# A Guide

# to the

# 2020 Integrated Resource Plans (IRPs)

# of

# Utilities Serving North Carolina

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**and**

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## Summary

This report is an overview of the contents and review processes of the North Carolina (NC) utilities' Integrated Resource Plans, their proposed blueprints for creating our energy future. It is written to assist NC residents and ratepayers in preparing for the March 16, 2021, Public Hearing on the IRPs, held by the North Carolina Utilities Commission (NCUC). Here is information on the Public Hearing, including how to sign up to speak. The deadline to sign up is Thursday, March 11, 5:00 pm.

## Background

The utilities in our state are monopolies. They are regulated by the NCUC, which consists of seven commissioners: Chair Charlotte Mitchell (term 2017-2023), ToNola D. Brown-Bland (2009-2017, re-appointed 2017-2023), Lyons Gray (2016-2021), Daniel G. Clodfelter (2017-2023), Kimberly W. Duffley (2019-2025), Jeffrey A. Hughes (2019-2025), and Floyd B. McKissick Jr. (2019-2025). All members are lawyers except Mr. Hughes and Mr. Gray, and all were appointed by Governor Cooper except Mr. Gray, whose term expires June 30th of this year. Mr. McKissick served in the NC Senate from 2007 to 2019. Note that NCUC decisions must adhere to any energy policies enacted into law by the NC General Assembly.

The NC Public Staff represents the public interest in terms of cost of service, not environmental or climate impacts.[1] Although the Public Staff is independent of the NCUC, it works very closely with the commission. The Public Staff "intervenes" in cases before the commission, doing extensive research on what the utilities present to the NCUC and acting as counsel for ratepayers.

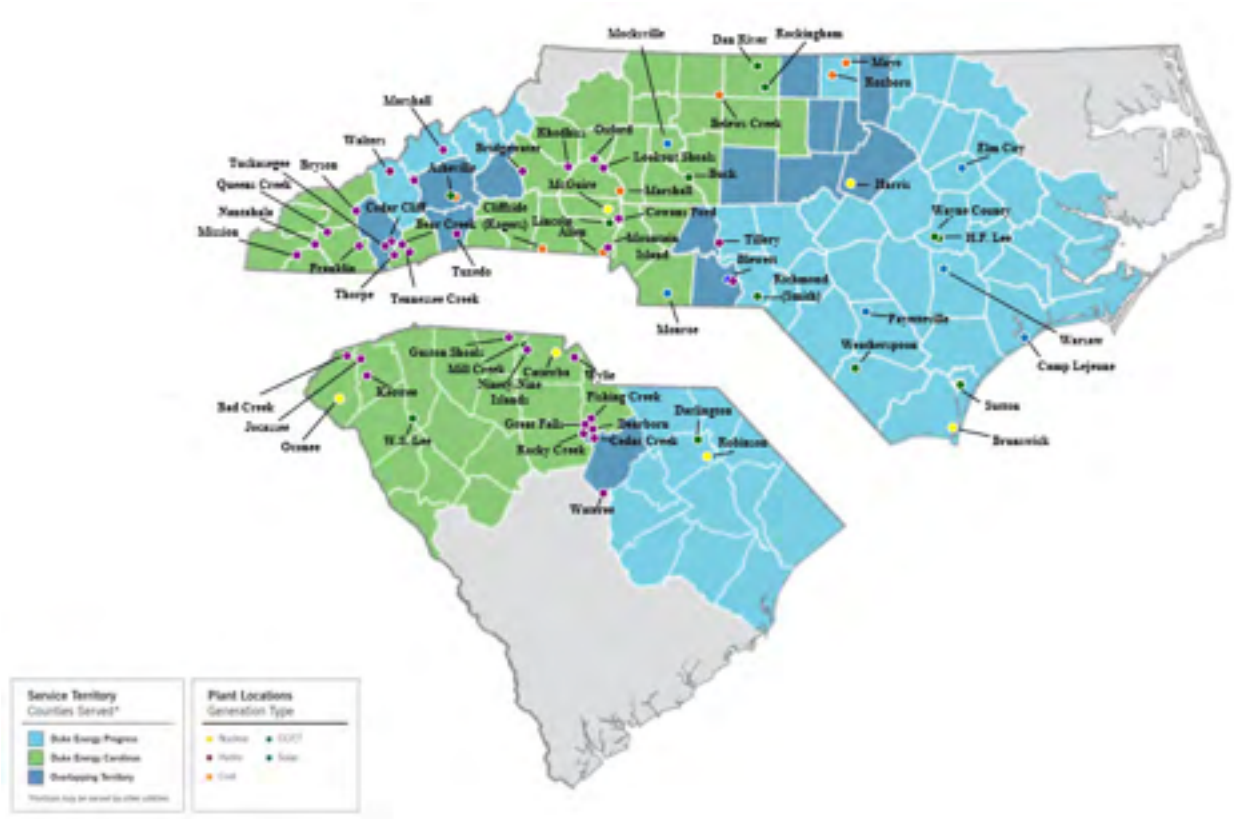
Other entities may also request intervenor status, which allows them to submit data requests to the utilities in order to obtain access to some data not available to the public. In addition, if the NCUC schedules an evidentiary hearing, attorneys for the intervenors are able to cross-examine utility witnesses, and vice versa. Some NC intervenors have requested the NCUC to hold an evidentiary hearing. Entities that usually request intervenor status include the Attorney General, trade and environmental groups, cities, and businesses.

Most NC customers are served directly by Duke Energy Carolinas (DEC) or Duke Energy Progress (DEP), both subsidiaries of Duke Energy, or by the Virginia Electric

[1] Presentation by Christopher J. Ayers, Executive Director, North Carolina Public Staff, to the NC House Committee on Energy and Public Utilities, February 9, 2021.

& Power Company (VEP), a subsidiary of Dominion Energy. Some customers are served directly by local companies or cooperatives that in turn buy their power from Duke Energy or Dominion Energy. Figure 1 indicates the major utilities' service areas. Green represents DEC, light blue DEP, and the darker blue are counties split between DEC and DEP. Dominion serves most of the gray area in northeast NC.

**Figure 1 Service Areas, Duke Energy Progress & Duke Energy Carolinas**




Source: Figure 2-A, DEC IRP, p. 28.

## What is an Integrated Resource Plan?

The utilities are required to submit Integrated Resource Plans (IRPs) every two years to their respective utility commissions for approval. Those plans consist of what the utility proposes to do over the coming 15-year horizon to provide reliable, cost-effective power to its customers. The IRPs address growth projections, future sources of energy (coal, fossil gas, nuclear, solar, wind, hydropower), infrastructure upgrades, and so forth. Full IRPs are submitted to the NCUC in even-numbered

years, with an IRP update filed in odd-numbered years. The IRPs being reviewed now were all filed in 2020.

This guide focuses on Duke Energy's proposed sources of energy and is based primarily on the Duke Energy-Carolinas (DEC) 2020 IRP. The boilerplate language of the DEC and DEP IRPs are identical. The differences relate to each system's power sources, schedules for closing down and adding new power, etc. The three full IRPs are available here: Duke-Carolinas, Duke-Progress, Virginia Electric & Power Company. The DEP and DEC IRPs also have been submitted to the South Carolina commission, and the Dominion IRP to the Virginia commission. Most IRP analysis in NC focuses on Duke Energy, as it is the primary provider of electricity here.

The IRPs are lengthy, complicated documents, difficult to decipher for the layperson. Even these lengthy IRPs do not reveal the reasoning behind the utilities' choices, which were produced by models and guided by consultant studies. Some of this background information is available to the public, some is available to intervenors only, and some is considered proprietary by the companies.

**Present and Projected Sources of Electricity**

All three utilities create electricity from nuclear, coal, fossil gas (called natural gas by the industry), renewables (wind, solar) and hydroelectric generation. Table 1 indicates the annual production, number of customers and service area for each company. These numbers reflect their entire service areas, not only NC customers.

**Table 1 Annual Production, Customers, Service Area Size for DEP, DEC, Dominion Energy[2]**

| Company | Production (megawatts) | Customers (millions) | Service Area (sq. miles) |
|---|---|---|---|
| Duke Energy Carolinas (DEC) (NC & SC) | 23,200 | 2.67 | 24,090 |
| Duke Energy Progress (DEP) (NC & SC) | 13,700 | 1.6 | 29,000 |
| Virginia Electric & Power Co. (VA & NC) (Dominion Energy) | 20,063 | 2.6 | 30,000 |

[2] DEP IRP, p.26; DEC IRP, p. 26; VEP IRP, p. 1.

DEC and DEP combined operate six nuclear power plants and 26 hydroelectric facilities, classified as carbon-free sources. Governor Cooper's NC Clean Energy Plan sets goals for the electric power sector of 70 percent reduction in greenhouse gas (GHG) emissions from 2005 levels by 2030 and "carbon neutrality" by 2050. Duke Energy's goals are to reduce carbon dioxide emissions 50 percent below 2005 levels by 2030 and achieve "net zero" status by 2050. Dominion is committed to net zero by 2050.

"Carbon neutral" and "net zero" do not necessarily mean zero carbon emissions. A utility might still burn gas but offset those emissions by using carbon capture and sequestration (CCS) technology or buying carbon offsets from other states.

DEC and DEP analyze six portfolios or pathways. Two of the six pathways, D and E, were developed by Duke "to illustrate potential pathways to achieve 70 percent $CO_2$ reduction by 2030."[3] One relies on wind, the other on small nuclear modular reactors (SMRs).

The IRP does not include significant details on the make-up of these six pathways or the assumptions used in selecting them. More of that information could be found in consultant and internal Duke documents and models, some of which are deemed proprietary by Duke Energy.

**A** *Base plan without carbon policy.* This is "business as usual," with incremental additions of solar and battery storage, reaching 14 percent renewables by 2035. (See DEC IRP, p. 91).

**B** *Base plan with new carbon policies.* This models the external imposition of a price on carbon on the base case.[4] Forty-eight percent of new energy resources are renewables, resulting in a total share of 20 percent renewables by 2035. (See DEC IRP, p. 92).

**C** *Earliest practicable coal retirement.* All except one DEC coal unit is retired by 2030. That unit, Cliffside 6, with dual fuel capability, would switch to fossil gas by 2030. (See DEC IRP, p. 91).

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[3] DEC IRP, p.6

[4] DEC, p.152, "..the Reference 2020 $CO_2$ price is $5/ton starting in 2025 escalating at a rate of $5/ton per year."

**D** *70 percent $CO_2$ Reduction High Wind*. This expedites onshore and offshore wind development and associated transmission by 2030. It also includes earliest practicable coal retirement. Duke currently considers this and high SMR to be the two most feasible carbon-free options, but notes that "practical and regulatory hurdles remain." (See DEC IRP, p. 92).

**E** *70 percent $CO_2$ Reduction High SMR*. This assumes that these SMRs could be in place by 2030. It also includes earliest practicable coal retirement. This and the High Wind option are considered the two most feasible carbon-free methods, but Duke also includes the caveat that "practical and regulatory hurdles remain." (See DEC IRP, p. 93).

**F** *No New Gas Generation*. This replaces all new gas with SMRs, wind, solar and storage, but Duke states that this portfolio has the "highest customer cost impacts primarily due to the magnitude of early adoption of emerging carbon free technologies and the significant energy storage and transmission investments."[5] (See DEC IRP, p. 93).

As a regulated monopoly, Duke Energy is charged with providing reliable, cost-effective service. The issue of climate pollution has not been a factor to be reckoned with during the long history of the utilities. With increasing awareness of the climate crisis, government entities, intervenors and public pressure are attempting to add the criterion of reducing GHGs.

Duke Energy's estimates of the effect of these six pathways on emissions reductions is shown in Figure 2. As indicated, Pathways D, E, and F reach the same estimated decrease of over 70 percent by 2035, with Pathway D, High Wind, falling most quickly.

Duke Energy estimates that the cost of transmission, of getting the power from the source to the grid, associated with Pathway A, essentially business as usual, would be $1 billion. Transmission costs of Pathway F were estimated to be $9 billion.[6] While one would expect Pathway A, business as usual, to have the lowest cost, there is not enough information in the IRP to ascertain how realistic this large cost differential is. And while Duke Energy acknowledges that costs of new technologies "may"

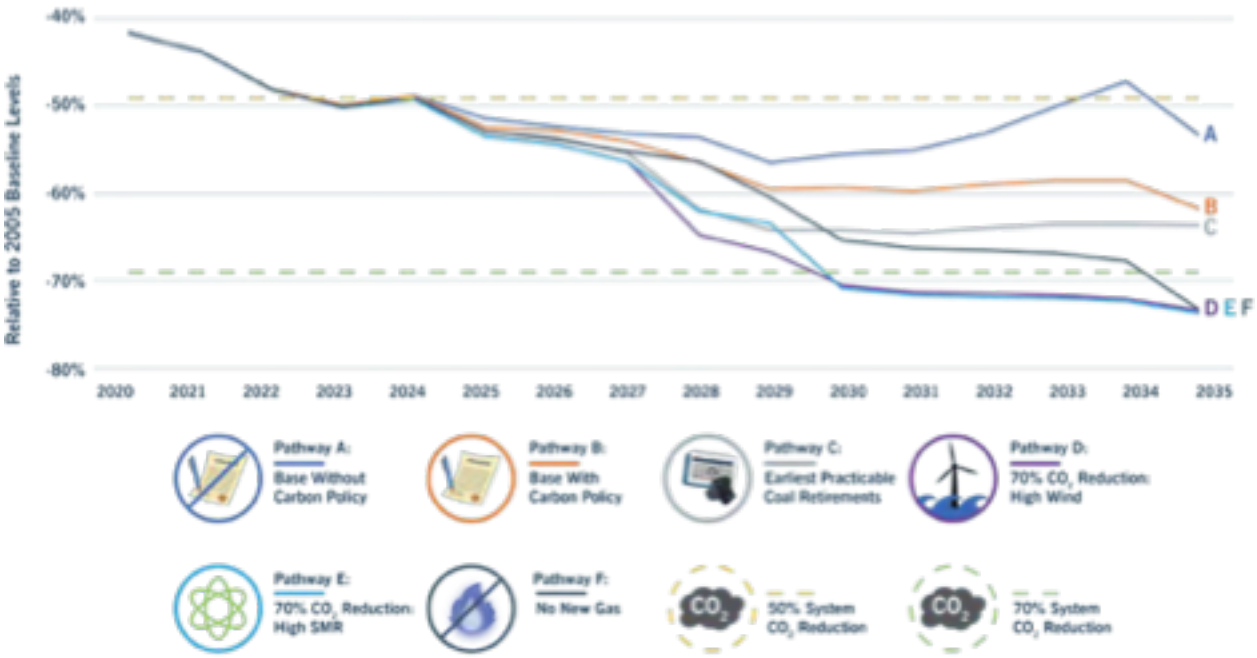
[5] DEC IRP, p. 23.

[6] DEC IRP, p. 14.

decrease, if those projected cost decreases are not fed into their models, they will be biased against and less likely to select new technologies.

Note that there is no Pathway G, one that maximizes wind and solar together. Developing pathways that do "˜this or that," but not both, are unlikely to yield the most effective, least-cost method of reducing GHGs.

**Figure 2 Estimated Combined Carbon Reduction by Scenario, 2020-2035, DEC, relative to 2005**




Source: DEC IRP, p. 8.

## What is Missing

The items listed below are either inadequately addressed in the IRPs, or left out.

*Local social costs*. The pollution produced at fossil-fuel-powered sites affects the physical and mental health of neighbors. There are myriad studies linking air pollution to disease, impaired cognitive learning, and general well-being. Besides the burdens imposed on those in the vicinity of fossil-fueled plants, there are costs to society, such as health expenses and lost wages. These social and financial costs are not

addressed in the IRPs. Similar to a price on carbon, these costs, borne by ratepayers and taxpayers, increase the real cost of fossil-fueled facilities.

*The cost of climate catastrophe.* There is no sense of urgency in regard to the climate crisis. Although Pathway B places a price on carbon, it is very low. The $5 per ton price, not even implemented until 2025, is on the order of one-tenth of what is required to simply meet the Paris Agreement.[7] The need to reduce GHGs is mentioned; the unspeakable consequences of missing the mark, including tremendous financial losses, are not. Hurricane Florence alone caused 53 deaths and damages of $24.7 billion.[8] The IRP states, for example, that "No battery resources were selected for DEC in the Base Case with Carbon Policy {Pathway B} in this IRP."[9] In that pathway, only 20 percent of the overall fleet is renewable by 2035.[10] Note also the phrase "practical and regulatory hurdles remain" in the two pathways that reach 70 percent reduction by 2030 (High SMR and High Wind) but no caveats such as "significant loss of life and destruction of property would occur" are mentioned in the four pathways with lower renewable shares.

*Grid security.* The recent news that Russian infiltration of the highest levels of our government's computer systems went undetected is a wake-up call. China is said to have the capability to shut down our grids.[11] Shutting down hundreds of distributed solar+storage microgrids would be a much more formidable task. These smaller grids would also be less prone to outages in storms, which are increasing in frequency and severity.

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[7] "According to a 2019 World Bank report on trends in carbon pricing, a carbon price range of US$40-80 is necessary by 2020 to reach the goals set by the 2015 Paris Agreement. As countries try to limit the average global temperature increase to 2 degrees Celsius, average carbon prices could increase more than sevenfold to US$120 per metric ton by 2030." A metric ton = 1.1 US tons. https://www.spglobal.com/en/research-insights/articles/what-is-carbon-pricing

[8] The total damage from Florence in North Carolina is more than the cost experienced during Hurricane Matthew (2016) and Hurricane Floyd (1999) combined. Total Estimated Costs: $24.7 Billion; 53 Deaths.
https://www.ncdc.noaa.gov/billions/events.pdf

[9] DEC IRP, p. 103, item 15. "New battery storage resources economically selected to meet load and minimum planning reserve margin."

[10] DEC IRP, p. 20.

[11] China used stolen U.S. technology to develop at least three types of high-tech weapons to attack the electric grid and key technologies that could cause a surprise…attack that could produce a deadly blackout to the entire country. https://www.forbes.com/sites/jamesconca/2020/06/25/china-develops-first-strike-capability-with-electromagnetic-pulse/?sh=685a460fe190

*Price volatility.* As with all new technologies, the cost of solar and wind infrastructure is not only decreasing as the industries mature, but sunlight and wind are immune from the market fluctuations that affect fossil fuels.

*Conservation.* The most inexpensive way to cut electricity production and costs is to decrease usage. This route is especially important now, while renewable energy remains a fraction of our electricity mix. Much more needs to be done to educate ratepayers on how to conserve, especially during times of peak demand, which incur higher financial and pollution costs. Residential rate structures could encourage conservation, with prices increasing with higher usage.

*Energy burden.* The IRP acknowledges that paying utility bills is a burden for lower-income users, but does not factor that into the planning. Immediate relief could be given by eliminating the fixed $14.00 monthly cost for Duke Energy's residential customers, with those revenues recovered through marginal rates for energy usage. For example, those with larger homes, or those wishing to maintain high winter and low summer thermostat settings, would pay gradually increasing marginal rates. Those with smaller dwellings who also conserve energy would end up with lower bills than they pay today. As low-income people often live in dwellings that are not well-insulated, care would need to be taken to ensure that graduated rates do not increase their energy burden.

*Methane emissions*. Duke is committed to reducing $CO_2$ emissions by 50 percent from 2005 levels by 2030. While replacing coal with fossil gas would decrease $CO_2$ emissions, it would increase methane emissions, which, as noted, are 86 times more powerful than $CO_2$ over a twenty-year time frame.[12] Depending on leakage rates, replacing coal with fossil gas could increase climate pollution.

*Plummeting costs of renewable technologies*. It is likely that Duke Energy's costs for renewables do not reflect the remarkable, continuing downward trends. Battery storage costs, for example, decreased 61 percent in just two years.[13]

*Accelerating penetration of renewables.* Duke makes the point that the storage capacity required in Pathway F, No New Gas, would be "over six times the amount of

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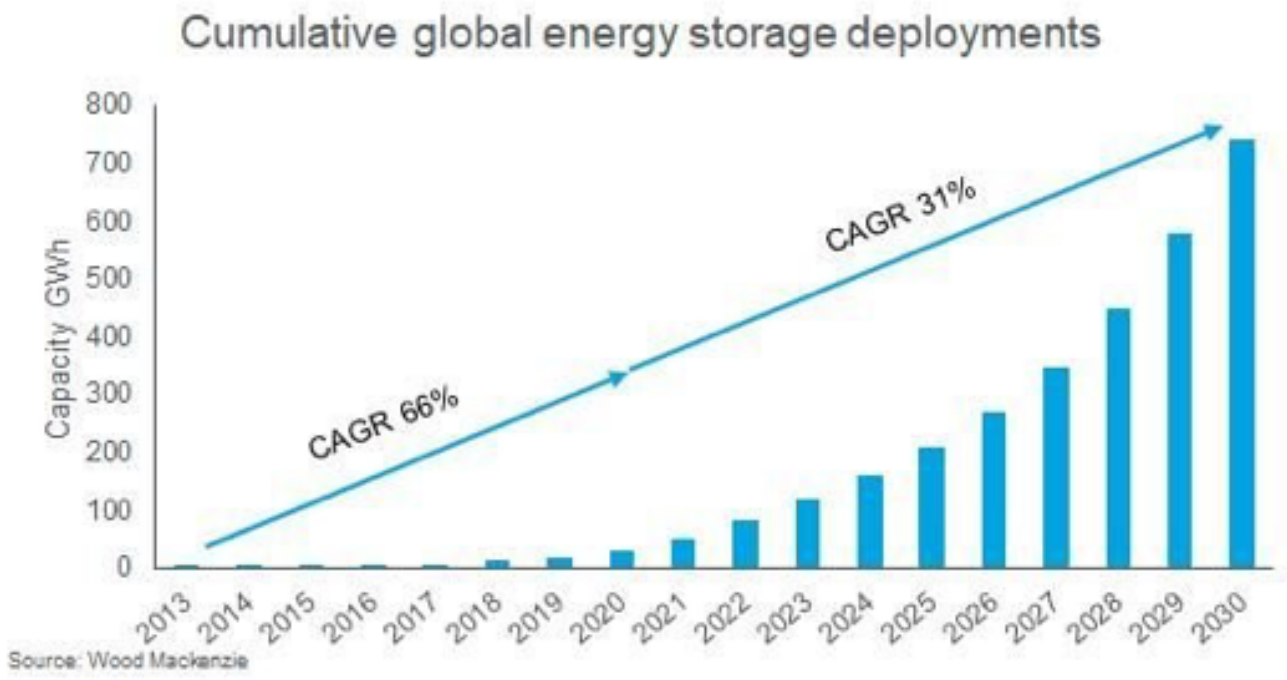
[12] https://www.scientificamerican.com/article/how-bad-of-a-greenhouse-gas-is-methane/

[13] $2,153 per kilowatt-hour (kWh) (2015) to $834 per kWh (2017). Source: https://www.eia.gov/todayinenergy/detail.php?id=44696, October 10, 2020.

large-scale battery storage currently in service in the United States."[14] While that sounds daunting, note that renewables plus storage capacity in the US in 2019 was projected to more than quadruple by 2023, two years from now.[15] Figure 3 indicates an expected compound annual growth rate (CAGR) of 31 percent, going from less than 50 gigawatt-hours (GWh) in 2019 to "741 gigawatt-hours of cumulative capacity by 2030."[16] We are in the midst of an energy revolution. Which leads to possibly the most concerning caveat.

**Figure 3 Existing and Estimated Deployment of Global Energy Storage, 2013-2030**




*The capability of Duke Energy to revolutionize our energy production*. The overall tone of the DEC IRP raises perhaps the major concern: Duke Energy is not the best vehicle for NC to achieve 100 percent clean energy as quickly as is needed. A huge fossilized company is being asked to do what new, nimble companies do best - upend the status quo. If Duke maintains its monopoly over our electricity future, then we will be strolling toward a clean energy future, not racing. If IBM had been given a monopoly over computer production, or if AT&T still held one on telephones, it is not

[14] DEC IRP, p. 23.

[15] https://www.eia.gov/analysis/studies/electricity/batterystorage/pdf/battery_storage.pdf, Figure 13.

[16] https://www.greentechmedia.com/articles/read/woodmac-global-storage-to-reach-741-gigawatt-hours-by-2030

likely we would have machines in our pockets thousands of times more powerful than the large computers that guided our early space explorations. Duke deserves credit for providing energy to North Carolinians since 1904. Asking them to lead us into the next phase is risky.

## Recommended Sources for Additional Information

These and other reports are available here.

Duke Energy Report Card. Fourteen organizations collaborated to rate ten categories in Duke Energy's IRPs. The Report Card ranged from a '"C' (for grid modernization) to four F's (Affordable Energy for All and Equitable Access to Clean Energy, No New Gas, Don't Rely on Imaginary Technology, and No Lobbying Against the Public Interest.)

The Dirty Truth About Utility Climate Pledges: The Sierra Club describes its report as "a comprehensive assessment of whether utilities are committing to the actions needed to avert a cataclysmic climate crisis. The report is based on an analysis of long-term energy plans released by utilities -- known as integrated resource plans (IRPs) -- and major announcements for the 50 utilities that generate the most electricity from coal and gas. This includes investor-owned utilities, power authorities (like the Tennessee Valley Authority), generation and transmission co-ops, and large 11municipal utilities. In total, Sierra Club analysts examined plans for 79 operating companies owned by 50 parent companies."

Review of Duke Energy 2020 Climate Report and Associated Duke Energy Climate Strategy, Charlotte Mecklenburg Climate Leaders (CMCL), Climate Report Review Group (CRRG). "The CRRG met with Duke Energy on behalf of CMCL environmental stakeholders in the Carolinas for the specific purpose of conducting a detailed examination, with Duke Energy's support and cooperation, of its 2020 Climate Report and corporate climate strategy. The results of this process are documented in the Findings and Recommendations reported here, material whose intention is to stimulate innovative ideas and actions of interest and value to both Duke Energy and environmental stakeholders."