performance assessment, and the provision of knowledge and global benchmarking tools available to local and regional planners and leaders to better inform their decision-making. Investigate and evaluate tools and policies at the State level that allow city planners to assess and improve the efficiency of traffic systems, and more importantly, to gain knowledge of possible options with high return for investment that can be used to fund future projects.

Recommendation #EE 28:

Evaluate options for establishing targets for transitioning public transit, private and fleet transportation, and other modes of transport to higher utilization of alternative fuels, including conversion of and engine rebuild for school buses and other vehicles.

Recommendation #EE 29:

Create and implement standardized highway and wayfinding language for alternative fuel stations, chargers, and associated infrastructure.

Recommendation #EE 30:

Evaluate the feasibility of on-road alternative fuel vehicles incentives, such as utilization of high-occupancy vehicle (HOV) lanes.

Recommendation #EE 31:

Collective recognition that EV adoption in the State will not happen in a vacuum and the impacts of such a paradigm shift are far-reaching. Opportunities to shape EV adoption in North Carolina will hinge on:

- How EV corridors of the State are publicized, marketed, and managed.
- Whether the State establishes an EV adoption / EV charging infrastructure goal.
- How the State leads-by-example in terms of its motor fleet EV purchases.
- The State's position on allowing private power supply for EV charging at public facilities.

Education, Data, and Tools

Recommendation #EE 32:

Increase energy efficiency education and career awareness in K–12 and Community Colleges. Curate and produce a series of EE "toolkits" containing sector-specific EE education and outreach material, scripts, presentations, and activities that would reside on one portal website with links to other materials as appropriate. In partnership with ApprenticeshipNC, create an EE apprenticeship program to include apprenticeships and pre-apprenticeships for NC workers with industry partners and organizations, and "career awareness" programs in K–12 settings.

Recommendation #EE 33:

Establish an online data repository for energy efficiency metrics including energy use, energy savings and types of EE measures implemented. Present information in an online database that enables users to download aggregated energy use and savings data. After demonstrating the utility of the database in tracking progress across the state, expand it to include voluntary reporting from new entities.

The Council is aware of the docket opened by the North Carolina Utilities Commission (NCUC) to consider the subject of electronic data transfer and customer access to data usage. The Council intends to monitor the progress of these discussions, and the extent to which measures adopted by the Commission support increased energy efficiency achievable by utility customers.

Statewide Policy and Planning

Recommendation #EE 34:

Support analysis of carbon-reduction and clean energy policies that best achieve statewide GHG emission reductions, electricity affordability, and grid reliability. These policy designs should consist of strategies such as accelerated coal retirements, market-based carbon reduction programs, clean energy policies, such as an updated REPS, clean energy standard, and Energy Efficiency Resources Standard (EERS) or a combination of these strategies.

Recommendation #EE 35:

Establish minimum energy efficiency goals within the current REPS program. Beginning in 2021, the legislature should consider incorporating a 25 percent minimum, up to 40 percent maximum EE contribution to the REPS goal for investor owned utilities, subject to cost-effectiveness screens.

Recommendation #EE 36:

Evaluate the creation of a NC Clean Energy Fund to issue loans, provide credit enhancements, and invest in clean energy and EE projects, to the benefit of NC businesses, congregations, nonprofits, and consumers.

Recommendation #EE 37:

NCUC should commence a study on EE cost-effectiveness testing and select a consultant to analyze opportunities to improve EE program participation using current or new cost-effectiveness testing regulations and protocols, including the National Standard Practice Manual (NSPM). The study would include valuation of non-energy benefits in EE investments and NCUC would develop methodology to calculate benefits to public health (via air and water quality), economic development, environmental health (GHG emission reduction, air and water quality), and increased property value and reduced tenant turnover for EE investments at the utility scale and at the building level.

3. Committee Updates

3.1 Energy Infrastructure Committee

Energy Resource Planning

North Carolina's energy infrastructure includes systems for electric power generation, transmission and distribution, and fuel distribution. The State depends on this infrastructure for its commerce and the support of its citizens, and must assure that it is robust, reliable and resilient both now and in the future. The infrastructure's inter-dependencies require each system to operate individually while supporting each other as a single unit similar to the fingers on one's hand.

The electric infrastructure generates energy from various sources (fossil fuel, nuclear and renewables) and transports power through its grid throughout its system of transmission and distribution lines. Electric utilities in North Carolina should continue to invest in their generation, transmission, and distribution infrastructure in order to support future load and economic growth in the State, while providing the highest levels of reliability and customer service in a safe, cost effective manner.

Since infrastructure is vital to a clean energy transformation, North Carolina's legislative and regulatory bodies should enact legislation, policies, and rules that support investments in maintaining electric utility's reliability, resilience and affordability. For example, the retirement of coal units will require investment in both replacement generation and transmission and distribution infrastructure to integrate higher percentages of distributed energy resources (solar, wind, energy storage) and to prevent line congestion. Distribution grid upgrades are necessary to leverage behind-the-meter energy technologies such as home battery storage and electric vehicles. Policies must explicitly incent grid upgrades and address barriers to transmission expansion.

Electric utilities in North Carolina should continue to further reduce CO2 emissions and adjust to evolving and innovative technologies in a way that properly reflects reliability and affordability of electric service. Policies must ensure that energy remains reliable and affordable for customers, and that all North Carolinians will benefit from the energy transformation. Energy reliability is vital to the state's economic health and growth. As the energy system is transformed, state policy should ensure that reliability is not compromised. The pace and cost of energy transformation must not leave anyone behind or disadvantage low-income households who spend a larger percentage of their income on energy bills. The state should develop policies that achieve emissions reductions in a cost-effective and equitable manner.

Furthermore, using legislations adopted in Tennessee and Arizona as examples, local governmental entities should not ban customer energy choices. The North Carolina General Assembly should not allow local governmental entities to make such decisions, thereby

depriving citizens of the ability to select their energy source. Integrated planning conducted in the best interest of all North Carolina consumers cannot be optimally accomplished in a fractured, uncoordinated basis that varies by county or municipality. The Tennessee statute includes the following directive: "*A political subdivision of this state shall not adopt a policy that prohibits, or has the effect of prohibiting, the connection or reconnection of a utility service based upon the type or source of energy to be delivered to an individual customer*."

Bioenergy Resources Related to Biogas/Biomethane/Renewable Natural Gas Production

North Carolina possesses significant bioenergy production potential, arguably the greatest of which is its biogas production capacity. Biogas, also referred to as biomethane, is produced during the breakdown of organic waste in oxygen-starved environments. The biogas released during this process is comprised of a mixture of approximately 60% methane and 40% carbon dioxide, which can be used to power small engines capable of running on raw biogas to produce electricity or can be refined into renewable natural gas (RNG), which can be used interchangeably with, and as a renewable substitute for, fossil-derived natural gas.

Biogas is particularly important for controlling greenhouse gas (GHG) emissions and meeting carbon reduction goals because its capture avoids the release of GHGs that would otherwise occur during the breakdown of organic waste and other organic matter. Its use as a substitute for natural gas helps to avoid emissions associated with conventional natural gas use, typically supplied by hydraulic fracturing or fracking methods. Hence, if better utilized, biogas can help North Carolina meet greenhouse gas emission reduction goals while relying on an in-state renewable energy resource.

A. Continue and advance the evaluation and quantification of economic and environmental benefits related to the capture and commercial use of biogas.

The use of bioenergy (biomass[12], biofuels[13], and biogas[14]) in North Carolina represents a real and consequential opportunity for the state to convert existing under-valued or low-value organic resources into increased economic prosperity for rural areas. North Carolina consumes about 2.6% of the total energy consumed in the nation, ranking 12th within the residential, commercial, industrial, and transportation sectors. The state relies heavily on imported fuel and energy

[12] Biomass is derived from plant-based materials such as crop wastes, purpose-grown grasses and woody energy crops, poultry litter, and forestry residues.

[13] Biofuels refers to bio-alcohols, such as ethanol, derived from the fermentation of crops rich in sugars and starches, biodiesel, derived from oil-producing crops, or bio-oils, derived from pyrolysis of woody biomass. Liquid biofuels are commonly used in place of, or blended with existing liquid petroleum fuels, such as gasoline and diesel.

[14] Biogas, sometimes referred to as biomethane, which can be purified to renewable natural gas ("RNG"), is a fuel in a gaseous form typically derived from the anaerobic digestion of organics, most commonly waste organics.

sources; 74% of the state's annual consumption is imported.[15] The use of biogas will also reduce our State's reliance on conventional fossil-derived fuels, which at present must all be purchased from suppliers out of state, representing a large export of wealth from our State's economy. A reduction in North Carolina's reliance on fossil-derived fuels will result in a reduction in the carbon emissions associated with the state's energy sector, as well as other constituents that result from the combustion of fossil fuels.

The opportunities and benefits from increased incorporation of bioenergy, and particularly biogas, into our State's energy profile make it crucial for stakeholders and policy makers to actively pursue its development and the policies necessary to support such development. Continued evaluation and quantification of environmental benefits related to the capture and commercial use of biogas should also be supported.[16]

Bioenergy derived from often undervalued and underutilized or wasted organic materials is typically used to create heat and electricity via combustion, in manner similar to, but in place of, conventional fossil-derived fuels, such as coal and geologically-derived natural gas. Waste organics typically include such materials as animal manures, poultry litter, food waste, forestry harvesting residues, crop residues, and biosolids created at municipal wastewater treatment facilities. Under typical conditions and management practices, these organic materials naturally decompose, releasing biogas or biomethane, which is comprised of methane and carbon dioxide, into the atmosphere. Emissions from the natural decomposition of organics represents a substantial source of North Carolina's total carbon emissions.

Capturing and repurposing biomethane naturally emitted from the decomposition of wasted or underutilized organic resources to satisfy current and future energy needs provides (1) a reduction in the existing carbon emissions from the natural decomposition of these wastes, and (2) a reduction in carbon emissions through the displacement of conventional energy fuels, like coal and geologic natural gas, when used as a replacement fuel. An added advantage of biogas development is that income from biogas sales may help to offset the cost of further improvements to waste management systems. Considering that the state has the capacity to produce 105 billion cubic feet per year (63 trillion Btu/year)[17] of biogas, and the follow-on

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[15] U.S. States Profiles and Energy Estimates, U.S. Energy Information Administration, 2017. Retrieved from https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_te.html&sid=US.

[16] Stakeholders have expressed concerns over air and water pollution from swine operations' use of biogas technologies that rely on lagoons and sprayfield waste management systems. Pollution to waterways, odors, and public health concerns for nearby and downstream communities, including those felt disproportionately by minority populations, are the reasons for opposition to biogas production from swine operations. Anaerobic digesters with methane capture coupled with energy recovery is an effective management system that allows additional add-on treatment systems to further reduce pollutants of concern to local communities. Management systems and add-on treatment technologies to address nutrient loading, odor, and pathogens that reduce methane emissions and risks to nearby ecosystems and communities should be supported with (1) demonstration projects, (2) dedicated funding mechanisms to enable farms to add any necessary technologies, (3) appropriate policy mechanisms, and (4) meaningful involvement of affected community on matters related to equity, biogas production and transport of waste and biogas.

[17] East Carolina University Biogas Inventory Assessment, 2020.

economic and environmental benefits of biogas development, it is important for biogas potential to be properly represented in the state's energy and greenhouse gas emission reduction plans.

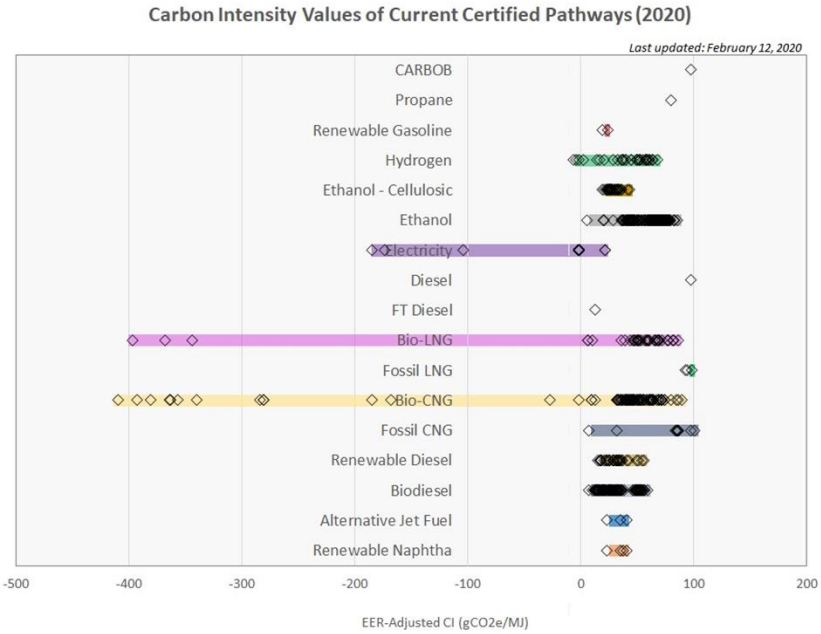

Figure 3-1. Comparative Energy Economy Ratio (EER-Adjusted) Carbon Intensity of Various Energy Fuels[18]

Figure 3-1, above, illustrates the comparative carbon intensity of various energy fuels. Note "Bio-CNG" (biomethane, as compressed natural gas replacement; also known as renewable natural gas) has the most negative comparative score, indicating significant carbon emissions reduction realized as compared to other energy fuels from both traditional and renewable resources.

Thus, the use of bioenergy resources related to biogas to displace the current use of fossil-derived fuels should be carefully considered in economic terms and with respect to net environmental benefits, including but not limited to air emissions reduction and water quality improvements, all of which should be quantified to inform the efficient and cost-effective achievement of reductions in the state's total carbon emissions. Pursuant to the 2018 EPC recommendations, an analysis (the results of which are expected to be publicly available by the fall of 2020) was conducted to more accurately identify the extent of North Carolina's biogas resources and their feedstocks.

[18] LCFS Pathway Certified Carbon Intensities, California Air Resources Board. https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities.

B. *Develop a comprehensive plan to incorporate biogas, and renewable natural gas into the State's energy resource planning, implementing a renewable natural gas standards program and applicable regulations by 2022.*

In addition to the potential environmental benefits derived from greater incorporation of bioenergy, particularly derived from undervalued or underutilized organic materials, into North Carolina's energy portfolio, the direct export and sales of renewable natural gas to consumers across the U.S. has the potential to stimulate economic gain for North Carolina. As companies, businesses and nonprofit institutions strive to improve their corporate sustainability programs in response to growing consumer demands for improved sustainability and climate neutrality, North Carolina is well-positioned to provide bioenergy resources in the form of biogas and renewable natural gas in particular to aid those entities in meeting such goals.

Consumer sustainability demands are already guiding programs for many of North Carolina's manufacturers and suppliers of consumer goods, who are turning to both the utilities that serve them and open markets for additional sources of renewable energy to fuel their operations. Many manufacturers, processors, and suppliers need renewable fuels to generate heat in addition to electricity, and therefore, have thermal energy needs that cannot be addressed through utility-scale solar and wind turbines. Additionally, renewable natural gas provides an alternative to imported natural gas that is subject to volatility in gas prices and interstate infrastructure capacity limitations.

Increased development of North Carolina's biogas resources also can provide our existing manufacturers (particularly in rural parts of the state) with renewable fuels to sustain their ability to meet customer demands, attract new businesses seeking such resources, and provide for the export and sale of renewable energy to other states and their customers. Currently, North Carolina purchases all[19] conventional energy fuels from out of state suppliers. A few facilities in North Carolina are currently producing renewable electricity by combusting bioenergy-derived resources: CPI USA Southport, 85 MW; Craven County Wood Energy New Bern, 50 MW; Capital Power Corp. Roxboro, 67.5 MW), and two renewable natural gas facilities (i.e., Optima KV and Optima, TH) are in operation. It is worth noting that a few additional projects (i.e., C2e Renewables NC, BF Grady Road RNG, Upper Piedmont Renewables, Catawba Biogas RNG (which uses poultry litter), Union County Green Energy and Wilson County Green Energy RNG projects, NCRP-Lumberton 22 MW capacity) are in the planning stages at the time of the writing of this report. The Loyd Ray Farms system, a project between Duke University and Duke Energy, has been collecting biogas in an anaerobic digester since 2011, which is used to power an on-farm 65 KW microturbine while Butler Farms has been generating electricity to power an 180 KW on-farm gen-set.

In response to such market demands by businesses and manufacturers, several states in the U.S. have either proposed or adopted laws to support the expansion of their state's renewable natural gas production and transmission capabilities, include biogas in their state renewable energy

[19] U.S. Energy Information Administration. (2019) *North Carolina State Profile Analysis*. Retrieved from https://www.eia.gov/state/analysis.php?sid=NC

plans, or have approved or are considering requests from state natural gas utilities to interconnect RNG and/or offer RNG products to their customers. As an example, Table 3-1 below offers a list of states who are leading on renewable natural gas development and the corresponding standards, programs and/or proposals relevant to each.

Table 3-1. State RNG Development-Related Efforts[20]

NV	NV PUC required to adopt regulations allowing public utility resale purchasers of natural gas to purchase RNG and recover reasonable costs associated with RNG acquisition.
CO	Introduced SB 20-150 to implement cost recovery for expansion of infrastructure supporting "the further incorporation of RNG", plus requirement to include RNG targets.
VT	VT PUC approved an RNG program in 2017;[21] Vermont includes Farm, Non-Farm and Landfill-generated biogas in its Comprehensive Energy Plan and supports incentives for farm-derived biogas, incl. Green Mountain Power's Cow Power program, Vermont's Clean Energy Development Fund, plus USDA programs; in 2010, the Vermont legislature allowed existing farm methane projects into the Standard Offer program and released all farm methane projects from the Standard Offer's kW capacity cap.[22]
ME	Maine's REPS (M.R.S. 35-A §3210) recognizes "anaerobic digestion of by-products of waste from animals or agricultural crops, food or vegetative material, algae or organic refuse" as a "renewable capacity resource" and compliance instrument.
WA	HB 2580 encourages RNG expansion through tax incentives and an inventory of potential RNG supply and associated costs, voluntary gas quality standards for injecting RNG into the natural gas system, and additional measures to promote RNG use.[23]
OR	SB 98, a RNG portfolio standard, requires new portfolio targets for RNG by OR's natural gas utilities and directs OR PUC to create cost recovery mechanisms for recovery of RNG-related investments; RNG targets set from 5% in 2020-24 to 30% by 2045-50.[24]
OK	HB3970 introduced in OK State Legislature early 2020 that directs state PUC to promulgate rules for incremental goals for increasing RNG in overall gas supply.[25]

[20] In addition, Michigan's PUC has approved a DTE program to sell RNG offsets.

[21] Vermont Gas Systems, Inc.; the PUC and Vermont's Department of Public Service must assess VGS' RNG program annually, with a comprehensive review of its effectiveness every 3 years "to ensure appropriate progress toward Vermont's Comprehensive Energy Plan goal of meeting 90% of Vermont's energy needs via renewables. See https://vtdigger.org/2017/09/07/vermont-public-utility-commission-approves-renewable-natural-gas-program-vermont-gas-customers/.

[22] See VT Comprehensive Energy Plan 2016 at 369, available at https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf.

[23] https://www.ngvamerica.org/2018/03/22/washington-gov-jay-inslee-signs-renewable-natural-gas-bill-law/.

[24] https://www.natlawreview.com/article/oregon-adopts-renewable-natural-gas-portfolio-standards.

[25] http://www.oklegislature.gov/BillInfo.aspx?Bill=hb3970&Session=2000.

CA	Implemented various regulations to include RNG as part of a broader GHG reduction strategy, incl. Low Carbon Fuel Standard (LCFS) and GHG cap-and-trade program.[26]
CT	Bill introduced in 2018 to "define RNG, create a renewable portfolio standard and procurement process for RNG, to require the Public Utilities Regulatory Authority to establish a quality standard for RNG and to require the procurement of electricity generated from a biomass facility by electric distribution companies."
NY	Northeast Gas Assn and GTI issued an RNG Interconnect Guide for NY in Aug. 2019 [27]
MN	MN PUC considering interconnection request from CenterPoint Energy to accept Minnesota-produced RNG into its distribution system.[28]

Given North Carolina's substantial and yet-to-be developed renewable natural gas resources, North Carolina should adopt similar supportive measures to promote the efficient and beneficial use of its renewable biogas resources and promote the economic gains and other benefits afforded to North Carolina businesses and communities through increased biogas resource development.

Recommendations in support of the development of a comprehensive and implementable plan for biogas utilization should include: Evaluation of the costs and benefits of establishing renewable natural gas goals, requirements necessary for incorporation of such goals into local distribution companies ("gas utilities") service offerings, and options for cost recovery by gas utilities for reasonable expenditures associated with any necessary infrastructure improvements and/or costs associated with incorporating and procuring renewable natural gas derived from in-state resources.

C. Expand evaluation and development of biogas resource utilization to include the diversion of food waste and other organics from landfills and beneficial use of biogas generated by municipal wastewater treatment plants.

The EPA Landfill Methane Outreach Program (LMOP) lists 123 active landfills serving North Carolina, with 31 active landfill gas systems and 11 candidate landfills. LMOP estimates that more than 84 MW of electricity-generating potential is being utilized from landfills in North Carolina. Three of the North Carolina landfills are designated to produce renewable natural gas[29], six are designated to provide landfill gas directly to a consumer for heat or off-grid use, and the remaining 22 are producing electricity. All other landfills without a current or planned

[26] https://www.mjbradley.com/sites/default/files/MJB%26A_RNG_Final.pdf.

[27] https://www.northeastgas.org/pdf/nga_gti_interconnect_0919.pdf.

[28] https://www.brainerddispatch.com/business/energy-and-mining/6273802-CenterPoint-proposes-renewable-natural-gas-service-in-Minnesota.

[29] At least two (2) additional landfill gas to pipeline renewable natural gas projects have been approved for interconnection through the North Carolina Utilities Commission but are yet to be constructed.

landfill gas utilization project represent great opportunity for further development of bioenergy resources within North Carolina.

As all of these landfills generate methane, the collection and use of landfill gas to generate energy results in environmental benefits as well as emissions of carbon greenhouse gases, especially for those landfills currently emitting gas to the atmosphere or which simply flare their landfill gas. Capturing and reusing landfill gas in this manner reduces emissions of methane (a potent greenhouse gas), non-methane volatile organic compounds regulated by the U.S. EPA, and leachate production. The biogas potential from all open landfills in the state is estimated to be ~12 billion cubic feet/year.

In addition to harvesting the landfill gas that is presently being produced from the state's landfills, which will likely yield appreciable biogas for thirty years, systems and programs should be implemented to separate organic waste from other solid waste materials prior to landfilling. Once separated, the organic waste should be redirected to anaerobic digesters. Materials could be redirected to existing municipal wastewater plants or to merchant digesters, such as the BioGas Corp food waste digester in Charlotte, North Carolina.

The U.S. EPA estimates, on average, that organic waste removal and recycling via energy harvesting digester systems can reduce the amount of waste landfilled each year by 20% to 40% (by volume). By reducing landfill inputs, the life of existing landfills can be appreciably extended, as space once used to accept organic wastes can be reserved for disposal of non-recyclable and/or inorganic wastes. Such an approach leverages existing assets in our State, defers the costly process of siting, permitting, and constructing new landfills by extending the life of the landfill, and protects land from development – all while supplying renewable and reliable energy fuels for use in the State. Five states – namely, California, Connecticut, Massachusetts, Rhode Island, and Vermont – have adopted laws to require producers of organic food wastes of a certain amount and greater (typically, 1 ton per week or more) to divert those organics to an alternate management facility instead of a landfill.[30] In these states, several merchant digester facilities have been constructed, providing biogas for electricity generation and increasing landfill life in those states.

North Carolina has already recognized the value of organics diversion through previous enactment of a ban on landfilling yard debris. An analysis of organic waste from the top eight industrial food production sectors has suggested that more than 850,000 tons per year of industrial food waste including fats, oils and grease (FOG) could be available for anaerobic

[30] E. Broad Leib, K. Sandson, L. Macaluso and C. Mansell, BioCycle Connect, "Organic Waste Bans and Recycling Laws to Tackle Food Waste", Sept. 2018 at https://www.biocycle.net/2018/09/11/organic-waste-bans-recycling-laws-tackle-food-waste/. In addition, at least six municipalities across the U.S. have enacted similar food diversion requirements, including Austin, TX; Boulder, CO; New York City; San Francisco, CA; Seattle, WA; and Portland, OR. Id.; see also Harvard Law School Food Law & Policy Clinic and Center for EcoTechnology, *Bans and Beyond: Designing and Implementing Organic Waste Bans and Mandatory Organics Recycling Laws*, July 2019 at https://www.chlpi.org/wp-content/uploads/2013/12/Organic-Waste-Bans_FINAL-compressed.pdf.

digestion in the state. Biogas production from these industrial sectors could be a promising and impactful start for a food diversion program.

Given the environmental and economic benefits related to the increased incorporation of bioenergy – and namely biogas – resources from landfills into the state's energy profile and considering existing landfill biogas resource potential, North Carolina is well positioned to realize diverse economic gains and environmental benefits through the diversion of food waste and organics from landfills.

D. Develop support programs, such as grant and loan programs, to aid North Carolina's smaller municipalities and smaller farming operations in implementing systems and processes to produce renewable natural gas from organic wastes for the 2022 plan.

While North Carolina has rich bioenergy resources with respect to biogas, those resources are widely distributed across the state from feedstocks produced on small farms, small communities and towns, food producers and processors, and other facilities that manage organics, such as wastewater treatment plants. Often, the costs associated with utility interconnection are among the greatest barriers to market participation, aside from the economies of scale that help larger projects justify investments in biogas generating technology and equipment. To address these barriers, North Carolina should explore and develop grant and loan programs to support market participation by smaller contributors who, collectively, provide the greater pool of biogas resources available to the state.

E. Examine existing General Statutes, Rules, and Policies regarding, affecting, and/or creating barriers to the use of bioenergy resources.

Many of the current policies, rules, and regulations regarding the combustion of energy fuels were adopted by the State over forty years ago, at a time when little thought was given to managing the carbon emissions associated with the use of fossil fuels, while the potential use of bioenergy resources, including but not limited to biogas, for supplying our state's energy needs was altogether overlooked. As such, many of the state's environmental policies and regulations were created to manage emissions from fossil-derived fuels, and may be inequitable, if not inapplicable, relative to the use of bioenergy fuels stemming from our state's rich biogas resources. As our state currently imports all fossil fuels from out of state suppliers, we import a significant amount of emission-creating materials. To support our current needs and to support a growing population and manufacturing sector, we continue to invest in expensive infrastructure projects to bring in out-of-state energy resources to serve our in-state markets.

Alternately, repurposing North Carolina's undervalued or wasted organic resources diversifies our energy portfolio, reduces reliance on out-of-state suppliers, and reduces existing in-state emissions, as well as displaces the use of imported fossil fuels which, in turn, further reduces the state's emissions. As such, the policies, rules, and regulations that govern or impact the use of the state's bioenergy resources, and specifically its biogas and renewable natural gas resources, should be examined for consistency with the intent and benefits of using this rich in-state

resource. This examination should identify policy and regulatory changes that should be enacted by 2022 capable of fully supporting the development of North Carolina's biogas resources.

Clean Energy

North Carolina should invest in the State's carbon-free future. 2019 was the second hottest year on record, second only to 2016, which was the hottest on record. Even more alarming, the five hottest years on record have all occurred in the last five years.[31] In 2018, the Intergovernmental Panel on Climate Change (IPCC) reported that we only have until 2030 to make drastic changes in CO2 emission reductions to limit global warming to 1.5 degrees Celsius before seeing irreversible damage, including loss of entire ecosystems.[32] As zero-emitting generation sources, renewable energy will play a critical role in reducing CO2 emissions and ultimately curbing climate change.

While zero-emission renewable energy will serve a vital role in the decarbonization of the global economy, it is also a safe and highly cost-effective form of energy. While non-renewable energy sources are subject to capital investments plus ongoing fuel costs, wind and solar have no fuel costs. The sun and wind are free, so renewables are not as sensitive to price spikes in the market caused by changes in fuel costs. Therefore, solar and wind projects when paired with battery storage and other clean energy technologies, can provide consumers with a predictable and low-cost energy source in the near future.

In 2007, North Carolina became a pioneer in the Southeast as the first state in the region to pass a renewable energy portfolio standard (REPS). The goal was to procure 12.5% of generation from renewable sources by 2021. It is now 2020, and the state has failed to increase this goal despite the urgency of climate mitigation. 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%.[33] The states with the strongest targets represent 47% of the U.S. residential electricity customers, as shown in the figure below.

[31] Copernicus: **https://climate.copernicus.eu/copernicus-2019-was-second-warmest-year-and-last-five-years-were-warmest-record**

[32] Global Warming of 1.5 degrees Celsius https://www.ipcc.ch/sr15/

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

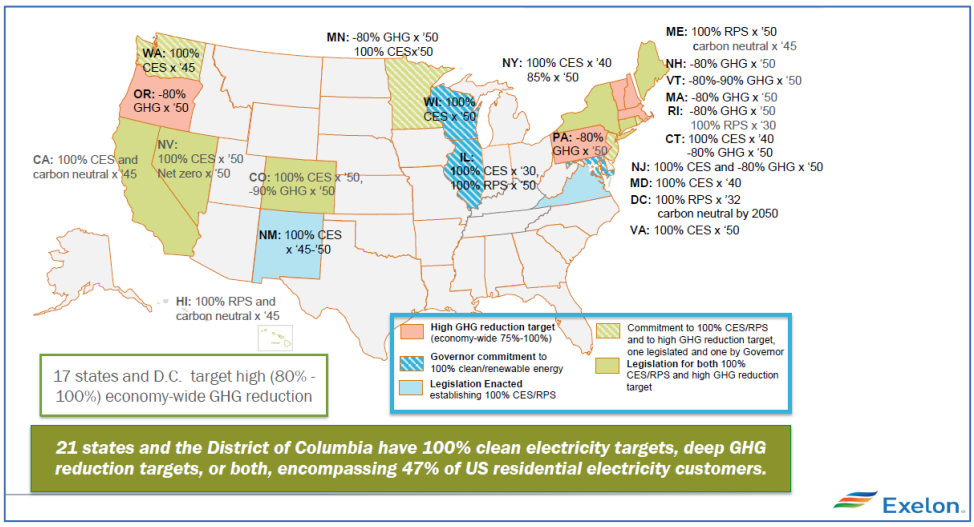

Figure 3-2. States with 100% Clean Electricity Standards, 100% RPS, or High GHG Reduction Targets

Governor Roy Cooper issued Executive Order 80 to help accelerate North Carolina's commitment to reduce CO2 emissions by transitioning to a clean energy economy.[34] Out of this Executive Order, the Department of Environmental Quality convened a robust stakeholder process in 2019 to develop a comprehensive Clean Energy Plan for North Carolina. A critical component of the plan, and the greater goal of climate change mitigation, is to initiate a rapid deployment of renewable energy resources.

Due to strong solar resource, a renewable energy portfolio standard, and an attractive PURPA market, North Carolina currently ranks 2nd in installed solar generating capacity in the country with over 6GW installed.[35] North Carolina's solar industry has created 42,000 jobs and over $14 billion of revenue, with the majority of those investments in rural communities.[36]

Not only is solar a carbon-free resource, but it is also cost effective. According to Lazard, onshore wind and utility-scale solar are two of the lowest-cost sources of energy with a levelized cost of $28MWh and $36MWh respectively.[37] The cost of solar is continuing to decline so rapidly that according to Wood Mackenzie Senior Solar Analyst, Tom Heggarty, by 2023 solar will be 'cheaper than natural gas in almost everywhere in the world'.[38] Also, combining utility-scale solar with storage will continue to reduce costs while providing round the clock power.

Although a much more nascent industry in North Carolina, onshore wind also provides cheap carbon-free energy. Despite a strong wind resource along the coast, North Carolina only has one utility-scale onshore wind farm which is located in Perquimans and Pasquotank Counties. Just over 200MW, the Amazon wind farm provides $1M to the local economy annually and will

[34] https://files.nc.gov/ncdeq/climate-change/EO80--NC-s-Commitment-to-Address-Climate-Change---Transition-to-a-Clean-Energy-Economy.pdf
[35] https://energync.org/clean-energy-numbers/
[36] https://energync.org/clean-energy-numbers/
[37] https://www.lazard.com/perspective/lcoe2019
[38] https://www.greentechmedia.com/articles/read/solar-plants-cheaper-than-natural-gas-just-about-everywhere-by-2023-woodmac

provide almost $400M of total investment into this rural community.[39] Similar to solar, combining this carbon-free resource with storage can provide the state with cheap round the clock power.

Despite strong solar and wind resources, North Carolina is coming to the end of its existing REPS goal, and in 2017 North Carolina's PURPA model was significantly changed in HB589 creating a less attractive PURPA market.

Therefore, without a strong clean energy strategy, North Carolina will begin to lose its coveted position as a renewable energy leader in the South, and certainly in the United States. In the last year alone, nine states have passed 100% clean energy standards including our neighbor to the north, Virginia. Virginia passed a bill this session requiring the state to obtain 100% of its energy from carbon-free sources by 2050.[40] 100% clean energy legislation would provide North Carolina with: (1) the least expensive generation mix, as the cost of renewables has quickly surpassed non-renewable forms of energy, like natural gas and coal, in levelized cost; (2) a source of significant job and economic growth, per a recent DOE study found that wind turbine technician is "the single fastest growing occupation in America" and that in 2016, "one out of every 50 new jobs created nationally came from solar"[41]; and (3) a leading position in the fight to protect our coastlines and our entire way of life from the threat posed by climate change.

3.2 Energy Assurance Committee

According to the American Society of Civil Engineers' (ASCE) *2017 Infrastructure Report Card*, North Carolina's overall energy infrastructure is rated as "good" with a B+ score. ASCE identified NC's strengths in energy source: affordability, diversity and reliability. It stated that North Carolina's energy infrastructure's foundation is able to support current and long-range (20 year) planning needs.[42]

Electric Power Grid Infrastructure

The North Carolina Transmission Planning Collaborative (NCTPC) was established to:

- Provide participants Duke Energy Carolinas (DEC), Duke Energy Progress (DEP), North Carolina Electric Membership Corporation, and ElectriCities of North Carolina and other stakeholders an opportunity to participate in the electric transmission planning process for the areas of NC and SC served by the Participants;
- Preserve the integrity of the current reliability and least-cost planning processes;

[39] https://www.power-grid.com/2017/02/09/amazon-wind-farm-us-east-completed-in-north-carolina/#gref
[40] https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+SB851
[41] https://www.energy.gov/eere/articles/5-fastest-growing-jobs-clean-energy
[42] American Society of Civil Engineers' (ASCE) *2017 Infrastructure Report Card.* Retrieved February 5, 2020 from https://www.infrastructurereportcard.org/state-item/north-carolina/]

- Expand the transmission planning process to include analysis of increasing transmission access to supply resources inside and outside the Balancing Authority Areas (BAAs) of DEC and DEP; and
- Develop a single coordinated transmission plan for the Participants that includes Reliability and Local Economic Study Transmission Planning while appropriately balancing costs, benefits and risks associated with the use of transmission and generation resources.

In its January 6, 2020 "*Report on the NCTPC 2019-2029 Collaborative Transmission Plan*", the NCTPC stated that "reliability study results affirmed that the planned DEC and DEP transmission projects identified in the 2018 Plan continue to satisfactorily address the reliability concerns identified in the 2019 Study for the near-term (5 year) and the long-term (10 year) planning horizons." Performed annually, the overall NCTPC process includes the Reliability Planning and Local Economic Study Planning Processes, which are intended to be concurrent and iterative. The overall process is designed to include considerable feedback and iteration between the two processes as each effort's solution alternatives affect the other's solutions.[43]

Natural Gas and Petroleum Pipeline Infrastructure

North Carolina's natural gas infrastructure, according to ASCE's 2017 report, "is almost entirely dependent on Transco Gas Pipeline for its natural gas requirements."[44] This single-source delivery system has been cited as a reason for these active or proposed natural gas pipelines:

- The Atlantic Coast Pipeline, proposed in 2014 by Dominion Energy and Duke Energy, was a 605-mile underground transmission pipeline planned to transport natural gas from West Virginia to Virginia and eastern North Carolina locations, ending in Robeson County, NC.[45] Many federal and state permitting challenges delayed the project. On June 15, 2020, the US Supreme Court ruled in favor of the new pipeline regarding permitting to cross the Appalachian Trail. [46,47] However, on July 5, 2020, Dominion Energy and Duke Energy announced the cancelation of the Atlantic Coast Pipeline due to ongoing delays and increasing cost uncertainty that put the project's economic viability into question.
- The Mountain Valley Pipeline Southgate project received Federal Energy Regulatory Commission's (FERC) order granting a Certificate of Public Convenience and Necessity in 2017 and applied in 2018 to FERC for authorization to build the project. The Southgate project consists of approximately 75.1 miles of natural gas pipeline and associated aboveground facilities in Pittsylvania County, Virginia, and

[43] North Carolina Transmission Planning Collaborative (NCTPC). *Report on the NCTPC 2019-2029 Collaborative Transmission Plan*. 2020. Retrieved on February 6, 2020 from http://www.nctpc.org/nctpc/document/REF/2020-01-22/2019-2029_NCTPC_Report_1_22_2020_FINAL.pdf
[44] ASCE, ibid. [retrieved February 5, 2020 from https://www.infrastructurereportcard.org/state-item/north-carolina/
[45] Atlantic Coast Pipeline, 2020. Retrieved June 26, 2020 from https://atlanticcoastpipeline.com/default.aspx]
[46] Atlantic Coast Pipeline, 2020. Retrieved June 26, 2020 from https://atlanticcoastpipeline.com/default.aspx]
[47] The Progressive Pulse, 2020. Retrieved June 29, 2020 from http://pulse.ncpolicywatch.org/2020/06/16/us-supreme-court-hands-win-to-atlantic-coast-pipeline-but-other-hurdles-remain-for-project/

Rockingham and Alamance Counties, North Carolina.[48] On June 18, 2020, FERC issued an order to construct and operate the 75.1 miles of natural gas pipeline. The Southgate Project is designed to provide up to 375,000 dekatherms (Dth) per day of firm transportation service.

- The Atlantic Sunrise Project, owned by Williams Transco, became operational in October of 2018. It increased the pipeline capacity by about 12% and extended the bi-directional flow coming directly from Marcellus natural gas supplies as far as south as Alabama. According to NCUC's Public Staff, no NC gas or electric utilities are subscribers. Much of the capacity from both Mountain Valley and Atlantic Sunrise is subscribed to by marketers and could (directly or indirectly) impact availability and price for natural gas in North Carolina.[49]

North Carolina receives petroleum from the Colonial Pipeline and the Plantation Pipeline. The two pipelines deliver refined products (gasoline, diesel fuel, kerosene, etc.) from the Gulf Coast at several locations in the state and then to terminals in the Northeast. The Dixie Pipeline, which supplies propane from refineries along the Gulf coast, serves NC and seven other southeastern states before terminating in Apex, NC, southwest of Raleigh. A small percentage of petroleum products arrive at Port of Wilmington, NC. Over 80% of NC's is consumed by the transportation sector as motor gasoline and diesel fuel.[50]

Energy Assurance Issues and Challenges

Natural Gas and Petroleum Pipelines

Even though underground gas pipelines are shielded from most natural hazards, they may be damaged or disrupted by weather-related events or caused by human errors that occur during excavation. From 2017 to 2019, North Carolina had no significant gas transmission incidents occur while only two significant gas distribution incidents occurred. [51] This low incident rate for the State may be attributable (to some extent) to its continuing statewide promotion of the national "811 Call Before You Dig" program. This federally designated call number raises national awareness of underground utility (both gas and electric) line locations to prevent accidents and disruptions.[52]

Electric Power

Since 2012, electric power generation has been North Carolina's largest natural gas-consuming sector, having increased from about 15% to 65% over the past ten years. In 2018, the electric

[48] Mountain Valley Pipeline Southgate. 2018. Retrieved February 5, 2020 from http://www.mvpsouthgate.com/wp-content/uploads/2018/11/News-Release-MVPSG-Application-Filing-FINAL.pdf

[49] Atlantic Sunrise Project. 2018. Retrieved February 5, 2020 from https://www.williams.com/2018/10/06/atlantic-sunrise-project-placed-into-full-service/

[50] U.S. Energy Information Administration (EIA), *North Carolina State Energy Profile*. 2020. Retrieved from https://www.eia.gov/state/print.php?sid=NC

[51] U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), *Significant Incident Consequences*, https://portal.phmsa.dot.gov/analytics/saw.dll?Portalpages]

[52] 811 "Call Before You Dig". 2020. Retrieved from , http://call811.com/

power sector used natural gas to generate about 33% its electricity. This one-third total surpassed nuclear energy generation (at about 31%) for the first time ever, and outpaced coal-fired generation of about 25%. The retirement of about 20 coal-fired units since 2011 and the addition of almost 30 natural gas-fired plants since then has continued to drive-up North Carolina's demand for natural gas.[53]

A large majority of North Carolina's electric power outages are weather-related, but the threat of a human-caused physical (e.g., a high-altitude electromagnetic pulse-EMP) or cyber-attack disruptions is expected to increase substantially. The North Carolina Energy Assurance Plan contains contingency and emergency measures to protect the public from possible shortages of energy.[54] To address to the growing cyber-threat, the North American Electric Reliability Corporation (NERC) designed GridEx, a biennial exercise to simulate a cyber/physical attack on the electric grid and other critical infrastructures across North America. In November 2019, NERC's GridEx V (involving electric utilities, regional/Federal government agencies in law enforcement, first responders, critical infrastructure partners, and supply chain stakeholders) was successfully executed.[55] Representatives of North Carolina's Emergency Management Division and Department of Environmental Quality's State Energy Office participated in GridEx V.

An Electric Power Research Institute (EPRI) technical report presentation on its "High-Altitude Electromagnetic Pulse (HEMP) and the Bulk Power System" to the June 12, 2019 NERC EMP Task Force Meeting found potential HEMP impacts could disrupt or damage electric substation electronics that may impact a large geographical area's electrical connections. EPRI has now initiated research/field trials on HEMP hardening with over 17 U.S. electric utilities and has begun further assessment of HEMP on generation plants.[56]

3.3 Energy Efficiency Committee

Energy efficiency is a low-cost solution to reduce energy usage and emissions. It is a rapidly growing field with creative new strategies implemented on a regular basis, resulting in many new clean energy jobs in the State. Each incremental investment in energy efficiency provides multiple benefits to consumers, including lower energy bills, increased grid reliability, and the deferral of new generation, transmission and distribution infrastructure investments.

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[53] U.S. EIA, North Carolina State Energy Profile, 2019. Retrieved from https://www.eia.gov/state/?sid=NC

[54] North Carolina Energy Office, *North Carolina Energy Assurance Plan*, 2019. Retrieved from https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Energy/Energy%20Assurance%20Plan%202013.pdf

[55] North American Electric Reliability Corporation (NERC), GridEx V, 2019. Retrieved from http://www.nerc.com/pa/CI/CIPOutreach/Pages/GridEX.aspx].

[56] Electric Power Research Institute (EPRI), *High-Altitude Electromagnetic Pulse (HEMP) and the Bulk Power System*, 2019. Retrieved from https://www.nerc.com/pa/Stand/EMPTaskForceDL/EPRI%206-12-19.pdf

North Carolina has realized increasing annual incremental EE savings, exceeding 1,221 GWh in 2018.[57] Currently, annual incremental EE savings from utility programs as a percentage of retail sales for North Carolina is less than 1 percent, and there is potential for significant increase in cost effective EE integration. Going forward, it will be vital for North Carolina to utilize new energy efficiency policies, technologies, programs and strategies to reduce the state's energy usage, emissions, costs, and secure its energy independence. The NC Clean Energy Plan and the Duke Nicholas Institute's Energy Efficiency Roadmap provide guidance on EE measures that the EE Committee should consider to pursue levelized demand, reduced pollution and achievement of energy savings in our state's economy and residents' daily lives.

The EE Committee drew from these two plans to expand its recommendations in areas including:

- A diverse set of EE measures and policies that focus on areas such as: education, data, technological innovation, building codes, etc.
- An emphasis on collaborative approaches such as working with ApprenticeshipNC to launch an EE apprenticeship program for North Carolina workers with industry partners and organizations, as well as enhancing existing collaborations with groups such as utilities.
- Strategies that could improve energy efficiency programs and existing technologies to reduce energy usage, especially in state-owned buildings.
- Recommendations to establish new ways to finance energy efficiency related projects, programs, and activities such as creating a North Carolina -based Clean Energy Fund to issue loans, provide credit enhancements, and invest in clean energy and EE projects, to benefit North Carolina businesses, congregations, nonprofits, and consumers. It would be established as an independent nonprofit organization to administer the program, following examples in other states.
- Enact a statewide PACE program for commercial buildings to remove or greatly reduce barriers to investing in EE or clean energy. PACE is already legislatively authorized in North Carolina, but the state does not have any active programs due to: (1) local North Carolina governments' lack of familiarity with PACE financing, (2) lack of local governments' ability to delegate the administration and the financing mechanism of such a program to a central third party, and (3) state-level approval required for all local debt. The current legislation sunsets on July 1, 2020 for cities and towns is and July 1, 2022 for counties.
- Support for new statewide carbon reduction and clean energy policies such as an EERS standard.

The policy recommendations build upon existing goals, while also adding new ones that will broaden the focus of energy efficiency in North Carolina and will require a mix of legislative, administrative, regulatory, or non-policy action to achieve implementation.

[57] North Carolina State Electricity Data, Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report" for the years 2013–2018. Retrieved from https://www.eia.gov/electricity/data/eia861/

Emission Reductions Due to EE Measures

As part of the annual report prepared by the NCUC pursuant to N.C.G.S. § 62-133.8(j), the DEQ provides an environmental review of the implementation of the REPS program.[58] This review summarizes the level of air pollution avoided from EE certificates (EECs) issued for each year using the North Carolina Renewable Energy Tracking System (NC RETS).[59] Table 3-1 shows the number of EECs issued for each year from 2008 through 2018. In 2018, North Carolina issued 5,572,279 MWh of EECs, which reduced retail sales of electricity by approximately 4%. This is the equivalent of a small coal utility power plant not operating.

Table 3-1. Energy Efficiency Certificates Issued and Estimated Avoided Air Pollution Emissions

Year	EECs Or Avoided Generation (MWh)	CO_2 Not Emitted (tons)	NO_x Not Emitted (tons)	SO_2 Not Emitted (tons)
2008	22,907	14,145	12	69
2009	80,008	46,266	29	79
2010	504,289	297,798	212	481
2011	1,134,040	669,685	478	1,081
2012	1,288,141	680,137	537	671
2013	2,119,916	1,119,313	885	1,105
2014	2,722,860	1,333,839	937	937
2015	6,218,251	3,046,116	2,139	2,139
2016	4,069,988	1,765,237	1,136	906
2017	4,812,048	2,087,084	1,343	1,071
2018	5,572,279	2,416,812	1,555	1,240

The data in Table 3-1 show the maximum reduction in air emissions due to EE savings achieved through REPS. In 2018, EE measures avoided 1,555 tons of nitrogen oxide (NOx) emissions and 1,240 tons of sulfur dioxide (SO_2) emissions from being emitted. The carbon dioxide (CO_2) emissions not released into the atmosphere due to EE measures is approximately 2.4 million tons, which is 4.6% of the total CO_2 emitted by power plants in North Carolina. This analysis shows that EE measures resulting from the REPS are significantly decreasing air pollution emitted in North Carolina and neighboring states.

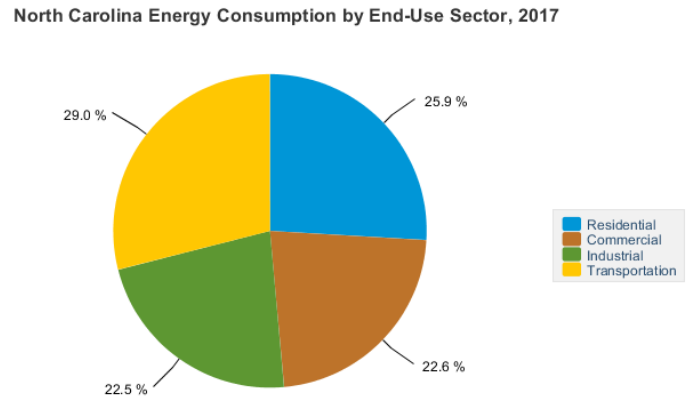
[58] Annual Reporting Regarding Renewable Energy and Energy Efficiency Portfolio Standard in North Carolina Required Pursuant to N.C.G.S. 62-133.8(j), North Carolina Utilities Commission, October 1, 2018, Retrieved from https://www.ncuc.net/reports/repsreport2018.pdf

[59] North Carolina Renewable Energy Tracking System, http://www.ncrets.org/.

4. North Carolina's Energy Profile

4.1 State Energy Statistics

Demographics[60, 61]		
Population	2018	10.4 million
Share of U.S.	2018	3.2%
State Ranking	2018	9th most populous
Rural Population	2010	34% of state's residents, largest in the U.S.
Economics[62,63]		
Gross Domestic Product	2018	$566 billion (11th largest)
Per Capita Personal Income	2018	$45,834
Energy Consumption[64], [65],		
Total Energy Consumed	2017	2,500 trillion Btu (2.6% of U.S. total)
National Ranking		12th highest
Amount Energy Imported		74%
Total Consumption per Capita		244 million Btu



Residential = 649 trillion Btu

Commercial = 567 trillion Btu

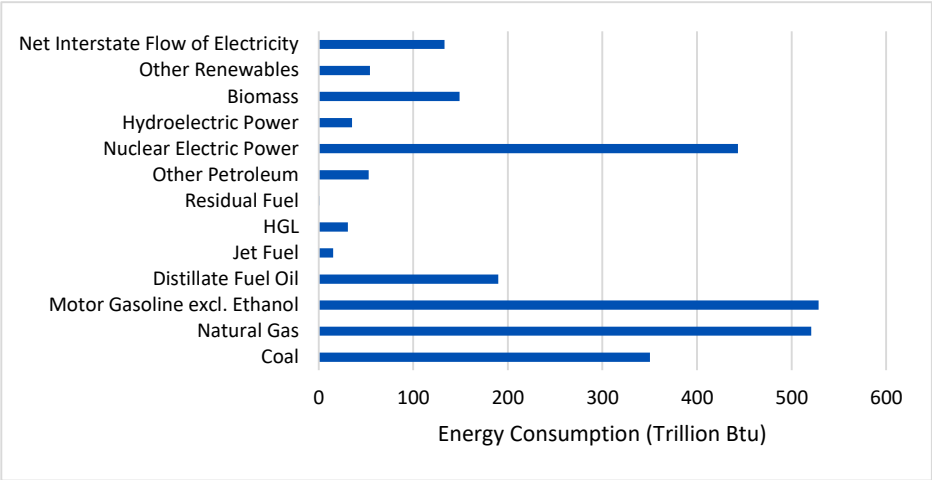
Industrial = 562 trillion Btu

Transportation = 725 trillion Btu, 11th highest vehicle miles traveled in U.S.

[60] North Carolina Budget and Management, Facts and Figures. Retrieved from https://www.osbm.nc.gov/facts-figures
[61] U.S. Census Bureau, 2010 Census (2010).
[62] Steven Pennington, NC Annual Economic Report: Gross Domestic Product, NC Department of Commerce, November 4, 2019. Retrieved from https://www.nccommerce.com/blog/2019/11/04/nc-annual-economic-report-gross-domestic-product
[63] North Carolina Department of Commerce, Labor and Economic Analysis Division, *North Carolina Annual Economic Report* (2019).
[64] U.S. States Profiles and Energy Estimates, U.S. Energy Information Administration, 2017. Retrieved from https://www.eia.gov/state/seds/data.php? incfile= /state/seds/sep_ fuel/html/fuel_ te.html&sid= US

[65] U.S. EIA, State Energy Data System, Table C3, Primary Energy Consumption Estimates, 2018.

North Carolina Energy Consumption by Fuel Type, 2018



Energy Source Used for Home Heating (% of households in 2018)

Electricity	63.6%
Natural Gas	24.7%
Liquefied Gases	6.7%
Fuel Oil	2.8%
Other/None	2.2%

VEHICLE FUELING[66]

Motor Gasoline Stations	2017	4,857 stations (4.0% of U.S.)
Propane Stations	2020	66 stations (2.3% of U.S.)
Electricity Stations	2020	633 stations (2.6% of U.S.)
E85 Station	2020	78 stations (2.2% of U.S.)
Compressed Nat'l Gas and other	2020	33 stations (2.8% of U.S.)

ELECTRICITY CONSUMED FOR TRANSPORTATION

Year	MWh
2002	NA
2003	0
2004	0
2005	36
2006	31
2007	22
2008	5,098
2009	6,695
2010	7,050
2011	7,212
2012	7,124
2013	7,405
2014	8,670
2015	8,651
2016	6,402
2017	3,540
2018	12,988

PRICES[67]

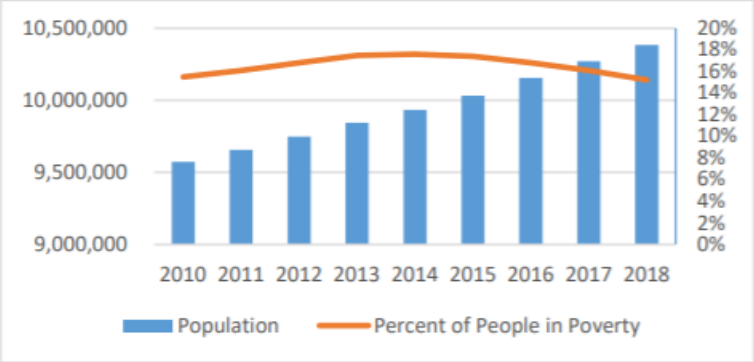
Natural Gas – City Gate	Feb 2020	$2.79/1000 cf (US avg. = $3.09)
Natural Gas – Residential		$11.68/1000 cf (US avg. = $9.26)
Electricity – Residential	Feb 2020	$11.48 cents/kWh (US avg. = 12.85)
Electricity – Commercial		$8.63 cents/kWh (US avg. = 10.36)
Electricity – Industrial		$5.89 cents/kWh (US avg. = 6.42)

[66] Petroleum Industry Preparation, Response & Recovery to Hurricane Florence, presented by David McGowan, NC Petroleum Council, NC Energy Policy Council Meeting, Archdale Building, February 20, 2019 meeting, Raleigh, NC. Retrieved from https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Energy/Energy%20Policy%20Council/EPC-Combined-Presentations.pdf

[67] U.S. EIA, North Carolina State Profile and Energy Estimates, Profile Data. https://www.eia.gov/state/data.php?sid=NC

ENERGY BURDEN

Population and Poverty Trends in North Carolina from 2010 to 2018



- State population has grown by 8.45 % since 2010.
- The percentage of persons living in poverty has remained between 14-16 % of the total population. In 2018, North Carolina had an overall poverty rate of 14.7 %, representing nearly 274,000 households or 1.5 million people living at or below the federal poverty level (FPL).
- The federal poverty guidelines in the United States are set by the U.S. DHHS. In 2019 equaled $25,750 for a family of four which is 51% of the North Carolina median household income of $49,822.
- The Covid-19 emergency is expected to significantly affect the state's poverty figures.

Average Home Energy Burden for North Carolina Residents, 2018

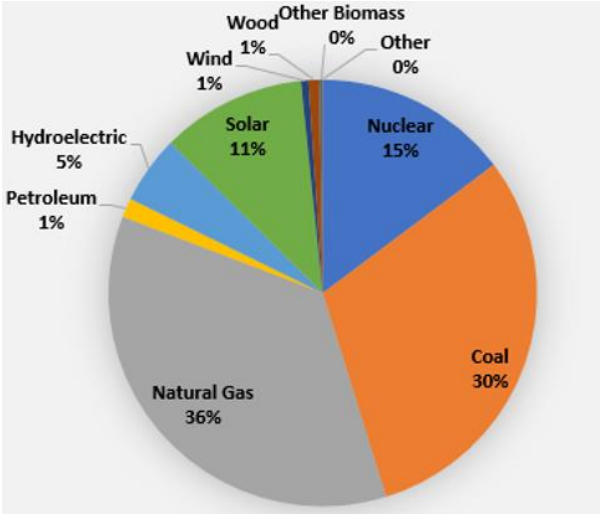
Poverty Level	Home Energy Burden
Below 50%	33%
50 - 100%	18%
100 - 125%	12%
125 - 150%	10%
150 - 185%	8%
185 - 200%	7%

- Households in North Carolina spend a disproportionate amount of annual household income on home energy bills, referred to as energy burden.
- For those living with incomes below 50% of the Federal Poverty level, 33% of their annual income is spent on energy bills.
- Energy burden is the percentage of a household's annual income that is spent on energy bills.
- The U.S. Department of Health and Human Services (DHHS) classifies an energy burden of 6 % or higher as "unaffordable".
- Energy burden is primarily driven by a household's poverty status, but factors such as home energy efficiency, housing type, quality of housing stock, and home ownership status contribute to the burden experienced by low income households.

Energy Burden by Fuel Type for Those at or below Federal Poverty Level, 2018

ELECTRICITY PROFILE[68], [69]

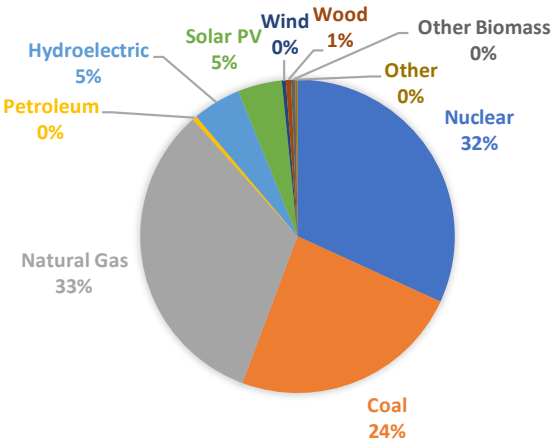
Electricity Capacity by Source (2018)



Primary Resource Type	Number of Plants	2018 Nameplate Capacity (MW)
Nuclear	3	5,395
Coal	9	11,167
Natural Gas	17	13,050
Petroleum	41	527
Hydroelectric	40	1,889
Solar	529	4,008
Wind	1	208
Wood	4	287
Other Biomass	22	98
Other	1	1
Grand Total		**36,630**
Pumped Storage	1	95

	Planned Capacity (MW)	
	2020	**2022**
Natural Gas	13,700	14,244
Solar	4,959	5,069.2

Electricity Generation by Source (2018)



Generation (MWh)	
Resource Type	**2018**
Coal	31,510,194
Hydroelectric Conventional	6,592,491
Natural Gas	43,219,397
Nuclear	42,076,949
Other	301,639
Other Biomass	580,388
Other Gases	0
Petroleum	611,416
Solar Thermal and Photovoltaic	5,998,634
Wind	542,772
Wood and Wood Derived Fuels	694,532
Grand Total	**132,128,412**

[68] Source: EIA Form 923 Preliminary Data for 2019 https://www.eia.gov/electricity/data/eia923/
[69] Source: EIA Detailed State Data, https://www.eia.gov/electricity/data/state/

2019 Generation by Resource and Ownership in MWh

Total Generation	**129,971,057**	
Duke Energy	104,405,484	80%
Non-Duke Energy	25,565,573	20%
Total Fossil Generation	**72,428,690**	**56%**
Duke Energy	62,393,016	86%
Non-Duke Energy	10,035,674	14%
Total RE Generation	14,014,121	**11%**
Duke Energy	96,863	1%
Non-Duke Energy	13,917,258	99%
Total Biofuel Generation	**1,287,720**	**1%**
Duke Energy	0	0%
Non-Duke Energy	1,287,720	100%

Change in RE Electricity Generation from 2007 to 2019 in thousand MWh[70]

Net Generation from Renewable Sources (thousand MWh)								
Source	**2007**	**2009**	**2011**	**2013**	**2015**	**2017**	**2018**	**2019***
Hydroelectric	3,121	5,214	3,893	6,901	4,742	3,818	4,993	6,199
Solar PV	0	5	17	345	1,374	5,114	6,997	7,292
Wind	0	0	0	0	0	471	543	523
Biomass	1,585	1,757	1,953	2,200	2,045	2,117	849	841
Biogas	87	131	375	410	544	695	501	447
Total	**4,793**	**7,108**	**6,239**	**9,855**	**8,705**	**12,215**	**13,883**	**15,302**

* Preliminary data in 2019

[70] EIA Form https://www.eia.gov/electricity/data/eia923/

EMISSIONS PROFILE[71, 72]

Electricity Generation CO2 Emissions

	2005	2019	2005	2019		2005	2019
Fuel Type*	**Net Generation (MWh)**	**Net Generation (MWh)**	**CO2 Emissions (MMT)**	**CO2 Emissions (MMT)**	**Percent Change in CO2**	**CO2 Intensity Factor kg/MWh**	**CO2 Intensity Factor kg/MWh**
Coal	77,994,318	30,596,331	71.43	28.59	-60%		
Natural Gas	3,142,892	41,611,919	1.45	16.89	1062%		
Diesel Fuel	246,883	220,440	0.24	0.18	-26%		
Total Fossil Fuel	**81,384,094**	**72,428,690**	**73.12**	**45.66**	**-38%**	**898.50**	**630.35**
Total Non-Emitting	44,655,954	55,929,726	0	0		0	0
Total Biofuel	459,903	1,287,720	NA	NA		NA	NA
Total - All Resources	**126,499,951**	**129,646,135**	**73.12**	**45.66**		**578.05**	**352.15**

* Does not include "other", non-fossil fuel CO2-emitting resources

Change in Fossil Fuel Use and CO2 Emissions by Entity

	2005	2019	2005	2019	
Fuel Type	**Fuel Consumption (MMBtu)**	**Fuel Consumption (MMBtu)**	**CO2 Emissions (MMT)**	**CO2 Emissions (MMT)**	**Percent Change**
Coal	765,793,732	306,484,922	71.43	28.59	-60%
Duke Energy	734,981,560	304,265,323	68.56	28.38	-59%
Non-Duke Energy	30,812,172	2,219,599	2.87	0.21	-93%
Natural Gas	27,387,595	318,315,771	1.45	16.89	1062%
Duke Energy	21,092,029	244,222,281	1.12	12.96	1058%
Non-Duke Energy	6,295,566	74,093,490	0.33	3.93	1077%
Diesel Fuel	3,203,742	2,384,933	0.24	0.18	-26%
Duke Energy	2,923,625	1,736,542	0.22	0.13	-41%
Non-Duke Energy*	280,117	648,391	0.02	0.05	131%
Total	**796,385,068**	**627,185,626**	**73.12**	**45.66**	**-38%**
Duke Energy	758,997,214	550,224,146	69.89	41.47	-41%
Non-Duke Energy*	37,387,854	76,961,480	3.23	4.19	30%

* Increase in diesel fuel use by "State Fuel Increment", which is an EIA estimate of fuel use for non-reporting generators

[71] Source: EIA Form 923, EPA CO2 Emission Factor

Avoided Emissions from Energy Efficiency & Non-Emitting Renewables[73]

NC REPS Program	2019 RECS (MWh)	CO2	NOx	SO2
		Not Emitted (tons)	Not Emitted (tons)	Not Emitted (tons)
Non-Emitting RE*	6,366,469	2,777,875	1,776	1,417
EE Measures	3,349,138	1,461,326	934	745
Total**	**9,715,607**	**4,239,201**	**2,711**	**2,162**

* From NC-RETS which includes out of state resources that sell generation to NC as part of for NC REPS.

** Does not include entities that opted out and customer sited generation and efficiency measures not included in REPS.

Operating Capacity Factors by Fuel Type[74]

2019 Fossil Resource Capacity Factor	Capacity (MW)
Coal	**10,350**
> 50%*	834
50%-30%	4,977
< 30%	4,538
NGCC	**5,159**
> 70%	773
70%-60%	4,386
< 60%	0
Gas CT	**5,516**
> 10%	3,378
< = 10%	2,138
Oil CT	**1,774**
< 1%	1,774

*Cliffside 6 co-firing coal and gas

Air Emissions and Emission Factors[75]

2018 Emissions		Rank
Sulfur dioxide (short tons)	40,739	17
Nitrogen oxide (short tons)	54,288	8
Carbon dioxide (thousand metric tons)	49,642	14
Emissions Intensity		
Sulfur dioxide (lbs/MWh)	0.6	26
Nitrogen oxide (lbs/MWh)	0.8	22
Carbon dioxide (lbs/MWh)	814	34

[73] NC RETS and EPA eGRID Emission Factors for SRVC region

[74] EPA Air Markets Program Data https://ampd.epa.gov/ampd/

[75] North Carolina Electricity Profile 2018, Table 1, 2018 Summary statistics Energy Information Administration, Retrieved https://www.eia.gov/electricity/state/northcarolina/index.php

EPA's Power Sector Modeling Forecast (2021-2050)[76]

NC Capacity Forecast by Resource Type (MW)

	Year	All Units	Biomass	Coal Steam	Combined Cycle	Combustion Turbine	Energy Storage	Fuel Cell	Hydro	Landfill Gas	Non-Fossil Other	Nuclear	O/G Steam	Offshore Wind	Pumped Storage	Solar PV	Wind
Historical	2012	30,391	481	12,105	4,128	6,406	0	4.8	1,964	46	3.7	4,998	54	0	86	115	0
	2013	30,048	502	10,795	4,707	6,439	0	10	1,997	48	0	5,076	54	0	86	333	0
	2014	30,498	503	10,833	4,739	6,434	0	10	1,999	71	0	5,094	54	0	86	676	0
	2015	31,310	402	10,803	4,766	6,453	0	10	2,004	75	161	5,114	0	0	86	1,437	0
	2016	32,290	474	10,746	4,725	6,360	0	10	2,002	75	54	5,114	0	0	86	2,437	208
	2017	33,028	479	10,537	4,725	6,374	1	0	2,002	90	54	5,118	0	0	86	3,355	208
	2018	34,178	465	10,505	5,233	6,388	1	0	2,002	88	54	5,150	0	0	86	3,998	208
Jan 2020 Ref Case	2021	32,879	78	7,964	5,797	6,306	1	0	2,003	84	84.2	5,118	1,386	0	86	3,759	211
	2023	36,041	78	7,964	5,797	6,306	1	0	2,094	84	84.2	5,118	1,386	0	86	6,831	211
	2025	37,296	78	7,964	5,893	6,306	1	0	2,094	84	84.2	5,118	1,386	0	86	7,990	211
	2030	41,409	78	7,964	6,389	6,306	1	0	2,094	84	84.2	5,118	1,386	0	86	11,527	291
	2035	43,469	35	7,448	8,835	6,480	1	0	2,094	84	84.2	5,118	1,386	0	86	11,527	291
	2040	44,777	35	6,761	9,712	6,508	1,091	0	2,094	84	84.2	5,118	1,386	0	86	11,527	291
	2045	47,877	35	6,708	10,373	7,779	1,091	0	2,094	84	84.2	5,118	1,386	0	86	12,747	291
	2050	58,743	35	3,612	10,415	7,910	2,599	0	2,094	84	84.2	4,186	1,386	4,954	86	21,007	291

NC Generation Forecast by Resource Type (1000 MWh)

	Year	Nuclear	Coal Steam	Combined Cycle	Combustion Turbine	O/G Steam	Biomass	Landfill Gas	Non-Fossil Other	Energy Storage	Fuel Cell	Hydro	Pumped Storage	Solar PV	Wind	Offshore Wind	All Units
Historical	2012	39,386	40,585	13,233	4,179	0	2,981	285	311	0	0	3,728	0	139	0	0	**104,827**
	2013	40,242	40,141	24,268	1,761	0	2,996	372	338	0	0	6,901	0	345	0	0	**117,364**
	2014	40,967	41,117	25,291	2,085	0	2,812	509	318	0	0	4,756	78	729	0	0	**118,661**
	2015	42,097	34,706	29,966	5,085	0	2,911	553	299	0	0	4,742	0	1,374	0	0	**121,733**
	2016	42,786	33,309	30,710	6,814	0	2,359	550	363	0	0	4,417	0	3,421	6	0	**124,736**
	2017	42,374	31,754	32,464	4,084	0	2,634	506	577	0	79	3,818	0	5,114	471	0	**123,875**
	2018	42,077	29,171	32,718	8,598	0	2,488	492	535	0	0	5,001	0	6,997	543	0	**128,620**
Ref Case Jan 2020	2021	40,194	23,659	39,342	2,612	3,441	316	555	346	1.46	0	4,448	25	6,452	547	0	**121,937**
	2023	40,276	25,733	38,224	2,649	3,259	316	555	346	1.46	0	4,926	32	11,234	547	0	**128,097**
	2025	40,310	22,614	39,428	2,885	3,606	316	555	346	1.46	0	4,926	41	13,005	547	0	**128,580**
	2030	40,310	18,169	43,425	4,525	4,067	316	555	346	1.46	0	4,926	43	18,625	844	0	**136,152**
	2035	40,310	9,931	57,077	4,478	3,771	0	555	346	1.46	0	4,926	44	18,625	844	0	**140,909**
	2040	40,310	10,928	63,980	3,022	0	0	555	346	1,593	0	4,926	39	18,625	844	0	**145,168**
	2045	40,310	10,862	68,248	3,714	0	0	555	346	1,593	0	4,926	29	20,564	844	0	**151,991**
	2050	32,922	4,057	62,395	2,654	0	0	555	346	3,795	0	4,926	33	33,686	844	21,028	**167,240**

[76] US EPA, *EPA's Power Sector Modeling Platform v6 using IPM January 2020 Reference Case*, released February 20, 2020, Retrieved from https://www.epa.gov/airmarkets/epas-power-sector-modeling-platform-v6-using-ipm-january-2020-reference-case

4.2 State Regulatory Profile

Legislative Actions

In the 2019-2020 legislative session, a number of bills were introduced, and three laws were passed related to NC state energy policy. Below is list of key legislative changes made and proposed.

Table 4-1. Select Legislative Actions (2019-2020)

Status	Regulatory Action	Date	Topic (s)
Law – S.L. #2019 - 132	HB 329	2019-2020 session	**Electric Vehicles**– exempt EV charging stations from regulation as public utilities **Storage -**manage battery end-of-life **Renewables** – manage solar decommissioning
Law – S.L. #2019 - 125	SB 384 HB 455	2019-2020 session	**Electric Vehicles** – manufacture and sale of EVs; allows up to five motor vehicle dealership locations until December 31, 2020 for a manufacturer and seller of only plug-in EVs. After December 31, 2020, up to six such dealerships may be operated. The bill includes several criteria that these manufacturers must also meet in order to operate dealerships in the state.
Law – S.L. #2019-244	SB 559 HB 624	2019-2020 Session	**Utility Rate Design, Business Model -** authorizes the Commission to approve securitization of storm cost
Proposed Legislation	HB 545 SB 517	2019-2020 session	**Offshore Energy -** Prohibit exploration, development and production of offshore oil & gas in NC coastal waters
Proposed Legislation	HB750	2019-2020 session	**Solar -** makes deed restrictions and other agreements prohibiting solar collectors on residential property void and unenforceable.
Proposed Legislation	SB377	2019-2020 session	**Wind -** Prohibition of wind energy facilities on military bases
Proposed Legislation	SB 568	2019-2002 session	**Energy Storage -** requires battery storage manufacturers to register and prepare and submit a stewardship plan by December 1, 2021 or within 30 days of its first sale in the state (whichever is later). The stewardship plan is to describe how recycling or reuse of batteries will be financed and how environmental impacts will be minimized. The bill establishes an initial registration fee of $10,000 for battery storage manufacturers, with proceeds going to the new Energy Storage System Battery Management Fund. The bill also prohibits energy storage system batteries from being disposed of in

Status	Regulatory Action	Date	Topic (s)
			landfills.
Proposed Legislation	HB330	2019-2020 session	**Utility Savings Initiative (state buildings) -** Increases Utility Savings Initiative goal from 30% to 40% reduction in energy consumption per gross square foot by 2025
Proposed Legislation	HB 958	2019-2020 session	**Regional Transmission Organization** - Authorizes the Commission to require any utility serving at least 150,000 customers to file an application with FERC for establishing or joining a regional transmission entity. In making its decision, the Commission must determine that participation in a regional transmission entity is in the public interest.

Regulatory Actions

In response to North Carolina's implementation of REPS, HB 589 and the pursuant energy storage study, the PUC opened a variety of dockets and responded to various components of previous orders and legislation. In October 2019, Governor Cooper issued Executive Order 80 and state agencies have conducted work under that order including the Clean Energy Plan, Zero Emissions Vehicle Plan, and a Workforce Assessment. Below is a summary of regulatory actions since the 2018 EPC Biennial Report.

Table 4-2. Select North Carolina Energy Regulatory Actions (2018-2020)

Topic/Driver	Overview	Status	Docket Number	Date Resolved
HB 589 implementation	Duke Energy community solar program plan	Plan approved	E-2 Sub 1169	4/4/19
HB 589 implementation	Community solar program terms for implementation	Rules adopted	E-100 Sub 155	1/26/18
HB 589 implementation	Competitive Procurement of Renewable Energy (CPRE) Program	Order approving CPRE program Proceeding remains ongoing.	E-2 Sub 1159 E-7 Sub 1156	2/21/18
HB 589 implementation	Green Source Advantage Program modifications and compliance	Order approving program	E-2 Sub 1170 E-7 Sub 1169	2/1/19

Topic/Driver	Overview	Status	Docket Number	Date Resolved
HB 589 implementation	Duke Energy application to become a commercial solar lessor	Order approving Duke Energy's application	EGL-2 Sub 0	12/17/18
HB 589 implementation	Modification of REPS swine and poultry waste set-aside	Order for all electric utilities	E-100 Sub 113	1/8/18
Energy Storage, Renewable Energy	Rules for integration of solar qualifying facilities with energy storage	Order adopting standard rates and contract terms	E-100 Sub 158	4/15/20
Energy Storage	Investigation to prepare for increased storage deployment	Educational presentations	E-100 Sub 164	N/A
Energy Storage, Renewable Energy	Interconnection Standards	Order approving rule revisions. Proceeding remains ongoing.	E-100 Sub 101	6/14/19
Renewable Energy, Energy Storage	Duke Energy Hot Springs Microgrid Solar and Battery project proposal	Order approving project, subject to ancillary service study requirements	E-2 Sub 1185	May 2019
Grid Modernization	Smart Meter Usage App pilots (Duke)	Order approving pilot	E-7 Sub 1209	9/5/19
Renewable Energy, Grid Modernization	Integrated Resource Plans and Smart Grid Technology Plans (Duke and Dominion). Development of Integrated System and Operations Planning (ISOP) process (Duke)	IRPs accepted Smart Grid Plans accepted	E-100 Sub 157	8/27/19 7/22/19
Grid Modernization	Rules for third-party access to customer data for Duke, Dominion	Ongoing	E-100 Sub 161	N/A

Topic/Driver	Overview	Status	Docket Number	Date Resolved
Grid Modernization, Rate case	Duke Energy rate cases for compliance, grid modernization, and optimization of customer experience. Data access, electric transportation and energy storage plans.	Ongoing	E-2 Sub 1219 E-7 Sub 1214	N/A
Rate Case	Duke Energy Carolinas rate case, including PowerForward grid modernization plan. Dynamic pricing pilots proposed, pursuant to NCUC order.	Order approved AMI investment, but denied remainder of the PowerForward plan	E-7 Sub 1146	6/22/18
Rate Case	Dominion rate case including proposed increase on residential charges	Resolved with partial rate increase, but full fixed charge increase	E-22 Sub 562	2/24/20
Rate Design	Public Staff recommendation on standard methods for NC IOUs to set fixed monthly customer charges	Report and Recommendation	E-100 Sub 162	3/28/19
REPS compliance	REPS compliance plans, Smart Grid Technology Plans, AMI analysis and data access plans (Duke)	Order accepting plans	E-100 Sub 147	4/16/18
REPS implementation	Allowable use of RNG in Piedmont Natural Gas pilot program	Order accepting revision	G-9 Sub 698	1/11/19
Transportation Electrification	Three-year pilot program proposed by Duke Energy. Includes incentives for residential charging equipment, fleet charging equipment, transit bus	Ongoing	E-7 Sub 1195 E-2 Sub 1197	N/A

Topic/Driver	Overview	Status	Docket Number	Date Resolved
	charging equipment, electric school buses, deployment of utility-owned charging equipment at multi-family properties and charging equipment for public use.			

Appendices

A. List of EPC Committee Meetings

Energy Assurance Committee
November 14, 2019

Energy Efficiency Committee
February 19, 2020
November 18, 2019
May 15, 2019

Energy Infrastructure Committee
February 19, 2020

August 21, 2019

May 15, 2019

February 20, 2019

B. Staff to the Council

Department of Environmental Quality

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Cynthia Moseley
Peggy Walker
Kevin Martin (former)
Maurice McKinney (former)
Holly Samaha
Maye Hickman
Robert Bennett

C. Public Comments