Energy Policy Council
2022 DRAFT Biennial Report

A Report to the:

North Carolina Governor,
Speaker of the North Carolina House of Representatives,
President Pro Tempore of the North Carolina Senate,
Environmental Review Commission,
Joint Legislative Commission on Energy Policy, and
Chair of the Utilities Commission.

OCTOBER 28, 2022

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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Mark Robinson, Lieutenant Governor
Chair, Energy Policy Council

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List of Abbreviations

ASCE	American Society of Civil Engineers
Btu	British thermal units
CHP	combined heat and power
CO_2	carbon dioxide
C-PACE	Commercial Property Assessed Capital Expenditure
CPCN	Certificate of Public Connivence and Necessity
CPRE	Competitive Procurement for Renewable Energy Program
cu ft	cubic feet
PACE	Property Assessed Capital Expenditure
DEC	Duke Energy Carolinas
DEP	Duke Energy Progress
DEQ	North Carolina Department of Environmental Quality
EA	energy assurance
ECPA	Energy Conservation and Policy Act
EE	energy efficiency
EEC	Energy Efficiency Certificate
EERS	Energy Efficiency Resource Standard
EI	energy infrastructure
EIA	Energy Information Administration
EO	Executive Order
EPC	North Carolina Energy Policy Council
EV	electric vehicle
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gases
GW	gigawatts
HB	House Bill
HERO	High Efficiency Residential Option
HERS	Home Energy Rating System
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
IRP	Integrated Resource Plan
ISOP	Integrated System and Operations Planning
kg/MWH	kilogram per megawatt-hour
kWh	kilowatt-hour
lb/MWH	pound per megawatt-hour
MMBtu	million British Thermal Unit

MMT	million metric ton
MW	megawatt
MWh	megawatt-hour
NASEO	National Association of State Energy Officials
NCBCC	North Carolina Building Code Council
NCDHHS	North Carolina Department of Health and Human Services
NCDOI	North Carolina Department of Insurance
NCDOT	North Carolina Department of Transportation
NC-RETS	North Carolina Renewable Energy Tracking System
NCUC	North Carolina Utilities Commission
NERC	North American Electric Reliability Corporation
NO_X	oxides of nitrogen
PV	photovoltaic
RE	renewable energy
REC	Renewable Energy Credit
REPS	Renewable Energy and Energy Efficiency Portfolio Standard
RNG	renewable natural gas
SEEM	Southeastern Energy Exchange Market
SERC	SERC Reliability Corporation
SHEA	Southeast Hydrogen Energy Alliance
SO_2	sulfur dioxide
U.S.	United State of America
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
USI	Utility Savings Initiative
WAP	Weatherization Assistance Program
ZEV	zero-emissions electric vehicles

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 toward 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

[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

government to identify opportunities to increase domestic energy supply within North Carolina and its adjacent offshore water,

- 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, and
- 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. In addition, there are three committees of the Council, which include;

- Energy Infrastructure,
- Energy Assurance, and
- Energy Efficiency.

These committees 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 2020 Biennial report, full Council meetings were held on the following days (in order from last to first).

- August 31, 2022
- May 18, 2022
- February 16, 2022
- November 17, 2021
- August 18, 2021
- May 19, 2021
- February 17, 2021

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, Brian LiVecchi, and is 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. Brian LiVecchi (acting for Lt. Governor Robinson) serves on each committee but only votes in the case of a tie.

1. The Energy Infrastructure (EI) Committee focuses on: utility-scale generation, transmission, and distribution; exploration for and penetration of traditional and renewable energy (RE) resources; identifying new energy resources; smart grid technology deployment; and grid modernization. The members of the EI Committee are:
    - William "Gus" Simmons (Chair)
    - Bruce Barkley
    - Diane Denton (former)
    - Kendal Bowman (replacement for Diane Denton)
    - Rachael Estes (resigned August 1, 2022)
    - Brian LiVecchi, acting for Lt. Governor Robinson

2. 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 Department of Commerce Secretary Sanders
    - Jenny Kelvington
    - Brian LiVecchi, acting for Lt. Governor Robinson

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
    - Ryan Gragg, (resigned August 18, 2022)
    - Sushma Masemore, acting for Department of Environmental Quality Secretary Biser
    - Brian LiVecchi, acting for Lt. Governor Robinson

1.3 Purpose of this Report

Pursuant to § 113B-12, this 2022 biannual report has been prepared by the Council for transmittal to the following persons:

- Governor,
- Speaker of the House of Representatives,
- President Pro Tempore of the Senate,
- Environmental Review Commission,
- Joint Legislative Commission on Energy Policy, and
- Chairman of the Utilities Commission.

The report supports the mission of the EPC. Specifically, Chapter 2 contains policy and program recommendations prioritized by the Energy Infrastructure Committee, Energy Assurance

Committee, and the Energy Efficiency Committee for consideration by the Governor and Legislature. 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.

This 2022 Draft Biennial Report is being released for public comment from September 30, 2022 to October 28, 2022. The Council will consider the public comments received, hold discussions, and vote on the final recommendation at its November 16, 2022 joint meeting.

2. Energy Policy Council Recommendations

2.1 Energy Infrastructure Committee

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.

Current 2022 Recommendations

Following are the EI Committee's 2022 recommendations related to energy infrastructure planning, bioenergy, and renewable energy.

Recommendation #EI 1

Electricity Infrastructure. Electricity providers in North Carolina should further invest in the generation, transmission, and distribution infrastructure to support future load and economic growth in the State, with specific focus on the development of lower carbon-emitting sources of electricity, carbon capture, and practices that support further decarbonization of our energy sector, consistent with House Bill (HB) 951 (Session Law 2021-165) and the Duke Energy Carbon Plan; while ensuring any generation or resource changes maintain or improve upon the adequacy and reliability of the existing grid. North Carolina's legislative and regulatory bodies should evaluate additional supportive funding and legislation, regulation, and policies needed that support these investments, including the disposition of expired or expended assets as applicable, the adoption of renewable energy resources, and further reduction of carbon emissions from the energy sector[2]

Recommendation #EI 2

Expansion of Natural Gas Infrastructure. Natural Gas distribution companies in North Carolina should further invest in the transmission and distribution infrastructure to support future customer demand and economic growth in the State, with specific focus on infrastructure that supports the addition and incorporation of renewable natural gas and the cost-effective expansion of natural gas service to unserved customers; while endeavoring to provide the highest levels of reliability and customer service in a safe, cost-prudent manner. The State's citizens and its industries are requesting greater access to natural gas and the State's elected leadership need to provide supporting policies and legislation that increase the availability of interstate supplies and intrastate infrastructure to meet this growing demand. The State's natural gas supply and delivery infrastructure can support the transition to an overall carbon emission reduction solution that properly includes cost and reliability considerations.

[2] Session Law 2021-165, House Bill 951, H951v6.pdf (ncleg.gov)

Recommendation #EI 3

Hydrogen Energy Production Appraisal. North Carolina should invest in the evaluation of potential sources of hydrogen energy that may be developed from within North Carolina, as well as the needed transmission and distribution infrastructure to support the incorporation of hydrogen-based fuels into our energy portfolio; while endeavoring to provide the highest levels of reliability and customer service in a safe, cost-prudent manner. The North Carolina Legislature should commission and fund a study effort to assess North Carolina's hydrogen energy production capabilities and the infrastructure improvements needed to support the incorporation, distribution, storage, and use of hydrogen energy fuels. Such a study effort should estimate the costs and prioritization for such infrastructure improvements. We recommend this study be accomplished and published in advance of the 2024 Biennial Report of the Energy Policy Council so that additional policy recommendations may be informed by the findings of the study.

Recommendation #EI 4:

Renewable Natural Gas Production Appraisal. North Carolina holds significant bioenergy production potential, nationally recognized as having the third-richest bioenergy resources in the U.S. External demand for renewable natural gas (RNG), through policies such as the federal Renewable Fuel Standard and state Low Carbon Fuel Standards, has bolstered the economic value of RNG production, given the determination that RNG from agricultural waste-derived biogas has a very beneficial impact to offset existing carbon emissions from the agricultural, power, and transportation sectors. RNG has been determined to be an alternative to natural gas, and thus, can be used to create electricity, satisfy thermal needs, and as a transportation fuel in a manner that both reduces emissions from the use of fossil fuels and from the production of food, feed, and fiber.

Several analyses of the economic, social, and environmental costs associated with the development of biogas resources within North Carolina have been conducted through various private and public initiatives over the past decade, yet there has been no effort to culminate the information available into a cohesive evaluation of the benefits of, associated emissions impacts of, and plan to use this rich resource for North Carolina. There is limited data available associated with health, social, and environmental impacts on the surrounding community. However, community advocates have raised significant concerns over the gas production operations impact on the quality of life, health and well-being.North Carolina's legislative and regulatory bodies should review and revise existing policies and regulations necessary to support the greater incorporation of renewable natural gas into our energy fuel portfolio, and develop additional supporting legislation, regulation, and policies that support investments in the development of North Carolina's RNG production capabilities to achieve further reduction of carbon emissions from the energy sector and address community concerns.

Recommendation # EI 5:

Expansion of Renewable Natural Gas Usage. In light of the opportunity to turn excess methane into new revenue streams for North Carolina's farmers and municipalities, the amount of natural gas currently being consumed by the citizens of the State, the need for diverse and reliable gas supplies and the environmental benefits of utilizing these resources, the State should enact legislation and adopt policies in 2023 that promote the development of renewable gas resources

and usage of renewable natural gas by customers of the natural gas local distribution companies. Renewable natural gas resources should be broadly defined to include biomass, biogas and biomethane from agricultural waste, landfill gas, and gas produced from wastewater treatment facilities. Support should be provided in the form of legislation that allows the North Carolina Utilities Commission (NCUC) to authorize cost recovery for infrastructure investments associated with renewable natural gas and any capital or operating costs incurred by the local distribution companies related to processing, pipeline interconnection, storage, and distribution of renewable natural gas while balancing the protection of environment, public health, and the well-being of neighboring communities.

Recommendation # EI 6:

Development of the North Carolina Energy Innovation Grant Program. North Carolina's elected leaders should develop financial support programs, such as grant and loan programs, to further foster North Carolina's energy resource development and innovation. Grant programs should be developed to assist smaller municipalities and smaller farming operations implement innovative systems and processes to produce renewable energy fuels and renewable electricity. Loan programs should be established to provide bridge funding to aid public sector organizations in implementing innovative renewable energy technologies and provide gap funding loans to small private sector organizations in implementing innovative renewable energy technologies. The loan program should be established as a revolving loan program that provides for the replenishment and continuation of the program. Specific focus should be given to energy innovation projects that have potential to prompt broader application to additional end users. This funding program should be administered by the North Carolina Department of Commerce in a manner similar to existing programs for other types of critical infrastructure. The program should be funded at a minimum of $30 million initially, with half of the funds directed to energy innovation grants.

Recommendation # EI 7:

Energy Policy, Regulations, and Rules Review. North Carolina has existing statutes that require state agencies to examine and review of certain rules on a recurring basis, such as N.C. Gen. Stat. §150B-21.3A, adopted in 2013 which requires such a review on a 10-year cycle. Given the rapid innovation that is occurring within the energy sector, and the timelines set forth for reducing carbon emissions associated with our electricity generation, and the ongoing transition to alternate transportation fuels, a focused review effort to examine rules that impact the development of in-state energy resources is needed. The existing North Carolina General Statutes, Rules, and Policies should be examined for inappropriate or unnecessarily inhibitive barriers to energy innovation and the development of in-state energy resources. 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 lower carbon-emitting resources and the piloting of innovative energy resources and technologies. This initial examination will identify policy and regulatory changes that should be enacted by or before the 2024 legislative session. Subsequent, similar reviews should occur every four (4) years thereafter, recognizing that the subsequent reviews will likely require less time and effort. The North Carolina Legislature should enact such a rules review and direct the State Energy Program Staff to facilitate the process. Additional funding to support additional staff resources may be required.

Recommendation # EI 8:

Net Zero Vehicle Charging and Fueling Infrastructure. Transportation electrification will lead to a significant increase in the amount of electricity consumed by customers as they switch to electric vehicles (EV). The North Carolina Legislature should commission and fund a study effort to investigate the infrastructure upgrades needed to enable broad-scale EV charging at home and on highway corridors to identify needs, level of investment required, and to ensure cost effective deployment of new infrastructure, including life cycle cost-benefit analysis. Additionally, the State should support research and development for deployment and utilization of alternative transportation fuels such as hydrogen, renewable natural gas, and fuel cell technologies that result in lower vehicle emissions.

2.2 Energy Assurance Committee

North Carolina's energy infrastructure, consisting of diversified electricity generating plants, transmission and distribution lines, petroleum and natural gas pipeline systems, and renewable resources, is susceptible to both natural and man-made occurrences that may result in local or statewide energy supply emergency events. As stated on the National Association of State Energy Officials (NASEO) 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."[3] 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 other occurrences or issues that may jeopardize North Carolina's energy supply and public safety. The EA Committee focuses on identifying and planning for potential energy emergency threats, preparing for them and mitigating their impacts.

Current 2022 Recommendations

Following are the EA Committee's 2022 recommendations related to energy assurance planning.

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 petroleum 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.

[3] National Association of State Energy Officials (NASEO) (2020) *Energy Assurance Planning*. Retrieved August 9, 2022 from https://www.naseo.org/energyassurance/

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, new emerging threat of disruptions, 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.

Recommendation #EA 3:

Development of the North Carolina Energy Security Plan. The Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law") requires North Carolina to create an energy security plan that assesses energy resources more broadly, with specific focus given to critical end users. The State is required to have an Energy Security Plan as a prerequisite to receiving federal funds through IIJA for energy infrastructure. A Stakeholder process to inform this effort is a required component of the development of the Energy Security Plan. A result of the Energy Security Plan is the prioritization of investments in critical infrastructure improvements and use of IIJA funding for infrastructure improvements, which will avail North Carolina to grant opportunities in research of new and alternative energy resource incorporation. North Carolina should financially support and direct the State Energy Office staff to facilitate the creation and development of a state Energy Security Plan which focuses on hardening our existing energy infrastructure to improve energy security, as well as exploring new and emerging energy infrastructure that can further improve energy security while continuing to endeavor to provide the highest levels of reliability and customer service in a safe, cost-prudent efficient manner.

2.3 Energy Efficiency Committee

The Energy Efficiency Committee has focused on reducing wasteful and inefficient uses of energy resources through state policy and practice, along with consideration of policies and programs 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. The Committee has also focused on mechanisms for financing energy efficiency.

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 assessed which recommendations were in progress or successful completed to assist with revisions to previously approved recommendations or development of new recommendations.

Current 2022 Recommendations

Following are the EE Committee's 2022 recommendations related to energy efficiency.

Public Buildings

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 2013, North Carolina agencies and universities achieved the 30% energy use reduction goal established by G.S. §143-64.12. In 2021, the reduction level had marginally increased to 31%. 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. To achieve this goal, state agencies should revert to an annual energy reporting period for public buildings and institutions under the Utility Savings Initiative (USI) program.

Recommendation #EE 2:

Strengthen and support the state's USI program 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 $1.6 billion in utility expenses since the 2002-2003 baseline year. 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:

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. 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.

Recommendation #EE 5:

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. Creating an outreach/education program for K-12 schools and community colleges to provide technical support and training for districts and campuses lacking in-house energy management.
e. Piloting a voluntary utility consumption reporting program with K-12 schools to assess energy savings potential.
f. Requiring all new or pending state building leases to incorporate energy efficiency measures (LED lighting, programmable HVAC, building envelope, etc.) into the standard contract terms.

Commercial and Residential Energy Efficiency

Recommendation #EE 6:

The NCUC shall establish a policy to ensure that all North Carolina utilities provide a secure and reliable manner to transfer to its customer or designees upon request utility usage data in a timely and non-cost prohibitive manner. This policy will allow all customers to leverage tools or systems such as the United States Environmental Protection Agency (USEPA) Portfolio Manager Program.[4] This policy will assist utility customers to potentially manage energy and water use and costs as well as work with utilities to identify the best opportunities for utility service efficiency programs. Any policy shall appropriately ensure that a specific customer utility usage data is not disclosed to any other party without the specific customer's knowledge and consent.

Recommendation #EE 7:

Examine the costs and benefits associated with adopting a minimum requirement for commercial buildings to require properly certified commissioning. Promote training, awareness, and incentives related to improving energy efficiency in the commercial energy sector.

Recommendation #EE 8:

Investigate state-level support for energy-related financing programs such as on-bill financing and Property Assessed Capital Expenditure (PACE) financing for both commercial and residential sectors. The legislature should also consider improvements in the existing Commercial PACE 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.

[4] Portfolio Manager | ENERGY STAR

Recommendation #EE 9:

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. Participating agencies include NC Department of Health and Human Services (NCDHHS), DEQ's Weatherization Assistance Program (WAP), NC Housing Finance Agency, NC Community Action Agencies and private entities.

Recommendation #EE 10:

Create new programs and incentives for improving the energy efficiency of manufactured housing. The Committee recommends that effective existing programs be expanded statewide.

Recommendation #EE 11:

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.

Building Codes

Recommendation #EE 12:

The NC Department of Insurance (NCDOI) and the NC Building Code Council (NCBCC) should assess the costs and benefits of measures intended to encourage builders or owners to exceed code standards, including programs such as Duke Energy Carolina's approved NCUC filing to expand Duke Energy Progress's 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. Educate consumers and realtors about metrics to assess residential EE, such as the Home Energy Rating System ("HERS") Index or other energy efficiency ratings.

Recommendation #EE 13:

Monitor developments and open a dialogue with the NC Building Code Council (NCBCC) and 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. Encourage participation between the NCBCC and the General Assembly for balancing issues of costs and policy for advancing energy efficiency in existing residential buildings because of the benefits to homeowners and renters. Consider new tax incentives for home improvements.

Recommendation #EE 14:

Implement and return to a building code cycle of 3 years, instead of the recently-adopted change to a 6-year cycle. The 3-year code cycle would improve energy efficiency benefits, overall cost benefits, and allow the State to qualify for certain federal funds that it does not qualify on the 6-year cycle.

Recommendation #EE 15:

Establish a defined pathway to increase statewide goal to 70% reduction from 2005 levels by 2030 and net-zero energy ready targets for new buildings by 2050 considering costs, benefits, and including targets for reduction of embodied carbon in new buildings and future infrastructure. 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.

Recommendation #EE 16:

NCUC should continue its efforts working with utilities to understand utility efficiency cost-effectiveness testing and leverage insights gained from any existing or future utility workstreams to determine valuation of non-utility benefits derived from utility efficiency investments including methodologies to estimate benefits to public health (via air and water quality), economic development, environmental health (GHG emission reduction, air and water quality), resiliency measures, and increased property value and reduced tenant turnover for utility efficiency investments at the utility-scale and at the building level.

Industrial Energy Efficiency

Recommendation #EE 17:

Identify and implement measures intended to encourage adoption of prevailing energy efficiency solutions 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 18:

Identify and create opportunities to engage industrial firms to design energy efficiency programs for industrial applications 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 19:

Investigate opportunities that would expand combined heat and power (CHP) deployment for industrial, large commercial and public buildings to lower operating costs at facilities, support resiliency with microgrids and other DERs, and assist with the goal of reaching carbon neutrality by 2050.

Transportation Efficiency

Recommendation #EE 20:

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.

Recommendation #EE 21:

Investigate the potential for improved traffic flow strategies and best practices implemented in other states, such as traffic circles, standardized highway signage, and high occupancy lanes (HOV).

a. Support the 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 22:

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.

Statewide Policy and Planning

Recommendation #EE 23:

The State Energy Office will coordinate with other state agencies and interested partners to evaluate the scope to 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 24:

Establish minimum energy efficiency goals within the current REPS program to align with carbon reduction goals in Session Law 2021-165 (HB 951). The legislature should incorporate 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 25:

Support the capitalization and development of programs with the NC Clean Energy Fund and the State to issue loans, provide credit enhancements, and invest in clean energy and EE projects, to the benefit of NC businesses, congregations, nonprofits, and consumers.

3. Committee Updates

3.1 Energy Infrastructure Committee

North Carolina's energy infrastructure includes all systems involved in electric power generation, transmission and distribution, as well as liquid and gaseous fuel distribution. The State depends on this infrastructure for its commerce and the support of its citizens. The State must ensure that this infrastructure is robust, reliable, and resilient both now and in the future. The infrastructure's inter-dependencies require each system to operate simultaneously to support each other as a united energy production and delivery system.

Developments Since 2020 Report

The most significant development since the 2020 Report relates to Recommendation #EI 2 in the 2020 EPC Report, which recommended reducing electricity sector carbon dioxide (CO_2) emissions. In October of 2021, Session Law 2021-165, also referred to as House Bill 951, was signed into law.[5] This law sets a goal for investor-owned utilities with greater than 150,000 customers to reduce CO_2 emissions by 70% in 2030 and be net-zero in 2050. However, these reductions must be done such that the electric utilities maintain reliability and implement a least-cost system.

Another important aspect of this law for infrastructure is that it enables financial securitization for the early retirement of coal plants. The law also expands competitive procurement of renewable energy and allows small energy providers to renegotiate purchase power agreements with utilities. Lastly, it allows Duke Energy to file for performance-based rates, which Duke Energy Progress filed on June 8, 2022 (See Section 4).[6]

Duke Energy submitted its draft Carbon Plan to the NCUC on May 16, 2022.[7] Under this plan, there are 4 proposed pathways to carbon neutrality in 2050. The NCUC is currently reviewing the draft plan and a final plan is due by December 31, 2022 (See Section 4 for the docket number). The plan will be updated every 2 years. A comprehensive discussion of the draft plan is not possible in this report. However, within the 2030 to 2050 timeframe, the plan requires the following:

- developing and integrating new, technologically challenging, resources onto the grid, potentially hydrogen, offshore wind and small modular nuclear reactors;
- developing and integrating significant amounts of additional utility-scale solar, onshore wind and hydroelectric, as well as additional gas plants;
- investing in research and deployment of batteries and other energy storage technologies,

[5] SL 2021-165 (HB 951) (ncleg.gov)

[6] ViewFile.aspx (ncuc.gov)

[7] Carolinas Carbon Plan - Duke Energy (duke-energy.com)

- building and modernizing transmission and distribution systems that allow bi-directional flow.

At the federal level, significant funding opportunities have become available since the last report to assist with development and deployment of clean energy and climate resilience. This funding will support the investments in infrastructure needed to implement SL 2021-165 as well as other clean energy goals. Legislators and policy makers should consider these opportunities for both infrastructure and structure new policies and programs that take advantage of this funding and support North Carolina's clean energy goals.

- The federal government passed the Infrastructure Investment and Jobs Act (IIJA) on November 15, 2021.[8] This law provides an additional $62 billion for the US Department of Energy to implement infrastructure projects and workforce development.[9] A substantial portion of this funding is to support transmission and grid modernization, as presented to the EI Committee in February of 2022. It also sets aside funding for regional "hydrogen hubs" to support the development and use of hydrogen as a new energy resource for the country.
- On August 16, 2022, Inflation Reduction Act became law.[10] This law focuses on reducing costs for implementing energy efficiency and clean energy projects at homes, commercial businesses and in rural communities primarily through tax incentives and rebates over the next ten years. It also promotes investing in domestic energy production, including renewable fuel production facilities, and natural gas pipelines.

The pace and cost of clean energy transformation must not leave anyone behind or further disadvantage low-income households who spend a larger percentage of their income on energy bills. The IIJA is focused on supporting disadvantaged communities receiving funding through the Justice 40 initiative, which requires 40% of the IIJA funding be spent on disadvantaged communities.[11] The State should support the use of federal and state funding to implement projects and develop policies that provide benefits to disadvantaged communities, such as residential energy efficiency, community solar and local energy resilience.

There have also been developments related to renewable natural gas. The Division of Water Resources was directed by the North Carolina General Assembly to develop general permits by July 1, 2022, for existing animal feeding operations that intend to build and operate a digester system.[12] In addition, Piedmont Natural gas introduced "Green Edge", a voluntary program that allows residential and commercial Piedmont Natural Gas customers in North Carolina to purchase "green energy blocks" from Piedmont for $3 per month. These blocks represent a blend

[8] H.R.3684 - 117th Congress (2021-2022): Infrastructure Investment and Jobs Act | Congress.gov | Library of Congress

[9] Bipartisan Infrastructure Law Homepage | Department of Energy

[10] Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress

[11] Justice40 Initiative - The White House

[12] 2022 Digester System General Permits | NC DEQ

of renewable natural gas environmental attributes and carbon offsets which the customers can then claim.[13]

Public Service Company of North Carolina, Inc., also now offers the GreenTherm program allowing customers to purchase carbon offsets for as little as $3 per month.

Perspectives on Current Recommendations

Clean Energy Transition

Since infrastructure is vital to SL 2021-165 and the energy transformation and there are significant federal resources now available for infrastructure, North Carolina's legislative and regulatory bodies should enact legislation, policies, and rules that support;

- transitioning to cleaner and net zero-emitting energy resources,
- developing infrastructure to develop, deploy and use these new resources,
- supporting future energy demand and economic growth,
- providing the highest levels of safety reliability and resilience, and
- ensuring quality, affordable, and equitable customer service.

Some aspects of energy infrastructure to consider as part of these policies include the following:

- Retirement of coal plants,
- Technically challenging replacement resources (hydrogen, offshore wind, and nuclear),
- New production, transmission and distribution systems needed to support new resources,
- Integration of high levels of renewable resources (solar and onshore wind) coupled with energy storage,
- Development and modernization of new and existing transmission and distribution systems to allow integration of new resources and bi-directional flow.

Policies and programs must explicitly incent distribution grid upgrades and address barriers to transmission expansion.

On June 9, 2021, Governor Roy Cooper issued EO 218 *Advancing North Carolina's Economic and Clean Energy Future with Offshore Wind*.[14] EO 218 sets a goal for 2.8 gigawatts (GW) of offshore wind by 2030 and 8.0 GW by 2040 off the coast of North Carolina. It also creates leadership positions in cabinet agencies and a taskforce to ensure responsible and economic development of the state's offshore wind resources.

In addition, North Carolina is examining additional clean energy opportunities under Executive Order 246 Climate and Equity, issued on January 7, 2022.[15] The order sets a goal for the state to have net-zero carbon emissions by 2050. This would require significant electrification of all economic sectors as well as new and innovative technologies and energy storage and

[13] GreenEdge - Piedmont Natural Gas (piedmontng.com)

[14] https://governor.nc.gov/media/2438/open

[15] Executive Order No. 246 | NC Gov. Cooper

management systems. The Governor's Office is currently developing a high-level analysis to outline possible decarbonization pathways that will be available in January 2023.

EO 246 also sets targets for adoption of electric vehicles, a goal of 1,250,000 passenger EV's by 2030 and increase the sale of zero-emissions EVs (ZEV) so that 50 percent of in-state sales of new vehicles are zero-emission by 2030. It also stresses environmental justice issues and support of disadvantaged communities as well as workforce development.

Hydrogen

Under SL 2021-165 and the federal IIJA, hydrogen is identified as an energy resource that could aid in the decarbonization of multiple economic sectors such as electricity generation, heavy industry and transportation. This requires the research and development for all aspects of the system; production, processing, delivery, storage, and end use. The USDOE has set aside $8 billion dollars to develop at least four regional "hydrogen hubs" as well as other research and deployment assistance programs.[16] The hubs are regional networks of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity.

Duke Energy and other key players are working on a proposal for a hydrogen hub located in the southeast, the Southeast Hydrogen Energy Alliance (SHEA). This effort is being facilitated by E4Carolinas. Duke Energy is also testing a 400 MW combustion turbine that can fire both natural gas and hydrogen at its Lincoln facility outside Charlotte.[17]

Given the interest in hydrogen at the federal regional and state level, it is prudent for the North Carolina legislature to commission and fund a study that will support the incorporation, distribution, storage, and use of hydrogen as an energy resource and further decarbonize our economy.

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

North Carolina possesses significant bioenergy (biomass,[18] biofuels,[19] and biogas[20]) production potential, arguably the largest of which is its biogas production capacity. Bioenergy is derived from a variety of sources, including energy crops grown for the purpose of deriving energy, but most commonly from organic materials that are under-valued or under-utilized, such as animal manures, poultry litter, food waste, forestry harvesting residues, crop residues, and biosolids created at municipal wastewater treatment facilities. Bioenergy 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. While these resources can be used to

[16] U.S. Department of Energy Hydrogen Program: DOE Hydrogen Program

[17] Lincoln CT Turbine Station Expansion (duke-energy.com)

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

[19] 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.

[20] 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.

directly fuel combustion processes, they are more often used as feedstocks for anaerobic digestion to make biogas.

Under typical conditions and management practices, these organic materials, often referred to as "wastes", naturally decompose, releasing carbonaceous emissions such as biogas into the atmosphere. Emissions from the natural decomposition of organics represents a substantial source of North Carolina's total carbon emissions. Biogas is produced during the natural breakdown of organic waste in oxygen-starved environments. Bioenergy projects include specifically engineered processes and equipment to contain the decomposition of organic materials and capture the resulting biogas, which reduces the would-be emissions from the natural breakdown of these materials and produces bioenergy in the form of biogas.

Biogas is typically comprised of approximately 60% methane and 40% carbon dioxide with few trace inert gases. Untreated biogas can be used to produce thermal energy (heat) in a boiler, as fuel for small engines that produce electricity, or it can be refined into renewable natural gas (RNG)[21] and used as a drop-in substitute for fossil-derived natural gas. Larger thermal energy needs, such as for manufacturing, cannot be met with intermittent renewable resources that produce electricity, such as solar and wind, and biogas derived from in-state resources can provide this needed energy resources for industrial and commercial utility customers.

The development of bioenergy systems that capture biogas can be a very important component of North Carolina's strategy for reducing carbon emissions from the energy and transportation sectors. The use of biogas energy typically reduces greenhouse gas (GHG) emissions in two ways. First, the capture of biogas that results from the natural decomposition of organic wastes avoids the release of GHGs that naturally occur. Second, the use of biogas as a substitute for natural gas avoids emissions associated with conventional natural gas use. Additional environmental benefits may be realized from the use of anaerobic digestion for manure management as such processes may improve water quality near some of these resources when included in a comprehensive manure management plan.

The development and use of bioenergy in North Carolina also represents a real and consequential opportunity for increased economic prosperity for rural areas. A large portion of the bioenergy potential within North Carolina is located in rural and historically economically disadvantaged counties, and the build-out of bioenergy systems in these areas will lead to significant infrastructure investments, construction related jobs, and permanent employment opportunities.

The use of biogas will also reduce reliance on conventional fossil-derived fuels, which are almost completely imported from out of state suppliers. Presently, only bioenergy resources (biogas, biomass, and biofuels) produce consumable fuels serving customers in North Carolina. Conventionally, liquid and gaseous fuels, such as liquid petroleum fuels and natural gas, are the products of other states, purchased and imported into North Carolina, representing a large export of wealth from our state's economy to others. The reliance on imported fuels also represents a significant risk to North Carolina's critical facility and emergency services operations should the transmission and transportation of imported fuels be disrupted. Although such supply

[21] Dominion Energy rates-and-tariffs and Piedmont Natural Gas Company, Inc. NCUC Tariff

interruptions have occurred infrequently in North Carolina, the availability of in-state bioenergy resources means that critical operations can be supported without reliance on sources and infrastructure beyond the state's borders.

North Carolina has the capacity to produce 105 billion cubic feet per year (63 trillion Btu/year)[22] of biogas, which is approximately 11% of North Carolina's current demand[23] for natural gas. The economic and environmental benefits of biogas development should be properly represented in the state's energy and carbon emission reduction plans. The development of in-state biogas resources can provide a valuable hedge against fuel supply disruptions associated with the interruption of imported fuel transmission and create significant economic opportunities in areas where needed most within the state. Given the opportunities and benefits from increased incorporation of bioenergy, and particularly biogas, stakeholders and policy makers should actively pursue policies that support its development, deploy it in a cost-effective manner, and ensure its development is responsible and equitable in these rural communities.[24]

Given the above discussion on RNG, the Energy Infrastructure Committee recommends two actions for North Carolina's legislative and regulatory bodies regarding biofuels and RNG, which include:

1) Review and revise existing policies and regulations necessary to support increased production and use of RNG into the state's energy fuel portfolio, and
2) Enact legislation and adopt policies in 2023 that promote the usage of renewable natural by customers of the natural gas local distribution companies.

Transportation

Energy Infrastructure committee members supported the deployment of electric vehicle charging infrastructure its 2020 recommendations. The Department of Transportation is preparing a Clean Transportation Plan under EO 246 that will be completed by April 2023.[25] The Committee continues its support for a clean transportation fleet by first recommending a policy to require North Carolina's state transportation fleet to transition to use net-zero carbon emissions fuel resources by 2050. Second, the Committee recommends a study to investigate the infrastructure upgrades need to deploy large-scale adoption of electric vehicles and charging both at home and EV along designated EV corridors. The study would identify needs, quantify the level of investment required, analyze cost effective deployment of new infrastructure, and produce a life cycle cost-benefit analysis. The Committee also broadens its support beyond EVs to other

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

[23] North Carolina State Energy Profile, U.S. Energy Information Administration

[24] 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.

[25] NCDOT: N.C. Clean Transportation Plan

renewable fuels produced within North Carolina that could enhance the resilience of this sector during emergency operations and inclement weather. Potential fuels include hydrogen, renewable natural gas, and fuel cell technologies that result in lower vehicle emissions.

Broad Issues

In addition to resource specific recommendations, the Committee focused on more broad policies and programs that would support new resources and rapid innovation within the energy sector.

First is the recommendation to develop a game-changing grant and/or loan program. The grants and loans could assist rural communities, private and public sector organizations, and small municipalities with deploying these new resources. Specifically, any gap and bridge funding should be identified and targeted by the grant/loan program.

Second, the Committee recommends examining laws, rules, and policies that may pose obstacles for energy infrastructure. The existing regulatory structure is centered around traditional fossil fuel-based resources and its supportive infrastructure. There are significant opportunities on the table and new laws and policies as well as funding sources around energy transition and decarbonization of all economic sectors. North Carolina regulators should identify policy and regulatory changes that should be enacted to support the energy transition on an ongoing basis.

3.2 Energy Assurance Committee

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

Developments Since 2020 Report

Electric Power Infrastructure

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 Dule Energy Carolinas (DEC) and Duke Energy Progress (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." [26] Since the inception of the NCTPC, more than $1.13 Billion in projects have been placed in service through the end of 2021.

In its 2021 Update to the Plan issued in August 2022, the Collaborative identified 16 major projects requiring more than $694 million in investments to advance the state's electric

[26] 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

transmission infrastructure.[27] The projects identified in the plan preserve system reliability and resiliency, support the growth of sustainable energy options, and improve electricity transfers across the transmission network. These projects will be completed over the coming decade.

Duke Energy began developing a Climate Change Resiliency Plan in 2021.[28] This plan addresses current and future climate-related events that could impact the electricity transmission and distributions systems, and electricity substations. The report assesses the exposure and vulnerability of Duke Energy's systems, at the asset level, to the physical impacts of climate change under conservative and high greenhouse gas emissions scenarios.

The interim report was released in August 2022 and indicates that Duke Energy is well positioned to handle climate change impacts under a more modest emissions scenario through 2050. However, under the higher emissions scenario, these systems have a high vulnerability to climate change and there could be some severe impacts to these systems. The next phase of this project will focus on flexible adaptation planning and identify opportunities to improve Duke Energy's reliability for both existing systems and future investments under increased climate-related threats.

SERC Reliability Corporation (SERC) is responsible for ensuring a reliable and secure electric grid across 16 southeastern and central states, including North Carolina. The focus of the 2021 SERC Regional Risk Report[29] is to identify reliability risks within the SERC region electricity grid. The report lists the top ten major reliability risks in order of importance for 2021. The Energy Assurance Committee notes these risks (listed below) should be considered when designing energy assurance exercises for the electricity system.

1. Supply chain cybersecurity (third party and cloud-based services)
2. Cybersecurity threats from exploitation of both external and internal vulnerabilities
3. extreme weather
4. Uncertainty due to changes in generating resources
5. Fuel diversity/fuel availability
6. Variable energy resource integration
7. Threats of attack due to legacy architecture (cybersecurity)
8. Extreme physical events (man-made): sabotage & attacks
9. Parallel/loop power flow issues
10. Loss of major application such as Energy Management Systems (EMS) and Supervisory Control and Data Acquisition (SCADA)

Natural Gas Pipeline Infrastructure

Natural gas use in the state is now at 560 trillion Btu.[30] Its use for electricity generation in the state has more than quadrupled during the past decade.[31] The electric power sector accounted for

[27] http://www.nctpc.org/nctpc/document/REF/2022-08-15/2021_Collaborative_Transmission_Plan_MidYear%20Update-FINAL-8-15-2022.pdf
[28] Settlement agreement between Duke Energy and Vote Solar, filed on July 9, 2020, NCUC Docket No. E-2, Sub 1219, Docket Details (ncuc.gov).
[29] 2021 SERC Regional Risk Report (serc1.org)
[30] U.S. Energy Information Administration - EIA - Independent Statistics and Analysis
[31] https://www.eia.gov/state/analysis

nearly three-fifths of the natural gas delivered to end-users in 2020. Commercial and industrial use of natural gas has also increased in the last decade. One out of four North Carolina households use natural gas for home heating.

North Carolina's natural gas infrastructure, according to a 2017 report from the American Society of Civil Engineers (ASCE), "is almost entirely dependent on Transco Gas Pipeline for its natural gas requirements".[32] This single-source delivery system has been cited as a reason for additional natural gas pipelines proposed in North Carolina. There is currently one natural gas pipeline being proposed.

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 Rockingham and Alamance Counties, North Carolina.[33] The Southgate Project is designed to provide up to 375,000 dekatherms per day of firm transportation service.

On June 18, 2020, FERC issued an order to construct and operate the 75.1 miles of natural gas pipeline. On June 28, 2022, the DC Circuit Court of Appeals rejected environmental groups challenge to the FERC approval. However, there were also denials of several key state-level permits, therefore, the Southgate Project did not start construction.

The Inflation Reduction Act, passed in August of 2022, would streamline the permitting process for the Mountain Valley Pipeline.[34] The IRA ensures that federal agencies take all necessary actions to permit the construction and operation of the gas line. The legislation directs future legal challenges to the pipeline to be heard by the United States Court of Appeals for the District of Columbia Circuit. It is unclear at this time how the IRA would impact state-level permitting issues.

Duke Energy conducted a natural gas supply and disruption exercise in July of 2022 for their internal use. The exercise specifically addressed preparation for a potential gas supply shortage, rather than their response to a disruption. The results of this exercise are not likely to be made public.

NC Emergency Management is planning a natural gas supply tabletop exercise for late 2022 or early 2023.

Petroleum Pipeline Infrastructure

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

[32] ASCE, ibid. Retrieved February 5, 2020 from https://www.infrastructurereportcard.org/state-item/north-carolina/

[33] 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

[34] Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress

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.[35]

On May 7, 2021, Colonial Pipeline, suffered a ransomware cyberattack that impacted the computers managing pipeline equipment.[36] The Colonial Pipeline Company halted all pipeline operations to contain the attack. The company paid the ransom to the hacker group (75 bitcoin or $4.4 million) within several hours. Subsequently, an IT tool was provided to Colonial Pipeline by DarkSide, a known criminal hacking group, to restore the system.[37] The U.S. Department of Justice then seized approximately $2.3 billion in Bitcoin from DarkSide, the first such recovery of ransom from a cybercrime.

The restoration tool provided by DarkSide required a very long processing time to get the computer systems restarted. The pipeline began limited operations began on May 12. However, by May 16 only about half of North Carolina's gas stations had fuel[38] and normal service was not restored until approximately May 21.[39]

In response, North Carolina conducted a "tabletop" emergency planning exercise for the petroleum sector, which was a recommendation in the 2020 EPC Report. The exercise was conducted by NC Emergency Management on September 22, 2021, and focused on a cyber security attack on North Carolina's petroleum/motor fuel pipeline supply. The exercise resulted in a number of confidential findings and recommendations to minimize impacts and aid in recovery from a cyber-attack.

North Carolina Energy Security Plan

Under the IIJA, USDOE has determined that states may request up to $200,000 to prepare or update their State Energy Security Plan. This plan must meet specific elements under section 366(c) of the Energy Conservation and Policy Act (EPCA), as amended by section 40108 of the IIJA.[40] The plan must assess the existing circumstances in the State and proposes methods to strengthen the energy security of the State, in consultation with owners and operators of energy infrastructure. Specifically, the plan requires to:

- secure the energy infrastructure of the State against all physical and cybersecurity threats;
- mitigate the risk of energy supply disruptions to the State;

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

[36] Bing, Christopher; Kelly, Stephanie (May 8, 2021). "Cyber attack shuts down top U.S. fuel pipeline network". Reuters. Archived from the original on May 8, 2021. Retrieved May 8, 2021

[37] Turton, William; Riley, Michael; Jacobs, Jennifer (May 12, 2021). "Colonial Pipeline Paid Hackers nearly $5 Million in Ransom". *Bloomberg*.

[38] Krauss, Clifford. "Colonial Pipeline Begins to Restart Flow of Fuel". *The New York Times*. Archived from the original on May 12, 2021. Retrieved May 12, 2021.

[39] NC gas station sues Colonial Pipeline over ransomware shutdown | Charlotte Observer

[40] State Energy Security Plan Administrative and Legal Requirements Document

- enhance the response to, and recovery from, energy disruptions; and
- ensure that the State has reliable, secure, and resilient energy infrastructure.

The North Carolina State Energy Office has been awarded these funds and will work with stakeholders to develop a comprehensive plan that meets the USDOE criteria as well as the specific needs to North Carolina's energy systems.

3.3 Energy Efficiency Committee

Energy efficiency is a low-cost scalable 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 but not limited to: lower energy bills, increased grid reliability, and the deferral of new generation, transmission and distribution infrastructure investments.

Developments Since 2020 Report

North Carolina has realized increasing annual incremental EE savings, exceeding 956,702 MWh in 2020.[41] 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.

Recommendations in the 2020 EPC Biennial Report were strongly drawn from two plans. The NC Clean Energy Plan[42] and the Duke Nicholas Institute's Energy Efficiency Roadmap[43] provided guidance on EE measures that the EE Committee should consider pursuing levelized demand, reduced pollution, and achievement of energy savings in our state's economy and residents' daily lives.

As discussed previously, the Inflation Reduction Act became law on August 16, 2022.[44]

The law provides direct consumer incentives to buy energy efficient and electric appliances, clean vehicles, rooftop-solar systems, and invests in home energy efficiency. These investments include;[45]

- $9 billion in rebate programs for energy efficient home appliances and retrofits,

[41] North Carolina State Electricity Data, Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report" for the years 2013–2020. Retrieved from https://www.eia.gov/electricity/data/eia861/

[42] https://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council/climate-change-clean-energy-plans-and-progress/clean-energy-plan

[43] https://nicholasinstitute.duke.edu/publications/north-carolina-energy-efficiency-roadmap

[44] Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress

[45] https://www.forbes.com/sites/rrapier/2022/08/14/energy-provisions-in-the-inflation-reduction-act/?sh=90c69bf34229

- consumer tax credits for energy efficient HVAC, heat pumps, and water heaters and rooftop solar,
- $1 billion grant program to make affordable housing more energy efficient,
- $4,000 consumer tax credit for lower/middle income individuals to buy *used* clean vehicles,
- up to $7,500 in tax credits to buy *new* clean vehicles, and
- tax credits and grants for clean fuels and clean commercial vehicles.

Perspectives on Current Recommendations

Since the release of the 2020 EPC Biennial Report, there have been major policy developments and implementation on some of the EE Committee recommendations. These developments are detailed below.

Recommendation EE #32, which recommended increasing energy efficiency education and career awareness in K-12 and Community Colleges and creating an EE apprenticeship program, was implemented. In partnership with North Carolina A&T State University, NC Community College Systems, Apprenticeship NC, and NC Business Committee for Education, NC Department of Environmental Quality facilitated and launched a workforce development program to offer education and job training opportunities in various clean energy and energy efficiency focused trades. A successful 2021 summer pre-apprenticeship/internship program was held and 30 students were trained in energy efficiency, heating, ventilation, and air conditioning, and solar through both classroom orientation and on-the-job training with 10 local industry partners in Halifax, Guilford and Wake counties. During the summer of 2022, the number of participants increased to 60 students in eight counties including Guilford, Forsyth, Halifax, Northampton, Nash, Wake, Gaston and Mecklenburg. The 2022 summer pre-apprenticeship/internship program offered students skills in energy efficiency equipment and management such as space heating and cooling, building automation, building energy management, energy engineering/design, renewable energy, solar panel installation, architectural design, and energy saving data analytics. The number of industry partners increased to 25.

In August of 2022, the US Department of Commerce's Economic Development Administration (EDA) awarded a $23.7 million American Rescue Plan Good Jobs Challenge grant to North Carolina Agricultural and Technical State University, Greensboro, North Carolina, to create STEPs4GROWTH, a clean energy workforce training program.[46] A key component is to ensure an equitable training program by removing barriers to access and meet workers where they are. Therefore, the program will utilize mobile training units in 16 distressed North Carolina counties to develop quality clean energy training for community members.

Recommendation EE #33, which recommended the establishment of an online data repository for energy efficiency metrics including energy use, energy savings and types of energy efficiency measures implemented, was established. The Nicholas Institute at Duke University compiled the

[46] U.S. Department of Commerce Invests $23.7 Million to Develop Clean Energy Workforce Training Program in North Carolina Through American Rescue Plan Good Jobs Challenge | U.S. Economic Development Administration (eda.gov)

stakeholder driven North Carolina Energy Efficiency Roadmap which had several recommendations to collect energy data from users across the state. The Nicholas Institute created an online energy efficiency dashboard that allows users to view aggregated data about energy use and energy intensity in the state.[47]

Recommendation EE #34, which supported the analysis of carbon-reduction and clean energy policies that best achieve statewide GHG emission reductions, electricity affordability and grid reliability, was accomplished. In October of 2021, the Legislature passed Session Law 2021-165, also referred to as House Bill 951.[48] This law specifies investor-owned utilities with greater than 150,000 customers reduce CO_2 emissions by 70% in 2030 and be net-zero in 2050. It also expands competitive procurement of renewable energy. allows small energy providers to renegotiate purchase power agreements and allows Duke Energy to file for performance-based rates and coal securitization.

In response to SL 2021-165, Duke Energy submitted its draft Carbon Plan, which recognizes EE in Appendix F Electric Load Forecast as a cost-effective resource to meet this goal. Duke Energy projects over 6,000 GWh of utility EE in its load planning for 2030 under the Carbon Plan.

In addition, the federal government passed the Infrastructure Investment and Jobs Act (IIJA) in November of 2021, which includes an additional $62 billion for the US Department of Energy to implement infrastructure projects and workforce development. A substantial portion of this funding is to support transmission and grid modernization, as presented to the EI Committee in February of 2022. The IIJA will create funding opportunities, both formula and competitive for states to support EE in low-income homes and rural communities as well as schools.

The current EE recommendations are expanded in areas including:

- A diverse set of EE measures and policies that focus on areas such as education, data, technological innovation, building codes, etc.
- 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

[47] https://nicholasinstitute.duke.edu/project/north-carolina-energy-efficiency-roadmap/north-carolina-energy-efficiency-dashboard

[48] https://www.ncleg.gov/BillLookup/2021/H951

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 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.

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 enacted in 2007.[49] 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).[50]

Section 4.1 of this report presents historical data on avoided energy use and air emissions due to EE measures. In 2021, North Carolina issued 6,507,561 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. Section 4.1 also shows that in 2020, EE measures avoided the emissions of the following pollutants;

- 1,627 tons of nitrogen oxides (NO_X) emissions avoided,
- 1,136 tons of sulfur dioxide (SO_2) emissions avoided, and
- 2.6 million tons of CO_2 emissions avoided.

This is approximately 6% of the total CO_2 released by the electric power sector in 2020, 41.8 million tons. This analysis shows that EE measures resulting from utility energy efficiency being tracked under the REPS are significantly decreasing air pollution emitted in North Carolina and neighboring states.

[49] 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, 2021, Retrieved from https://www.ncuc.net/reports/repsreport2021.pdf

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

4. North Carolina's Energy Profile

4.1 State Energy Statistics

Demographics[51, 52, 53]		
Population	2020	10.44 million
Share of U.S.	2020	3.2%
State Ranking	2019	9th most populous
Rural Population	2019	43% of state's residents
Economics[54,55]		
Gross Domestic Product	2021	$684.6 billion (11th largest)
Per Capita Personal Income	2020	$31,993
Energy Consumption[56,57]		
Total Energy Consumed	2019	2,653 trillion Btu (2.6% of U.S. total)
National Ranking		12th highest
Amount Energy Imported		74%
Total Consumption per Capita		253 million Btu

[51] North Carolina Budget and Management, Facts and Figures, 2020 Census. Retrieved from https://www.osbm.nc.gov/facts-figures

[52] U.S. Census Bureau, 2020 Census, Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020

[53] Is North Carolina Rural or Urban? | NC OSBM, North Carolina OSBM Standard Population Estimates, Vintage 2019

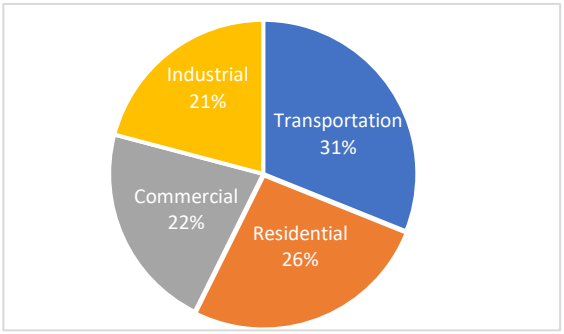
[54] Gross Domestic Product by State, 4th Quarter 2021, Table 3. Current-Dollar Gross Domestic Product, by State and Region, 2020:Q1–2021:Q4, U.S. Bureau of Economic Affairs (BEA)

[55] U.S. Census Bureau QuickFacts: North Carolina

[56] U.S. States Profiles and Energy Estimates, U.S. Energy Information Administration, 2017. Retrieved from https://www.eia.gov/state/seds/data.php

[57] EIA State Energy Data, State Profiles and Energy Estimates, Table C1. Energy Consumption Overview: Estimates by Energy Source and End-Use Sector, 2019 (Trillion Btu), https://www.eia.gov/state/seds/data.php.

NC Energy Consumption by End Use Sector, 2019

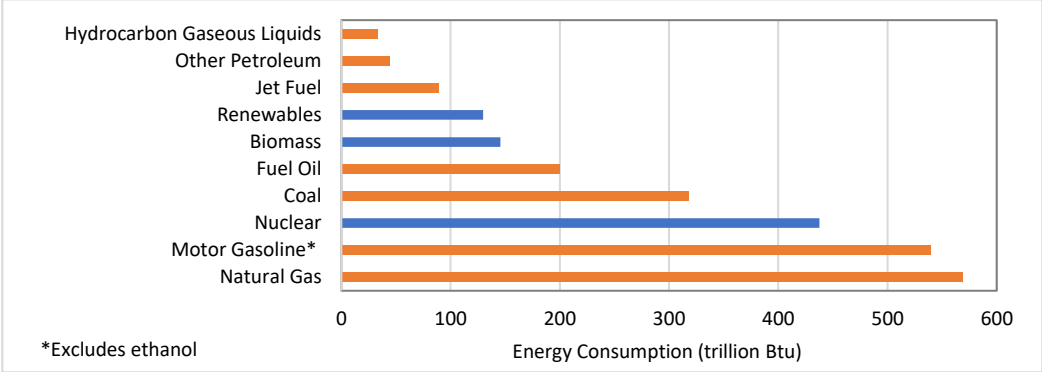


Energy Consumption by Sector, 2019[58]

Sector	Consumption (trillion Btu)
Transportation*	825
Residential	696
Commercial	578
Industrial	554
Total	2.653

*6th highest vehicle miles traveled in U.S.

North Carolina Energy Consumption by Fuel Type, 2019



North Carolina Transportation Fuel Consumption by Resource Type, trillion Btu

Motor Gasoline	Distillate Fuel Oil (diesel)	Jet Fuel	Natural Gas	Lubricants	Aviation Gas	Electricity	Hydrocarbon Gaseous Liquids	Residual Fuel Oil
497.5	164.5	65.1	5.0	3.4	0.5	0.1	0.1	<0.05

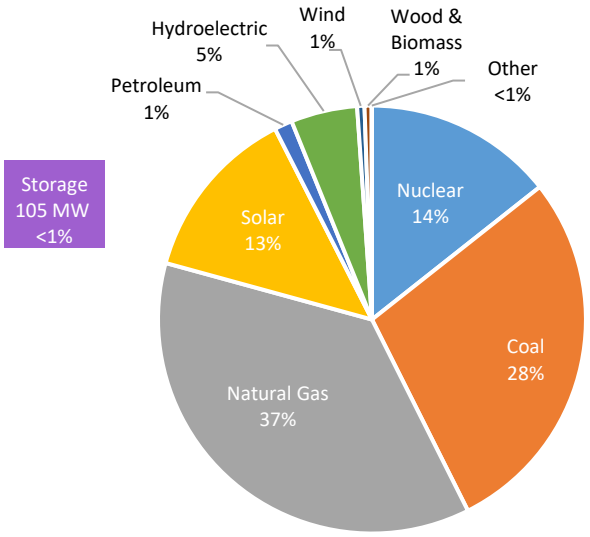
[58] EIA Table C1. Energy Consumption Overview: Estimates by Energy Source and End-Use Sector, 2019

PRICES[59]

North Carolina Energy Prices for March 2022

Natural Gas	Units	North Carolina	U.S. Average
City Gate	$/thousand cu feet	$5.25	$5.59
Residential	$/thousand cu feet	$19.13	$12.98
Electricity		**North Carolina**	**U.S. Average**
Residential	cents/kWh	12.24¢	14.47¢
Commercial	cents/kWh	9.26¢	11.77¢
Industrial	cents/kWh	6.91¢	7.50¢

ELECTRICITY PROFILE[60, 61]



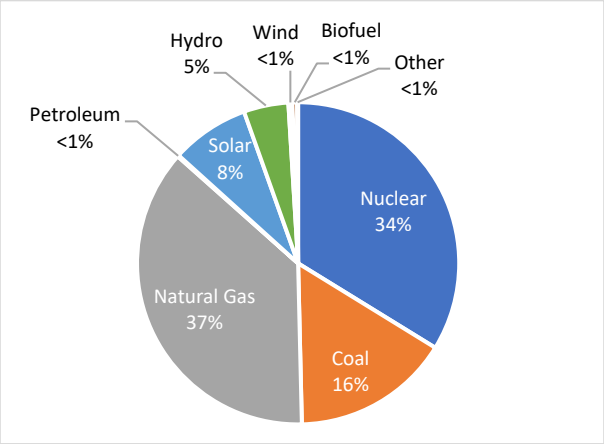
Nameplate Capacity by Resource Type, 2020

Primary Resource Type	Number of Plants	2020 Nameplate Capacity (MW)
Nuclear	3	5,395
Coal	6	10,611
Natural Gas	16	13,775
Petroleum	35	5,395
Hydroelectric	38	1,885
Solar	636	4,981
Wind	1	208
Wood	4	287
Other Biomass	18	82
Other	2	10
Grand Total		**37,573**
Pumped Storage	1	95
Battery Storage	2	10

	Planned Capacity (MW)			
	2022	2023	2024	2025
Natural Gas	0	0	1,080	0
Solar	744	100	110	5
MW Battery		7.1	0	0

[59] U.S. EIA, North Carolina State Profile and Energy Estimates, Profile Data. https://www.eia.gov/state/data.php?sid=NC
[60] Existing Nameplate and Net Summer Capacity by Energy Source, Producer Type and State, 1990-2020, Detailed State Data
[61] Form EIA-860 detailed data with previous form data (EIA-860A/860B)

Electricity Generation by Source, 2021[62]



2021 Electricity Generation	
Resource Type	**MWh**
Nuclear	43,117,707
Coal	20,228,285
Natural Gas	47,143,178
Petroleum	172,904
Solar	10,021,804
Hydro	5,722,452
Wind	514,703
Biofuel	593,046
Other	128,621
Total	**127,642,700**

2021 Generation by Resource and Ownership in MWh

Total Generation	**127,855,040**	**Percent of Total**
Duke Energy	104,092,924	81%
Non-Duke Energy	23,762,116	19%
Total Fossil Generation	**67,552,409**	
Duke Energy	58,817,563	87%
Non-Duke Energy	8,734,846	13%
Total RE Generation	**16,400,762**	
Duke Energy	2,157,654	13%
Non-Duke Energy	14,243,108	87%
Total Biofuel Generation	**732,742**	
Duke Energy	0	0%
Non-Duke Energy	732,742	100%

Change in RE Electricity Generation from 2007 to 2021 in thousand MWh

Net Generation from Renewable Sources (thousand MWh)									
Source	**2007**	**2009**	**2011**	**2013**	**2015**	**2017**	**2019**	**2020**	**2021***
Hydroelectric	3,121	5,214	3,893	6,901	4,742	3,818	6,172	7,942	5,722
Solar PV	0	5	17	345	1,374	5,114	7,342	8,173	10,022
Wind	0	0	0	0	0	471	523	546	515
Biomass	1,585	1,757	1,953	2,200	2,045	2,117	699	582	348
Biogas	87	131	375	410	544	695	477	465	385
Total	**4,793**	**7,108**	**6,239**	**9,855**	**8,705**	**12,215**	**15,213**	**17,709**	**16,992**

* Preliminary data for 2021

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

ELECRICITY EMISSIONS PROFILE[63, 64]

Electricity Generation CO_2 Emissions

	2005	2021	2005	2021		2005	2021
Fuel Type*	**Net Generation (MWh)**	**Net Generation (MWh)**	**CO_2 Emissions (MMT)**	**CO_2 Emissions (MMT)**	**Percent Change in CO_2**	**CO_2 Intensity Factor kg/MWh**	**CO_2 Intensity Factor kg/MWh**
Coal	77,994,318	20,228,285	71.43	19.69	-72%		
Natural Gas	3,142,892	47,143,178	1.45	19.77	1260%		
Diesel Fuel	246,883	172,904	0.24	0.15	-37%		
Total Fossil Fuel	**81,384,094**	67,544,367	**73.12**	39.61	-46%	**898.5**	**586.4**
Total Non-Emitting	44,655,954	59,376,666	0	0		0	0
Total Biofuel	459,903	593,046	NA	NA		NA	NA
Total - All Resources	**126,499,951**	127,514,079	**73.12**	39.61		**578.0**	**310.6**

* Does not include "other", non-fossil fuel CO_2-emitting resources

2021 Duke Energy Dual Fuel Steam Plants - Fuel Consumption (MMBtu)

Plant	Coal	Diesel	Natural Gas	Total Energy	Percent Coal	Percent Natural Gas
Dual Fuel Plants						
Cliffside	20,174,220	87,980	26,229,187	46,491,387	43%	56%
Belews Creek	56,474,860	0	32,091,883	88,566,743	64%	36%
Marshall	53,571,305	54,706	15,680,659	69,306,670	77%	23%
Coal Only Plants						
G G Allen	2,392,989	35,955		2,428,944		
Mayo	16,505,265	142,955		16,648,220		
Roxboro	61,784,183	248,428		62,032,611		
Total Energy	**210,902,822**	**570,024**	**74,001,729**	**285,474,575**	**74%**	**26%**

2021 CO_2 Emissions Reductions from Use of Natural Gas in Coal Plants (MMT)

Plant Fuel	Coal	Diesel	Natural Gas	Total Emissions	Percent Reduction in CO_2
Only Coal Scenario	26.57	0.04		26.62	
Actual Emissions	19.67	0.04	3.93	23.64	**11%**

[63] Source: EIA Form 923, USEPA CO_2 Emission Factor

2020 Electricity Sector Air Emissions and Emission Intensity[65]

Air Emissions

Pollutant	Units	Emissions	State Ranking
SO_2	short tons	33,254	14
NO_X	short tons	41,914	10
CO_2	thousand metric tons	38,462	15

Emissions Intensity

Pollutant	Units	Emissions Intensity
SO_2	lb/MWh	0.5
NO_X	lb/MWh	0.7
CO_2	lb/MWh	680

2020 Avoided Emissions from Energy Efficiency & Non-Emitting Renewables[66]

NC REPS Program	2020 RE Certificates (REC) (MWh)	CO_2 Not Emitted (tons)	NOx Not Emitted (tons)	SO_2 Not Emitted (tons)
Non-Emitting RE*	7,587,973	2,446,537	1,396	937
EE Measures	6,507,472	2,098,159	1,197	804
Total**	14,095,445	4,544,696	2,594	1,741

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

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

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

[66] NC-RETS and USEPA eGRID Emission Factors for SRVC region

4.2 State Regulatory Profile

Legislative Actions

During the 2021-2022 legislative session, Session law 2021-165 was passed, which set out carbon reduction targets for Duke Energy Progress and Duke Energy Carolinas as well as supporting measures such as coal securitization, performance based ratemaking and new solar energy initiatives. Duke Energy submitted a draft Carbon Plan which requires approval by the NCUC in December of 2022.

In addition, number of bills were introduced related to NC state energy policy and one administrative ruling was made. Below is list of key legislative changes made and proposed.

Table 4-1. Select Legislative Actions (2021–2022)

Status	Regulatory Action	Date	Topic (s)
Law: SL 2021-165	HB 951	10/13/2021	**Electric Utility Carbon Reductions -** Duke Energy is required to reduce CO2 emissions by 70% in 2030 and to be net-zero in 2050. Expands competitive procurement of renewable energy. Allows small energy providers to renegotiate purchase power agreements. Allows Duke Energy to file for performance-based rates and coal securitization.
NC Supreme Court Ruling	NC Court Opinion	6/17/2022	**Rooftop Solar** – NC Supreme Court opinion affirming state law that protects homeowners' right to install rooftop solar. Homeowners' Association's architectural review committee cannot limit the location of solar panels to the back of the home.
Ratified Legislation, Vetoed by Governor	HB 220	12/9/21	**Choice of Energy/Modify Pub. Rec**. - Proposed bill to limit cities and counties from prohibiting consumer choice of energy service based upon the type or source of energy to be delivered.
Proposed Legislation	SB 709	2021-2022 session	**Increase Energy Production In North Carolina -** Development of Governors' Regional Interstate Offshore Energy, three state compact to promote all forms of offshore energy production and to promote onshore shale gas to support jobs growth.
Proposed Legislation	HB 296	2021-2022 session	**EV Charging Station/Parking** – Establishes $100 penalty for non-electric vehicle parked in an electric vehicle charging parking space.
Proposed Legislation	HB 577	2021-2022 session	**Utilities Customers' Right of Refusal Act** – Prohibits utility from installing a "smart meter" without the customers' consent.
Proposed Legislation	HB 611	2021–2022 session	**Study Electric Utilities' Resiliency**– Directs NCUC to conduct a study to evaluate reform of the regulatory wholesale

Status	Regulatory Action	Date	Topic (s)
			electricity market in North Carolina
Proposed Legislation	HB 633	2021-2022 session	**Reenact Solar Energy Tax Credit** - Qualifying solar energy equipment is allowed a credit equal to 35%) of the cost of the equipment
Proposed Legislation	SB 509	2021-2022 session	**An Energy Resilient NC**- An act to direct the state energy office to carry out a grant program to improve the energy resilience, energy democracy, and energy security of communities.
Proposed Legislation	SB 674	2021-2022 session	**Carbon Tax** - Every distributor shall pay a tax on any carbon-based fuel product sold, used, or entered into the State by the distributor in the amount $20.00 per metric ton of CO2 equivalent emissions from combustion.
Proposed Legislation	SB 826	2021-2022 session	**Homeowner Solar Expansion Act –** Makes deed restriction or covenant that prohibits solar energy at a residence is void and unenforceable
Proposed Legislation	HB 1156	2021-2022 session	**Critical Technologies Research Fund** - Fund to support research into critical technologies that may enhance economic competitiveness and promote the national security and energy independence from foreign energy sources
Proposed Legislation	HB 641	2021-2022 session	**State Parks/Fund EV Charging Stations** – Act to ensure EV charging stations are available at State Parks.
Proposed Legislation	SB 358	2021-2022 session	**C-PACE** – Act to enable Commercial Property Assessed Capital Expenditure (C-PACE) to establish commercial property assessed program that local governments may join to allow businesses and multifamily residential properties to obtain low-cost, long-term financing for energy efficiency, water conservation, renewable energy, and resilience projects
Proposed Legislation	SB 606	2021-2022 session	**Public Schools PPA** Eligibility - Any local board of education that installs a solar energy system in a school facility that qualifies as a small power producer shall be eligible for purchased power rates and terms, including a contract duration of 10 years.
Proposed Legislation	HB 942	2021-2022 session	**Green Schools Save Money –** Appropriate funds for public school energy efficiency, solar energy and EV buses.
FERC Order	Order er22-2226-000	8/26/2022	**Distributed Energy Resource Interconnection** - FERC issued an order accepting ISO-New England tariff revisions to streamline interconnection process for distributed energy resources.

Regulatory Actions

In response to Session law 2021-165, the NCUC 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)

Docket Description	Docket No.	Website
Duke Energy Carbon Plan	E-100 Sub 179	
NCUC Public Hearings on Carbon Plan		NCUC: Carbon Plan
Securitization of Early Retirement of Subcritical Coal-Fired Facilities	E-100, Sub 177	
Performance-Based Regulation of Electric Utilities	E-100, Sub 178	
Filing of Carbon Plan and Establishing Procedural Deadlines	E-100, Sub 179	
Modify Existing Power Purchase Agreements with Eligible Small Power Producers	E-100 Sub 181	
Joint Hearing with Public Service Commission of South Carolina to Develop Carbon Plan (*Petition withdrawn February 2, 2022*)	E-2 Sub 1283, E-7 Sub 1259	
DEP Performance Based Rate Application	E-2 Sub 1300	
Application of DEC and DEP for General Rate Case	E-7, Sub 1214, E-2 Sub 1219	
Application of Dominion for General Rate Case	E-22 Sub 562	
EE & DSM Cost Recovery Rider	E-7, SUB 1249, E-2 Sub 1273	
Comprehensive Rate Review Collaborative	E-7 Sub 1214, E-2 Sub 1219	
Dynamic Rate Design Pilots	E-2 Sub 1280, E-7 Sub 1253	
Decommissioning Costs for Nuclear Power Plants	E-100 Sub 56	
DEC and DEP 2020 Integrated Resource Plans	E-100 Sub 165	
DEC & DEP REPS Compliance Report	E-2 Sub 1276, E-7 Sub 1264	
Dominion Energy 2020 IRP & REPS Compliance Report	E-100 Sub 137	
CPRE Compliance Report	E-7 Sub 1262, E-2 Sub 1275	
Avoided Cost Rates for Electric Utility Purchases from Qualifying Facilities - 2021	E-100 Sub 175	
Biennial Determination of Avoided Cost Rates for Qualifying Facilities	E-100 Sub 175	
Net Metering	E-100 Sub 180	

Docket Description	Docket No.	Website
Amend Rules R8-63 and R8-64 to include transmission costs in CPCN	Docket No. E-100, Sub 176	
Southeast Energy Exchange Market (SEEM)	E-7 Sub 1245, E-2 Sub 1268	Southeast Energy Exchange Market- southeastenergymarket.com
Low Income Affordability Collaborative	E-2, Sub 1219/1193 & E7 Sub 1213/1215/Sub 1187	
Carolinas Transmission and Distribution Climate Risk and Resiliency Working Group	E-7 Sub 1214, E-2 Sub 1219	
North Carolina Transmission Planning Collaborative		nctpc.org/nctpc/home.jsp
North Carolina Grid Improvement Plan	E-7 Sub 1214B, E-2 Sub 1219B	
Duke Energy ISOP		Integrated System & Operations Planning (ISOP) (duke-energy.com)
NCUC IIJA Transmission	M-100 SUB 164	
Technical Conference - Transmission Projects included in DEP PBR Application	E-2 Sub 1300	NCUC: E-2 Sub 1300 Hearing
Duke Energy EV Charging Pilots	E-7 Sub 1266, E-2 Sub 1291	
Application for Approval of Proposed Electric Transportation Pilot	E-2 Sub 1197, E-7 Sub 1195	

Appendices

A. List of EPC Committee Meetings

Energy Infrastructure Committee

February 10, 2021
May 12, 2021
August 12, 2021
November 16, 2021
February 9, 2022
March 24, 2022
May 10, 2022
June 20, 2022
August 10, 2022

Energy Efficiency Committee

February 15, 2021
May 17, 2021
November 15, 2021
January 21, 2022
April 7, 2022
April 29, 2022
June 24, 2022
August 15, 2022

Energy Assurance Committee

February 12, 2021
May 4, 2021
July 28, 2021
November 2, 2021
February 1, 2022
March 11, 2022
June 29, 2022

Joint EE and EI Committee Meeting

August 10, 2021

B. Staff to the Council

Department of Environmental Quality

State Energy Office

Sushma Masemore
Elizabeth “Beth” Schrader
Star Hodge
Russell Duncan (retired in May 2022)
Cynthia Moseley (retired in July 2022)
Paula Hemmer
Matthew Davis
Peggy Walker
Maye Hickman
Rachel Wolff

C. Public Comments

This report has undergone a public review process before adoption and before discussion by the full Energy Policy Council. A draft of the 2022 Energy Policy Council's Biennial Report was posted on the North Carolina Department of Environmental Quality's website from September 30, 2022 to October 28, 2022 for public comments. Comments were received from six different individuals or organizations. The table below shows the individual or organization that submitted comments, a summary of their comments, and the actions taken by the Energy Policy Council or changes that were made in the report in response to the comments. Following the table are the full comments from the individuals and organizations.

Commenter	Summary of Comment	Response to Comment

LETTERS