2017 Climate Report to Shareholders
Executive Summary

Duke Energy continues to build an energy future for our customers and communities that is smarter, cleaner and more resilient. We are excited about the transformation underway in our industry as we expand renewable generation, transition our generation fleet from coal to natural gas, reduce our environmental footprint and modernize the grid to support new technologies.

We have reduced carbon dioxide (CO₂) emissions by 31 percent since 2005, and have set our sights on even greater progress. In 2017, we established a goal to reduce CO₂ emissions 40 percent from 2005 levels by 2030. Beyond 2030, the company’s long-term strategy will continue to drive carbon out of our system.

The specific path forward to a low-carbon energy future will depend on a number of factors, including market forces, public policy, technology innovation and commercialization and customer demand. Duke Energy will continue to work collaboratively with our regulators, policymakers and other stakeholders to chart a course that meets our obligation to provide safe, reliable, affordable and increasingly clean energy.

The Climate Report to Shareholders

Duke Energy is pleased to provide this comprehensive climate report to shareholders, continuing our tradition of disclosure and transparency about how we do business and how we strive to benefit the communities we serve. The purpose of this report is to provide information on Duke Energy’s strategy and the steps we are taking to mitigate risks from climate change including:

- Physical Risk – How we are addressing issues such as managing water resources and hardening the system against extreme weather;
- Policy Risk – How we are navigating policy uncertainty and planning for possible constraints on CO₂ emissions; and
- Economic Risk – How we are strategically planning investments that will reduce the risk of stranded assets and position the company well into the future.

As part of our Policy Risk analysis, we evaluated a “two-degree policy” where CO₂ emissions are sharply reduced in order to limit global temperature increase to no more than 2 degrees Celsius above pre-industrial levels. This analysis provides high-level insights on one possible pathway consistent with a carbon-constrained future, including potential long-term impacts on the company’s generation mix associated with a “two-degree policy” scenario.

It is important to note that our current plan to achieve a 40 percent reduction by 2030 is consistent with a pathway to achieve a science-based two-degree target.

The scenario we analyzed would require all sectors of the global economy to reduce CO₂ emissions equally. Under this scenario, Duke Energy would achieve a 72 percent reduction in CO₂ emissions by 2050, compared to 2010 levels. This would be accomplished by phasing out existing coal generation,
increasing energy efficiency, expanding renewables, natural gas and energy storage, and deploying innovative technologies.

Transformation of this magnitude introduces important issues that must be solved. For example, our analysis identified a need for a significant amount of new zero-CO₂ emitting generating capacity that can increase and decrease output to balance renewables and meet customer demand. We believe that deep decarbonization will also require other grid innovations to enable us to cost-effectively manage high levels of renewable energy and distributed generation on the grid while meeting customer demand every hour of every day. Sustained financial support for research, development and scaling of low-carbon technologies, including smart grid, energy efficiency, solar, wind, storage, nuclear and carbon capture and sequestration, will be needed to meet these challenges.

Committed to a Lower-Carbon Future

The actions of no one country, industry or company can single-handedly influence a changing climate. It is the cumulative impact of these actions that can make a difference. Over the past decade, we’ve incorporated carbon emissions into our long-term planning, helping inform our investment strategy and mitigating future risks. The investments we’ve made to retire older, less efficient coal- and oil-fired power plants, build highly efficient natural gas generation, expand our portfolio of wind and solar resources, increase energy efficiency offerings and invest in our zero-CO₂ emissions hydropower and nuclear plants have diversified our system and significantly reduced CO₂ emissions. We first adopted voluntary CO₂ reduction goals in 2010 to benchmark and track our progress. These goals are reviewed and updated regularly. Our current 2030 goal is based on emission reductions that are achievable with currently available and commercially demonstrated technologies. Progress toward our CO₂ and other sustainability goals will continue to be updated on an annual basis in our Sustainability Report.

Beyond 2030

Looking to the future, the actual pathway that Duke Energy takes to further reduce CO₂ emissions will adjust to evolving and innovative technologies in a way that balances the reliability and affordability that our customers expect and our regulators require. Our long-term strategy includes planned investments in additional renewable energy sources coupled with storage, grid modernization and improved energy efficiency and demand response programs. We are focused on finding ways to quickly integrate emerging technologies into our portfolio and we consider CO₂ emissions as we evaluate generation options. We are also advocating for public policies that sustain a balanced portfolio mix, support research and development of low-carbon technologies and manage costs for customers. Specific system investments will be addressed in our company’s integrated resource plans, which are filed on a regular basis with state utility commissions in the jurisdictions we serve.
As we work toward a lower-carbon future, we remain optimistic about the transformation underway in our industry. We believe that we will continue to meet our customers’ needs through a portfolio of technologies. As we have done for more than a century, we will collaborate with regulators, policymakers and stakeholders to build the road map for our shared energy future – a future lower in carbon but also resilient and affordable.

I. Strategy and Drivers – How We Plan and Deliver Value

Providing safe, reliable and affordable energy has been at the heart of Duke Energy’s mission for more than 100 years. Duke Energy began harnessing rivers to generate electric power in 1904. Today, we leverage a balanced energy mix including nuclear, natural gas, coal, wind, hydro and solar to power the lives of our customers and the vitality of our communities. As we continue to modernize our system and deliver increasingly clean energy, reducing emissions cost-effectively remains an important tenet of our investment strategy and our customer value proposition.

The electric utility industry is undergoing extraordinary transformation, driven by increasing customer expectations, rapidly changing technology and new public policy requirements. We must also adjust to a changing climate and ensure our system remains resilient and provides value to our customers and shareholders for decades to come. To succeed in this dynamic environment, we developed a long-term, customer-focused strategy designed to mitigate risks and guide investments that deliver greater value to our customers and shareholders.

Our Strategy

- Transform the Customer Experience
- Modernize the Power Grid
- Generate Cleaner Energy
- Expand Natural Gas Infrastructure
- Engage Employees and Stakeholders

A. Generating A Smarter Energy Future

Duke Energy is focused on delivering the cleaner, smarter energy solutions that our customers value and expect. As the energy system adapts to meet customers’ demands in this era of transformation, it requires changes to the grid, power generation, fuel supply infrastructure and customer-enabling technologies.

1. Regulatory obligations as a provider of vital services

At Duke Energy, safely powering the lives of our customers and enhancing the vitality of our communities remain our most important responsibilities. Duke Energy serves approximately 7.6 million electric customers in Florida, Ohio, Kentucky, North Carolina, South Carolina and Indiana, representing a population of about 24 million people. We also provide natural gas distribution service to over 1.5 million customers in
North Carolina, Ohio, Kentucky, South Carolina and Tennessee. As a provider of vital services, Duke Energy is highly regulated at the state and federal level and operates under a regulatory model that prioritizes reliable service at the lowest cost for customers. As such, the company must receive approval from regulators for capital investments before recovering the cost of those investments from our customers.

Duke Energy is also subject to numerous environmental laws and regulations affecting many aspects of operations that can result in increased capital, operating and other costs. Currently, there is no U.S. federal or state mandate in force that limits CO₂ emissions from the company’s operations. Thus, any decisions to invest in new power plants or technologies solely for the purpose of reducing CO₂ emissions must be made in collaboration with state policymakers and with the approval of our state regulatory commissions. Timely recovery of our investments is essential to providing adequate returns to our investors and attracting the capital required for building the energy future that our customers want.

2. Policy uncertainty

While there remains uncertainty surrounding future U.S. climate policy, the company’s strategy over the past decade has been and will continue to be to plan for a carbon-constrained future and make prudent investments to modernize an energy system that continues to benefit our customers. Identifying potential risks and opportunities associated with an uncertain policy future, and performing ongoing scenario analyses are essential aspects of our strategic investment planning.

Duke Energy first established voluntary CO₂ absolute and intensity reduction goals in 2010 to benchmark our progress in reducing emissions, and those goals were updated in 2017. Through 2017, our fleet modernization efforts and the retirement of older coal-fired generating units have reduced fleetwide CO₂ emissions from electricity generation by 31 percent since 2005. We’ve leveraged the integrated resource planning process to explore a range of future carbon policy scenarios, as will be discussed in more detail below.

3. Advancing our strategic vision

Duke Energy is committed to continuing to make smart investments to deliver a future where the energy we provide is affordable, reliable and cleaner – now and for years to come. As we consider various investment approaches and options, our strategy is focused on the following priorities:

- **Balancing Reliability, Affordability and Sustainability** – generating cleaner energy while keeping power affordable and reliable for all customers
- **Transforming the Customer Experience** – meeting our customers’ evolving expectations
- **Innovation** – investing in a modernized, more advanced power grid
- **Stakeholder Engagement** – working with regulators, policymakers, customers and other stakeholders to create the electric system of the future

B. Integrated Resource Planning

Duke Energy annually, biennially or triennially (depending on the state) prepares lengthy, forward-looking “integrated resource plans” (IRPs) for each of our regulated utility companies. These detailed, highly technical plans are based on the company’s thorough analyses of numerous factors that can impact the cost of producing and delivering electricity and influence long-term resource planning decisions. The IRP process helps to evaluate a range of options, taking into account forecasts of future electricity demand, fuel prices, transmission improvements, new generating capacity, integration of renewables, energy storage, energy efficiency and demand response initiatives. The IRP process also helps evaluate potential environmental and regulatory scenarios to better mitigate policy and economic risks. The IRPs we file with regulators look out 10 to 20 years, depending on the jurisdiction.

Core questions and assumptions drive our scenario planning. Here are just some of those considerations:

**Core Questions**

- What is the anticipated future demand for electricity?
What is the expected price for electricity and natural gas? How will price affect customer behavior?

What is the cost of capital?

New and Improved Technologies

What technologies will be commercially available to generate electricity with fewer or no carbon emissions? Will they be economical?

How will technology improve the efficiency of electricity use? How will that affect future demand?

Enabling Public Policy

What public policies can foster competitive markets for reducing emissions cost-effectively?

Will a carbon market evolve? If so, what will be the price on carbon? What role might carbon offsets play?

Customer Behavior

Will customers change their behaviors to reduce energy use?

Will customers accept and/or optimize advanced technologies available through the smarter electric network?

If customer incentives are needed, will cost recovery be allowed? Will they be sufficient to drive these changes?

Sustainability and Collaboration

What are the economic, environmental and social implications of each type of generation?

Will stakeholders support the direction?

What new ideas will come from collaboration?

1. Balancing reliability and affordability

Climate change policies should not only result in reductions in CO$_2$ emissions at achievable rates over time, but also balance impacts to our customers’ rates, the economies of our service territories and the reliability that our customers and regulators demand. A key aspect of the IRP process is planning system investments in a way that achieves this balance.

Duke Energy’s investment strategy has helped us significantly reduce emissions while maintaining electric rates below the national average for our customers.

2. Incorporating carbon pricing

Since 2010, Duke Energy has included a price on CO$_2$ emissions in our IRP planning process to account for the potential regulation of CO$_2$ emissions. Incorporating a price on CO$_2$ emissions in the IRP allows us to evaluate existing resources and future resource needs against potential climate change policy risk in the absence of policy certainty. One of the challenges with using a CO$_2$ price, especially in the absence of a clear and certain policy, is determining the appropriate price to use. To address
this uncertainty and ensure the company remains agile, Duke Energy uses a range of potential CO₂ prices in our IRP process to reflect a range of potential policy outcomes.

C. Fleet Modernization

Potential impacts on financial earnings from future climate change policy have been at least partially mitigated by our transition from coal generation to natural gas and renewables.

1. Where we are today, 2030 projections and beyond

Between 2011 and 2017, Duke Energy’s fleet modernization included:

- Retirement of 47 coal-fired generating units with a combined capacity of 5,424 megawatts (MW);
- Addition of highly efficient natural gas combined cycle (NGCC) generating facilities, which emit about half as much CO₂ as coal;
- Expansion of renewables across our regulated and commercial businesses. In total, Duke Energy now has more than 20 wind projects and 70 solar facilities in operation, totaling more than 3,000 MW of generating capacity;
- Evaluation of the possibility of seeking additional license extensions from the Nuclear Regulatory Commission for our existing nuclear plants, which provide zero-CO₂ emissions energy. Through 2017, our nuclear fleet marked 19 consecutive years operating at a capacity factor exceeding 90 percent.

The energy delivered by our total generation fleet, which includes both regulated utility and commercial assets, in 2017 compared to 2005 is shown below. Over 38 percent of the electricity we delivered in 2017 was from carbon-free sources.

Duke Energy Generation (megawatt-hours (MWh))

Mixing it up

A diverse fuel mix – nuclear, natural gas, coal and renewables – helps us meet our obligation to provide affordable, reliable and increasingly clean energy.

Looking ahead, by 2024 Duke Energy plans to retire nine more coal-fired generating units with a total capacity of 2,006 MW, and invest $11 billion over 2017-2026 in new natural gas-fired, wind and solar capacity.

Natural gas will play a key role as Duke Energy builds a cleaner, low-carbon future. Our pipeline
Development projects will bring much-needed natural gas to the southeast United States and support the transition of our generation fleet to cleaner energy sources. Expanded natural gas infrastructure will save customers money through lower fuel costs, protect them from price spikes during cold snaps, enhance reliability and enable more renewable energy – as well as provide a powerful engine for economic development and job growth.

By 2030, we project natural gas generation will increase to 42 percent, and coal generation will decrease to 16 percent of total company generation. We expect generation from hydro, wind and solar to double to 10 percent. The slight decrease in nuclear is not a reflection of lower production from nuclear, but rather its percentage contribution declines as generation from other sources increases.

**Duke Energy Projected 2030 Generation (MWh)**

- **42%** Natural gas
- **32%** Nuclear
- **16%** Coal
- **10%** Hydro/wind/solar

2030 projection will be influenced by customer demand for electricity, weather, fuel availability and prices.

Looking beyond 2030, we will continue to consider CO₂ emissions in our generation options and integrate innovative and cost-effective technologies into our portfolio. Our long-term strategy includes planned investments in additional renewable energy sources coupled with storage and improved energy efficiency and demand response programs.

### 2. Expanding renewables

Clean energy technologies are advancing, and Duke Energy is investing in renewables in our regulated jurisdictions, and through our commercial business, Duke Energy Renewables. Highlights include:

- Since 2015, solar has been the number one source for new energy capacity in the Carolinas.
- In addition to the facilities we own and operate, we also purchase more than 3,000 MW of solar, biomass and wind on behalf of our customers.
- Our regulated and commercial businesses plan to invest an additional $2.7 billion in new renewable energy over the next five years, with a goal to own or contract 8,000 MW of wind, solar and biomass by 2020.

The details of our renewables investments are discussed in the company's annual [Sustainability Report](#).
As renewables become an increasing part of our generation portfolio, there will also be a need for generating resources and technologies that can complement the variable nature of solar and wind, such as smart grid, energy storage and rapidly responding load-following generating technologies. The generating fleet will need to be more flexible – quickly ramping up and down as renewable production fluctuates during the day. We will manage this mix of resources by putting energy storage, smart grid technologies and demand response programs where they are most economical and operationally effective. We will also continue to collaborate with the Electric Power Research Institute, Department of Energy and National Labs on evolving technologies and ways to manage higher penetrations of renewables.

3. Enhancing energy efficiency

Our customers want new products and services to help them use energy wisely. Duke Energy has been an industry leader in embracing policies and regulatory models that promote efficiency.

We collaborate with utilities, technology companies, environmental stakeholders, consumer advocates and regulators to bring new service offerings to market. In 2017, Duke Energy invested $486 million in energy efficiency and demand response programs to help our customers save energy and money. Our My Home Energy Report program was first of its kind in the world to hit the 1 terawatt-hour energy savings milestone. Other programs include on-site energy assessments, rebates for energy-efficient equipment and incentives for reducing energy use during peak demand. As of year-end 2017, peak demand has been reduced by more than 5,300 MW.

Through 2017, Duke Energy customers have saved over 14,400 gigawatt-hours (GWh) through our energy efficiency programs.

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Based on the expansion of existing programs, we expect cumulative energy savings to grow to 22,000 GWh by 2030. This is equivalent to the annual usage of 1.8 million homes.

II. Risk Management – How We Identify and Mitigate Risk

Generation and transmission assets are large, capital-intensive, long-lived infrastructure projects that are essential to provide customers with reliable energy. With oversight from the Board of Directors, Duke Energy’s approach to managing these assets is to be proactive in identifying and mitigating risks, both economic and physical, and to use continuous process improvement and lessons learned to enhance system resiliency.

A. Physical Risks

Duke Energy recognizes that severe weather events are often associated with increasing levels of greenhouse gases (GHGs) in the atmosphere, with the potential that such events could have a material impact on future operations should they occur more frequently and with greater severity. Destruction caused by severe weather events, such as hurricanes, tornadoes, severe thunderstorms, snow and ice storms can result in property damage, including damaged transmission and distribution lines, and significant power outages. Outages present disruptions to our customers, lost operating revenues and additional and unexpected expenses to mitigate storm damage. Potential changes in technology, extreme weather events, including increased frequency, duration and severity are difficult to predict, and make estimating any future financial risk with any degree of accuracy impossible.

This makes no-regrets planning and preparation essential. Duke Energy has historically planned and prepared for severe weather events and has established operational procedures and technical measures to reduce potential impacts and speed recovery.

1. System hardening

Duke Energy’s electric distribution system has experienced physical damage in the past from ice storms, hurricanes and severe thunderstorms. While our system is exceedingly reliable, recent significant storms, such as hurricanes Irma and Matthew, have highlighted the need to strengthen our system.

To that end, as part of Duke Energy’s plan to invest $25 billion over 2017-2026 to create a smarter, more modern grid, nearly $7 billion is included over the first five years specifically for storm hardening and targeted undergrounding. These investments are aimed at improving resiliency and hardening the grid against extreme weather to make the grid less likely to experience outages or equipment failure, and to minimize impacts to customers from outages when they do occur. Investments will include substation and transmission line upgrades, increased system automation, equipment modernization, elevating substations in flood-prone areas, replacing and strengthening utility poles, and relocating miles of hard-to-access overhead power lines underground. These investments will help prevent outages, especially during storms, and provide faster restoration times during outages.

2. Emergency planning, response and recovery

We also continually look to improve our storm response based on lessons learned from past events. For example, we’ve formed a new storm event organization to increase our ability to quickly handle surges in customer inquiries, increased the number of storm restoration staging areas to more quickly distribute resources, and employed improved communications technologies to provide proactive outage alerts and power restoration updates to affected customers. We also conduct systematic tree-trimming to reduce the risk of damage to our power lines. In addition, almost all new residential lines are being installed underground to protect them from storm damage.
Duke Energy collaborates within our industry to prepare for adverse physical events affecting the electric grid. We are active participants in regional utility grid response and recovery organizations, such as Grid Assurance, to enable effective utility collaboration and resource sharing during major outage events. We're involved with research and development work through the Electric Power Research Institute to make electrical systems more resilient to weather-related damage. We also participate in North American Electric Reliability Corporation (NERC) GridEx exercises, which simulate physical and cyberterrorism threats in order to develop an effective coordinated national response. Our experiences preparing for and responding to the impacts of severe weather events help us plan and prepare for future events to reduce their operational and economic impacts.

3. Managing water scarcity

Because of the importance of water to generating electricity, prolonged drought poses a risk to our operations. Specifically, sustained severe drought conditions could adversely impact output not only from hydroelectric plants, but also, and more significantly, from fossil and nuclear plant operations, as these facilities withdraw large quantities of water for cooling. In the summer of 2007, the Carolinas experienced a drought of historic proportions. A unique aspect of our Carolinas operations is that we manage many of the lakes that supply water for our plants' operations. In response to the 2007 drought, we established an in-house Drought Mitigation Team to monitor and forecast drought effects on the lake system storage. We also implemented equipment and operational changes at nuclear and coal-fired generating plants to reduce drought-related risks. The experience Duke Energy gained from the 2007 drought will help us respond effectively to potential similar events in the future.

When examining water used for energy production, it’s important to differentiate between water withdrawn and water consumed. Water withdrawn is the total volume of water removed from a water source. Because many of our plants utilize once-through cooling systems, almost 99 percent of this water is returned to the source and is available for other uses. Water consumed is the amount of water removed for use and not returned. Since 2011, we’ve been steadily reducing our water intensity, defined as the amount of water consumed per MWh generated as shown below.

![Duke Energy Water Consumption Intensity](image)

Much of the coal generating capacity Duke Energy has retired since 2011 has been replaced with natural gas combined-cycle generation, which withdraws significantly less water than coal-fired units for cooling purposes. Therefore, the transition
of Duke Energy’s generation fleet away from coal reduces risk exposure to potential future droughts. Duke Energy has a long history of working with government, community and private sector parties to help manage and enhance water resources.

B. Policy Risk

1. International climate policy

The Paris Climate Agreement (“Paris Agreement” or “Agreement”) entered into effect on November 4, 2016, after having been ratified by 55 countries that together accounted for at least 55 percent of the total global GHG emissions. Currently, 175 parties have ratified the Agreement. The Agreement provides a framework for international cooperation to reduce GHG emissions globally with the goal of holding the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels. The Agreement calls for ratifying countries to: 1) establish what are referred to as nationally determined contributions (NDCs), or domestic emission reduction goals intended to achieve the purpose of the Agreement; 2) develop and communicate successive and progressively more ambitious NDCs every five years; and 3) pursue domestic policies aimed at achieving the objectives of each NDC. Each country identifies its NDC, which is voluntary and not binding. Should the United States remain a party to the Agreement, any impacts on Duke Energy from the Paris Agreement would not come from the Agreement itself, but rather from domestic GHG reduction policies that may be established in response to an NDC.

2. U.S. climate policy

Climate change policy in the United States is very uncertain. The initial U.S. NDC is to achieve an economywide target of reducing its GHG emissions by 26 to 28 percent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28 percent. The central domestic policy for the U.S. NDC that pertained to the electricity sector was the Clean Power Plan (CPP).

However, on June 1, 2017, President Trump announced his intention to withdraw the United States from the Paris Agreement. The Paris Agreement was designed not to be legally binding. On October 16, 2017, the U.S. Environmental Protection Agency (EPA) proposed to repeal the CPP. On December 28, 2017, the EPA issued an Advance Notice of Proposed Rulemaking in which it solicits input on various aspects of a potential CPP replacement rule. If EPA decides to move ahead with a replacement rule, it will need to issue a formal proposal for public comment. There remains significant uncertainty as to what a potential replacement rule may look like and the timing for implementation. Further, given the current U.S. political landscape, it is unlikely that Congress will pass legislation directly regulating GHG emissions.
3. State initiatives

In the absence of federal mandates, several states have taken various steps to implement policies that limit GHG emissions within their borders. Most notable are a group of Northeastern states, operating through the Regional Greenhouse Gas Initiative, and California. However, most states, including the states in which Duke Energy regulated utility companies operate, do not currently regulate GHG emissions.

Despite the current and future uncertainty around the direction of U.S. climate change policy at both the federal and state level, Duke Energy believes it is in the best interests of our customers and shareholders to continue providing reliable, economical power to our customers, while prudently and cost-effectively lowering our CO₂ emissions.

4. Our view on carbon policies

Duke Energy has long advocated for climate change policies that will result in economywide reductions in CO₂ emissions at achievable costs over time. We support market-based approaches to reduce CO₂ emissions that balance environmental protection with affordability, economic vitality and reliability.

It is our view that effective policies to reduce CO₂ emissions should:

- Be established through new legislation that covers all sectors of the economy;
- Create a transparent, market-based system that provides the incentive to lower emissions in the most economically efficient way possible;
- Provide sustained financial support for the research, development and demonstration of innovative, low-carbon technologies, including those that follow load;
- Establish the durable policy framework needed to support long-term public and private investments in low-carbon technologies; and
- Recognize regional differences to avoid disproportionate impacts on any region or state.

C. Economic Risk

Potential future climate change-related regulations or legislation may require Duke Energy to make additional capital expenditures to comply, and could increase operating and maintenance costs. Regulatory changes could also result in early retirement of some generation facilities, resulting in customers paying for both the retired capacity and the replacement capacity at the same time, or stranded costs if Duke Energy is not able to fully recover the costs and investments in replacement generation. As with costs incurred for complying with other types of environmental regulations, Duke Energy would plan to seek cost recovery for investments through regulatory rate structures for costs associated with complying with any climate change-related laws or regulations. The significant steps Duke Energy has taken in recent years – and those we will continue to take to reduce emissions and transition our generation fleet away from coal toward lower-emitting natural gas and zero-emissions renewables – help to mitigate Duke Energy’s financial exposure to potential future carbon regulation.

There is the potential that future climate change policies could result in a change in the cost of the various fuels we use to generate electricity. Fuel prices can greatly influence the types of generating resources we invest in, and the order in which resources are dispatched to meet the energy needs of customers, with the lowest cost resources being dispatched first. Changes in fuel prices are neither positive nor negative for Duke Energy financially because they are a pass-through cost paid directly by customers. Although there is no direct financial impact to the company, Duke Energy actively manages fuel costs because of the impact to our customers’ bills.
D. Potential Opportunities

While potential future U.S. or state climate change policies could result in additional compliance costs for Duke Energy, they also have the potential to create business opportunities. It’s possible that future climate change-related policies could create additional demand for wind, solar and other zero-carbon energy resources. If this were to occur, Duke Energy could benefit from its already diverse portfolio, including nuclear, or by the development of new commercial and/or regulated projects.

Another opportunity for Duke Energy is electric transportation. U.S. electric sector CO₂ emissions are down 25 percent since 2005, and transportation is now the largest GHG emitting sector in the country. After achieving success in reducing emissions from the electric sector, the utility industry is well positioned to facilitate emissions reductions from the transportation sector. Switching from a gasoline-powered car to an electric vehicle (EV) can reduce CO₂ emissions by 50 to 90 percent annually along with significant reductions of other pollutants such as nitrogen oxides and volatile organic compounds.

Rapid battery cost declines and expanded product offerings from automakers have resulted in strong annual sales growth of EVs, showing a 62 percent increase year over year within the Duke Energy footprint in 2016 and passing the 1 percent market share threshold for new light-duty vehicles nationally in 2017. Electric drive technology is expanding outside of typical light-duty vehicles, with transit buses, school buses, delivery vehicles and forklifts now available as EV options, and new product announcements are being released with increasing frequency.

For the past decade, Duke Energy has been active in building public charging stations at parking decks, libraries and shopping areas. That infrastructure is needed as EVs become a growing part of the nation’s auto fleet, and the effort will continue in 2018 with Duke Energy installing more than 500 charging stations in Florida as part of the first large-scale charging station deployment by a Florida utility. In North Carolina, Duke Energy is continuing a project that will ultimately fund more than 200 public EV charging stations under a $3 million grant program. This program is also funding electric transit bus, truck stop electrification and transport refrigeration unit projects. Stations are planned in almost 50 counties around the state.

Duke Energy has a dedicated team to oversee our efforts to prepare for widespread customer adoption of EVs. These efforts include developing charging infrastructure programs as well as working with manufacturers of EVs, batteries and charging stations to expand adoption of all types of electric transportation.

Greenhouse gases emitted by Duke Energy facilities include carbon dioxide (CO$_2$), methane (CH$_4$), nitrous oxide (N$_2$O) and sulfur hexafluoride (SF$_6$). The burning of fossil fuels to generate electricity is the primary source of Duke Energy’s GHG emissions, producing emissions of CO$_2$, CH$_4$ and N$_2$O. The other sources of Duke Energy GHG emissions include CH$_4$ emissions from natural gas distribution operations, and emissions of SF$_6$, an insulating gas used in high-voltage electric transmission and distribution switchgear equipment.

### Duke Energy Greenhouse Gas Emissions from Electricity Generation (million tons CO$_2$e)

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<tr>
<th></th>
<th>2005</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td>CO$_2$</td>
<td>152.955</td>
<td>109.377</td>
<td>108.041</td>
<td>104.953</td>
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<tr>
<td>CH$_4$</td>
<td>0.420</td>
<td>0.244</td>
<td>0.236</td>
<td>0.230</td>
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<tr>
<td>N$_2$O</td>
<td>0.731</td>
<td>0.416</td>
<td>0.402</td>
<td>0.391</td>
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<tr>
<td>Total</td>
<td>154.106</td>
<td>110.037</td>
<td>108.679</td>
<td>105.573</td>
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### Duke Energy CH$_4$ Emissions from Natural Gas Distribution (million tons CO$_2$e)

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<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>CH$_4$</td>
<td>0.201</td>
<td>0.184</td>
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### Duke Energy SF$_6$ Emissions from Electric Transmission and Distribution (million tons CO$_2$e)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>SF$_6$</td>
<td>0.456</td>
<td>0.291</td>
<td>0.570</td>
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In any year, CO$_2$ accounts for greater than 99 percent of Duke Energy’s total GHG emissions from electricity generation and more than 98 percent of Duke Energy’s total GHG emissions from all operations. 2017 data for the bottom two tables was not available at the time of report publication.

SF$_6$ emissions fluctuations are due to maintenance, replacement and storm repair needs.

B. Emissions Monitoring and Reporting

Duke Energy has been quantifying and reporting CO$_2$ emissions from electricity generation to the EPA since 1995 in accordance with EPA’s 40 CFR (Code of Federal Regulations) Part 75 continuous emissions monitoring rule. More than 99 percent of Duke Energy’s CO$_2$ emissions from electricity generation are directly measured using continuous emissions monitors (CEMs). The small amount of CO$_2$ emissions from electricity generation not monitored directly with CEMs are quantified using the amount of fuel burned and the CO$_2$ emission characteristics of each fuel type.

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3 Duke Energy voluntarily reports emissions in our annual Sustainability Report and in our Carbon Disclosure Project questionnaire response.

4 The 40 CFR Part 75 rule includes requirements for regular testing and calibration of CEMs to ensure their accuracy.

5 Duke Energy electric generating facilities where CEMs are not used to quantify CO$_2$ emissions include small natural gas and oil-fired combustion turbines.
In 2010, a new EPA rule, the Greenhouse Gas Mandatory Reporting Rule (GHG MRR), went into effect. In addition to the continued reporting of CO₂ emissions from electricity generation as discussed above, this rule requires annual quantification and reporting of CH₄ and N₂O emissions from electricity generation, CH₄ emissions from natural gas distribution, and SF₆ emissions from transmission and distribution activities based on EPA established emission quantification methodologies and quality assurance/quality control protocols. Once submitted to EPA, emissions reports are evaluated by electronic validation and verification checks to identify potential errors. In addition, reporters must certify that the data submitted to EPA are true, accurate and complete before they can be submitted. The GHG Reporting Program verification process ensures that data submitted to EPA are accurate and complete, and if errors are identified, they are corrected and resubmitted.

Duke Energy's 2015 CO₂ emissions accounted for 5.2 percent of U.S. CO₂ emissions from electricity generation and 1.8 percent of U.S. CO₂ emissions from all sources (2015 was the latest available data at the time of report publication).

C. Carbon Goals

In 2010, Duke Energy established CO₂ absolute and intensity reduction goals. The absolute goal was to reduce CO₂ emissions from our generation fleet 17 percent below the 2005 level by 2020. The intensity target was to reduce the CO₂ intensity of our generating fleet 27 percent below the 2005 level by 2020.

In 2016, with a 29 percent reduction in CO₂ emissions relative to 2005, we well exceeded our 2020 absolute reduction goal. In 2016 our CO₂ intensity was 25 percent lower than in 2005, aligned with progress toward our 2020 intensity goal.

Based on our recent CO₂ emissions performance relative to our 2020 goals, Duke Energy determined that 2017 was an appropriate time to reaffirm the company’s commitment to a low-carbon future by

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6 The GHG Reporting Program specifies the following global warming potentials for non-CO₂ GHGs: 25 for CH₄, 298 for N₂O and 22,800 for SF₆.

updating our CO₂ absolute and intensity reduction goals. Duke Energy’s updated absolute reduction goal is a 40 percent reduction in CO₂ emissions from electricity generation below the 2005 level by 2030. The updated intensity reduction goal is to achieve a 45 percent reduction in the CO₂ intensity of our generating fleet below the 2005 level by 2030. Duke Energy will provide annual updates of its progress toward meeting these updated goals in our annual Sustainability Report.

Duke Energy commits to 40 by ’30 goal

- Duke Energy reaffirms our commitment to a lower-carbon future with additional investments of $11 billion in cleaner energy and an aggressive goal to reduce carbon dioxide emissions 40 percent from 2005 levels by 2030.
- We also commit to reduce carbon intensity by 45 percent versus 2005.

Many stakeholders are asking companies to set a science-based emission reduction target. As we considered what our new CO₂ reduction goals should be, we were guided by the following three criteria: 1) our goal needed to be aggressive; 2) it needed

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8 A science-based target has been defined as a level of GHG emission reduction in line with the level of decarbonization required to keep global temperature increase below 2 degrees Celsius compared to pre-industrial temperatures, as described in the Fifth Assessment report of the Intergovernmental Panel on Climate Change (IPCC AR5).
to be achievable with currently available and commercially demonstrated technologies; and 3) it needed to be viewed as credible. After performing the two-degree scenario analysis discussed below, we were able to confirm that our current plan to achieve the 40 percent reduction by 2030 is consistent with a pathway to achieve a science-based two-degree target.

IV. Two-Degree Scenario Analysis

Duke Energy recognizes that many stakeholders have an interest in understanding how possible future regulatory limits on CO₂ emissions may impact the company’s operations. As such, Duke Energy, with oversight from our Board of Directors, is providing an analysis of the potential impacts to the company’s generation portfolio from meeting CO₂ emissions reduction targets intended to limit global warming to no more than 2 degrees Celsius over pre-industrial levels. The scenario analyzed by the company is one outlined by the Science Based Targets Initiative (SBTi). The SBTi is a leading organization in the area of science-based target setting.

Developing Industry Best Practices

Duke Energy has joined nine other utilities on an Electric Power Research Institute (EPRI) project called “Understanding Climate Scenario and Goal Setting Activities.” The project will develop a technical knowledge base for informed dialogue and decision-making regarding two-degree scenario analysis and science-based target setting.

Duke Energy is also helping pilot a voluntary industrywide Environmental, Social, Governance (ESG) and Sustainability reporting template for investors, developed by Edison Electric Institute (EEI) and member companies.

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9 The SBTi is a collaboration among the Carbon Disclosure Project, World Resources Institute, the World Wide Fund for Nature, the United Nations Global Compact, and the We Mean Business Coalition initiatives.

10 The SBTi refers to this scenario as the Contraction of Absolute Emissions. More information on the scenario can be found at: http://sciencebasedtargets.org/wp-content/uploads/2015/09/SBTManual_PubComDraft_22Sep15.pdf.

11 This emissions reduction trajectory is in close alignment with the Intergovernmental Panel on Climate Change representative concentration pathway (RCP) 2.6.
A. Key Assumptions and Considerations

Any analysis of system changes through 2050 would include numerous uncertainties and assumptions. The company’s historic planning horizon, as reflected in our IRPs, provides a relatively clear view through 2030 and is based on currently available technology. Projecting beyond that time frame requires assumptions for how technology, demand and fuel prices may evolve. Our two-degree analysis assumes that a federal regulatory requirement is driving the entire U.S. power generation sector to reduce emissions to the same level. Other assumptions and considerations include:

- System load increases 0.45 percent annually from 2017 to 2050. This includes the impacts of existing and advanced energy efficiency programs. Without these programs, system load would increase by an even greater amount due to pressures that increase demand such as electrification of the residential, industrial and transportation sectors. The type of electrification (e.g., electric vehicles, heat pumps, motors) could impact daily and seasonal demand and our ultimate generation mix.
- All existing nuclear capacity is relicensed and authorized to operate for an additional 20 years (for a total operating life of 80 years).
- Load-following zero-emitting generating technologies are commercially available. Potential technologies that could be deployed under a deep decarbonization future include advanced nuclear, natural gas combined cycle equipped with carbon capture and storage, and closed-cycle biomass generation. Additional technological advances may provide other alternatives in the future.
- No breakthroughs in development of new battery storage technologies were assumed beyond the significant improvements in the cost effectiveness of existing lithium-ion technologies. Renewable and storage technologies continue to improve their cost effectiveness at a declining rate for 10 years.

Uncertainty Related to Relicensing Existing Nuclear Capacity

- Duke Energy currently owns nearly 9,000 MW of 1970s-1980s nuclear generating capacity that is licensed to operate for a total of 60 years.
- We are evaluating the possibility of seeking additional license extensions for these facilities, which would allow us to operate them for a total of 80 years.
- No nuclear unit in the United States has yet to be licensed by the Nuclear Regulatory Commission for 80 years of operation and license extension is not guaranteed.
- Retirement of the existing nuclear fleet would require additional zero-CO₂ emissions generation to meet demand and maintain a trajectory of lowering carbon.
Beyond that point, costs are assumed to increase with inflation.
- Given the many uncertain details of a potential national cap-and-trade program, no emissions trading is assumed. The existence of trading tends to have a moderating effect on the cost of reducing emissions, which could mitigate price spikes for customers.
- Transmission access is assumed to increase to allow for greater amounts of wind to be included in the energy mix for our utilities.
- Natural gas prices remain flat through 2028 and then increase about 4 percent annually.

B. Scenario Analysis Results

It is important to note that the following results reflect only one possible pathway that Duke Energy could follow to achieve the CO₂ emissions reduction target associated with the Pro-Rata Reductions scenario. An actual pathway to emissions reductions would depend on a number of factors, including public policies and technology availability at the time of planning. The company’s actual investment plans beyond 2030 will be developed in conjunction with regulators, policymakers and stakeholders.

The following charts show the company’s 2017 actual regulated utility generation mix and a potential 2050 regulated utility generation mix under the Pro-Rata Reductions scenario (in MWh). In this scenario, Duke Energy would completely phase out existing coal generation by 2050. Coal would be replaced with renewables and new zero-emitting generation that can increase and decrease output to balance renewables. Nuclear production from existing facilities would remain constant, but its percentage declines slightly as generation from other sources increases.

As the adoption of renewables grows to between 20 and 30 percent of total generation, the value of the resource begins to diminish due to extended periods of excess energy in the spring and fall and insufficient output during the winter months. While energy storage helps to mitigate the periods of excess and lower output, storage alone cannot address the energy deficiency during the winter months. Thus, this analysis has shown that public policy requiring deep reductions in CO₂ emissions must include sustained financial support for research, development and demonstration to ensure that commercially available technologies exist, at reasonable costs, to achieve the reductions and ensure that the power system remains reliable and resilient. The zero-emitting capacity required would need to be capable of increasing and decreasing output on demand to support variable output from wind and solar. Possible technologies could include nuclear with the ability to load follow, natural gas combined cycle with carbon capture and storage, and closed-cycle biomass generation.

C. Looking Ahead

In the past 15 years, we’ve seen dramatic advancements in energy technology, including abundant natural gas due to hydraulic fracturing, and declining prices of solar and wind technology. Given this rapid pace of development, we fully expect technology innovations in the coming decades. That’s why planning the generation system of 2050 with 2018 technology would be purely speculative. Duke Energy will continue to evaluate, test and deploy emerging technologies as we plan and build our system in the future.

Looking to the future, the actual pathway that Duke Energy takes to further reduce CO₂ emissions will adjust based on evolving technologies and other factors. As we have done for more than a century, we will collaborate with regulators, policymakers and stakeholders to evaluate the best options to meet the needs of customers while balancing reliability, affordability and sustainability.
We're excited about the transformation underway in our industry, and the developing technologies that will help us meet the needs of our customers. We have dedicated teams collaborating with industry and government on emerging technologies and looking for new opportunities to expand renewables across our system. We'll continue to leverage a portfolio of technologies to meet our customers' expectations and power their lives.

V. Governance – How We’re Accountable

The day-to-day direct management of climate change policy issues, such as carbon regulations and federal climate change legislation, is the responsibility of Duke Energy’s vice president of federal government affairs and strategic policy. This position reports to the executive vice president external affairs, chief legal officer and corporate secretary, who is a member of Duke Energy’s senior management team, and who reports directly to the chairman, president and chief executive officer. The federal government affairs and strategic policy group has organizational responsibility for the development of Duke Energy’s position on federal legislative and regulatory proposals addressing climate change and GHG emissions, and for assessing the potential implications of legislative and regulatory proposals on the company.

The Board of Directors, which is composed of a number of directors with experience and knowledge of environmental regulations and issues in the energy industry and across the nation, is actively engaged in the oversight of the company’s environmental positions and issues. Review of climate issues occur primarily at the Board level with the Regulatory Policy and Operations Committee regularly reviewing operational environmental risks and the Corporate Governance Committee regularly reviewing sustainability issues. In 2018, the Board, in acknowledgement of the growing importance of sustainability issues and the Corporate Governance Committee’s active involvement in sustainability and climate issues, formally tasked the Corporate Governance Committee with oversight of sustainability issues by adding a designated responsibility in the Corporate Governance Committee’s Charter.

Our view on 100 percent renewable energy

Recent research supports that a decarbonized energy system would require a mix of technologies. Renewables will be an important part of that mix, but we do not believe 100 percent renewables can reliably deliver the power required by a modern economy. Similarly, we do not advocate for 100 percent natural gas or nuclear energy. An analysis published in the Proceedings of the National Academy of Science concluded that a decarbonized energy system would very likely need other technologies besides renewables, including nuclear and carbon capture and sequestration. The analysis, published by a large, cross-functional team of energy system analysts and economists, revealed deep flaws in a prominent study claiming to demonstrate the feasibility and affordability of an energy system comprised exclusively of renewables.


The report “Pathways to Deep Decarbonization in the United States” written by Energy & Environmental Economics, Inc. (E3), in collaboration with Lawrence Berkeley National Laboratory and Pacific Northwest National Laboratory, concludes that the high renewables scenario was likely the most costly, while both the mixed scenario (renewables, nuclear and carbon capture on fossil) and the high nuclear scenario would likely cost less.

During 2017, the Board placed particular focus on the review of climate risks at several Board meetings. Regular updates to the Corporate Governance Committee and the Board on engagements with shareholders and stakeholders, and the Corporation’s disclosures of climate risks and sustainability measures, occurred throughout the year. This directly resulted in the Board’s decision to have the company take an industry leadership role on these issues through participation in the EEI Environmental, Social and Governance (ESG) and Sustainability voluntary reporting pilot program and production of this climate report.

Forward-Looking Information
This document includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements are based on management’s beliefs and assumptions and can often be identified by terms and phrases that include “anticipate,” “believe,” “intend,” “estimate,” “expect,” “continue,” “should,” “could,” “may,” “plan,” “project,” “predict,” “will,” “potential,” “forecast,” “target,” “guidance,” “outlook” or other similar terminology. Various factors may cause actual results to be materially different than the suggested outcomes within forward-looking statements; accordingly, there is no assurance that such results will be realized. These factors include, but are not limited to: state, federal and foreign legislative and regulatory initiatives, including costs of compliance with existing and future environmental requirements, including those related to climate change, as well as rules that affect cost and investment recovery or have an impact on rate structures or market prices; the extent and timing of costs and liabilities to comply with federal and state laws, regulations and legal requirements related to coal ash remediation, including amounts for required closure of certain ash impoundments, which are uncertain and difficult to estimate; the ability to recover eligible costs, including amounts associated with coal ash impoundment retirement obligations and costs related to significant weather events, and to earn an adequate return on investment through rate case proceedings and the regulatory process; the costs of decommissioning Crystal River Unit 3 and other nuclear facilities could prove to be more extensive than amounts estimated and all costs may not be fully recoverable through the regulatory process; costs and effects of legal and administrative proceedings, settlements, investigations and claims; industrial, commercial and residential growth or decline in service territories or customer bases resulting from sustained downturns of the economy and the economic health of our service territories or variations in customer usage patterns, including energy efficiency efforts and use of alternative energy sources, such as self-generation and distributed generation technologies; federal and state regulations, laws and other efforts designed to promote and expand the use of energy efficiency measures and distributed generation technologies, such as private solar and battery storage, in Duke Energy’s service territories could result in customers leaving the electric distribution system, excess generation resources as well as stranded costs; advancements in technology; additional competition in electric and natural gas markets and continued industry consolidation; the influence of weather and other natural phenomena on operations, including the economic, operational and other effects of severe storms, hurricanes, droughts, earthquakes and tornadoes, including extreme weather associated with climate change; the ability to successfully operate electric generating facilities and deliver electricity to customers including direct or indirect effects to the company resulting from an incident that affects the U.S. electric grid or generating resources; the ability to complete necessary or desirable pipeline expansion or infrastructure projects in our natural gas business; operational interruptions to our natural gas distribution and transmission activities; the availability of adequate interstate pipeline transportation capacity and natural gas supply; the impact on facilities and business from a terrorist attack, cybersecurity threats, data security breaches, and other catastrophic events such as fires, explosions, pandemic health events or other similar occurrences; the inherent risks associated with the operation of nuclear facilities, including environmental, health, safety, regulatory and financial risks, including the financial stability of third-party service providers; the timing and extent of changes in commodity prices and interest rates and the ability to recover such costs through the regulatory process, where appropriate, and their impact on liquidity positions and the value of underlying assets; the results of financing efforts, including the ability to obtain financing on favorable terms, which can be affected by various factors, including credit ratings, interest rate fluctuations, compliance with debt covenants and conditions and general market and economic conditions; the credit ratings may be different from what the company and its subsidiaries expect; declines in the market prices of equity and fixed income securities and resultant cash funding requirements for defined benefit pension plans, other post-retirement benefit plans, and nuclear decommissioning trust funds; construction and development risks associated with the completion of Duke Energy and its subsidiaries’ capital investment projects, including risks related to financing, obtaining and complying with terms of permits, meeting construction budgets and schedules, and satisfying operating and environmental performance standards, as well as the ability to recover costs from customers in a timely manner or at all; changes in rules for regional transmission organizations, including changes in rate designs and new and evolving capacity markets, and risks related to obligations created by the default of other participants; the ability to control operation and maintenance costs; the level of creditworthiness of counterparties to transactions; employee workforce factors, including the potential inability to attract and retain key personnel; the ability of subsidiaries to pay dividends or distributions to Duke Energy Corporation holding company (the Parent); the performance of projects undertaken by our nonregulated businesses and the success of efforts to invest in and develop new opportunities; the effect of accounting pronouncements issued periodically by accounting standard-setting bodies; substantial revision to the U.S. tax code, such as changes to the corporate tax rate or a material change in the deductibility of interest; the impact of potential goodwill impairments; the ability to successfully complete future merger, acquisition or divestiture plans; and the ability to implement our business strategy. Additional risks and uncertainties are identified and discussed in Duke Energy’s and its subsidiaries’ reports filed with the SEC and available at the SEC’s website at sec.gov. In light of these risks, uncertainties and assumptions, the events described in the forward-looking statements might not occur or might occur to a different extent or at a different time than described. Forward-looking statements speak only as of the date they are made; Duke Energy expressly disclaims an obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.