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NORTH CAROLINA'S BUSINESS-DRIVEN ENERGY VISION

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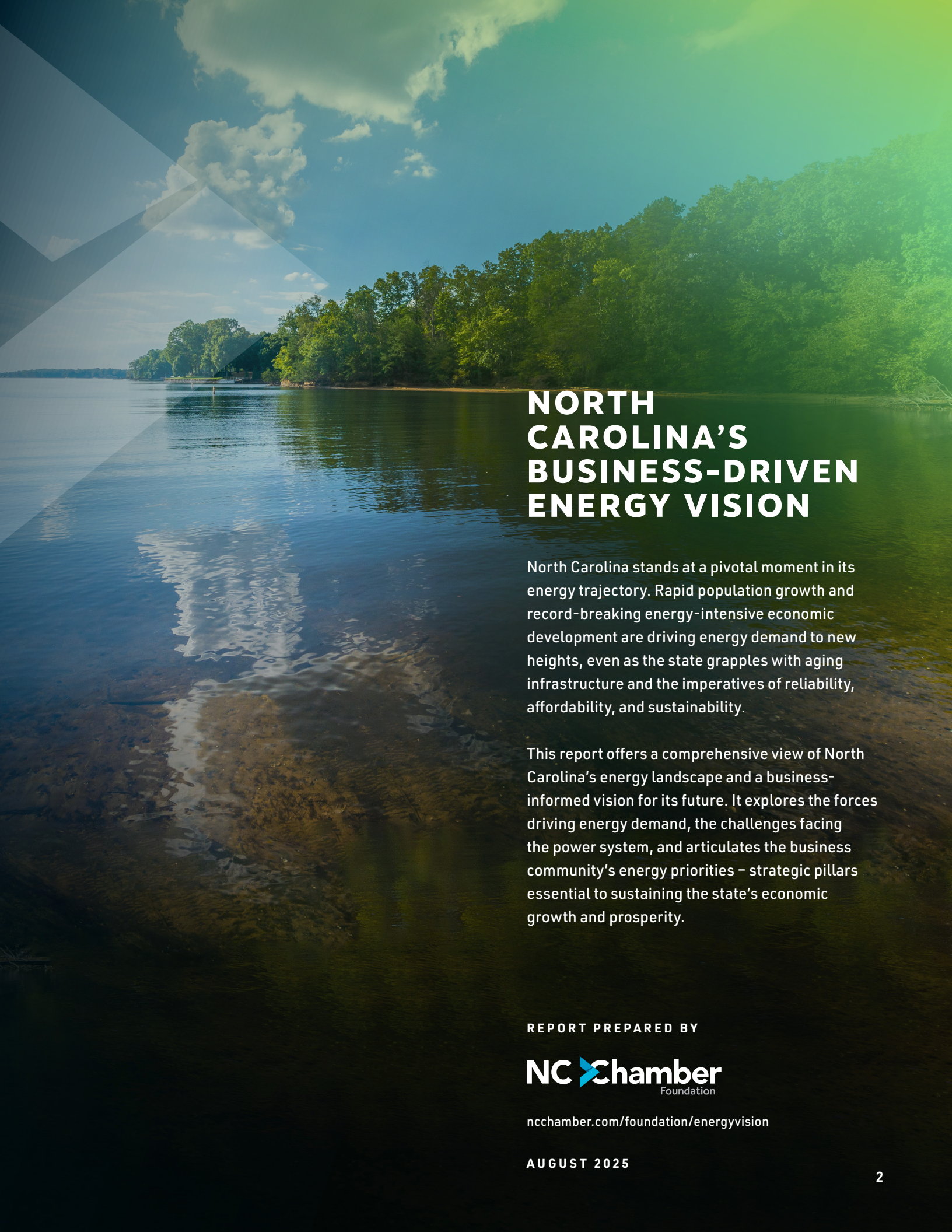

NORTH CAROLINA'S BUSINESS-DRIVEN ENERGY VISION

North Carolina stands at a pivotal moment in its energy trajectory. Rapid population growth and record-breaking energy-intensive economic development are driving energy demand to new heights, even as the state grapples with aging infrastructure and the imperatives of reliability, affordability, and sustainability.

This report offers a comprehensive view of North Carolina's energy landscape and a business-informed vision for its future. It explores the forces driving energy demand, the challenges facing the power system, and articulates the business community's energy priorities – strategic pillars essential to sustaining the state's economic growth and prosperity.

REPORT PREPARED BY

NC Chamber Foundation

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Executive Summary

North Carolina's economy is booming, fueled by growth in advanced manufacturing, life sciences, technology, and other industries. The state now exceeds eleven million residents and is still growing rapidly, driving electricity demand to record levels. Businesses report that reliable power is a key business priority. While North Carolina's electricity rates remain below the national average, meeting future demand will require upgrading the grid.

BUSINESS PRIORITIES & INSIGHTS

This report offers a comprehensive view of North Carolina's energy landscape and a business-informed vision for its future. It explores the forces driving energy demand, the challenges facing the power system, and articulates the business community's energy priorities – strategic pillars essential to sustaining the state's economic growth and prosperity.

KEY INFRASTRUCTURE CHALLENGES

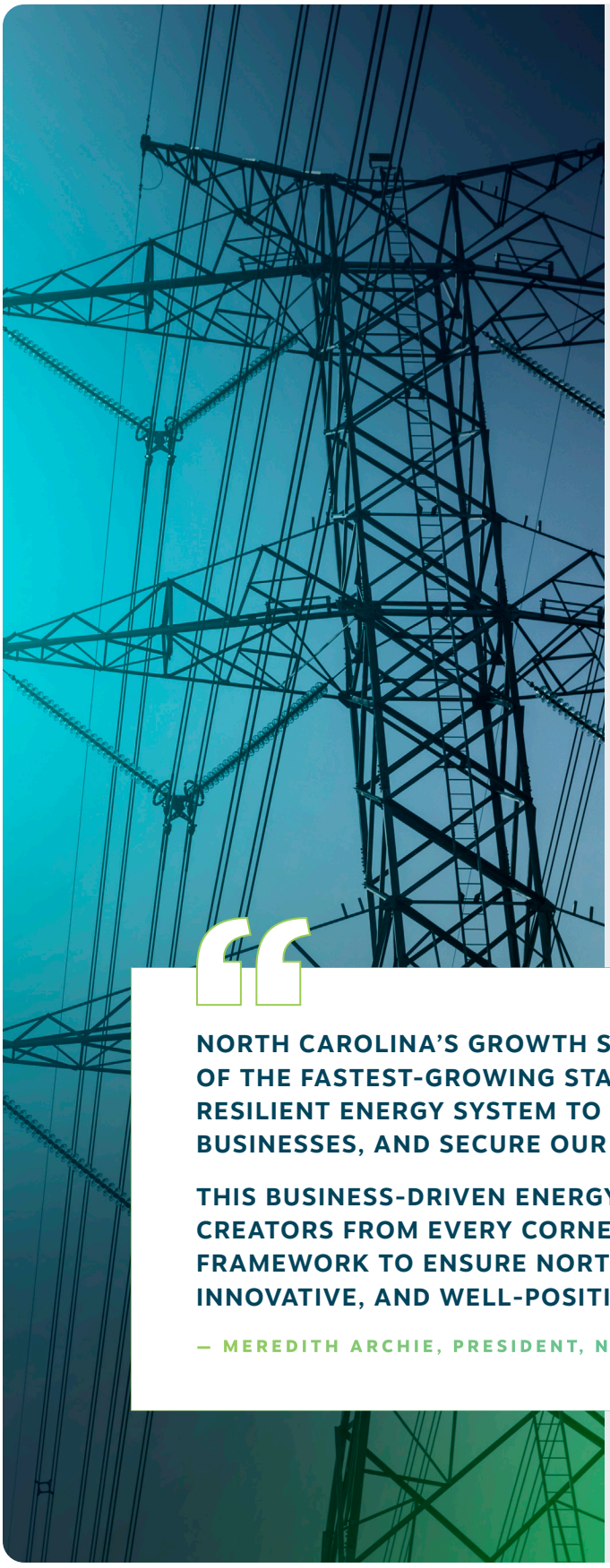
- **Surging Demand.** Rapid population and economic growth means energy consumption is rising. New data centers, automation, electrified vehicles, and industrial electrification are adding new loads. Utilities project peak demand will grow far faster than expected. Shifting demand from industry also creates challenges in predicting demand growth. If generation and transmission expansions don't keep up, bottlenecks or higher costs and inefficiencies could slow growth.
- **Aging Grid Assets.** Much of North Carolina's transmission and distribution equipment is decades old. State and industry analysts warn that this infrastructure is stretched to its limits. Outages risk becoming longer and more frequent, especially in rural areas. Upgrading and digitizing the grid via smart meters, sensors, self-healing networks, and storm hardening is urgent to maintain reliable service.
- **Permitting and Regulatory Delays.** Building new power plants, transmission lines, and renewable projects involves complex, multi-layered approvals. Businesses and utilities note that inconsistent local and state regulations create delays. Coordinating reviews (for air, water, land use) and accelerating permitting, while still protecting communities, is critical to keep projects on schedule and meet future demand.
- **Rural-Urban Disparities.** A growing concern is the gap between well-served urban areas and under-resourced rural regions. Cities typically benefit from recent grid upgrades, whereas many small towns rely on older circuits with longer outages. This imbalance can discourage investment outside metro areas. Ensuring equitable energy investments will allow all regions to share in the state's growth.
- **Security and Resilience.** A more integrated, digital grid introduces new risks. Recent monumental storms and increasing cyber threats highlight vulnerabilities. Protecting critical infrastructure, through cybersecurity defenses, reinforced physical security, and local backups (such as microgrids), is essential so that storms, cyberattacks, or sabotage do not disrupt power.

STRATEGIC PILLARS FOR ACTION

To address these challenges and align with business needs, the NC Chamber Foundation recommends seven strategic pillars for action. Each are interconnected and advancing all seven pillars will be critical to North Carolina's success:

- **Build Strong, Secure, and Resilient Infrastructure Capacit.** Invest urgently in upgrading the grid by replacing aging lines, expanding transmission capacity, and deploying smart technologies. Integrate these upgrades with robust physical and cybersecurity defenses, reinforced substations, and local backup solutions. Coordinated long-term planning will keep power supply aligned with growth, protected against threats, and capable of returning to full service rapidly, ensuring businesses never face a capacity or reliability shortfall.
- **Treat Reliability as Table Stakes.** Reliability is non-negotiable: even momentary outages can halt manufacturing or compromise health services. Ensuring the reliability we enjoy in North Carolina today is there tomorrow will require investments in grid hardening and the strengthening and upgrading of utility infrastructure. These investments should both prevent service interruptions and enhance resilience, the grid's ability to recover rapidly from disruptions, so that restoration is faster and service quality remains hig.
- **Ensure Affordable, Predictable Power.** Keep energy costs competitive through least-cost planning and efficiency. Use multi-year rate plans, demand-response programs, and federal incentives to smooth rates and avoid sudden rate spikes. Transparency in pricing and rate changes will help businesses and families plan, preserving North Carolina's cost advantage.
- **Diversify the Energy Mix (All-of-the-Above).** Maintain a balanced portfolio. Continue leveraging nuclear and natural gas (with future hydrogen capability) for baseload power, while scaling solar, storage, and expanding wind and other technologies. This mix hedges against fuel price swings and allows for more clean energy without compromising reliability.
- **Streamline Regulations and Permitting.** Simplify and coordinate approval processes to accelerate projects. Consolidate permit reviews and standardize interconnection rules for power plants, transmission lines, and renewables. Faster, predictable permitting, with community input preserved, will help critical infrastructure get built on schedule.
- **Bridge the Rural–Urban Energy Gap.** Invest across geographies so all communities benefit. Provide matching grants or partnerships for rural grid upgrades and microgrids, and strengthen local utilities. Expand broadband and workforce training in rural areas. By uplifting rural infrastructure, North Carolina can attract investment beyond urbanized cities and spread prosperity statewide.
- **Leverage Sustainability as a Competitive Advantage.** Treat zero-emission energy as economic opportunity. Accelerate renewables, efficiency developments, and support emerging zero-emission technologies. Businesses note that markets increasingly demand low-carbon products, an approach that not only reduces emissions but also creates new jobs in North Carolina's emerging energy economy.

Each pillar is rooted in business input and analysis. Companies in energy-intensive sectors consistently prioritized reliability and clear cost signals in their planning. In practice, these strategic pillars reinforce one another: improving infrastructure bolsters reliability, an all-of-the-above energy mix stabilizes prices, and streamlined regulations speed up projects.



MOVING FORWARD

This vision emphasizes urgency and collaboration. Many solutions, from grid-modernization programs to new renewable and zero-carbon installations, are already underway, but they must be accelerated. Success will require public agencies, regulators, utilities, and industry working together to coordinate investments (including federal funds), track performance, and update plans as technologies evolve.

North Carolina's business-driven energy vision provides a clear, data-informed roadmap. It demonstrates how energy infrastructure can continue powering the state's economy, keeping power reliable and affordable, bridging regional gaps, and embracing zero-emission energy. By committing to these strategic priorities, North Carolina can secure its competitive advantage and foster resilient, sustainable growth for decades to come.

> **NORTH CAROLINA'S GROWTH STORY IS ALSO AN ENERGY STORY. AS ONE OF THE FASTEST-GROWING STATES IN THE NATION, WE NEED A MODERN, RESILIENT ENERGY SYSTEM TO POWER OUR COMMUNITIES, SUPPORT OUR BUSINESSES, AND SECURE OUR ECONOMIC FUTURE.**
>
> **THIS BUSINESS-DRIVEN ENERGY VISION REFLECTS THE VOICES OF JOB CREATORS FROM EVERY CORNER OF OUR STATE, OFFERING A CLEAR FRAMEWORK TO ENSURE NORTH CAROLINA REMAINS COMPETITIVE, INNOVATIVE, AND WELL-POSITIONED FOR THE DECADES AHEAD."**
>
> — MEREDITH ARCHIE, PRESIDENT, NC CHAMBER FOUNDATION

Introduction: North Carolina's Energy Crossroads

An increased focus on energy is not unique to North Carolina. Across the United States, energy demand is rising at a pace not seen in decades. This trend is driven by a convergence of many factors, including increasing automation within advanced manufacturing, electrification of transportation, regional population growth, data center and AI load expansion, reshoring of production, and environmental and climate variability.

Nationally, meeting this demand will be complicated and expensive. Domestic capital investment to support digital load growth alone will exceed $2 trillion in energy infrastructure according to a 2025 Bain & Company survey of energy-sector executives. Data centers are forecasted to consume 2.6% of global electricity by 2027.[1] Not surprisingly, energy needs and capabilities regularly rank as a primary consideration for economic developers, site selection professionals, and industrial investors. At the state level, North Carolina has long-enjoyed affordable and reliable energy, a key factor in industrial growth and the state's economic prosperity since industrialization.[2] Growth and demand are also surging at the state level and today North Carolina faces the challenge of maintaining its competitive advantage in energy, all while navigating a dynamic and rapidly changing energy landscape.

Economically, North Carolina has emerged as a powerhouse in the Southeast, the nation's fastest-growing region. The state's population now exceeds 11 million (2024) and its real GDP exceeds $661.9 billion.[3] There's no expected slowdown either, as real GDP growth in North Carolina outpaced the national average by nearly a full percentage point between 2023 and 2024, reflecting rapid growth in sectors like manufacturing, life sciences, advanced technology, construction, and warehousing/logistics.[4]

This growth also reflects increases in consumer spending, investment, government spending, and exports, partially offset by an increase in imports. North Carolina's annualized growth rate remains in the nation's top 15. In 2024 alone, more than $15 billion was invested through corporate relocations and expansions, creating over 14,000 jobs.[5] Major announcements also continued into 2025, with $1.1 billion in Q1 investments and nearly 2,700 jobs added.[6]

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1 *Dougans, G. et al. (2025) Energy Executive Agenda 2025: New challenges, new innovations, Bain. https://www.bain.com/insights/energy-agenda-2025-new-challenges-new-innovations.*

2 *Solender, M.J. (2018) The Idea That Transformed the Carolinas, Illumination. https://illumination.duke-energy.com/articles/the-idea-that-transformed-the-carolinas.*

3 *Gross Domestic Product: All Industry Total in North Carolina (2025) Federal Reserve Bank of St. Louis (FRED). https://fred.stlouisfed.org/series/NCNGSP.*

4 *Gross Domestic Product by State and Personal Income by... (2025) Bureau of Economic Analysis. NC: 3.7% U.S.: 2.8% https://www.bea.gov/sites/default/files/2025-03/stgdppi4q24-a2024.pdf.*

5 *Copeland, A.M. (2025) North Carolina Economic Development Report , Brooks Pierce. https://www.brookspierce.com/publication-north-carolina-economic-development-report.*

6 *Economic Development Activity Report: Q1 2025 (2025) EDPNC. https://edpnc.com/economic-development-activity-report/.*

This level of investment and growth is intentional. North Carolina's hard-earned favorable business climate regularly earns national acclaim. It claimed the top spot in CNBC's America's Top States for Business rankings in 2022, 2023, and again in 2025 across criteria such as infrastructure, workforce, education, political and legal stability, quality of life, and innovation.[7]

The state's population growth, driven by nearly 400,000 new residents from other states and abroad between 2020 and 2023, has accelerated demand for housing, schools, and workforce services. Together with natural growth, this significant domestic inbound migration positions North Carolina on track to become the 7th-most populous in the U.S. by the early 2030s.[8]

Sources of Population Change

APRIL 1, 2020 – JULY 1, 2023

Area	Percent Natural Change	Percent Net Migration	Absolute Population Change
United States	27%	73%	396,032
The South	9%	91%	3,856,761
North Carolina	5%	95%	3,449,947

Source: U.S. Census Bureau

Recent headline investments are bringing jobs and strengthening North Carolina's economic prosperity, but they also underscore a pivotal reality: *economic growth is tightly interwoven with energy capacity*. North Carolina's robust business and population expansion has placed unprecedented demands on the state's infrastructure systems, particularly energy resources.[9]

7 *Cohn, S. (2025) America's Top States for Business 2025: The Full Rankings, CNBC. https://www.cnbc.com/2025/07/10/top-states-for-business-americas-2025-the-full-rankings.html.*

8 *Johnson, J. (2024) Shaping North Carolina's Future, Kenan Institute of Private Enterprise. https://kenaninstitute.unc.edu/commentary/shaping-north-carolinas-future-with-jim-johnson/.*

9 *Kearney, L. (2024) Duke Energy Seeks Take-or-Pay Power Contracts for Data Centers, Reuters. https://www.reuters.com/business/energy/duke-energy-seeks-take-or-pay-power-contracts-data-centers-2024-05-07/.*

A Complex Challenge

North Carolina faces a complex challenge in maintaining competitiveness while meeting rising energy demand. Peak electricity consumption is growing, and total electricity use is among the top 10 of all state.[10] Currently, industrial and commercial sector energy usage accounts for 56% of NC's electricity consumed. Aligning North Carolina's energy vision with the needs of business and industry is essential to sustaining the state's positive economic momentum and robust quality of life. As companies expand operations and new industries grow, energy reliability and scalability have become non-negotiable requirements of site selection and industrial operational planning. Simultaneously, residents and local governments expect access to affordable, resilient, and sustainable energy to support growing populations. Other considerations such as resiliency and security are also key factors to ensuring that the energy infrastructure investments we make today will withstand increasingly volatile climate and security dynamics. An energy strategy that fails to consider and address these converging, complex priorities and influences risks undermining the impact of significant investment, exacerbating regional disparities, and weakening North Carolina's competitive edge.

Why is a Business-Driven Energy Vision Necessary?

A business-driven energy vision is necessary because North Carolina's energy future will directly shape the state's business competitiveness, workforce readiness, public health, and economic growth. **By building a forward-looking energy vision grounded in business priorities, the state can ensure that energy infrastructure remains a catalyst for economic development, job growth, and shared prosperity rather than a constraint on progress.**

In 2024, the NC Chamber Foundation began research on North Carolina's energy position and found a key voice missing: the perspective of the business community. The NC Chamber Foundation initiated a statewide energy visioning process in early 2025, bringing together industry leaders, stakeholders, subject-matter experts, and others from manufacturing, agriculture, technology, healthcare, construction, retail, and more. Representatives from the diverse industries operating in North Carolina today spoke about their concern for energy reliability, affordability, and sustainability in the future.

As sectors like advanced manufacturing, biotech, and data infrastructure scale up, energy needs will diversify and intensify, not just in quantity but in quality, consistency, and sustainability. Without a strategic, well-informed plan, the state risks falling behind peer states that are more aggressively aligning their infrastructure with next-generation industry needs.

A business-centered vision ensures that the state's energy roadmap is not only technically sound but also economically feasible. Companies bring essential on-the-ground insights about permitting pain points, interconnection delays, fuel-switching challenges, the cost of downtime, or perspective on what's going on right now in their community. This makes them invaluable partners in shaping relevant

10 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

and workable energy policies. Moreover, the state's legacy of research, development, and innovation, if harnessed for energy, may position North Carolina as a potential hub for energy technology development and deployment. A coordinated strategy that harnesses these innovation capabilities while reinforcing reliability, affordability, and access will allow North Carolina to compete and lead not just regionally but globally.

Finally, grounding the energy vision in business priorities creates a foundation for public-private partnership. Whether it's co-investing in energy hubs, streamlining permitting for industrial renewables, or designing incentives for distributed resources, the alignment of policy with private-sector readiness will be essential to accelerating results. In this way, a business-focused energy vision becomes not only a guide for the power sector, but a catalyst for inclusive, innovation-driven economic growth across North Carolina.

Why the NC Chamber Foundation?

The NC Chamber Foundation is uniquely suited to spearhead North Carolina's business-driven energy vision process. As the research and policy arm of the NC Chamber, its mission is to foster a strong, sustainable future through nonpartisan research, thoughtful collaboration, and data-informed strategy development.

Through its NC LEADS strategic plan, the Foundation is committed to ensuring that North Carolina's future prosperity is built upon strategic investments in critical infrastructure, a competitive and favorable business climate, and robust statewide workforce development. Energy infrastructure, as a foundational element of North Carolina's economy, must be robust and resilient to continue supporting economic growth and stability. With its established network, proven track record in infrastructure policy and planning, and demonstrated capacity through NC LEADS to convene diverse voices around complex economic challenges, the NC Chamber Foundation serves as the logical convener and research leader for this collaborative, business-informed energy vision that aligns economic growth with community and business resilience.

Methodology for Vision Development

The development of this energy vision was grounded in a robust stakeholder engagement and research process, designed to capture a wide spectrum of insights from North Carolina's business, industry, and community leaders. Led by the NC Chamber Foundation supported by APCO Worldwide, the approach emphasized cross-sectoral representation and actionable feedback to ensure the resulting vision is not only forward-looking but also pragmatic and business-informed.

From March through May 2025, the research team convened nearly a dozen small-group, facilitated listening sessions with representatives from key industries. These confidential, off-the-record conversations provided space for candid dialogue around infrastructure concerns, future energy needs, and the challenges facing energy-intensive operations across the state. Participants

represented diverse sectors, including manufacturing, agriculture, life sciences, retail, energy, healthcare, telecommunications, construction, technology, real estate development, and small business. The sessions were deliberately structured to include representation from urban and rural regions, as well as cultural and geographic diversity alongside industry breadth.

In parallel, the NC Chamber Foundation distributed an in-depth survey to the NC Chamber membership to garner additional input on energy concerns, demands, and expectations. The research effort also engaged members of the Energy Vision Steering Committee, subject matter experts and business leaders assembled to guide the direction of this initiative. Their qualitative responses helped to identify shared priorities around reliability, cost predictability, sustainability, and regulatory consistency, issues roundly validated across the broader stakeholder representation.

The purpose of this engagement process was twofold: first, to gain a deeper understanding of the priorities and expectations of North Carolina's business community related to energy demand, generation, infrastructure, and planning; and second, to ensure the final vision reflects the voice of business – grounding it in the operational realities, investment concerns, and growth strategies of the private sector. This direct input has shaped a business-aligned energy vision that is both responsive to current needs and adaptable to the state's rapidly evolving economic future.

Complementing these primary research efforts, the team also reviewed insights from recent public convenings and reports, and publications from academic and policy institutions. A targeted literature review examined national energy policy trends, technology developments, and infrastructure strategies, helping to position North Carolina's vision within a broader context of innovation and change.

Setting the Scene: NC Current Energy Landscape

Understanding the unique energy environment in North Carolina begins by understanding the regulatory model, as well as the structure of the energy sector in terms of both organization and infrastructure. A rapidly changing landscape of generation technologies also provides both opportunities and challenges for the state's energy providers and business customers.

THE REGULATED UTILITY MODEL AND MARKET STRUCTURE

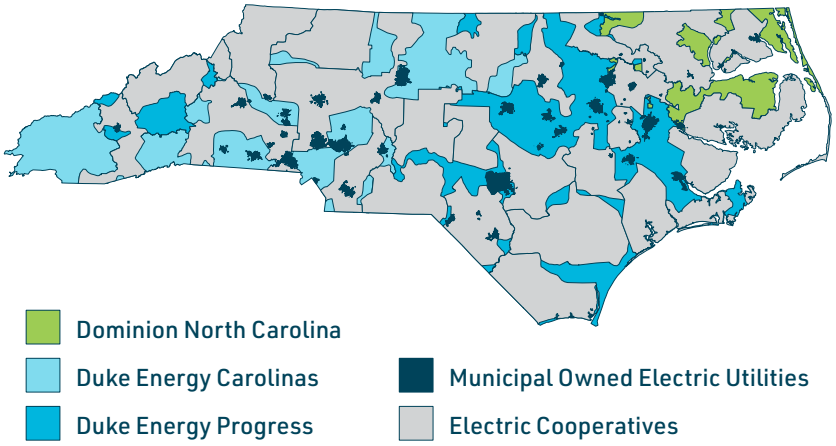
North Carolina's electric system follows the classic regulated-monopoly model. Investor-owned utilities (IOUs) receive exclusive service territories in exchange for a "regulatory compact" that obliges them to provide reliable, least-cost service and allows them to earn an approved return on their investments. The five-member North Carolina Utilities Commission (NCUC), whose members are appointed by the Governor, State Treasurer, President *pro tempore* of the Senate, and the Speaker of the NC House of Representatives, and are confirmed by the NC General Assembly.[11] The NCUC

11 *NCLEG (2024) Session law 2024-57 Senate Bill 382, North Carolina General Assembly. https://www.ncleg.gov/Sessions/2023/Bills/Senate/PDF/S382v4.pdf.*

enforces this agreement by certifying new facilities, approving rates, and policing service quality, with the statutory mandate to keep charges "just and reasonable."[12]

Two vertically integrated IOUs dominate the state's retail market: Duke Energy Carolinas and Duke Energy Progress serve most customers, while Dominion Energy North Carolina supplies a smaller pocket in the northeast. Duke Energy generation assets and infrastructure also serve customers and communities in South Carolina, while Dominion Energy has significant service area in Virginia to the north. These IOUs are fully regulated by the NCUC, unlike the state's 31 electric cooperatives and more than 70 municipal power systems, whose retail rates fall outside NCUC jurisdiction. North Carolina has no regional wholesale market of its own. Duke Energy operates as a self-contained Balancing Authority, whereas Dominion Energy's North Carolina load is embedded in the PJM Interconnection regional transmission organization footprint, making PJM the only organized market touching the state.[13] Together, this structure preserves traditional cost-of-service regulation even as wholesale competition takes place across the border.[14]

NC Electric Territories



Source: NC Sustainable Energy Association

Note: This map is for informational purposes only and is not a definitive source for service territory boundaries. Boundaries are designated under North Carolina law and depicted here as accurately as possible; however, scale limitations prevent complete precision. For exact boundaries, consult all applicable laws, statutes, ordinances, and regulations. No warranty, expressed or implied, is provided regarding the accuracy of this map.

12 NC Utilities Commission (2025) North Carolina's Public Utility Infrastructure & Regulatory Climate, North Carolina Utilities Commission. https://www.ncuc.gov/documents/overview.pdf.

13 PJM Regional Transmission Organization (2022) 2021 North Carolina State Infrastructure Report, PJM.com. https://www.pjm.com/-/media/DotCom/library/reports-notices/state-specific-reports/2021/2021-north-carolina-state-infrastructure-report.pdf.

14 NC Utilities Commission (2025) North Carolina Utilities Commission: What We Do?, NCUC. https://www.ncuc.gov/consumer/whatwedo.html.

The NCUC's regulatory activity involves periodic rate cases in which utilities must justify expenses and investments before recovering them from customers through rate charges. NCUC is also the policy driver for integrated resource planning.

Duke Energy and Dominion Energy both file biennial resource plans, now combined with the legislatively mandated Carbon Plan, outlining generation and transmission needs over a 15-year horizon.[15] The Commission reviews these filings for least-cost, reliability, and carbon-reduction compliance. Public Staff economists audit the filings on behalf of consumers, and all stakeholders may intervene. Through this process, and through relevant rate cases, the Commission decides everything from allowed returns on equity, to the mix of new solar, storage, gas, or nuclear units, ensuring that privately owned assets are built and paid for only when they align with statewide reliability and policy objectives. (Co-ops such as NC Electric Cooperatives are not rate-regulated, and do not file an Integrated Resource Plan or Carbon Plan. Co-ops are governed by their boards and the Rural Electrification Authority for most corporate matters.[16]

This model has historically given North Carolina reliable, moderately priced power and the ability to do long-term integrated resource planning. In fact, the state's electricity rates have been competitive compared to national averages. Latest EIA data confirms that North Carolina's power costs remain a strategic advantage. in April 2025 industrial customers paid about 7.6¢/kWh (roughly 0.6¢ below the U.S. industrial average), commercial users paid 10.2¢/kWh (about 3¢ less than the national figure), and residential customers averaged 14.5¢/kWh, still nearly 3¢ under the U.S. mean.[17]

These below-average rates help manufacturers and other energy-intensive businesses keep operating costs down and strengthen the state's overall competitiveness. Business leaders generally appreciate this stable, predictable investment climate for utilities, which has helped ensure adequate generation and avoided the price volatility seen in some deregulated markets. They cite North Carolina's regulatory stability and "favorable policies" as key factors that have encouraged corporate investment in the state.

ENERGY GRID AND TRANSMISSION OWNERSHIP

North Carolina's electric grid is a complex system that reflects the diverse utility ownership model. Duke Energy, through its subsidiaries Duke Energy Progress (DEP) and Duke Energy Carolinas (DEC), delivers approximately 96% of utility-supplied electricity in the state. Dominion Energy North Carolina (VEPCO) provides another 4%, primarily in the northeastern corner of the state. Together, these three investor-owned utilities (IOUs) dominate generation, transmission, planning, and operation of the bulk power system, including most of the state's high-voltage transmission lines and substations.[18]

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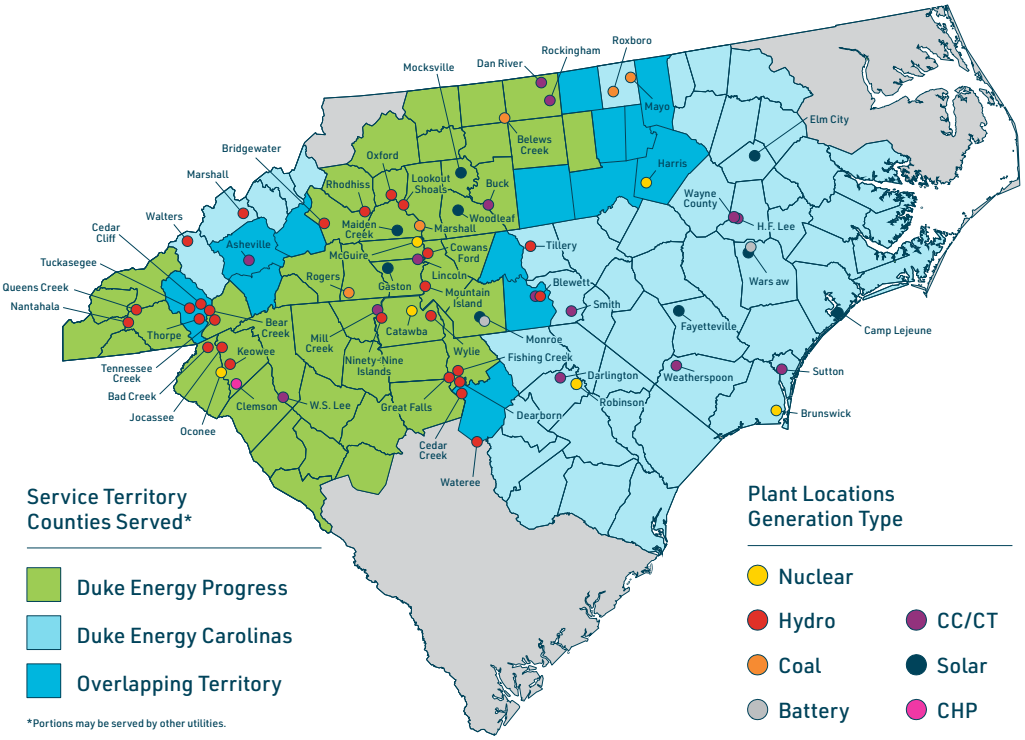
15 *Duke Energy (2025) Carolinas Resource Plan, Duke Energy. https://www.duke-energy.com/our-company/about-us/irp-carolinas.*

16 *NC Utilities Commission (2025) North Carolina's Public Utility Infrastructure & Regulatory Climate, North Carolina Utilities Commission. https://www.ncuc.gov/documents/overview.pdf.*

17 *U.S. Energy Information Administration (2025) Electric Power Monthly , Electric Power Monthly - U.S. Energy Information Administration (EIA). https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a.*

18 *NC Utilities Commission (2024) Annual Report Regarding Long Range Needs... https://ncuc.gov/reports/longrange24.pdf.*

Map of Duke Energy Service Areas (North and South Carolina)



Source: Duke Energy

The remaining service territory is covered by 31 electric membership cooperatives (EMCs) and more than 70 municipal and university-affiliated utilities, which collectively serve approximately 2.4 million North Carolinians in 95 of the state's 100 counties, or about 23% of the state's population.[19] These non-IOU providers typically depend on wholesale power purchases from Duke Energy or Dominion Energy. The largest of these is the NC Electric Cooperatives which supply approximately 11 GWh of power to the NC load. NCEC maintain their own distribution infrastructure and have implemented advanced metering infrastructure (AMI) and smart meters for over a decade, as well as integrated transmission-distribution coordination through distribution operators, battery storage, and microgrid infrastructure.[20]

North Carolina's grid is part of the broader Eastern Interconnection, one of the two major synchronized grids in North America. This means that the state's electricity system is physically and electrically linked with a broader energy network stretching from the U.S. East Coast to the Midwest and to parts of Canada. Power can flow across state lines, enabling greater reliability, resource sharing, and regional coordination during periods of high demand or grid stress. While the state does not operate under a unified Regional Transmission Organization (RTO), its utilities coordinate planning and reliability

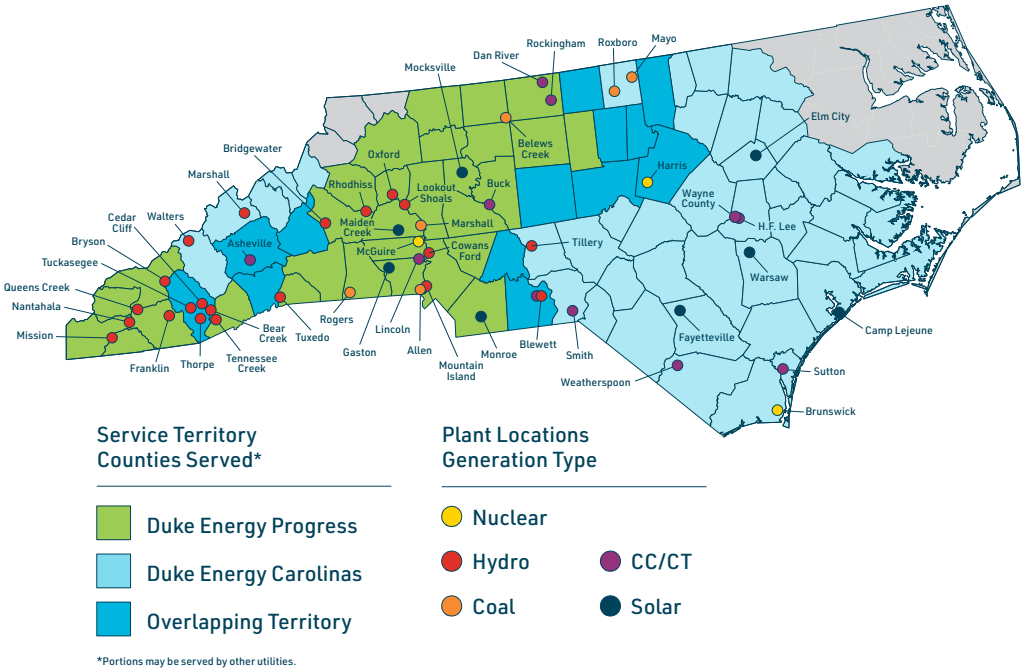
19 *NC Electric Cooperatives (2025) About Us, NCEC. https://www.ncelectriccooperatives.com/who-we-are/.*

20 *NC's Electric Cooperatives (2019) Edgecombe-Martin County EMC Begins AMI System Upgrade, NCEC. https://www.ncelectriccooperatives.com/who-we-are/spotlight/edgecombe-martin-county-emc-begins-ami-system-upgrade.*

through the Carolinas Transmission Planning Collaborative (CTPC). The CTPC ensures transmission users hare engaged in build-out priorities and cost allocation. Dominion's North Carolina operations are embedded within PJM Interconnection[21], while Duke Energy's service areas fall under the jurisdiction of the Southeastern Electric Reliability Council (SERC) East region.[22]

North Carolina's electric utilities are subject to rigorous reliability oversight, including the tracking and reporting of industry-standard outage metrics such as SAIDI (System Average Interruption Duration Index) and SAIFI (System Average Interruption Frequency Index). The North Carolina Utilities Commission (NCUC) requires utilities to maintain a winter planning reserve margin of at least 17% increasing to 22% by 2031 above expected peak demand, ensuring a buffer of excess generation capacity to maintain reliability during unforeseen events. For Dominion Energy as a PJM participant, a similar target of 18.5% is advised for 2025-2026.[23] These existing requirements help form the foundation of a resilient grid.

Map of Duke Energy Service Areas (North Carolina)



Source: Duke Energy

21 *PJM Regional Transmission Organization (2024) 2023 North Carolina State Infrastructure Report, PJM.com. https://www.pjm.com/-/media/DotCom/library/reports-notices/state-specific-reports/2023/north-carolina.pdf.*

22 *Sas, M. (2024) SERC Regional Reliability Plan. https://www.nerc.com/comm/RSTC/RTOS/SERC-Regional-Reliability-Plan.pdf.*

23 *NC Utilities Commission (2025) North Carolina's Public Utility Infrastructure & Regulatory Climate, North Carolina Utilities Commission. https://www.ncuc.gov/documents/overview.pdf.*

North Carolina has sufficient generation and domestic import capacity to meet current peak load, yet real-world challenges persist. Between 2018 and 2023, summer peak demand in Dominion's territory increased by 14%, compared to a more modest 4% rise for Duke Energy Carolinas and flat demand in Duke Energy Progress's area.[24] These uneven load-growth patterns have exposed transmission bottlenecks, particularly in regions with high concentrations of proposed solar projects or emerging industrial activity. The state's most recent collaborative transmission plan identifies nearly $382 million in upgrades needed by 2034 to support reliability and accommodate renewable integration, including more than thirty priority projects across Duke Energy and Dominion Energy's service territories.[25] At the same time, reliability metrics have shown signs of slippage, reflecting aging infrastructure, increased demand volatility, and severe weather risks that affect both rural and urban service areas. These trends, and North Carolina's position as a net domestic importer of electricity, underscore the need for targeted investments in grid modernization, enhanced coordination across providers, and strategic long-term planning.

ENERGY CAPACITY AND GENERATION MIX

North Carolina's electric power capacity is substantial with about 36,300 MW of generation installed as of 2025, but its composition and geographical distribution present both strengths and vulnerabilities.[26] The current capacity mix skews toward nuclear and natural gas, which together make up more than 71% of in-state capacity.[27]

Duke Energy operates a fleet of nuclear reactors (at Brunswick, McGuire, Catawba, and Harris plants) with a strong reliability record. Between 2022-2024, Duke Energy's nuclear fleet ran at an average 90.5% capacity factor, which is in line with the national average during the period.[28] Duke Energy operates a fleet of nuclear reactors (at Brunswick, McGuire, Catawba, and Harris plants) with a strong reliability record. Between 2022-2024, Duke Energy's nuclear fleet ran at an average 90.5% capacity factor, which is in line with the national average during the period.[29]

Natural gas-fired plants (a mix of combined-cycle and peaking units) have grown to represent 36.7% of generation, although according to the U.S. Energy Information Administration, "North Carolina ranks among the bottom one-third of states with the lowest natural gas use per capita, even though natural

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24 *NC Utilities Commission (2024) Annual Report Regarding Long Range Needs... https://ncuc.gov/reports/longrange24.pdf.*

25 *Carolinas Transmission Planning Collaborative (2025) Report on the CTPC 2024–2034 Collaborative Transmission Plan. https://carolinastpc.org/media/reference/2025/02/28/2024_CTPC_Collaborative_Transmission_Plan_FINAL_Report_02-28-2025.pdf.*

26 *U.S. Energy Information Administration (2025) Electric Power Industry Net Summer Capacity - U.S. Energy Information Administration (EIA). https://www.eia.gov/electricity/monthly/xls/table_6_02_a.xlsx.*

27 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

28 *U.S. Energy Information Administration (2024) Electricity Explained: Electricity Generation, Capacity, and Sales in the United States, U.S. Energy Information Administration (EIA). https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php.*

29 *Gallier, S. and Wald, M. (2025) U.S. Nuclear Capacity Factors: Stability and Energy Dominance, Nuclear Newswire. https://www.ans.org/news/2025-05-02/article-6967/us-nuclear-capacity-factors-stability-and-energy-dominance.*

gas use for electricity generation in the state has more than doubled in the past decade."[30] Most of these gas units are located near load centers in the Piedmont and have replaced retired coal units.

Reliability of the natural gas supply is an infrastructure concern, too.[31] North Carolina is at the terminal end of interstate gas pipelines, has no in-state gas production, and pipeline capacity has become a limiting factor. The cancellation of the Atlantic Coast Pipeline in 2020 and delays to the Mountain Valley Pipeline extension mean the state has had to rely on existing pipelines, which have limited capacity and redundancy. The Energy Policy Council in 2024 noted that, "the importance of an uninterrupted supply of natural gas grows even more critical," as we lean on gas for both baseload and peaking power.[32] ny disruption to gas supply, such as the 2021 Colonial Pipeline cyberattack, could directly impact electricity generation. Part of strengthening energy infrastructure includes securing fuel supply chains – whether by adding incremental natural gas interstate lines, adding on-site fuel backup (oil or liquid natural gas (LNG) storage for dual-fuel plants), or accelerating alternatives such as battery storage or demand-response technologies that can reduce reliance on gas in peak times.

Coal, once dominant, is now just 8.8% of generation and falling, with only a few large coal plants (Marshall, Roxboro, Belews Creek) still operating and slated for retirement by the 2030s.[33] Marshall, Belews Creek, and Cliffside are dual fuel operations capable of cofiring with natural gas.

Renewables (solar, hydro, biomass, wind) account for 19.3% of generation combined, with solar photovoltaic by far the largest component.[34] The state's solar farms are mainly concentrated in rural eastern North Carolina – an area with excellent sunshine and available land, but far from some of the biggest demand centers, which creates transmission challenges. North Carolina now ranks fifth nationally for total installed solar capacity with more than 9,700 MW.[35] Solar growth in the state has outpaced the grid's ability to connect projects, leading to interconnection backlogs.

Under North Carolina Senate Bill 266 (SB266), the Power Bill Reduction Act (2025), renewables are expected to keep growing, but their pace and scale will be governed primarily by least cost modeling, interconnection and transmission availability, and federal incentives rather than an interim statutory emissions target. SB266's early cost recovery provisions for baseload plants through 2033 could prioritize nuclear life extension investments, upgrades, and planning for future nuclear options, indirectly moderating the volume and timing of renewable additions that would otherwise have been driven to meet a 2030 carbon deadline.

Renewables, primarily utility scale and distributed solar, hydro, biomass, onshore wind, and battery storage, collectively supply nearly one-fifth of North Carolina's generation today. With the recent

30 *IBID.*

31 *NCDEQ Energy Policy Council (2024) Energy Policy Council 2024 Biennial Report. https://www.deq.nc.gov/state-energy-office/energy-policy-council-2024-biennial-report/open.*

32 *IBID.*

33 *Gracia, C. (2024) Latest North Carolina Plan to Reduce Carbon Emissions Pushes Back 2030 Goal, WUNC. https://www.wunc.org/environment/2024-11-07/duke-energy-carbon-plan-ncuc-reduce-carbon-emissions-hb951.*

34 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

35 *Solar Energy Industries Association (2025) NC Solar: State Spotlight, Solar Energy Industries Association. https://seia.org/wp-content/uploads/2025/06/Solar-Industry-Economic-Impact-06-2025-1.pdf.*

ratification of SB266, the 2025 Power Bill Reduction Act, eliminating the 2030 interim emissions deadline, future renewable growth inside utility portfolios will be paced by least cost planning outcomes, reliability needs, interconnection and transmission constraints, and federal tax incentives, rather than by a statutory near-term decarbonization mandate. Interconnection backlogs and transmission limitations will remain key factors of concern. Storage, demand response, and other distributed energy resources will take on greater importance as operational tools to manage peak demand and integrate variable resources. Yet, the absence of the 2030 mandate means procurement volumes will be calibrated to cost and reliability rather than an emissions compliance deadline. Executive branch targets established by prior orders including Executive Order 218 will continue to guide agency activity, but they do not, on their own, compel utility procurement absent Commission findings of need or least cost outcomes. Other renewables in the mix include hydroelectric dams (about 3% of generation mostly in western North Carolina), and a small contribution, around 1%, from biomass (wood waste and animal waste methane).

North Carolina notably was the first southeastern state to adopt a Renewable Portfolio Standard (RPS) in 2007, which required utilities to achieve 10–12.5% of sales from renewables by 2018–2021, targets that were met on schedule.[36] In a state with significant agricultural activities, the RPS also positioned North Carolina as the only state with requirements to source energy made from swine waste, while current minimums include production of at least 0.2% from swine waste by 2026 with additional incentives supporting further development.[37] The July 2025 ratification of SB266 does not modify the state's RPS, whose targets have already been met. Without new statutory renewable mandates, incremental additions will depend on cost competitiveness, locational value, corporate and municipal clean power procurement, and federal incentives.

Challenges Facing NC Energy

SURGING POPULATION, INDUSTRIAL INVESTMENT & JOB GROWTH CREATES RECORD DEMAND

North Carolina is one of the fastest growing states in the nation with projections anticipating a total population of nearly 12 million citizens by 2030.[38] Net domestic migration accounts for the vast majority of the state's growth. Major metro areas like Charlotte, the Triad, and the Triangle continue to swell, but growth is also dispersing into smaller cities and counties as newcomers arrive in search of opportunity. This population boom translates directly into higher energy consumption, placing greater demands on the electric grid and energy infrastructure.

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36 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

37 *Lips, B. and Wang, S. (2025) Clean Energy and Energy Efficiency Portfolio Standard, DSIRE: N.C. Clean Energy Technology Center. https://programs.dsireusa.org/system/program/detail/2660.*

38 *Cline, M. (2025) NC to Become 7th Most Populated State in Early 2030s, Office of State Budget and Management. https://www.osbm.nc.gov/blog/2025/02/03/nc-become-7th-most-populated-state-early-2030s.*

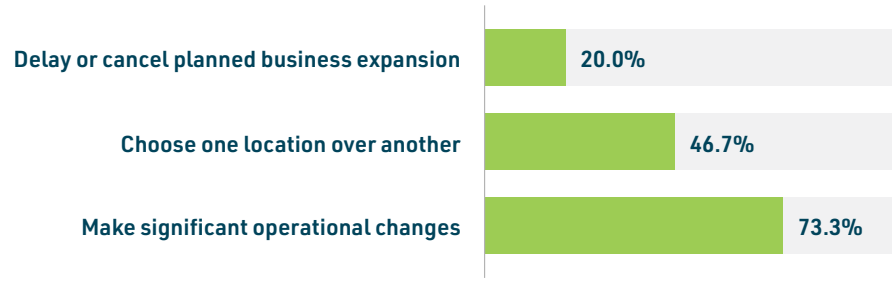
> **WITH GROWING POPULATION, GROWING ECONOMY, GROWING ENERGY DEMAND, IT'S INFRASTRUCTURE THAT MAKES IT ALL HAPPEN. NORTH CAROLINA NEEDS TO NOT JUST KEEP UP WITH THE EXISTING DEMAND, BUT HANDLE WHAT THAT FUTURE DEMAND LOOKS LIKE."**
>
> — NORTH CAROLINA BUSINESS LEADER, TELECOMMUNICATIONS SECTOR

At the same time, North Carolina's pro-business climate has attracted an unprecedented wave of corporate investment across advanced industries. Each new economic development success, either through recruiting new companies or growing industries already present in the state, brings enormous economic benefits – and significantly increases the demand for energy. Across sectors, businesses in manufacturing, agriculture, and beyond are rapidly adopting more automation, robotics, and always-on digital systems (from energy-intensive data centers and AI computing clusters to precision farming tools) that significantly raise their electricity needs in real time. Many industry leaders anticipate much higher power requirements over the coming decade as these technologies increase in scale.

Impact of Energy Considerations on Business Decisions

PERCENTAGE OF RESPONDENTS

Have energy consideration (cost, reliability, sustainability, energy capacity) ever caused you to:



Source: NC Chamber Foundation Stakeholder Engagement Process and Polling (2025)

Business leaders are increasingly worried about whether sufficient generation capacity will be available to support this growth. The concern is not just theoretical: if demand outstrips supply, it could lead to higher electricity prices, strained grids, or even difficulty in getting new facilities connected in a timely manner. North Carolina's economic success is now tightly linked to energy.

Peak electricity demand forecasts have been sharply revised upward. Duke Energy projects that by 2030 the increase in peak load will be roughly eight times greater than what was expected just two years ago.[39] This spike is largely attributed to the very manufacturing and tech investments that the state has worked hard to attract. Electrification of transportation from rising EV adoption, electric school buses, and commercial fleet electrification, will also add to energy demand.

Energy and energy capacity is a key factor in economic development and for those recruiting industry to North Carolina. According to a 2025 survey of industrial site selectors by Site Selection Magazine, modern industry sees energy infrastructure as a priority in their planning, affecting where they locate, when they expand, and how they operate.[40] Companies often rule out areas with poor access to energy, which particularly hurts rural development.[41]

> **"ELECTRICITY CAPACITY IS BECOMING AN ECONOMIC DEVELOPMENT DIFFERENTIATOR, SO IT IS IMPORTANT THAT WE CONTINUE TO MAKE INVESTMENT IN NEW GENERATION AND GRID INFRASTRUCTURE TO CAPTURE THE COMPANIES INTERESTED IN GROWING THEIR FOOTPRINTS IN NORTH CAROLINA."**
>
> — NORTH CAROLINA BUSINESS LEADER, ECONOMIC DEVELOPMENT SECTOR

AGING INFRASTRUCTURE THREATENS CURRENT & FUTURE SUCCESS

Many of North Carolina's transmission lines, substations, and bulk power assets were built in the mid-20th century to serve a smaller, less industrialized population. Today, these aging systems are being pushed beyond their original design limits.[42] As North Carolina experiences unprecedented industrial expansion, state energy officials have flagged the condition of legacy grid infrastructure as a serious and growing risk to the state's energy security and economic sustainability.[43]

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39 *Mildenberg, D. (2023) Development Boom Driving Power Usage in NC to Record Levels, Duke Energy Exec Says, WRAL TechWire. https://wraltechwire.com/2023/12/14/development-boom-driving-power-usage-in-nc-to-record-levels-duke-energy-exec-says.*

40 *Boyer, D. (2025) Site Selectors Survey: Why Site Selectors Love the South, Site Selection Magazine. https://siteselection.com/site-selectors-survey-why-site-selectors-love-the-south/.*

41 *Southern Economic Development Council (2025) The Growing Role of Power Requirements in Economic Development Site Selection, Southern Economic Development Council. https://www.sedc.org/news/the-growing-role-of-power-requirements-in-economic-development-site-selection.*

42 *NCDEQ Energy Policy Council (2024) Energy Policy Council 2024 Biennial Report. https://www.deq.nc.gov/state-energy-office/energy-policy-council-2024-biennial-report/open.*

43 *NCDEQ Energy Policy Council (2024) Energy Policy Council 2024 Biennial Report. https://www.deq.nc.gov/state-energy-office/energy-policy-council-2024-biennial-report/open.*

> **NORTH CAROLINIANS HAVE WORKED DILIGENTLY FOR DECADES TO DEVELOP ONE OF THE BEST BUSINESS CLIMATES IN THE UNITED STATES. IN ORDER TO MAINTAIN OUR POSITION, WE MUST CONTINUE TO INVEST IN MAINTAINING AND UPGRADING OUR INFRASTRUCTURE TO INCLUDE THE ELECTRIC GRID."**
>
> — NORTH CAROLINA BUSINESS LEADER, BUSINESS SERVICES SECTOR

According to the recent 2025 Report Card for America's Infrastructure, the American Association of Civil Engineers (ASCE) points to outdated energy infrastructure as one of the key vulnerabilities threatening the reliability and resilience of the nation's economic resilienc.[44] At the state level, many of North Carolina's high-voltage transmission assets are aging, and critical substations remain dependent on legacy analog equipment, increasing the likelihood of mechanical failure and complicating integration with digital control systems. The layering of automation, advanced metering, and distributed energy resources onto aging hardware and infrastructure introduces both operational complexity and cybersecurity exposure, making comprehensive modernization essential.

Progress on these efforts has not been without setbacks. In 2017, Duke Energy announced their Power/Forward Carolinas program as a $13 billion, 10 year grid modernization initiative. However, regulatory settlements led to its scaling back to a $2.5 billion pilot program, and eventually the North Carolina Utilities Commission ultimately declined to approve the full proposal. While Duke Energy continues to invest in grid hardening and modernization through other frameworks, the $13 billion initiative itself is no longer active as originally planned.[45] However, the utilities are making progress. The number of customers on self-healing circuits doubled in two years and as of 2024 nearly 50% of Duke Energy's customers are connected to "self-healing" grid technology that can automatically reroute power during an outage, avoiding over 1.5 million extended outages in 2023 alone.[46]
Despite these and other investments, gaps remain. North Carolina lacks a fully integrated, long-term infrastructure strategy for grid asset replacement and modernization across all utilities, including municipal and electric membership cooperatives that serve large portions of rural and industrial North Carolina. Recent analyses from NC State University highlight that insufficient coordination and alignment among utility providers and grid planners can create bottlenecks, increase outage risk,

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44 *Fogleson, M. (2025) Infrastructure's Upward Momentum Reflected in Report Card, ASCE American Society of Civil Engineers. https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/issues/magazine-issue/article/2025/03/infrastructures-upward-momentum-reflected-in-report-card.*

45 *Hurley, E. (2019) What's Next for Duke Energy's North Carolina Grid, ScottMadden's Grid Minute. https://pdi2.org/images/uploads/2021/03/204-Whats-Next-for-Duke-Energys-North-Carolina-Grid-Modernization-Plan-ScottMadden.pdf.*

46 *Duke Energy (2024) Duke Energy Strengthens the Grid, Increases Resiliency ahead of the 2024 Hurricane Season, Duke Energy News Center. https://news.duke-energy.com/releases/duke-energy-strengthens-the-grid-increases-resiliency-ahead-of-the-2024-hurricane-season.*

and lead to underinvestment in critical infrastructure.[47] Without a forward-looking, collaborative approach, aging energy infrastructure may constrain industrial growth, especially in regions targeted for economic development but underserved by modern, high-capacity grid assets. Ultimately, aging energy infrastructure is not just a technical liability but a strategic threat.

> **IT'S SUSTAINABLE GROWTH. SMART GROWTH. PLANNED GROWTH. THAT WOULD ALLOW US TO MAKE BETTER DECISIONS NOT ONLY FOR SMALL BUSINESSES BUT FOR OUR LARGE MANUFACTURING COMPANIES, OUR LARGE COMPANIES THAT WANT TO COME TO THE STATE OR GROW IN THE STATE. I THINK IT'S JUST HAVING SOMETHING THAT IS PLANNED AND STRATEGIC."**
>
> — NORTH CAROLINA BUSINESS LEADER, TELECOMMUNICATIONS SECTOR

Without a forward-looking, coordinated strategy, aging energy infrastructure may become a constraint on industrial growth, particularly in regions targeted for economic development but underserved by high-capacity or modern grid assets. Ultimately, aging energy infrastructure is not just a technical liability, but a strategic threat.

GROWING EXISTING INDUSTRY DEMANDS RELIABILITY, PREDICTABILITY

For existing businesses, energy reliability is a priority, particularly manufacturers, retailers, and healthcare providers who rely on consistent power for operations and safety. Multiple respondents and participants in the stakeholder engagement process highlighted that even brief power disruptions can severely impact production, potentially damage expensive equipment, and create risks for patient care in healthcare settings. Many businesses have invested in costly backup generators and redundancy measures to mitigate these risks, adding to their operational expenses.

47 *Kopitopoulou, C. (2022) Planning an Affordable, Resilient, and Sustainable Grid in North Carolina, NC Clean Energy Technology Center. https://nccleantech.ncsu.edu/wp-content/uploads/2022/02/PARSG-Stakeholder-Meeting-3-Presentation-2.pdf.*

> **WE HAVE PEOPLE ON BREATHING DEVICES. WE HAVE PEOPLE IN OPERATING ROOMS 24/7 GETTING SURGERIES. WE CAN'T AFFORD NOT TO HAVE A RELIABLE ENERGY SYSTEM. IT WOULD COST HUMAN LIVES, FOR SURE. IT'S NOT JUST MEASURED IN DOLLARS."**
>
> — NORTH CAROLINA BUSINESS LEADER, HEALTHCARE SECTOR

SLOW PERMITTING, REGULATORY PROCESS CHALLENGES PROGRESS

North Carolina's energy and infrastructure sectors face increasingly complex regulatory and permitting challenges that impact the pace and cost of development. As the state experiences surging demand for electricity and new infrastructure to support population and industrial growth, regulatory inefficiencies and delays are slowing progress on key projects.

> **THERE'S SO MANY HANDS IN THE POT RIGHT NOW THAT IT IS A LITTLE OVERWHELMING AS A BUSINESS OWNER. WHERE AM I SUPPOSED TO GO WITH QUESTIONS AND WHO SHOULD I TALK TO? TOO MANY COOKS IN THE KITCHEN."**
>
> — NORTH CAROLINA BUSINESS LEADER, CONSTRUCTION SECTOR

The North Carolina Department of Environmental Quality (NCDEQ) requires extensive review periods for air and water permits that can delay energy generation, transmission, and industrial development. This has prompted calls from the business community to efficiently modernize the permitting process while maintaining robust environmental protections.[48]

"The pace of growth is expected to increase in the years ahead, creating a need to expand electric capacity and modernize our grid infrastructure to be ready for these economic development

48 *NC Chamber (2023) NC Legislature Passes Regulatory Reform Act of 2023 with Bipartisan Support, NC Chamber. https://ncchamber.com/2023/09/26/nc-legislature-passes-regulatory-reform-act-of-2023-with-bipartisan-support/.*

opportunities," Kendal Bowman, President of Duke Energy's North Carolina operations said. "The decisions we make now and the pace at which we execute infrastructure expansion will determine how well we are able to support the exponential growth of large energy users.[49]

Electric transmission development is among the most pressing regulatory hurdles. As utilities seek to build new high-voltage lines to connect renewable energy sources and meet rising industrial demand, they face lengthy and fragmented permitting requirements at the state and local levels.[50] Projects like Duke Energy's proposed transmission upgrades in the Piedmont and southeastern regions, including the high-priority red zone projects identified in the prior CPIRP order, have encountered land-use conflicts and community opposition, slowing their progress.

Similarly, siting and permitting for zero-emission energy infrastructure, such as solar farms, battery storage facilities, hydrogen production, and small modular reactors, face increasing scrutiny and resistance. Local governments often have zoning authority over utility-scale solar and storage projects, leading to inconsistent outcomes across counties and, in some cases, outright moratoriums.[51]

Several counties in eastern North Carolina have enacted restrictions on solar development, citing concerns over land use, aesthetics, and end-of-life decommissioning.[52] Meanwhile, proposed natural gas "peaker plants" that supplement base load supply and promote grid stability have drawn criticism from environmental groups who argue for stricter climate and health reviews, leading to protracted permit disputes.[53]

With rapid growth, business leaders cite a multitude of challenges creating confusion and uncertainty for businesses attempting to navigate the system, or plan for growth, including fragmentation across institutional authorities, communication channels, geographic access, policy approaches, and support mechanisms. These dynamics create uncertainty for investors and developers attempting to respond quickly to rising electricity needs. Without reforms, these permitting challenges may hinder the state's ability to meet its own carbon reduction and economic development goals.

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49 *Gentry, C. (2025) A Switch to Power-Hungry Mode, Triangle Business Journal. https://www.bizjournals.com/triangle/news/2025/05/23/ai-surge-energy-demand-infrastructure-duke-energy.html.*

50 *U.S. Department of Energy (2023) National Transmission Needs Study. https://www.energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf.*

51 *Edgecombe County (2024) Moratorium on Solar Farm Applications to Review County Ordinances, Edgecombe County. https://www.edgecombecountync.gov/news_detail_T5_R480.php.*

52 *Alfini, M. (2025) Is Solar Threatening North Carolina Farms, or Is there Room for Cooperation?, WSOC TV. https://www.wsoctv.com/news/local/is-solar-threatening-north-carolina-farms-or-is-there-room-cooperation/A3FLAPOA6BFL7KVD3UHH3FLS44/*

53 *Southern Environmental Law Center (2024) Duke's Proposed Gas Plants Would Leave Communities to Bear Costs of Increased Air Pollution, Southern Environmental Law Center. https://www.selc.org/press-release/dukes-proposed-gas-plants-would-leave-communities-to-bear-costs-of-increased-air-pollution/.*

> **MAKE THE LOCAL PERMITTING AND STATE PERMITTING PROCESS COORDINATED RATHER THAN ME HAVING TO TALK TO THE CITY, THEN THE COUNTY, THEN THE STATE, AND THEN THE CITY GOES AHEAD WITH IT, THE COUNTY DOESN'T WANT IT, AND THE STATE IS SOMEWHERE STUCK BETWEEN THOSE TWO."**
>
> — NORTH CAROLINA BUSINESS LEADER, UTILITIES SECTOR

CHALLENGES TO INFRASTRUCTURE RELIABILITY AND RESILIENCY

Severe weather events regularly test the grid. The state's diverse geography means utilities must contend with a wide range of extreme weather threats. Overall, North Carolina's grid reliability has been strong historically, but extraordinary recent events exposed vulnerabilities.

In December 2022, during Winter Storm Elliott, Duke Energy was forced to curtail power for the first time in its Carolina history. While the extreme cold caused a partial derate of some natural gas units, the primary factor driving the load shed was a curtailment of firm electricity imports from the PJM regional transmission organization, rather than any failure of local infrastructure. Neighboring southeastern utilities, including the Tennessee Valley Authority and South Carolina's Santee Cooper, also reduced service to maintain grid stability.[54] The event has since prompted reviews of winter preparedness and the reliability of backup supply arrangements.

Eastern NC faces hurricanes annually which damage coastal transmission lines and substations. Flooding can inundate substations and hinder fuel delivery. Western NC experiences ice storms, landslides, and heavy winds. Hurricane Florence (2018) and Tropical Storm Michael (2018) together took power from millions, some for over a week.

54 *Wagner, A. (2023) Duke Energy Had Rolling Blackouts Last Christmas Eve. How It Aims to Avoid a Rerun., The News & Observer. https://www.newsobserver.com/news/weather-news/article283008093.html.*

> **IN OUR PLANTS WE RUN EXTRUSION MACHINES AND INJECTION MOLDING MACHINES, AND ALL IT TAKES IS A TWO OR THREE MILLISECOND SAG TO KNOCK THOSE MACHINES OFFLINE. AND THEN YOU HAVE TO STOP, CLEAN THEM OUT, RESTART THEM. WE LOSE HOURS OF PRODUCTION, MACHINES GET DAMAGED."**
>
> — NORTH CAROLINA BUSINESS LEADER, MANUFACTURING SECTOR

More recently, hurricane and tropical storm impacts became relevant in western North Carolina when Tropical Storm Helene swept through the region in September 2024. Energy infrastructure sustained significant destruction and damage. The state's electric co-ops alone had over 150,000 outages while some mountain communities were inaccessible for days due to flooding, delaying repairs.[55] A senior co-op official described it as "an unprecedented situation…impassable roads and many logistical hurdles before we can even evaluate the outages". Such challenges are more acute in rural areas where circuits lack redundancy – if one line goes down, whole communities may be isolated, similar to failures in transportation infrastructure.

New threats like targeted physical attacks have also arisen. In December 2022, the sabotage of multiple substations in Moore County caused a county-wide outage for several days. [56] NThis incident underscored the need for enhanced grid security and the value of distributed energy resources that supply critical loads during emergencies. North Carolina has since reinforced substation security protocols and is exploring microgrids for key facilities. The Town of Wake Forest, for example, is working on a microgrid to keep water and public safety services powered if the main grid fails.[57]

Cybersecurity presents an increasingly urgent threat to North Carolina's energy infrastructure. While recent substation attacks in Moore and Jones counties were physical in nature, they exposed the growing risk of cyber-physical attacks that can disrupt critical operations or manipulate public perception through misinformation. NCDEQ identifies cybersecurity as one of the most significant human-caused threats, citing the vulnerability of legacy control systems, the integration of digital grid technologies, and the expanding attack surface from distributed energy resources. Utilities across North Carolina, including the state's electric cooperatives, have begun deploying layered cybersecurity

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55 *Johnson, S. (2024) Co-Ops Pick up The Pieces after Helene, America's Electric Cooperatives. https://www.electric.coop/electric-co-ops-pick-up-the-pieces-after-helene.*

56 *NCDEQ Energy Policy Council (2024) Energy Policy Council 2024 Biennial Report. https://www.deq.nc.gov/state-energy-office/energy-policy-council-2024-biennial-report/open/.*

57 *Hayes, L. (2023) Investing in Transportation & Infrastructure, Town of Wake Forest, NC. https://www.wakeforestnc.gov/strategic-plan/investing-transportation-infrastructure.*

defenses, conducting vulnerability assessments, and participating in information-sharing partnerships to enhance threat detection and response.[58]

Federal and state hearings have underscored the urgency of grid hardening, stronger cybersecurity protocols, and investment in cyber workforce readiness. Without sustained and coordinated action, North Carolina's ability to deliver reliable energy, and protect its increasingly digital infrastructure, may be compromised by adversarial threats exploiting both technical and governance gaps.

Strain on energy infrastructure is not limited to damage or disaster as recent record heat waves have driven up air conditioning loads, testing the grid's capacity on hot summer days.

No matter the cause, the lesson from recent crises is clear: stronger, smarter, more secure, and more redundant infrastructure is needed to withstand the next hurricane, ice storm, heat wave, or attack. Securing funding for resiliency upgrades remains a barrier to progress. And while federal grants from FEMA such as the Building Resilient Infrastructure and Communities (BRIC) grants, or targeted funding from the U.S. Department of Energy have helped in some cases, they are unpredictable and will not serve as a long-term strategy.[59]

BRIDGING THE RURAL-URBAN ENERGY GAP

One of the most pressing and persistent challenges facing North Carolina's energy infrastructure is the widening gap between urban and rural regions in terms of reliability, investment, and access. While urban centers benefit from robust, modernized grid infrastructure and active investment tied to population growth, many rural communities continue to rely on older systems with limited redundancy. This structural imbalance threatens to undermine the state's goals for energy reliability, affordability, and long-term sustainability.

In the state's fast-growing metropolitan hubs, power demand is surging. The Triangle, Triad, and Charlotte regions are seeing record-setting growth from tech campuses, expanded industrial sites, and high-density housing developments. Utilities are racing to site and build new substations and transmission lines to meet soaring load projections, but permitting, land constraints, and the pace of development have created bottlenecks.[60] In some locations, new construction is already outpacing the available grid infrastructure needed to support it.

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58 *National Rural Electric Cooperative Association (2025) Cybersecurity and Grid Resilience, National Rural Electric Cooperative Association. https://www.electric.coop/issues-and-policy/cybersecurity-and-grid-resilience.*

59 *Federal Emergency Management Agency (2025) Building Resilient Infrastructure and Communities, FEMA.gov. https://www.epa.gov/fedfunds/building-resilient-infrastructure-and-communities-bric*

60 *Horner III, B. (2022) VinFast, Wolfspeed Projects Hitting Timelines, The Chatham News & Record. https://chathamnewsrecord.com/stories/vinfast-wolfspeed-projects-hitting-timelines,15166.*

> **MANY IN AGRICULTURE ARE HAMPERED BY LACK OF CHOICES WHEN IT COMES TO ENERGY. CHEAPER AND MORE EFFICIENT NATURAL GAS IS NOT READILY AVAILABLE."**
>
> — NORTH CAROLINA BUSINESS LEADER, AGRICULTURE SECTOR

Rural North Carolina faces infrastructure vulnerabilities that increase the risk of outages and weaken economic competitiveness. In many counties, a single downed transmission line can isolate entire communities due to a lack of alternate feeds. Transmission access is sparse, and maintenance cycles are often longer because rural electric cooperatives must service large geographic areas with limited resources. Despite commendable performance – North Carolina's co-ops maintain 99.98% reliability on average – when major disruptions strike, recovery is slower and impacts are more widespread.[61]

This rural energy deficit is more than a service issue; it is an economic constraint. Modern industries, whether a food processing facility or an advanced manufacturing plant, depend on reliable, high-capacity electricity. Economic developers report that companies routinely eliminate rural sites from consideration due to concerns over energy infrastructure. Site-selection consultants now describe electricity capacity as "the new deal-breaker," warning that any site taking more than four years to energize is "out of the running before the conversation truly begins."[62] North Carolina's own Megasite Readiness Report reaches the same conclusion, noting that its inventory of rural megasites has been "depleted" because only those with robust utility infrastructure make corporate short-lists today.[63] Although the state has begun addressing this through upfront investment at select sites such as the Greensboro-Randolph Megasite for Toyota's battery manufacturing facility, this approach is not yet widespread.

North Carolina is not taking the issue lightly and active investment in rural infrastructure is starting to close the gap. The North Carolina Rural Infrastructure Authority, a 17-member board housed at the North Carolina Department of Commerce is responsible for reviewing and approving grants and low-interest loans to support rural infrastructure. The mandate includes water, wastewater, transportation, railroad, natural gas, industrial parks, and utility grants. Since 2023, the NCRIA has executed six funding rounds supporting more than 50 rural projects for more than $22 million.[64]

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61 *NC Electric Cooperatives (2024) Key Facts and Statistics. https://www.ncelectriccooperatives.com/wp-content/uploads/2024/02/NCECs-Key-Facts-2024.pdf.*

62 *Barvi, R. (2025) How Infrastructure, Energy and Water Are Reshaping Site Selection in 2025, Site Selectors Guild. https://siteselectorsguild.com/infrastructure-energy-water/..*

63 *EDPNC (2023) NC Megasite Readiness Program Report 2023, Economic Development Partnership of North Carolina. https://edpnc.com/wp-content/uploads/2024/03/NC-Megasite-Readiness-Program-Report.pdf..*

64 *EDPNC (2025) Rural Infrastructure Authority Approves Grants to Create 137 Jobs in Rural Communities, Economic Development Partnership of North Carolina. https://edpnc.com/news/ria-announcements-june-2025.*

A June 2025 announcement from Amazon signals another demand-driver now in the queue for North Carolina's reliable and affordable power. The company plans a $10 billion data center campus in Richmond County, creating upwards of 500 jobs and significant local supply chain activity.[65] This investment will also require significant upgrades to transmission infrastructure, redundancy, and on-site capacity. This activity will transform what was once a relatively low-load area into a critical energy draw. State and local leaders have recognized the need for coordinated upgrades not only to energy infrastructure but also to water, wastewater, and fiber networks to support the development.[66] Without these investments, similar rural regions will continue to miss out on transformative opportunities.

At the same time, rural North Carolina holds untapped potential for energy development and innovation that could advance statewide sustainability and economic goals. Open land, agricultural activity, and forestry resources make many rural areas ideal for renewable energy deployment including solar farms, bioenergy, and even wind-related infrastructure. Eastern counties have already seen benefits from solar investments that generate tax revenue and lease income for landowners. Bioenergy initiatives, such as wood pellets and biogas from livestock operations, could diversify rural economies while supporting clean energy transitions.[67] These projects support both economic diversification and sustainability goals, but only if communities have the capacity and technical support to pursue them. Small towns may need assistance planning microgrids or attracting solar developers, and public-private partnerships will be crucial to build the necessary backbone infrastructure.

Recommendations

FOUNDATIONAL THEMES SECURE ECONOMIC PROSPERITY FOR NORTH CAROLINIANS

The findings from this stakeholder engagement process reveal a consistent and urgent call for reliability, modernization, and strategic planning, elements that are foundational to the future competitiveness and sustainability of North Carolina's economy.

Synthesizing the insights shared by leaders from industries across the state highlight what's needed from the grid, where policy gaps hinder growth, and where innovation and investment are most needed. These voices and perspectives provide not only a snapshot of today's energy challenges, but also the foundation for a pragmatic, business-aligned energy future that can foster industrial expansion, strengthen the state's economic vitality, bridge the rural-urban gap, and strengthen both

65 *Palmer, A. (2025) Amazon to Invest $10 Billion in North Carolina Data Centers in AI Push, CNBC. https://www.cnbc.com/2025/06/04/amazon-data-centers-ai.html.*

66 *Toler, W.R. (2025) Amazon to Bring Jobs, Infrastructure Improvements to Richmond County with Data Center Project, Richmond Observer. https://richmondobserver.com/stories/amazon-to-bring-jobs-infrastructure-improvements-to-richmond-county-with-data-center-project,46734.*

67 *Ferjani, A. (2022) Renewable Natural Gas – A Primer on North Carolina's Biogas Resources, NC Clean Energy Technology Center. https://nccleantech.ncsu.edu/2022/03/30/renewable-natural-gas-a-primer-on-north-carolinas-biogas-resources.*

the reliability of energy service and the resilience of North Carolina's communities and industries, ensuring consistent performance and the ability to recover quickly from disruptions.

Bringing together all these insights, North Carolina's statewide business energy vision can be distilled into a set of strategic pillars – core principles and objectives that will anchor the state's energy future. They serve as guideposts for policymakers, utilities, and stakeholders as they plan and invest in our state's future. Each pillar represents a priority area where action is needed to achieve a robust, future-ready energy system for North Carolina.

THE STRATEGIC PILLARS

- Strengthen Infrastructure Capacity and Resiliency
- Reliability Is Table Stakes
- Affordable, Predictable Power: A Business Imperative
- An All-of-the-Above, Balanced Mix of Energy Generation
- Regulatory Reform and Streamlining Development
- Bridging the Rural-Urban Gap
- Sustainability as a Competitive Advantage

STRENGTHEN INFRASTRUCTURE CAPACITY AND RESILIENCY

North Carolina's business community has been unequivocal: the state's energy infrastructure must be modernized, reinforced and expanded. Throughout the stakeholder engagement process, industry leaders across sectors repeatedly raised concerns that the electric grid and related infrastructure are not keeping up with explosive growth. Aging transmission lines, limited substation capacity, and a rural–urban reliability gap were cited as critical issues hindering investment.

In rural eastern and western parts of the state, areas prone to hurricanes or mountain ice storms, power outages last longer and capacity is weaker, undermining agriculture and small-town industry.

> **"POWER TO AGRICULTURE IS EXTREMELY CRUCIAL. ANIMALS IN BARNS CAN DIE QUICKLY WITHOUT NEEDED HEAT OR VENTILATION. INVENTORY IN COLD STORAGE FACILITIES WILL RUIN QUICKLY WITHOUT CRITICAL ENERGY."**
>
> — NORTH CAROLINA BUSINESS LEADER, AGRICULTURE SECTOR

The unanimous recommendation from business stakeholders is for immediate infrastructure investments and long-range capacity planning to "maintain North Carolina's competitive advantage." As one steering committee member put it, "we must continue to invest in maintaining and upgrading our infrastructure to include the electric grid." In short, reliable energy isn't a luxury for business growth – it's a baseline expectation.

Proactive Planning for Growth

With North Carolina's population and industry booming, the state must plan and build out energy infrastructure ahead of demand. Participants stressed that energy capacity should be managed like highways or broadband as a foundation for economic development that requires sustained investment. If infrastructure lags, burgeoning sectors from biotech in RTP to new manufacturers in the Triad could face power bottlenecks.

"Simply put, our infrastructure is not being built fast enough to keep up with the rising demand," said John Moura, director of reliability assessments and planning analysis at the North American Electric Reliability Corporation, a not-for-profit international regulatory authority whose mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.[68] Immediate attention to expanding grid capacity, upgrading aging components, and securing new generation is essential to sustain North Carolina's economic momentum. In practice, this reinforces the importance of comprehensive long-term infrastructure planning coordinated between government and utilities with input from industry, so that power supply never becomes a constraint on growth.

GRID MODERNIZATION AND RESILIENCY UPGRADES

To close the gap, North Carolina is prioritizing grid modernization and hardening. Duke Energy, the state's largest utility, has embarked on an ambitious grid upgrade program, planning to invest about $75 billion in grid improvements over the next decade.[69] This massive effort – part of a broader $145 billion capital plan – includes installing smart grid technologies, stronger transmission lines, and advanced automation to reduce outages. In the 2025–2030 period, Duke Energy is replacing aging transformers and lines, deploying thousands of smart sensors and advanced meters, and hardening vulnerable facilities against storms. State regulators are also encouraging the use of grid-enhancing technologies like dynamic line ratings and power flow control devices that can increase capacity on existing lines and speed the interconnection of new resources. A recent North Carolina Utilities Commission order noted that such technologies, "can be used to overcome interconnection limits," on the aging grid.[70]

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68 *Walton, R. (2025) 'Explosive' Demand Growth Puts More than Half of North America at Risk of Blackouts: NERC, Utility Dive. https://tinyurl.com/46xcj3mr.*

69 *Penrod, E. (2022) Duke Energy Ups 10-Year Capital Spending Plan to $145B to Modernize Grid, Move to Zero-Carbon Generation, Utility Dive. https://www.utilitydive.com/news/duke-energy-grid-modernization-renewable-capital-plan/633418/#:~:text=technologies%20that%20remain%20unproven.*

70 *Ouzts, E. (2025) North Carolina Eyes Grid-Enhancing Tech to Improve Aging Power Lines, Canary Media. https://www.canarymedia.com/articles/transmission/north-carolina-duke-grid-technology*

> **ENERGY INFRASTRUCTURE INVESTMENT IS SMART BUSINESS. IT ENHANCES OUR RESILIENCE, SHARPENS OUR COMPETITIVE EDGE, AND STRENGTHENS THE COMMUNITIES WE SERVE."**
>
> — NORTH CAROLINA BUSINESS LEADER, HEALTHCARE SECTOR

By the end of 2024, a majority of Duke Energy's customers are being served by "self-healing" networks that automatically isolate faults and reroute power, significantly shortening outage durations. Grid reinforcement is also paving the way for new energy sources. Taken together, these modernization efforts are designed to boost reliability and capacity statewide, ensuring that high-growth corridors can support new industrial loads without disruption. Business leaders view these investments as vital to instill confidence that North Carolina's infrastructure will keep pace with expansion.

The passing and signing into law of the H.R. 1 "One Big Beautiful Act" in July 2025, establishes new federal resources including a new Energy Dominance Financing authority and $1 billion in loan-guarantee credit through 2028 to increase capacity or output and to fund transmission, distribution, and reliability projects.[71] These federal loan guarantees, combined with optional 180-day, one-year National Environmental Policy Act (NEPA) review timelines for sponsors that pay the new review fee, mean grid hardening and expansion in North Carolina may move faster and at lower cost than before.[72] However, because the bill's implementation mechanisms are still unproven, and recent federal program roll outs have seen shifting timelines and murky guidance, initial enthusiasm may be tempered until H.R. 1's promises translate into on-the ground results.

Expanding Renewable Generation and Storage

North Carolina remains a national leader in solar energy, with continued growth expected despite recent policy shifts under Senate Bill 266 (SB266). By 2030, the state is slated to add roughly 8,000 MW of utility-scale solar, nearly doubling its current solar capacity along with about 2,500 MW of battery energy storage.[73] While SB266 removes certain interim carbon reduction targets established under House Bill 951, market forces, corporate zero-emissions-energy commitments, and competitive procurements are still driving dozens of new solar projects across the state.

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71 *H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act (2025) U.S. Government Publishing Office. https://www.congress.gov/bill/119th-congress/house-bill/1/text. (sec. 50403).*

72 *H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act (2025) U.S. Government Publishing Office. https://www.congress.gov/bill/119th-congress/house-bill/1/text. (sec. 60026).*

73 *American Clean Power (2023) Clean Energy Powers North Carolina, ACP. https://cleanpower.org/news/clean-energy-powers-north-carolina.*

This ongoing expansion of renewables will add zero-emission energy to the grid and underscores the increasing need for robust grid infrastructure and balancing resources. Large-scale battery storage systems, ranging from utility-level banks to distributed community installations, are planned to store excess solar power and deliver it during peak demand or outages. By mitigating solar variability, these batteries will help stabilize the grid, meet late-day demand, and address reliability concerns raised by North Carolina's business community.

Large renewables and storage projects often require new transmission lines or substation enhancements. If those investments lag, zero-emission power cannot reach businesses and consumers effectively. Integrating these resources will demand advanced grid controls and planning, but the payoff is significant: more home-grown energy, improved grid flexibility, and backup power that can keep critical facilities running through outages.

Energy storage is increasingly treated as a stand alone distributed energy resource (DER) that serves as a "virtual power plant," absorbing surplus electricity from any source and injecting it back when the grid is strained. North Carolina expects to add upwards of 2,000 MW of battery capacity, ranging from utility scale banks to community batteries, giving operators flexible tools to shave peaks and defer costly wires upgrades.[74] Beyond grid economics, storage backed microgrids are already being deployed to keep critical facilities such as water and public safety systems online during sabotage events or severe storms, demonstrating a resilience value that goes well beyond supporting nearby solar arrays. National analyses estimate that well sited battery energy storage systems can avoid significant costs in traditional generation and transmission investment, underscoring their role as a flexible reliability asset rather than merely a solar add on.[75]

Business stakeholders are enthusiastic about the growth of solar and battery assets in North Carolina, so long as infrastructure keeps pace. The consensus is that renewables and storage must be supported by a more resilient grid in order to truly strengthen the state's energy foundation.

Hydrogen-Ready Gas Plants for Peak Reliability

Even as renewables surge, reliability remains paramount. To ensure the lights stay on during extreme peaks and when renewable output dips, North Carolina's strategy includes limited new natural gas-fired peaking capacity as a bridge in the near term.

Duke Energy's approved resource plans call for building several fast-start combustion turbine plants by 2030 on the order of four units totaling 1.7 GW.[76] Importantly, any new gas units will be built "hydrogen-capable," meaning they can eventually be fueled with low-carbon hydrogen instead

74 *Norton, B. (2024) Duke Energy Responds to Constructive Carolinas Resource Plan Decision by North Carolina Utilities Commission, Duke Energy News Center. https://news.duke-energy.com/releases/duke-energy-responds-to-constructive-carolinas-resource-plan-decision-by-north-carolina-utilities-commission.*

75 *Jarbratt, G. et al. (2023) Enabling Renewable Energy with Battery Energy Storage Systems, McKinsey & Company. https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/enabling-renewable-energy-with-battery-energy-storage-systems.*

76 *Wolfe, S. (2024) Duke Energy Gets Approved to Deploy Thousands of MW of New Generation in NC, Power Engineering. https://www.power-eng.com/business/policy-and-regulation/duke-energy-gets-approved-to-deploy-thousands-of-mw-of-new-generation-in-nc-including-new-gas-plants.*

of natural gas. Duke Energy has earmarked about $5 billion for hydrogen-enabled gas technology as part of its 10-year plan, ensuring that today's reliability investments do not lock in obsolete fossil infrastructure.

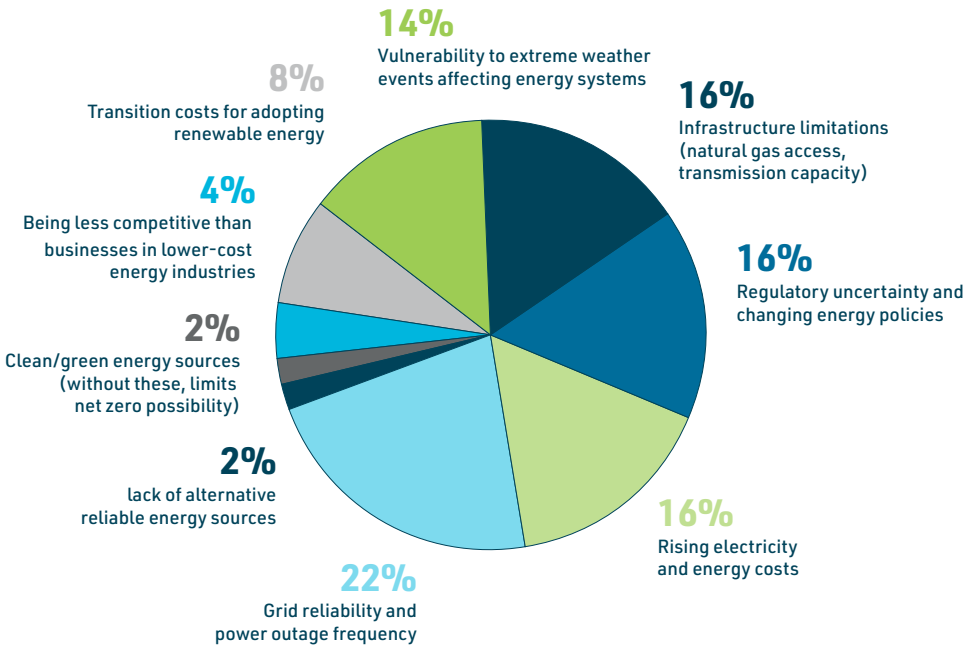
These new "peaker plants" may serve as insurance for the grid during the hottest summer afternoons or coldest winter nights. They will operate only when needed. Many business leaders see these limited gas additions as an acceptable trade-off to maintain near-term reliability. This view aligns with SB266's focus on dispatchable baseload capacity and cost/reliability over the now-removed 2030 interim emissions mandate. Support is conditional, however, on clear guardrails such as dual-fuel or hydrogen readiness, pairing with storage or demand response, or sunset dates tied to future resource additions.

Regulators have pledged to closely review any proposed gas projects to ensure they meet least-cost planning standards, support system reliability and affordability, and remain consistent with the state's 2050 carbon-neutral objective.[77] These reviews will push utilities to use peaker plants sparingly and justify fuel price and pipeline deliverability. Bolstering infrastructure capacity, reliability, and resilience is fundamental to North Carolina's energy vision and economic future. Reliability underpins business confidence, while resilience ensures the system can recover swiftly from storms, cyber-attacks, or other disruptions. Infrastructure reliability underpins business confidence, influences site selection decisions, and enables growth in every sector of the economy. Strengthening infrastructure is a long-term endeavor, one that requires public-private collaboration, forward-looking investment, and continued responsiveness to the voice of industry. The payoff will be a future-ready energy system that can support North Carolina's prosperity for decades to come.

77 *Ouzts, E. (2024) Regulators OK Duke Energy's Gas-Plant Buildout Despite N.C. Climate Law, Canary Media. https://www.canarymedia.com/articles/utilities/regulators-ok-duke-energys-gas-plant-buildout-despite-n-c-climate-law.*

Top Energy-Related Concerns for Businesses in NC

PERCENTAGE OF RESPONDENTS



Source: NC Chamber Foundation Stakeholder Engagement Process and Polling (2025)

RELIABILITY IS TABLE STAKES

North Carolina's energy reliability has long been one of its strategic advantages, but the bar is rising. As modern industries become more automated, interconnected, and continuous in operation, the tolerance for even brief disruptions is shrinking. Business leaders participating in this process described reliability not as a preference, but as a prerequisite, "table stakes" for doing business in the state. Even momentary voltage sags can stop production lines, damage sensitive equipment, or jeopardize life-saving procedures in healthcare settings. Across sectors, stakeholders made it clear: without reliable power, North Carolina's competitive edge is at risk.

> **AS A GLOBAL MANUFACTURING COMPANY, ENERGY IS AN ESSENTIAL COMPONENT OF OUR OPERATIONS. CONSEQUENTLY, MAINTAINING RELIABLE AND RESILIENT ENERGY SERVICE IS CRUCIAL TO OUR PROFITABILITY AND SUCCESS."**
>
> — NORTH CAROLINA BUSINESS LEADER, MANUFACTURING SECTOR

Reliability emerged as one of the most frequently cited concerns in interviews and surveys. Companies stated they, "consistently prioritize energy reliability above cost considerations," for operations that cannot tolerate downtime. While affordability still matters, most respondents said they are willing to support rate structures or investments that ensure uninterrupted service. Several firms in the stakeholder process have invested in backup generators, uninterruptible power supply systems, or on-site energy storage. However, they stressed that these redundancies add significant expense and should not be a substitute for a robust and dependable grid.

Recent developments following the passage of H.R.1 now position projects that support "known or forecastable electric supply at time intervals necessary to maintain or enhance grid reliability or other system adequacy needs" eligible for additional federal funding. With this, utilities gain a federal backstop for self-healing networks, advanced relays, and reserve-margin upgrades (the amount of power utilities must have available beyond projected peak demand).[78] If the law is executed effectively, this financing will reduce retail rate pressure while bolstering reliability standards across North Carolina.

78 *H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act (2025) U.S. Government Publishing Office. https://www.congress.gov/bill/119th-congress/house-bill/1/text. (sec. 50403).*

> **WITH MANY MODERN BUSINESS PROCESSES DEMANDING SIGNIFICANTLY HIGHER ELECTRIC LOADS THAN PAST YEARS, WE NEED TO ENSURE THAT ELECTRICITY REMAINS READILY AVAILABLE TO MEET THE DEMAND, WHILE ALSO MAINTAINING AFFORDABILITY AND RELIABILITY. RELIABILITY IS REQUIRED FOR BUSINESS GROWTH, BALANCING CLEAN ENERGY OPTIONS, AFFORDABILITY, AND RELIABILITY IS KEY TO CONTINUED SUCCESS."**
>
> — NORTH CAROLINA BUSINESS LEADER, ENGINEERING SECTOR

Quality and Resiliency

Importantly, reliability expectations are evolving. It is no longer just about uptime, but *quality* and *resiliency*. Firms emphasized the priority of power quality (voltage consistency), the ability to recover rapidly after faults, and adequate protection from high-impact, low-frequency threats such as severe storms or cyberattacks.

The economic stakes are high. According to the U.S. Department of Energy, power outages cost American businesses up to $150 billion per year in lost productivity, damaged goods, and missed revenues.[79] This pillar, while closely related to infrastructure investment, is focused specifically on operational performance. Businesses are calling for investments in outage prevention, faster restoration, better vegetation management, and smarter grid segmentation. Research highlights the potential role higher reliability standards could play as a key metric in long-term planning and cost recovery decisions.[80]

Upholding the reliability imperative during the energy transition

Business leaders are supportive of North Carolina's emissions goals and the integration of renewables, but stress that zero-emission energy must be dependable energy. As one business leader put it: *"Affordability, sustainability – those are strategic. But reliability is foundational. If we lose that, we lose the whole game."*

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79 *Office of Nuclear Energy (2018) Department of Energy Report Explores U.S. Advanced Small Modular Reactors to Boost Grid Resiliency, Energy.gov. https://www.energy.gov/ne/articles/department-energy-report-explores-us-advanced-small-modular-reactors-boost-grid.*

80 *Stover, O., Karve, P. and Mahadevan, S. (2022) Reliability and Risk Metrics to Assess Operational Adequacy and Flexibility of Power Grids, Reliability Engineering & System Safety. https://www.sciencedirect.com/science/article/abs/pii/S0951832022006330.*

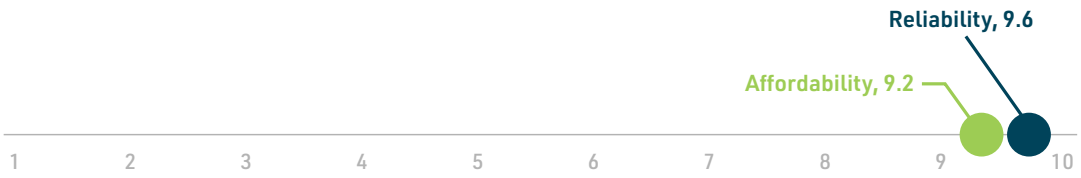
In this way, reliability is not just one pillar; it is the load-bearing beam that supports them all. North Carolina must treat reliability as a shared performance goal across utilities, regulators, developers, and industries – and ensure it evolves to meet the increasingly complex demands of a modern economy.

AFFORDABLE, PREDICTABLE POWER: A BUSINESS IMPERATIVE

While reliability is the priority, energy cost is, "a very close second," on the list of business concerns. This cost advantage, underpinned by abundant low-cost generation such as nuclear, solar, and natural gas, helps North Carolina companies compete globally. Competitive prices, "help keep operating costs down and strengthen the state's overall competitiveness." As one executive observed, North Carolina's power costs are, "comparable to the Midwest and much lower than high-cost regions like California," underscoring how affordability attracts new investment.

Importance of Energy Reliability and Affordability

On a scale of 1-10, how important is reliable energy to your business operations?
On a scale of 1-10, how important is affordable energy to your business operations?



Source: NC Chamber Foundation Stakeholder Engagement Process and Polling (2025)

Industry Concerns: Price Stability and Fairness

Businesses plan on multi-year horizons, so predictability of energy costs is essential. Executives warn that sudden fuel-price spikes or unexpected rate surges are difficult for manufacturers and industry to absorb.

> **ENERGY COST REPRESENTS A SIGNIFICANT PORTION OF PERSONAL, COMMERCIAL AND ESPECIALLY MANUFACTURING BUDGETS, THUS REPRESENTS A KEY CONSIDERATION."**
>
> — NORTH CAROLINA BUSINESS LEADER, ENGINEERING SECTOR

To manage this risk, companies value regulatory tools that smooth rate changes such as multi-year rate cases, fuel hedging, and performance-based rate plans. Industry leaders also emphasize fairness in cost allocation. If a handful of exceptionally large new users drive the need for new infrastructure, those customers should, "bear a fair share of the cost," rather than shifting it onto other ratepayers. Similarly, energy-intensive firms favor rate designs that reward off-peak usage and efficiency such as time-of-use pricing or demand charges. Throughout, businesses expect transparency. Utilities should clearly explain why rates change and engage stakeholders in the planning process.

Policy Tools: Least-Cost Planning and Strategic Investment

North Carolina's regulatory framework helps keep future rates in check. State law requires utilities to pursue cost-effective, "least-cost" resource plans, forcing every new investment to justify its long-term value. Business stakeholders stress that as demand grows, North Carolina must maintain a careful three-way balance of "reliable, affordable, and sustainable" energy.

> **RELIABLE, AFFORDABLE, CLEANER – IN THAT ORDER."**
>
> — NORTH CAROLINA BUSINESS LEADER, UTILITY SECTOR

In practice, this means pursuing new capacity and grid upgrades only in ways that minimize total system cost. For example, North Carolina's recent reforms such as long-term rate plans, multi-year fuel factors, and integrated resource planning with carbon goals are designed to spread out expenditures and avoid sudden rate shocks. Companies support aggressively leveraging federal incentives and private capital to minimize rate impacts. Stakeholders note that North Carolina's diversified energy mix already provides a foundation for low costs, and continued investment in smart grid and efficiency measures will lock in those benefits.

Smart Investments and Federal Impact

Business leaders insist that affordability and modernization are not mutually exclusive. Smart investments now can prevent expensive outages and fuel volatility later. Stakeholders call for maximizing federal and state funding to accelerate this transition, however the landscape is complicated by the recent passage of H.R. 1 which terminates residential and commercial zero-emission energy investment credits and several other Inflation Reduction Act incentives, trimming federal credits originally assumed in infrastructure financing.[81] Despite this, the U.S. Department of Energy's "Grid Resilience and Innovation Partnerships (GRIP)" program, and its $10.5 billion authority,

81 *U.S. House Committee on Ways & Means (2025) The One, Big, Beautiful Bill, U.S. House Committee on Ways & Means. https://waysandmeans.house.gov/wp-content/uploads/2025/05/The-One-Big-Beautiful-Bill-Section-by-Section.pdf. (sec. 112003-112007).*

remain in-tact and is explicitly aimed at strengthening the power system while reducing costs for consumers.[82]

As the dust settles and H.R. 1 moves into practice, these strategies remain relevant:

- **Use federal and private dollars:** Aggressively pursue federal infrastructure and grid modernization grants and public–private partnerships to offset capital costs.
- **Smart rate design:** Implement rate structures that reward energy efficiency and demand response. This includes time-of-use rates, peak-demand pricing, and performance-based incentives.
- **Accelerate efficiency:** Strengthen and reinforce energy efficiency programs. These smart-growth strategies help North Carolina maintain its affordability edge, even as the grid evolves.

Integrating Affordability into the Energy Vision

In North Carolina's business-driven energy vision, affordability is closely tied to reliability and sustainability. Industry leaders emphasize that affordable energy must remain a priority, even as the state pursues a balanced mix of zero-emission and dispatchable power sources.

With SB266 now law, the focus has shifted toward expanding generation capacity and ensuring dispatchable baseload resources while managing costs over time.[83] Rigorous long-term planning, cost-benefit analysis, and smart use of federal incentives will be critical to avoid rate shocks and maintain competitiveness. SB266's provisions aim to stabilize the cost of new investments by spreading expenditures across project timelines and aligning resource additions with affordability and reliability goals.

Business leaders emphasize that some cost increases may be necessary for grid modernization, but these should be modest and predictable. Indeed, one industry participant summarized the goal as "planned, smart growth" that aligns the interests of both small businesses and large manufacturers. By keeping energy costs competitive, North Carolina can uphold its reputation as a top site-selection state – sustaining long-term economic growth and prosperity across the state.[84]

Federal activity remains a significant influence on energy affordability. Changes in on-shore oil and gas lease sales and expedited review processes following the passage of H.R. 1 may ease natural gas price pressure in the Mid-Atlantic.[85] This may prove to offset losses from the removal of zero-emission energy subsidies. As the price landscape for energy generation sourcing fluctuates, the business directive to balance affordability and reliability demands a risk-sensitive energy generation strategy.

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82 *Grid Resilience and Innovation Partnerships (GRIP) Program (2025) Energy.gov. https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program.*

83 *Wagner, A. (2025) NC General Assembly Passes Bill Removing Interim Carbon Reduction Target for Duke Energy, WUNC. https://www.wunc.org/politics/2025-06-19/nc-energy-bill-power-costs-duke-energy-residential-customers.*

84 *Gerlach, D. (2025) Addressing North Carolina's Health Care Workforce Crisis , NC Chamber Foundation: Foundation Forecast. https://ncchamber.com/2025/06/18/foundation-forecast-new-ranking-points-to-strength-of-manufacturing-in-north-carolina-2/.*

85 *H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act (2025) U.S. Government Publishing Office. https://www.congress.gov/bill/119th-congress/house-bill/1/text. (sec. 50201).*

AN ALL-OF-THE-ABOVE BALANCED MIX OF ENERGY GENERATION

North Carolina's business leaders overwhelmingly endorse a diversified "all-of-the-above" portfolio to power the state's growth. Each energy resource has unique strengths, and stakeholders emphasize that overreliance on any single technology introduces unacceptable risk. Reliability, affordability, and sustainability must be achieved in parallel. Throughout the stakeholder engagement process, it was abundantly clear that North Carolina's business leaders welcome innovation with cautious optimism – eager for proven energy solutions but insisting on scalability, reliability, and cost-effectiveness. Stakeholders view portfolio diversification as essential, but only if reliability metrics are maintained or improved. In practice, every proposed resource shift must first clear a "no-degradation-to-reliability" test.

North Carolina's business-driven energy vision embraces innovation not for its novelty, but for its ability to deliver real-world value and to bolster competitiveness. In this light, a balanced energy mix is not only a hedge against market volatility but also a key enabler of industrial development and resilience.

Nuclear Power and New Technologies

Nuclear power remains a cornerstone of North Carolina's energy portfolio. Historically a reliable and emissions-free source of baseload power, nuclear energy is gaining new attention as clean energy and resilience goals intensify. In stakeholder conversations, interest was especially high in small modular reactors (SMRs) that can provide constant output with enhanced safety and deployment flexibility.

> **"I THINK WE NEED INVESTMENT IN A WIDE CROSS SECTION OF INDUSTRIES. WE ALSO NEED A CAMPAIGN TO TALK ABOUT THE SAFETY OF NUCLEAR ENERGY, BECAUSE I FEAR THERE IS A LOT OF MISCONCEPTIONS ABOUT IT."**
>
> — NORTH CAROLINA BUSINESS LEADER, BUSINESS DEVELOPMENT SECTOR

The recent commissioning of nuclear facilities elsewhere in the U.S., along with Duke Energy's plans to bring two 300 MW advanced reactors online by 2035, signals momentum.[86] Policymakers in North Carolina are now exploring licensing readiness, preservation of existing nuclear sites, and partnerships

86 *DiGangi, D. (2024) North Carolina OKs Duke Energy Plan to Add 3.6 GW Gas-Fired Capacity, 7 GW Renewables, Utility Dive. https://www.utilitydive.com/news/north-carolina-commission-accepts-duke-energys-carbon-plan/732010.*

with research institutions like NC State University, which has long been a leader in nuclear R&D.[87] Industry leaders see these moves as prudent preparation to ensure SMRs are an available tool should they mature as expected.

Renewables, Storage, and Innovation

Renewables and energy storage are also a part of the balanced mix. North Carolina has already distinguished itself as a top-tier solar state, ranking fifth nationally for installed solar capacity.[88] The business community broadly supports expanded solar deployment, both utility-scale and distributed, as well as emerging investments in wind power. However, realizing this promise will require substantial grid infrastructure upgrades, port investments, and regulatory certainty. In the interim, battery storage is seen as a critical enabler to manage solar intermittency, ensure peak reliability, and defer costly upgrades.[89] Storage projects are already in the pipeline across Duke Energy's territory, from grid-scale installations to smaller community-level systems that can provide backup resilience. The goal is a future where storage routinely buffers solar variability and supplies flexible capacity during stress events.

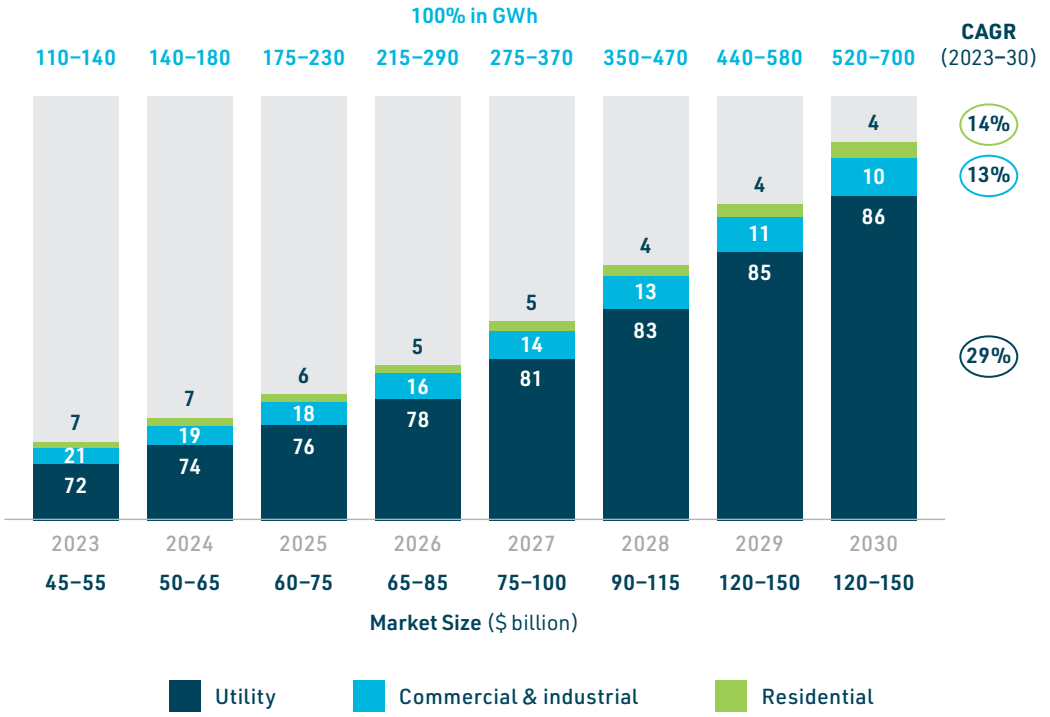
87 *Advancing Nuclear Research (2025) NC State University Clean Energy Study. https://www.ncsu.edu/clean-energy-study..*

88 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

89 *Jarbratt, G. et al. (2023) Enabling Renewable Energy with Battery Energy Storage Systems, McKinsey & Company. https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/enabling-renewable-energy-with-battery-energy-storage-systems.*

Annual Added Battery Energy Storage System (BESS) Capacity

PERCENT



Note: Figures may not sum to 100% because of rounding.

Source: McKinsey & Company Energy Storage Insights BEDD market model.[90]

While optimistic, business leaders are clear-eyed about renewable limitations. Intermittency remains a concern, particularly for around-the-clock operations such as healthcare, data centers, and manufacturing. For these users, the idea of a future grid dependent entirely on variable sources without adequate firm power is unworkable. As such, stakeholders see renewables as vital, but not sufficient. To bridge that gap, many support "hydrogen-ready" natural gas plants that can operate as peaking units today and transition to zero-emission fuels over time. Several business leaders described natural gas as a "bridge" that supports reliability while new technologies and transmission catch up.

90 IBID.

> **INVESTING IN ENERGY INFRASTRUCTURE, INCLUDING NATURAL GAS PIPELINES, UNDERGROUND UTILITY LINES, AND ENHANCED VEGETATION AND WILDFIRE MANAGEMENT, MAY CONTRIBUTE POSITIVELY TO THE GROWTH POTENTIAL OF THE INDUSTRY IN NORTH CAROLINA."**
>
> — NORTH CAROLINA BUSINESS LEADER, BUSINESS DEVELOPMENT SECTOR

In the recent passage of H.R. 1, the repeal of the Greenhouse Gas Reduction Fund and other IRA grant authorities, utility scale solar, storage and zero-emission vehicle adoption will depend more on state-level incentives and corporate power purchase agreements than on federal grants to achieve sustainability.[91] Counter to this challenge, new loan guarantees target the funding of projects that increase capacity or output of any generation resource, an objective that reinforces the importance of diversified, reliability-focused portfolio.

Efficiency and demand-side management round out the balanced portfolio. Stakeholders emphasize that the cheapest and greenest kilowatt-hour is the one not used. North Carolina is already a regional leader in energy efficiency, but it is clear that opportunity remains. Many businesses are already investing in energy efficiency upgrades from LED lighting and HVAC automation to process controls in advanced manufacturing. These efforts not only reduce costs but help alleviate stress on the grid. As one participant noted, "We need to use everything in the toolbox – and that includes using less."

Ultimately, a balanced mix is both a strategic hedge and a competitive advantage. By leveraging every viable source – nuclear, renewables, natural gas, storage, and reduced usage – North Carolina will enjoy reliable, affordable, and sustainable power across all sectors. This portfolio approach also enhances resilience, ensuring that disruptions to one supply chain or generation source do not undermine overall system performance. From the business perspective, diversification is not just a technology preference but a necessity for long-term economic growth. As one executive in the healthcare sector summarized, "The amount of energy we need is too significant to be solely reliant on clean energy…maybe we meet in the middle."

REGULATORY REFORM AND STREAMLINING DEVELOPMENT

If North Carolina is to meet its energy goals while supporting rapid economic growth, the regulatory environment must be more efficient, transparent, and predictable. Across every focus group and

91 *H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act (2025) U.S. Government Publishing Office. https://www.congress.gov/bill/119th-congress/house-bill/1/text. (sec. 60002).*

survey, businesses identified permitting delays, jurisdictional fragmentation, and unclear timelines as major barriers to investment.

Companies attempting to build new energy projects routinely face multi-year approval cycles involving local zoning, state permits, and federal reviews. This process is often sequential rather than concurrent, causing compounding delays. According to a recent Brookings study, such delays are now a leading reason for project cancellations nationwide.[92] Similar challenges face workforce housing development and construction, child care, water and wastewater efforts.[93] For North Carolina to stay competitive, permitting and regulatory processes must be deliberately aligned with the pace of growth.

Improving, Clarifying, Simplifying Processes

Industry leaders are calling for the creation of a centralized "one-stop permitting shop" to streamline approvals for major energy infrastructure. This concept is increasingly used in other states and consolidates local, state, and federal oversight into a coordinated process, eliminating redundancies and providing developers with a single point of contact.[94] In neighboring Virginia, Dominion Energy's 2.6GW Coastal Virginia Offshore Wind project has advanced through permitting nearly twice as fast as earlier efforts in the energy sector due to improved coordination between federal agency review and streamlined procedures that have reduced delays, lowered project costs, and kept the infrastructure build on schedule.[95]

Clear statutory timelines should be established for each permit type, with transparent tracking of application progress. Such reforms would give companies greater certainty, reduce risk premiums, and accelerate construction of the infrastructure needed to support population and business growth. Business stakeholders consistently stressed that the current lack of coordination and inconsistencies between jurisdictions causes confusion, duplicative reviews, and, ultimately, missed opportunities.

Further regulatory uncertainty at the federal level compounds the challenges that businesses face when considering growth, investment, or expansion hamstrung by disjointed permitting processes.[96] With the recent passage of H.R. 1, amendments to the NEPA process include expedited environmental review with clearly articulated timelines; however, their implementation and practical application remain untested.[97] Embedding a fast-track option in state guidance would bolster businesses' call for predictable timelines and align North Carolina's one-stop concept with the new federal framework.

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92 *Bauer, L., Edelberg, W. and Greene, C. (2024) Eight Facts about Permitting and the Clean Energy Transition, The Hamilton Project. https://www.hamiltonproject.org/publication/economic-fact/eight-facts-permitting-clean-energy-transition/.*

93 *NC Chamber Foundation (2025) Addressing North Carolina's Child Care Crisis, NC Chamber Foundation. https://ncchamber.com/wp-content/uploads/2025-NC-Chamber-Foundation-Child-Care-Report.pdf.*

94 *Alagappan, L. et al. (2024) Assessment of Renewable Energy Siting and Permitting Policies, Energy + Environmental Economics. https://www.ethree.com/wp-content/uploads/2024/04/Renewable-Siting-and-Permitting-Policies-E3-Public-Version-04.17.2024.pdf.*

95 *Ford, N. (2024) U.S. Set for Faster Offshore Wind Permits under New Rules, Reuters. https://www.reuters.com/business/energy/us-set-faster-offshore-wind-permits-under-new-rules-2024-05-03.*

96 *Aschenbach, D. (2025) Uncertainty of Government Policy Looming Financial Risk, Energy Central: Energy Business. https://www.energycentral.com/energy-biz/post/uncertainty-of-government-policy-looming-financial-risk-pGVDwK3gNPl1ocd.*

97 *Rothenberg, E. (2025) The One Big Beautiful Bill Act Offers Expedited NEPA Review – for a Fee, O'Melveny & Myers LLP. https://www.omm.com/insights/alerts-publications/the-one-big-beautiful-bill-act-offers-expedited-nepa-review-for-a-fee/.*

Transparency, Information, and Communication

Other proposals include building out a publicly available permitting dashboard, enhanced pre-application consultations to identify fatal flaws early, and increased staffing and technical capacity within state agencies to process growing application volumes. Stakeholders also suggested piloting expedited reviews for projects that meet pre-defined siting or emissions criteria. Business leaders see value in categorical exclusions or "fast lanes" for non-controversial zero-emission energy projects that comply with local land-use plans and environmental standards. Such tools are common in transportation infrastructure and are increasingly proposed for energy infrastructure at the federal level.[98]

> **IF THEY COULD PAINT A PICTURE OF WHAT IT WILL LOOK LIKE, WE'D BE OPEN TO GO THROUGH SOME TEMPORARY PAIN FOR A GOOD OUTLOOK ON THE OTHER SIDE."**
>
> — NORTH CAROLINA BUSINESS LEADER, BUSINESS DEVELOPMENT SECTOR

Better communication and collaboration between regulators and industry is essential and was discussed by both industry and utilities during the engagement process. Companies want to be partners in the energy transition, while utilities can do far more to meet customer needs when they are in the loop. Industry representatives expressed a willingness to endure temporary rate increases or compliance costs, but only if the end goals are clear, aligned with their operational timelines, and reflect a coordinated public-private strategy. In this context, regulatory reform is not just about speed, it is about clarity, coordination, and confidence.

Providing Long-Range Planning Certainty

Beyond permitting, firms seek a more predictable long-range planning framework. Stakeholders want to understand what North Carolina's future energy mix and grid capacity will be. Regular updates to the state's Carbon Plan, Integrated Resource Plan (IRP), and grid modernization strategy are viewed as essential. Business leaders emphasize that they make capital decisions on 20-to-30-year horizons and need long-term alignment from policymakers. Regulatory "whiplash" from frequent shifts in direction due to changes in leadership or agency policy deters investment and makes project financing more difficult. As one utility executive noted, "It's very hard to invest in 30-year assets when administrations change every four years and have a different approach on energy."

98 *Bipartisan Policy Center (2022) The Role of Categorical Exclusions in Achieving Net-Zero by 2050, Bipartisan Policy Center. https://bipartisanpolicy.org/report/categorical-exclusions.*

BRIDGING THE RURAL-URBAN GAP

Ensuring Access and Resources

One of the most consistent priorities voiced by North Carolina's business and industry stakeholders is the need to bridge persistent energy infrastructure disparities between urban and rural areas. The state's fast-growing metropolitan hubs benefit from regular investment and modern grid assets, while rural communities too often remain under-resourced, with older systems and limited redundancy. This imbalance not only undermines statewide reliability, meaning the consistent delivery of power, and resilience, the ability to restore service quickly after disruptions, it also limits the economic potential of rural North Carolina. Bridging the rural-urban gap is a strategic imperative that enhances statewide competitiveness and supports economic development.

> **ENERGY CONSIDERATIONS ARE PRIMARY QUESTIONS FROM OUR ECONOMIC DEVELOPMENT CLIENTS, WHETHER NEW TO THE COMMUNITY OR THOSE CONSIDERING EXPANSION HERE. READILY AVAILABLE, AFFORDABLE AND SUSTAINABLE ENERGY IS FOUNDATIONAL TO NORTH CAROLINA'S BUSINESS CLIMATE."**
>
> — NORTH CAROLINA BUSINESS LEADER, ECONOMIC DEVELOPMENT SECTOR

The NC Chamber Foundation's stakeholder engagement process emphasized that rural reliability gaps are becoming dealbreakers in site selection decisions. Industry leaders and economic developers confirmed that some companies bypass rural locations due to insufficient or uncertain access to reliable, high-capacity power. This trend jeopardizes job creation and investment in regions that often need it most. A forward-looking energy vision must anticipate rural growth potential rather than wait for demand to outpace infrastructure.

From Constraint to Opportunity: Rural Energy as a Strategic Asset

While rural areas face real infrastructure constraints, they also represent unique opportunities for innovation and energy development. With open land, robust agricultural and forestry activity, and a growing network of cooperative and municipal utilities, rural North Carolina is well-positioned to support the expansion of renewable energy, distributed generation, and energy resilience technologies. Rural solar farms have already brought tax revenue and lease income to Eastern counties, and there is growing interest in bioenergy, biogas, and microgrid development. With the recent passage of H.R. 1, 25% of renewable energy right-of-way fees on federal land will now return to

the counties in which they are generated.[99] This may provide rural coastal and mountain counties with a revenue source for local grid upgrades. Stakeholders expressed concern that rural solar siting must consider agricultural land-use conflicts and engage the agriculture community.

Electric cooperatives, serving many of these areas, have emerged as innovation partners. Several are exploring technologies like broadband over power lines, community solar gardens, and rural EV charging infrastructure.[100] These entities bring deep community ties and service-driven missions, making them ideal collaborators in building locally tailored energy solutions. Strengthening this capacity through targeted technical assistance, planning grants, and capital investment will unlock more shovel-ready projects and drive long-term resilience.

Strategies to Close the Gap

To eliminate rural-urban energy disparities, North Carolina must implement a coordinated set of strategies that prioritize reliability and economic vitality, including:

- **Targeted Rural Investment:** Offer matching grants or low-interest loans for rural grid upgrades, including construction, substation modernization, and deployment of smart grid technologies. Focus should include small cities and cooperative service areas, where infrastructure upgrades, particularly smart technologies and microgrids, are critical. Simply expanding rural transmission capacity is not a complete solution.
- **Public-Private Partnerships:** Encourage collaborative investment models to make rural infrastructure projects viable despite lower population density.
- **Resilience Planning:** Support the development of resilience hubs and community microgrids to provide critical backup power in areas with long restoration times. Expand deployment of microgrids and grid-enhancing technologies such as dynamic line ratings and power flow controls to improve flexibility and redundancy.
- **Workforce Development:** Build the rural energy workforce through partnerships with community colleges and co-ops, creating pathways into clean energy careers.
- **Inclusive Governance:** Institutionalize rural participation in energy planning processes, such as through regional coordination bodies or Regional Councils of Governments-led energy strategies.

A Vision of Shared Opportunity

Bridging the rural-urban gap enhances the resilience and flexibility of the entire grid. It also positions North Carolina to compete more effectively for industrial investment across all regions, not just metro corridors. Just as a diversified supply chain provides risk mitigation in industry, a geographically balanced energy infrastructure network reduces single points of failure and brings the benefits of zero-emission, reliable energy to every resident, community, and business.

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99 *Friedman, S. (2025) What's in The Big Bill for Us?, The Smokey Wire: National Forest News and Views. https://forestpolicypub.com/2025/07/07/whats-in-the-big-bill-for-us-ii-selling-more-timber-and-long-term-contracts.*

100 *North Carolina's Electric Cooperatives (2023) Co-Ops Charge Forward with Electric Vehicles, North Carolina's Electric Cooperatives. https://www.ncelectriccooperatives.com/who-we-are/spotlight/co-ops-charge-forward-with-electric-vehicles.*

By aligning infrastructure policy with rural economic development goals, North Carolina can transform legacy constraints into a competitive advantage. This pillar of the energy vision reaffirms the central idea that no community should be left behind, and that the state's economic success is stronger when it is shared. Strengthening rural energy infrastructure is not just about keeping the lights on in small towns; it's about powering the next chapter of North Carolina's broad growth and innovation story.

SUSTAINABILITY AS A COMPETITIVE ADVANTAGE

North Carolina's business community made clear that sustainability is no longer optional – it is a strategic requirement. Global customers, investors, and regulators increasingly demand low-carbon products and operations. North Carolina manufacturers now face requirements that suppliers use a set percentage of renewable energy or risk losing contracts. This dynamic makes access to zero-emission power a competitive edge. As one stakeholder warned, "Sustainability is becoming a must-have for doing business with global partners, not just a moral choice." Business and industry leaders see clean energy and environmental stewardship as more than a cost center, it is an essential for growth and competitiveness.[101]

Business Perspectives on Sustainability

Industry reported that meeting customer and partner sustainability expectations directly "affect[s] their growth and ability to compete," especially in markets with strict standards. North Carolina's deep ties to international markets and supply chains mean that European and Asian partners' aggressive carbon targets quickly become local realities. Many North Carolina firms therefore proactively seek carbon-free solutions now.

> **"BUSINESSPEOPLE IN NORTH CAROLINA CARE DEEPLY ABOUT THE ENVIRONMENT AS WELL AS THE HEALTH OF THEIR BUSINESS. WE MUST FIND A WAY TO BALANCE THE NEEDS AND THEIR ENVIRONMENTAL CONCERNS."**
>
> **— NORTH CAROLINA BUSINESS LEADER, RURAL CHAMBER OF COMMERCE**

Utilities are listening and meeting industry where they are needed. Duke Energy's voluntary Green Source Advantage Choice program allows large North Carolina customers to procure zero-emission

101 *Heimbach, S. (2015) Siemens To Be Climate Neutral by 2030, Siemens. https://press.siemens.com/global/en/pressrelease/siemens-be-climate-neutral-2030.*

power from specific solar and wind projects.[102] Industry leaders stressed that having a clean, reliable grid, backed by ample renewables and storage, will attract investment and keep businesses from leaving the state. If North Carolina fails to offer scalable low-carbon options, companies warned, some operations could shift to competing states or countries that do.

Global Corporate Commitments

Major multinational firms with North Carolina operations illustrate this trend.[103]

- Apple, a large employer in North Carolina, now powers its data centers with 100% renewable energy. In Maiden, N.C., a Catawba County town with just over 3,800 in population, the company built two 100-acre solar farms and biogas fuel cells to supply its campus.
- Google similarly contracted local zero-emission energy, signing a 189 MW wind power purchase agreement in 2023 that supports its goal of running all data centers on carbon-free electricity by 2030.[104]
- Novo Nordisk, the Danish pharmaceutical and biotechnology giant with stringent sustainability commitments, has invested in a 105 MW solar farm near its Clayton manufacturing campus so that all North Carolina facilities will operate on emissions-free power.[105]
- Toyota chose North Carolina for its first North American battery plant, highlighting the state's skilled workforce and zero-emission energy infrastructure. The new plant is explicitly part of Toyota's roadmap toward carbon-neutral electric vehicles.[106]
- Siemens, the German technology conglomerate with several operations in North Carolina, has set a net-zero operations target by 2030, reflecting the broader industry commitment.[107]

Sustainability credentials make North Carolina more attractive to investors and help recruit new "next-generation" industries that prize zero-emission energy access. With the sunsetting or rescinding of

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102 *Stewart, L. (2024) Duke Energy Expands North Carolina Program That Helps Businesses Become More Renewable and Carbon-Free, Duke Energy News Center. https://news.duke-energy.com/releases/duke-energy-expands-north-carolina-program-that-helps-businesses-become-more-renewable-and-carbon-free.*

103 *Note: Corporate sustainability commitments shown are accurate as of this report's publication date. They do not constitute, and should not be interpreted as, any form of agreement, endorsement, or obligation. For the most current information on a company's sustainability objectives, please contact the company directly.*

104 *Strumlauf, C. (2023) Apex and Google Partner to Advance North Carolina's Second Wind Farm, Apex Clean Energy. https://www.apexcleanenergy.com/news/apex-and-google-partner-to-advance-north-carolinas-second-wind-farm.*

105 *Maurer, A. (2019) NC Solar Plant to Serve All Novo Nordisk U.S. Operations, NC Biotechnology Center. https://www.ncbiotech.org/news/nc-solar-plant-serve-all-novo-nordisk-us-operations.*

106 *Governor Cooper Announces Toyota Will Build Company's First North American Battery Plant in North Carolina (2021) NC Governor's Press Office. https://www.commerce.nc.gov/news/press-releases/governor-cooper-announces-toyota-will-build-company%E2%80%99s-first-north-american.*

107 *Siemens AG (2025) Leading The Way to A Net-Zero Future, Siemens AG. https://www.siemens.com/global/en/company/sustainability/net-zero.html.*

most federal zero-emission tax credits and grant programs[108], North Carolina has the opportunity to further strengthen its value-proposition to both domestic and foreign corporate investment with state-level programs and incentives.

Profitability through Sustainability

Contrary to old assumptions, cutting emissions often saves money and drives innovation. "Cutting our carbon footprint is not only good corporate citizenship, it's also good business," said Joe Kaeser, president and CEO of Siemens AG.

At global scale, Siemens expects to reduce energy costs by more than $23.5 million a year.[109] Energy efficiency investments routinely lower costs while reducing pollution – a win win. Likewise, boosting renewables, storage, and zero-carbon nuclear power in North Carolina can hedge against volatile fuel prices and provide backup power during outages, directly benefiting bottom lines.

North Carolina's relatively low power costs (the state ranks below U.S. averages for industrial and commercial rates) are a competitive asset.[110] Pairing that affordability with more on-site solar, wind, storage, and even nuclear generation through SMR technologies, will keep rates attractive and stable.

Business stakeholders agree that a modernized smart grid and distributed resources (like microgrids and batteries) may improve reliability and flexibility, enabling more industry and job growth. As one summary of stakeholder feedback put it, "energy efficiency lowers costs and emissions simultaneously, grid modernization improves reliability and enables cleaner energy, [and] renewables can hedge against fuel price volatility while cutting carbon." In this way, sustainability and economic prosperity reinforce one another.

Sustainability and Procurement

In the absence of mandates or carbon credit markets, procurement strategy itself becomes a powerful and strategic lever for advancing sustainability goals, especially when aligned with cost control, supply chain stability, and customer expectations.

In North Carolina, where voluntary action often leads the way, businesses are increasingly turning to zero-emission energy procurement not just to reduce emissions, but to gain competitive operational advantages. Companies with manufacturing facilities in the state, such as global consumer goods or automotive suppliers, are using long-term power purchase agreements to lock in low, predictable electricity rates by sourcing directly from solar or wind projects. This shields them from fossil fuel price volatility while meeting the sustainability criteria demanded by downstream partners. In the

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108 *U.S. House Committee on Ways & Means (2025) The One, Big, Beautiful Bill, U.S. House Committee on Ways & Means. https://waysandmeans.house.gov/wp-content/uploads/2025/05/The-One-Big-Beautiful-Bill-Section-by-Section.pdf. sec 112003)*

109 *Heimbach, S. (2015) Siemens To Be Climate Neutral by 2030, Siemens. https://press.siemens.com/global/en/pressrelease/siemens-be-climate-neutral-2030.*

110 *U.S. Energy Information Administration (2025) North Carolina State Energy Profile, North Carolina Profile. https://www.eia.gov/state/print.php?sid=NC.*

automotive sector, sustainability factors through the entire supply chain.[111] Purchasing organizations' metrics regularly take into account Scope 2 and Scope 3 emissions, beyond the impact (and compliance) of direct Scope 1 activities.[112]

Even without external incentives (or global disincentives), zero-emission energy procurement allows firms to future-proof operations, comply with global buyer standards, and more easily align with growing climate disclosure expectations, turning sustainability into a strategic advantage rather than a regulatory burden.

In sectors with tight margins, this strategy enhances both economic resilience and environmental performance. The business case becomes even clearer when factoring in brand value, investor interest in environmental, social, and governance performance, and customer requirements that favor low-carbon products. In the retail sector, consumer expectations can drive demand growth. According to a 2023 McKinsey study, retail products with related claims averaged 28% cumulative growth over the past five years while those with no such claims grew at 20%. If North Carolina's energy infrastructure ecosystem and business climate can provide tailwinds for the state's manufacturers and industry to lead with sustainability, growth will continue.

> **"SCALING INFRASTRUCTURE THOUGHTFULLY, CONTROLLING COSTS, ENSURING EQUITABLE ACCESS, ALIGNING WITH CLEAN ENERGY AND RESILIENCE GOALS, STRENGTHENING OUR WORKFORCE. THESE CONCERNS ARE NOT JUST RISKS – THEY'RE ALSO CATALYSTS FOR INNOVATION, COLLABORATION, AND MORE SUSTAINABLE MODELS OF CARE DELIVERY IN NORTH CAROLINA'S FAST-CHANGING LANDSCAPE."**
>
> — NORTH CAROLINA BUSINESS LEADER, HEALTHCARE SECTOR

111 *Mahoney, K. (2024) Growing Collaboration of Global Automakers and Suppliers Driving Carbon Reporting and Reduction Through Supply Chain, Suppliers Partnership for the Environment.* https://www.supplierspartnership.org/sp-news/growing-collaboration-of-global-automakers-and-suppliers-driving-carbon-reporting-and-reduction-through-supply-chain.

112 *Dalton, A. (2024) Procuring Lower Scope 3 Emissions: 5 Steps to Decarbonize Supply Chains, McKinsey & Company.* https://www.mckinsey.com/capabilities/operations/our-insights/making-supply-chain-decarbonization-happen.

Innovation and Zero-Emission Technology

North Carolina's strong innovation ecosystem can amplify these benefits. The state has growing R&D in smart grid, battery storage, vehicle-to-grid systems, and advanced nuclear or hydrogen.[113] Local pilot projects already demonstrate possibilities.

- North Carolina manufacturers are installing solar-plus-storage to shave peak demand as well as deploying fleet electrification.
- UNC Charlotte's USDOE-supported NSF Innovation Engine "CLEANcarolinas Regional Innovation Engine," or the university's Energy Production and Infrastructure Center (EPIC) Duke Energy Smart Grid Laboratory are both actively facilitating cutting edge energy sector research.[114]
- In RTP, startups and university partnerships are exploring microgrids, AI-based energy management, and other emerging tech.[115]

Businesses remain pragmatic, adopting only proven solutions, but are eager for demonstrations or education about applicable innovation. Stakeholders note that financial and policy support such as grants, tax incentives, or favorable rates can tip the scales for emerging technologies. Incentives for on-site storage or microgrid trials can de-risk projects. Taken together, these activities, and North Carolina's legacy of innovation, position the state to be an early market for next-generation energy solutions, spurring new investment, companies, and jobs while solving operational challenges.

Workforce Development a Linchpin for Continued Success

As North Carolina's energy infrastructure modernizes and demand for broader zero-emission technologies accelerates, workforce development has emerged as a critical factor. Business leaders across sectors voiced concern that automation, driven by labor challenges and rising productivity expectations, will dramatically increase energy intensity, necessitating a workforce trained in advanced systems and grid technologies.

While infrastructure upgrades often grab headlines, the people needed to build, maintain, and operate this new energy economy are just as essential. Institutions like the NC Community College System and university-led centers such as NC State's FREEDM are helping prepare talent in areas like smart grid operation, battery storage, solar installation, and energy analytics.[116] Forward-thinking businesses are also partnering with utilities and educational institutions to close training gaps, recognizing that a

113 *Walton, R. (2022) T&D World C&E Tech Tour: Duke Energy's Mount Holly Emerging Technology Innovation Center, EnergyTech. https://www.energytech.com/distributed-energy/article/21252214/td-world-ce-tech-tour-duke-energys-mount-holly-emerging-technology-innovation-center*

114 *U.S. National Science Foundation (2024) NSF Names Two New Innovation Engines in North Carolina, NSF. https://www.nsf.gov/news/nsf-names-two-new-innovation-engines-in-nc.*

115 *Triangle Is Central for Smart Grid Development (2025) Wake County Economic Development. https://raleigh-wake.org/news-and-media/news-and-rankings/triangle-is-central-for-smart-grid-development.*

116 *Innovation and Collaboration for Enhanced Electrification (2025) Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Engineering Research Center. https://www.freedm.ncsu.edu.*

modern energy workforce is key to project speed, safety, and scale. These are jobs with competitive wages. According to a 2021 U.S. Energy & Employment Report, energy sector jobs pay approximately 34% higher wages than the median industrial wage nationally.[117]

Conclusion

The stakeholder engagement process undertaken for this report yielded a clear set of priorities for North Carolina's energy future. Across every industry, businesses point to the same foundational requirements:

- Infrastructure that keeps pace with growth
- Consistently high reliability
- Predictable and competitive pricing
- A diversified generation portfolio
- Administrative permitting framework that removes unnecessary delays
- Fair service to rural areas
- The integration of sustainability as a serious business consideration

These themes form a coherent framework rather than a menu of independent options, and progress in one area tends to reinforce progress in the others.

Modern infrastructure features prominently in stakeholder feedback. Planned investments in transmission, substations, and advanced grid controls are broadly viewed as essential to accommodate rising load in metropolitan corridors and to reduce vulnerability in areas regularly exposed to hurricanes, winter ice events, flooding, climate variability, or even substation failures. The private sector's main concern lies not in the scale of spending but in the alignment of project timelines with anticipated demand growth.

Reliability must be treated less as a performance metric and more as a prerequisite for industrial activity. Manufacturers, healthcare systems, and data-centric enterprises report that even short power interruptions have disproportionate economic or operational impacts. The findings suggest that maintaining, or in some places refining, current reliability standards will remain a higher priority than rapid changes to the generation mix. Utilities' adoption of self-healing circuits, system segmentation, and contingency planning for fuel supply constraints is an important trend in this context. It is also important to recognize the role industry must play in keeping utilities and energy decision-makers well informed about shifts in their business model or investments in automation, key demand drivers in the modern energy economy.

117 *United States Energy & Employment Report 2021 (2021) U.S. Department of Energy.* https://www.energy.gov/sites/default/files/2021-07/USEER%202021%20Executive%20Summary.pdf

Affordability and price stability remain close to the top of the private-sector agenda. Most respondents indicate an acceptance of incremental rate adjustments if tied to transparent, clearly explained capital programs that demonstrably improve reliability or expand capacity. Least-cost planning, multi-year rate proceedings, and strategic use of federal incentives are regarded as practical mechanisms for moderating cost trajectories. This is easier said than done as the passage of H.R. 1 simultaneously retires several long standing zero-emission energy incentives and opens new pathways for conventional generation. The eventual impact on rates is not yet known so carefully following federal policy in the resource planning process will further reinforce affordability if federal priorities shift.

Addressing the power generation mix, stakeholders display broad support for a balanced portfolio. With reliability as priority, solar, storage, and efficiency-maximizing technologies are seen as valuable additions. Yet, there is parallel interest in preserving existing nuclear assets, exploring small modular reactors, and retaining a limited fleet of natural gas-fired units capable of rapid response to peak demand. The motivation is directly tied to risk management where diversified supply is considered the most pragmatic way to hedge fuel, technology, and policy uncertainties over the planning horizon.

The report's interviews and surveys highlight ongoing frustration with sequential, jurisdiction-spanning, disjointed permitting processes. Companies frequently reference multi-year approval cycles as a factor that raises project risk and discourages otherwise viable investments. Consolidation of review steps, more predictable timelines, and improved agency staffing levels are identified as potential areas of administrative improvement.

Geographic access emerged as another recurring subject. Rural electric cooperatives and municipal utilities serve territories that, at present, do not always have the redundancy or capacity needed for large industrial expansions. Participants indicate that targeted support or coordinated transmission upgrades could reduce regional disparities and broaden the state's pool of investable industrial and economic development sites.

Finally, sustainability has moved from peripheral concern to a mainstream mandate in corporate planning. Customer requirements and investor expectations increasingly hinge on measurable carbon performance. Access to low-carbon electricity is described less as a reputational advantage or nice-to-have, and more as a basic condition of market participation in several export-oriented industries.

These observations, anchored to the concerns and priorities of business, provide a practical reference for future policymaking and utility planning. While the strategic pillars sometimes compete for attention, they are largely complementary:

- Infrastructure upgrades facilitate reliability;
- Reliability supports affordability by minimizing outage-related costs;
- A balanced generation mix moderates price volatility;
- Streamlined permitting accelerates all other initiatives;
- Rural investment broadens economic opportunity; and
- Sustainability goals, when addressed through cost-effective technologies, reinforce long-term competitiveness. These themes also provide North Carolina with a clear path forward. The challenge ahead is ensuring that planning, execution, policy, development, and infrastructure investment align with the strategic pillars set forth in the business energy vision.

Utility planners, regulators, industry and business leaders, policymakers, and the broader range of stakeholders, including communities and the general public, should keep these priorities front and center as they make near- and long-term decisions. By measuring new proposals, ideas, or strategies against the core concerns identified – capacity, reliability, affordability, diversity, efficiency, equity, and sustainability – North Carolina will maintain the competitive edge that has fueled its success, industrial growth, and economic prosperity, and position itself to meet the next decade's demand with confidence.

By grounding innovation and future state development in the shared concerns of business leaders, North Carolina can move from debate to deployment, solving complex energy challenges with objectivity and open dialogue, ensuring that the state's energy infrastructure continues to support sustainable, long-term growth for families and communities across the state.

Acknowledgments

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