

DUKE'S \$3 BILLION SECRET



March 29 2021

Duke Energy’s aging, expensive coal plants are costing North Carolina customers billions. Duke could reduce bills and pollution by accelerating the transition from coal to clean energy.

Yolanda Cooper is a single mom living in Durham, N.C. Her hours have been reduced during the pandemic, and she is four months behind on her bills. She has kids to feed, and each month she has to decide between groceries and the electric bill.

In the darkest hours of the COVID pandemic, Duke Energy has already shut off electricity to 28,000 customers this winter. Yolanda may soon be one of them.

“I have nowhere to go,” Yolanda says. “My kids are all I got.”

Yolanda is paying more than she should for electricity in North Carolina. She is one of Duke Energy’s three million customers paying for Duke to continue operating its coal plants at a net loss. Over \$120 of her annual bills go to covering the roughly \$600 million that Duke’s coal plants lose each year. **A new Sierra Club economic analysis shows that Duke Energy’s coal plants have cost customers nearly \$3 billion since 2015.**

Meanwhile, Duke and its investors make a guaranteed 10% return on equity from coal plants that are losing billions.

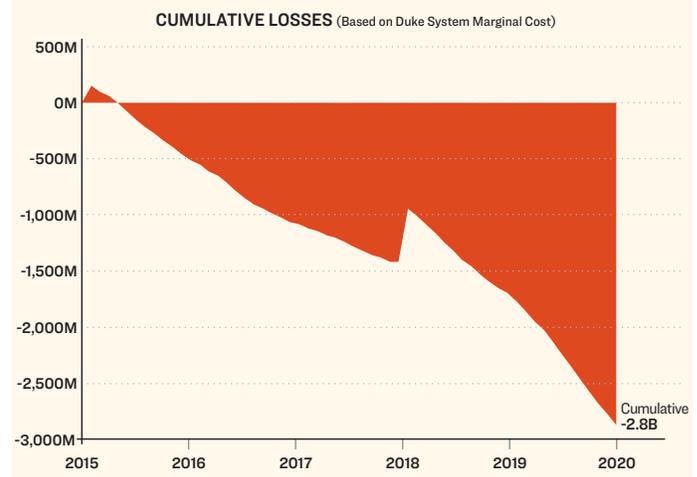
THE COST OF COAL

Coal plants are the most expensive way to produce energy in North Carolina. All of Duke’s coal plants can be replaced right now with cheaper clean energy. Yet Duke Energy continues to operate all of its old, dirty coal plants — wasting billions of dollars and making customers pay for them.

Sierra Club analyzed the total cost of Duke Energy’s coal plants in North Carolina using publicly available data. It found that **all of Duke’s coal plants lost money between 2015 and 2019, and in total, they lost over \$2.8 billion** relative to the value of energy they produced (Figures 1 and 2). Nearly all of the nearly \$3 billion in wasted costs is passed on to customers’ electricity bills.

COVER PHOTO: SHUTTERSTOCK.COM

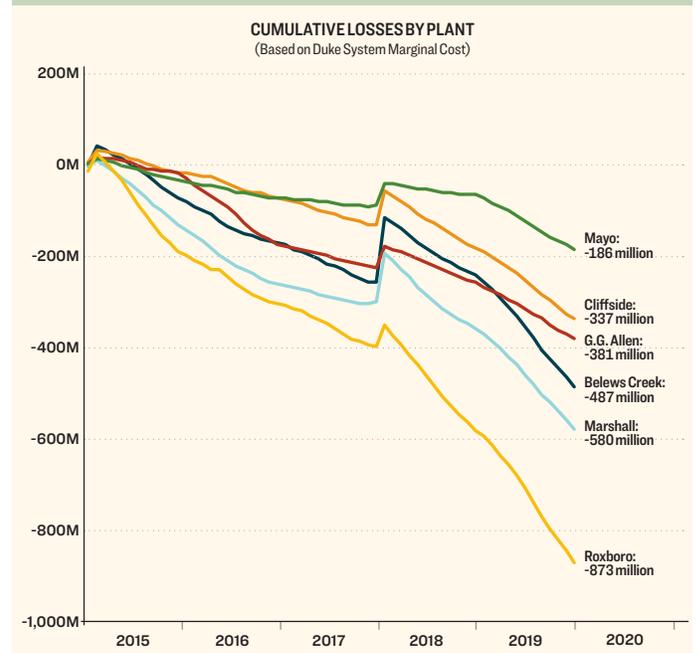
Figure 1: Duke’s Coal Fleet’s Cumulative Losses¹



SUMMARY

Total Cost 2015-2019	\$9.09 Billion
Energy Value	\$6.24 Billion
Net Energy Margin After Cost	-\$2.85 Billion
Annualized Net Energy Margin per kW	-\$57/kW-yr
Total Coal Capacity	10 GW

Figure 2: Net Losses of Each Duke Coal Plant



DUKE'S OLD, DIRTY, AND EXPENSIVE COAL FLEET

Duke Energy Corporation includes five investor-owned utilities across Indiana, Kentucky, Florida, North and South Carolina. It operates the largest coal fleet in the country. Combined, Duke generated 54 million megawatt hours of electricity from coal in 2019. Only 11 percent is firmly committed to retire by 2030.²

Duke Energy is also the country's largest utility polluter. It produces the most carbon dioxide — over 100 million tons each year.³ If Duke were a country, it would rank 44th in the world for carbon emissions, ahead of Belgium, Austria, and Greece.⁴

In North Carolina, Duke operates six coal plants across North Carolina that provide nine gigawatts of coal-fired generation. Duke Energy Progress, whose service territories are in the eastern and western part of the state, operates the Roxboro and Mayo coal plants (Figure 3). Duke Energy Carolinas, whose service territories are in the central portion of the state, operates the Allen, Marshall, Cliffside, and Belews Creek coal plants.

The 2,462-megawatt Roxboro, 2,220-megawatt Belews Creek, and 2,078-megawatt Marshall coal plants are among Duke Energy's largest coal plants and some of the most polluting coal plants in the region.

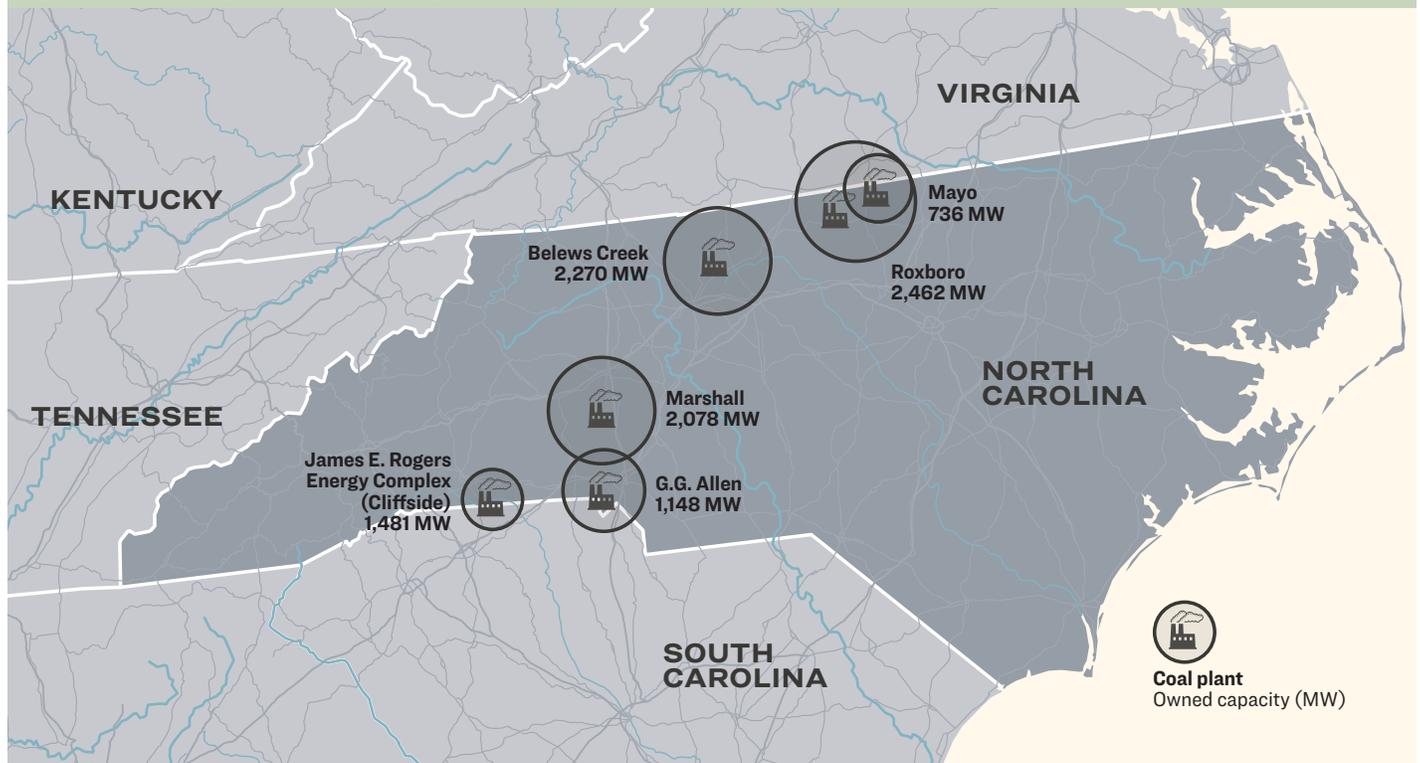
Duke Energy's North Carolina coal fleet emits over 27 million tons of carbon dioxide pollution annually, making it the largest polluter in the state (Table 1).

TABLE 1: Duke Energy's Coal Fleet in North Carolina⁵

Coal Plant	Megawatts	Years Built	Carbon Pollution 2019 (in tons)
Roxboro	2462	1966-1980	7,446,020
Belews Creek	2270	1974-1975	6,874,176
Marshall	2078	1965-1970	8,085,348
Allen	1148	1957-1961	1,058,551
Mayo	736	1983	1,936,254
Cliffside	1481	1972, 2012	1,822,504

Duke's aging coal plants are operating less each year. All of Duke's coal plants operated less than 39% of the time on average in the first half of 2020 (Table 2). Allen and Roxboro, two of its oldest plants, ran for only 11% and 26% of the year. However, customers still pay for these plants even when they are barely used.

Figure 3: Duke Energy's owned operating coal plants in the Carolinas



Adapted from S&P Global®

TABLE 2: Duke's aging coal plants and percentage time of operation in 2020

Coal Plant	Capacity Factor (% time of operation)
Roxboro	26%
Belews Creek	32%
Marshall	35%
Allen	11%
Mayo	16%
Cliffside	38%

Adapted from S&P Global⁷

Why does Duke keep these aging coal plants in operation if they are barely running, not needed, and cost more to operate than the energy they generate? For a very simple reason: Duke and its investors continue to profit from them if they are still in operation, even if they operate at a net loss for customers. Ratepayers continue paying billions to prop up Duke's outdated, expensive plants as long as the coal plants are still used, however infrequently. In Duke's 2020 Integrated Resource Plan, the company proposes to keep burning coal until 2049 (Table 3).

TABLE 3: Duke's Planned Retirement Dates for Coal-Fired Power Plants

Coal Plant	Duke's Planned Retirement Date*
Roxboro	2029
Belews Creek	2039
Marshall	2035
Allen	2024
Mayo	2029
Cliffside	2049

* 2020 Duke Energy IRPs' base case scenario. These are not commitments to retire coal plants; they are simply dates for planning purposes and could change.

CUSTOMERS PAY THE PRICE

Most companies would not continue operating an asset that was losing billions of dollars. They would close it as quickly as possible. However, Duke is a regulated monopoly utility that is currently guaranteed a 10% return on equity, regardless of how high its coal plants costs are. It can simply pass those losses onto its customers. Duke's earnings are tied to capital expansion projects rather than the electricity they sell. So when they build a new power plant, they are essentially guaranteed the full recovery of that investment plus a profit.

Duke still has roughly \$7.2 billion in coal plant investments that it hopes to recover from customers (Table 4). If it stops operating its coal fleet, Duke and its investors would eat the \$7.2 billion. Instead, Duke

continues propping up its outdated, expensive coal plants so that customers foot the \$7.2 billion bill.

TABLE 4: Estimated amount that Duke still hopes to recover from customers for each coal plant

Coal Plant	Undepreciated Balance 2020
Roxboro	\$1,254,400,000
Belews Creek	\$1,477,600,000
Marshall	\$1,129,500,000
Allen	\$451,800,000
Mayo	\$655,300,000
Cliffside	\$2,252,400,000
TOTAL	\$7,221,000,000

Source: Duke Energy Progress and Duke Energy Carolinas 2020 Integrated Resource Plans. Testimony of John Spanos: Depreciation schedules.

Duke customers continue paying for coal plants as long as the North Carolina Utilities Commission (NCUC) deems these costs "reasonable and prudent," which utilities commissions almost always do if the plants in question are operating. Customers also end up paying a premium for the electricity they produce, since all of Duke's coal plants cost far more to operate than the energy they generate is worth. How much are customers paying to keep coal online? **Already, Duke customers have paid nearly \$3 billion since 2014 — approximately \$600 in present value cost per customer** — just to cover the high cost of operating these coal plants. If Duke is allowed to continue operating its coal fleet until 2049, customers will be paying billions more over the next three decades.

Many customers across North Carolina must choose between paying their electric bill and feeding their family. One out of every five Duke customers are already behind on their bills, and the pandemic has made things worse. These same customers are being forced to subsidize Duke and their investors with every bill so that Duke can continue profiting from aging, expensive coal plants.

HEALTH AND COMMUNITY COSTS OF COAL

Coal is the dirtiest source of energy in the country. Not only are coal plants the largest stationary source of carbon emissions — the main contributor to the climate crisis — but pollution from coal also causes serious health effects and contributes to four of the five leading causes of death in the United States: cancer, stroke, heart disease, and upper respiratory disease (see sidebar).⁸ Coal-related pollution is responsible for more than \$100 billion in health costs.⁹

Coal pollution in North Carolina is especially severe. North Carolina ranks among the worst states in the



PHOTO: MELISSA WILLIAMS

country in hospital admissions, heart attacks, and mortality from coal pollution. Each year, coal pollution results in 1,136 asthma attacks, 106 heart attacks, and 177 deaths.¹⁰

Since 2000, Duke has racked up the fifth-highest amount of environmental penalties of all companies in the United States.¹¹ In 2015, Duke pled guilty to nine criminal violations of the Clean Water Act and paid the largest federal criminal fine in North Carolina history — \$102 million — for releasing coal ash into the Dan River.¹²

Duke’s toxic coal ash has poisoned drinking water sources near every one of its coal plants. [Dozens](#) of nearby households lacked safe drinking water for more than three years before getting connected to municipal water or a filtration system. Many of these sites are located in Black, Indigenous, and low-income communities. Duke has attempted to charge these customers for the replacement water that these homes have required for basic living. All told, cleaning up coal ash in North Carolina will cost at least \$8 billion.¹³

Coal plants also discharge millions of gallons of toxic wastewater laced with mercury and arsenic into rivers and lakes across the state each day. And coal plants are also the largest industrial source of air pollution in North Carolina, releasing smothering plumes of soot, sulfur dioxide, nitrous oxides, and heavy metals across much of the state.

Hundreds of North Carolinians die prematurely each year as a result of coal plants’ continued operation.¹⁴ Black and low-income communities have been hit hardest. Yet Duke wants customers to keep paying for its coal plants until 2049, costing customers billions more in bills and health care costs. Duke could save money and lives right now by switching to clean energy.

THE HEALTH COST OF COAL

Coal-burning is responsible for

- one-third of all U.S. carbon-pollution emissions
- over 13,000 premature deaths every year
- over 12,000 emergency room visits each year
- over 20,000 heart attacks every year
- over 200,000 asthma attacks a year
- more than \$100 billion in annual health costs
- smog and soot, which can lead to asthma attacks. One in ten U.S. schoolchildren suffer from asthma
- more toxic mercury emissions than any other source
- one-half of U.S. families now live in places where it is unsafe to breathe the air

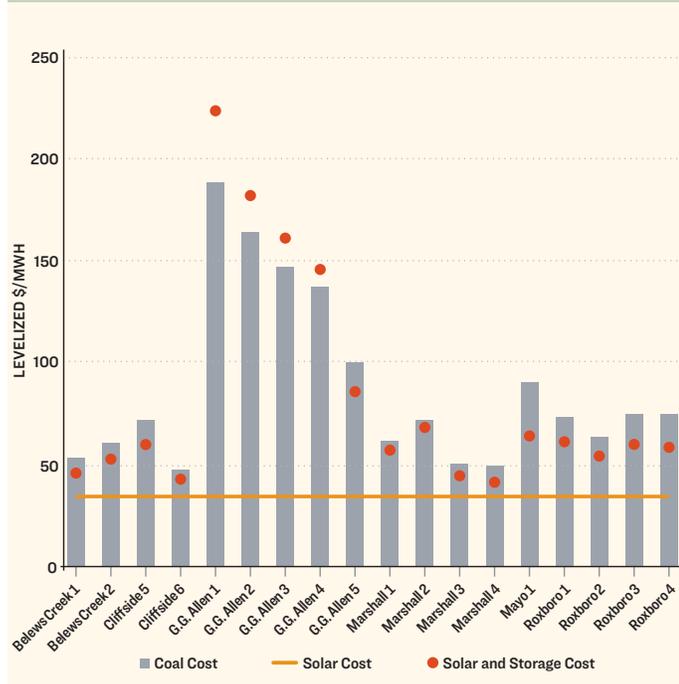
Sources: Centers for Disease Control and Prevention: *Asthma in the U.S.*
American Lung Association: *“State of the Air 2019: Key Findings.”*
Clean Air Task Force: *“The Toll from Coal.”*

CLEANER IS CHEAPER

Solar energy is already cheaper than operating any of Duke’s North Carolina coal plants. Duke could replace its entire coal fleet with clean energy, still reliably meet North Carolina’s energy needs, and save customers billions.

And by 2028, building new solar facilities with battery storage could cost-effectively replace nearly all of Duke’s coal capacity. In Sierra Club’s economic analysis of Duke’s coal plants, the cost of continuing to burn coal was compared with the cost of building and operating stand-alone solar as well as solar plus battery storage.

Figure 4: The cost of coal plants (gray) vs. cost of solar (yellow) and cost of solar plus storage (orange) in 2028



Source: Sierra Club Analysis (see appendix for methodology).

Solar with battery storage was cheaper at all but the Allen plant, Duke’s oldest coal plant built in the 1950s. This is because Allen rarely runs anymore. It is the least efficient coal plant on the system, and Duke has acknowledged that they don’t need to replace it with any new capacity to maintain a reliable system.

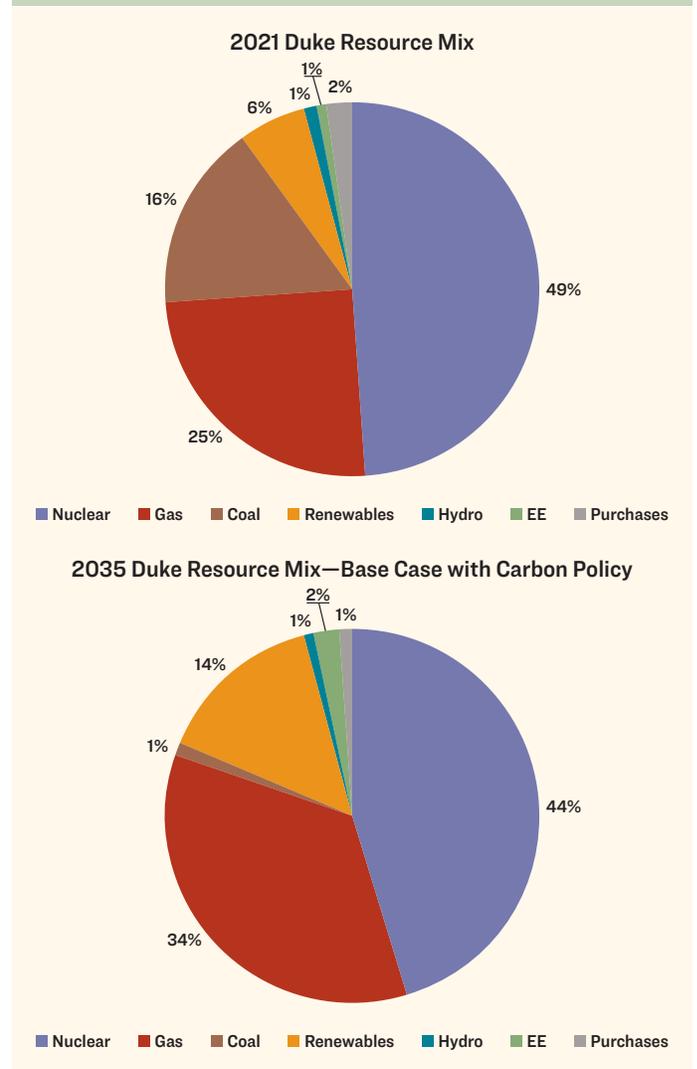
Duke can save customers money by retiring its coal fleet and replacing it with clean energy. Any single unit of its coal fleet could be economically replaced with solar and battery storage by 2028. And right now, stand-alone solar produces energy more cheaply than all of Duke’s coal plants. Yet Duke has only modest solar projects planned — not enough to meet the state’s climate goals or its own. North Carolina aims to reduce its carbon

emissions by 70% by 2030, and Duke has a goal of net-zero carbon by 2050. Duke’s most recent energy plan won’t achieve either.

DUKE’S ENERGY PLAN

Duke Energy’s 2020 Integrated Resource Plan proposes to burn coal until 2049 and build as many as 13 new fracked gas plants — while only including incremental increases in solar and battery storage. Burning coal for three more decades and building a massive fracked gas fleet is not likely to achieve the needed carbon reductions. Figure 5 below shows Duke’s mix of energy sources for 2021. By 2035, in its base case scenarios, at least 35% of its energy resources will continue to come from fossil fuels, **an increase of almost 10%.**

Figure 5



Source: Duke Energy Carolinas IRP page 107

Duke’s commitment to solar is even weaker. By 2035, less than 14% of Duke’s generation in North Carolina will

come from solar in its base case scenario. Nationally, renewables make up 18% of utility energy generation today¹⁵. However, Duke plans to continue squandering billions running their expensive, polluting coal plants and falling further behind on clean energy.

Solar is already a cheaper source of energy than coal, and the renewable energy industry can bring millions of quality jobs to North Carolina. Currently, the clean energy sector employs over 110,000 North Carolinians, ten times more than the state's entire coal, oil, and gas industries combined. All 100 counties in North Carolina — from Cherokee to Currituck — are home to clean energy jobs, and North Carolina is number three in the country in installed solar.¹⁶

However, Duke lags far behind in its clean energy investments. As a parent company, Duke burns more coal than any other utility in the United States. It also has the largest gap between its coal and clean energy investments of any utility in the country. Duke currently has 40 gigawatts of fossil fuel capacity, but it plans to add only 7 gigawatts of renewables by 2030.¹⁷

Instead of rapidly ramping up renewables, Duke wants to continue operating the largest coal fleet in the country at a net loss. Customers are paying the price.

METHODOLOGY

To determine how much Duke's coal fleet is costing its customers, Sierra Club analyzed the total cost of Duke Energy's coal plants in North Carolina using publicly available data from EIA and FERC. Costs included fuel costs, operations and maintenance costs, and incremental capital investments made in equipment, structures, and improvements in the plants from 2015 through 2019.

These costs were then compared to Duke Energy's System Lambda (the marginal cost of meeting another megawatt of demand in Duke's systems) in each hour, weighted by when each plant generated electricity.

All plants lost money between 2015 and 2019, and in total they lost \$2.8 billion relative to the value of energy they produced. Relative to prices in the neighboring PJM wholesale electricity market, the plants lost a cumulative \$2.0 billion.

To evaluate the forward-looking costs of Duke's coal plants and compare it with solar and battery storage, Sierra Club projected the cost of coal over the next 10

RETIRING COAL REDUCES BILLS AND POLLUTION

All of Duke's coal-burning plants and pollution is subsidized by customers who are paying billions extra in their bills. Customers should not be sacrificing their money and health so that Duke can continue to burn its dirtiest and most expensive fuel. The billions that Duke squanders on its coal fleet are also hindering investments in solar, wind, and other cleaner, cheaper energy sources.

Duke should commit to retiring all of its coal by 2030 and close its most uneconomic units this year. Duke also needs to accelerate the deployment of solar, storage, and energy efficiency.

This year is pivotal for North Carolina's energy future. Duke's 2020-2021 Integrated Resource Plan (IRP) will guide Duke's decisions around coal and solar for the next 15 years. Duke's plan must be approved by the North Carolina Utilities Commission and the South Carolina Public Service Commission, which can require Duke to retire uneconomic, polluting coal plants and replace them with cleaner, cheaper solar.

Public input will be critical. The commission's decision could accelerate the transition from coal to clean energy, which will save Duke customers billions while providing healthier air and water for everyone.

years, based on historical plant-specific information and estimates of incremental capital costs as plants age. Fuel, operations and maintenance expenses data are based on EIA and FERC reported data, while maintenance capital investments were based on EIA's NEMS modeling assumption for coal plants. The resulting cost was compared with stand-alone solar as well as solar plus storage. For solar plus storage, the storage component was sized to cover 100% of each plant's capacity, while solar was sized to meet annual energy output from the plant. Costs of solar and storage over time were based on NREL's Annual Technology Baseline.

Explore the data and learn more [here](https://public.tableau.com/profile/brendan.pierpont#!vizhome/DukeEnergy-NCCoalEconomicsDashboard/Story). (<https://public.tableau.com/profile/brendan.pierpont#!vizhome/DukeEnergy-NCCoalEconomicsDashboard/Story>)

ENDNOTES

1. Fuel costs are based on reported data from EIA Form 923. Operations and maintenance costs are based on reported data from FERC Form 1. Historical incremental capital investment is based on year-to-year changes in gross investment in structures and equipment from FERC Form 1. Future incremental capex based on EIA's NEMS modeling assumption based on unit age and pollution control technology.
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