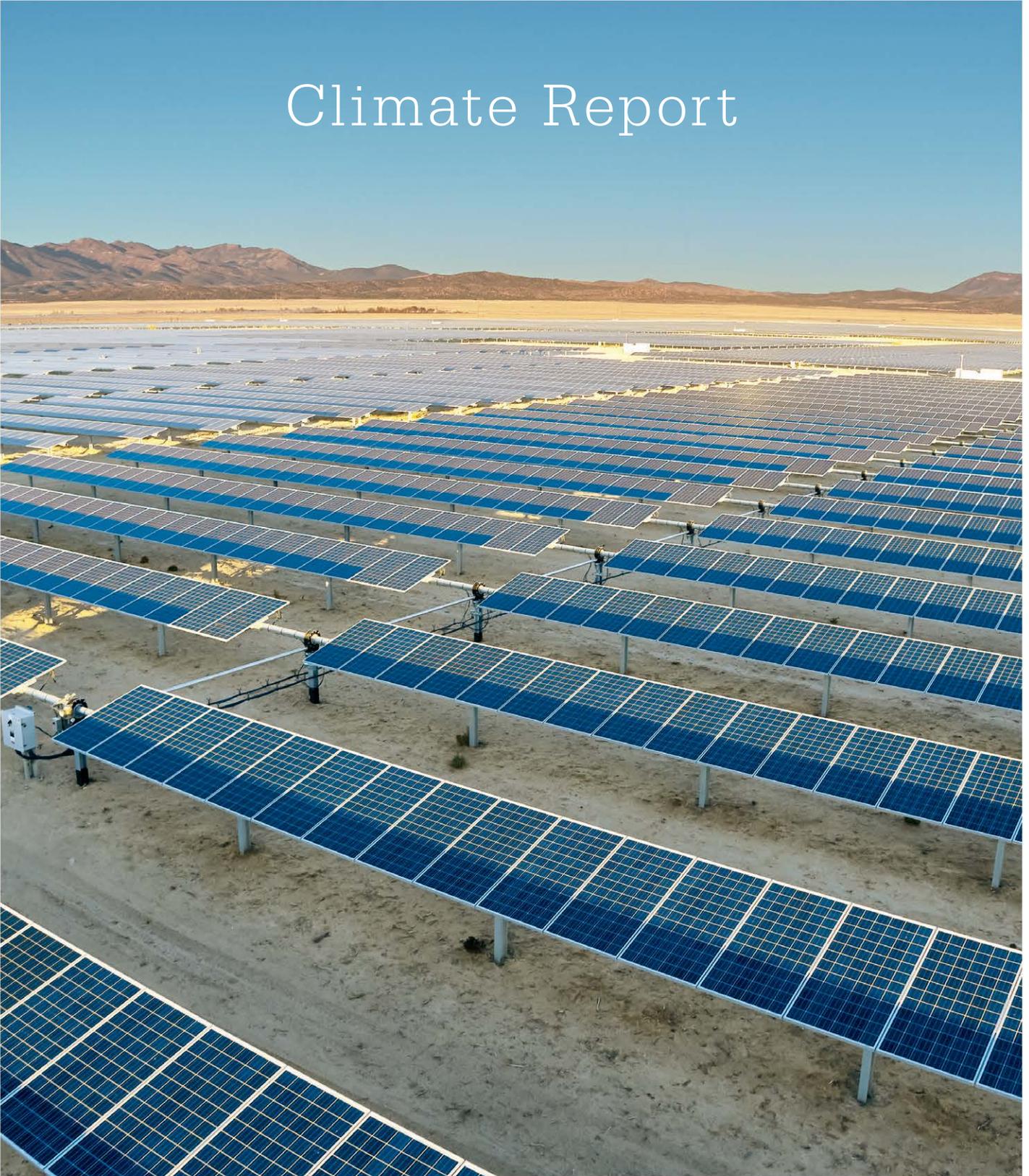
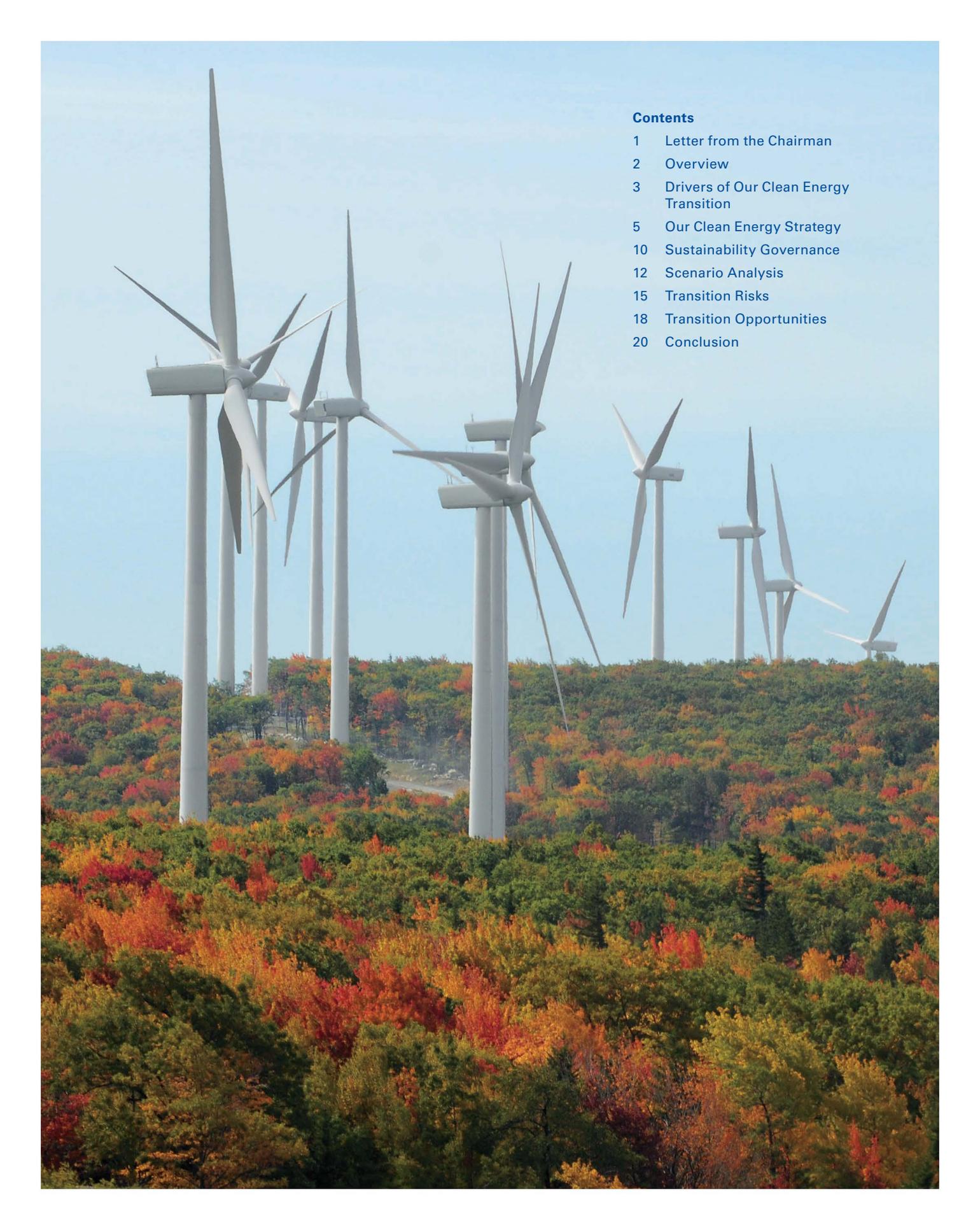


November 2018



# Climate Report





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# From the Chairman

Climate change is one of the most challenging issues of our time, and Dominion Energy has been deeply engaged in the worldwide effort to limit global temperature increases. Our stakeholders want cleaner energy. We intend to deliver it.



We are making great progress. We now operate the country's fourth-largest solar energy fleet. We have cut our total carbon dioxide emissions by nearly 50 percent over the past ten years—the equivalent of taking 6 million cars off the road. We have reduced our carbon intensity (the amount of carbon emitted per unit of energy produced) by 50 percent since 2000, achieving our goal. We are challenging ourselves with a new target, which will be shared this fall in our revised Sustainability and Corporate Responsibility Report. We take all of these steps with an unwavering commitment to safety, reliability and affordability for our customers.

We are committed to taking actions to support the objectives of the Paris Climate Agreement, and the United Nations Framework for Climate Change Convention (UNFCCC), on which the agreement was built. We will continue to monitor and learn from the latest scientific evidence regarding the impacts of a warming climate as we implement measures to meet our carbon reduction pledge in support of the goals of the Paris Agreement.

This report represents one example of our commitment to transparency. Our website includes a number of new disclosures—reports covering everything from how we are addressing climate change to reducing emissions and more. More disclosures appear in our financial

reporting documents and elsewhere. We go to these reporting lengths because you expect transparency, and we value it.

This report focuses on the numerous opportunities we see in the transition to lower carbon electricity generation. These include electric cars, microgrids, heating and cooling of homes, offshore wind, solar energy, pumped storage, and many more.

These opportunities should be widely available, but they will increase the cost of electricity for our customers. We believe the right course is to recommit to the basic principle of universal service, re-imagined for a clean energy world. For nearly a century, Americans have believed that all citizens should have access to energy and electricity, no matter where they live. This principle remains important as our society now makes the transition to cleaner energy together. It means sharing not only the benefits of cleaner energy, but also the cost of making the transition. This is the best way to avoid creating clean energy “haves” and “have-nots.”

Dominion Energy is embracing change to take advantage of clean energy opportunities. In fact, that's one of the five core values that guide everything we do—safety, ethics, excellence, embrace change, and teamwork. We have a strong innovation team in place, and a company culture oriented toward shaping the future.

This culture of innovation will enable

us to meet—and exceed—our carbon commitments, while maintaining a high level of affordable service for our customers, shareholders, employees, and the communities where we do business.

But let's be candid: Every consumer, every industry, and every nation has a role in shaping a clean energy future. No one can change the trajectory on their own, including the electric and gas industries in the United States. A clean energy future will require the transportation sector to go completely electric or to clean natural gas, and it will require countries around the world to do their part—especially in areas of rapid industrialization. Absent that, progress will remain slow. Everyone who uses energy will have to do their share: Private industry and public policymakers need to take actions that promote clean energy and protect economic prosperity—without unfairly burdening customers with the cost of this transition. At Dominion Energy, we are committed to doing our part, and we stand ready to work with customers, business partners, and governments to help achieve the clean energy future that we all know is possible.

A handwritten signature in black ink that reads "Tom Farrell". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

**Thomas F. Farrell, II**  
Chairman, President and CEO

# Overview

Dominion Energy is a national leader in the reduction of carbon emissions and aims to continue transitioning to a lower-carbon fleet and working to reduce our carbon footprint and that of our customers. This report is intended to provide an overview of our efforts to date and an analysis of public policy scenarios that can help better inform understanding of the business risks and opportunities associated with this transition.



The report focuses on a climate change scenario analysis for Dominion Energy's generation portfolio and provides an overview of the company's strategy to further reduce our carbon footprint. It examines the company's approach to carbon-emission reductions from a variety of angles, including the proactive (how the company will reduce carbon emissions) to the reactive (how it will respond to a changing environment). Above all, the company recognizes that the threat of climate change is a significant global issue and that our role in reducing carbon emissions plays a role in addressing it.

The report begins with an examination of the drivers and strategy behind the company's approach. Those include changing customer and investor expectations for more clean energy; changes in technology and public policy; and the need for more resilient systems. The company's strategy encompasses cleaner energy, battery technology, grid transformation, energy conservation and efficiency, and innovation.

Because governance plays a key

role in how the company approaches the climate challenge, this report details oversight by Dominion Energy's Board of Directors, including a Board committee devoted to environmental, social and related governance matters, as well as management structure and engagement with stakeholders.

The governance overview is followed by a discussion of the scope and method of the report—including the results of an independent third-party analysis that looks at the future make-up of Dominion Energy's electric generation fleet under hypothetical 60 and 80 percent carbon reduction scenarios. The guiding concept behind this analysis is the "two degree" framework put forth in the Paris Agreement and the United Nations Framework for Climate Change Convention (UNFCCC) on which the agreement was built. Under the Paris Agreement, which became effective in 2016, the vast majority of countries around the world adopted a global response to the threat of climate change that entails keeping the increase in average global

temperatures to less than two degrees Celsius below pre-industrial levels.

Finally, the discussion of our analysis leads to an examination of the risks to Dominion Energy from climate change and climate policy (including regulatory risks, physical risks and financial risks), and then describes the business opportunities presented by addressing climate change—from increasing demand for clean power (such as electric vehicles) to generation opportunities (including renewable energy sources).



# Drivers of Our Clean Energy Transition

Dominion Energy is committed to achieving a clean energy future and has been working for two decades to diversify and transform our generation portfolio to support our low-carbon goals.

Our long-term commitment to reducing emissions derives from our core values, which include both changes to how we do business and a commitment to long-term sustainability. Several other factors also influence our clean energy transition, as described below.

## Stakeholder Expectations

Our customers, investors, and other stakeholders share a broad demand for clean energy. This desire is apparent at the local level when we engage with residents of the communities in which we do business and at the national and international level when we meet with investors, rating agencies, and industry groups. We are responsive to this demand as we continue to transform our generation fleet.

## Technological Change

Improvements in natural gas infrastructure and power generation, carbon-free nuclear, universal solar, and offshore wind technology have all enabled a transition to cleaner, less carbon-intensive energy at a pace that would not have been deemed practicable even five years ago. Solar energy can now compete with traditional energy on cost. Offshore wind prices have fallen, and capacity factors have increased. Natural gas infrastructure is cleaner and safer than ever, and natural gas power generation is now available at a scale, low emission level, and efficiency level that was inconceivable a decade ago. In addition, recent progress in battery technology hints at a larger role for battery storage in the energy puzzle over the years to come.

These changes become all the more important in light of the need for natural gas baseload generation to backstop renewable energy sources such as solar and wind, which are intermittent. All these technological changes help fuel the carbon emission reductions discussed in this report, as do the capacity, output, reliability, and unit life in our carbon-free nuclear units.

To put these technological changes in perspective:

- A modern combined-cycle electric generation unit can generate more than 1,500 megawatts around-the-clock on a small footprint (100 acres or even substantially less). The newest combined-cycle units in Dominion Energy's fleet operate with world-class efficiency, achieving heat rates that are significantly lower than those of our other combined-cycle and simple-cycle units. These advances have allowed natural gas-fired units, which once were used primarily to provide peaking power during periods of heaviest demand, to operate as baseload generation.
- A large solar facility in the Mid-Atlantic five years ago might have meant five megawatts; it now means 100 megawatts or more.
- Offshore wind turbine capacity is commercially available now at up to eight megawatts per turbine, with further improvements expected. Current industry research and development efforts are focused on testing turbines in some locations in the 12 to 15 megawatt range.
- Dominion Energy now generates more carbon-free nuclear-powered electricity from two units at Millstone Power Station in Connecticut than the previous owner did with three units, and the company is now anticipating that it can operate its four nuclear



units in Virginia (two at North Anna, two at Surry) for 80 years (versus the previous expectation of a 60-year service life), subject to approval by state and federal agencies.

While these technological and operational improvements are substantial, technological challenges remain. Carbon capture for fossil fuel units remains at the conceptual and pilot level, for instance, and while there has been notable progress in battery technology, a game-changing leap forward in energy storage has yet to emerge—and that leap is likely years away.

### Shifting Regulatory Focus

Over the next several years, carbon regulations are expected to occur mostly at the state level. Recently, the United States Supreme Court stayed and the federal government proposed to repeal the carbon reduction efforts for existing fossil fuel units under the Clean Power Plan. The Affordable Clean Energy Rule, which the United States Environmental Protection Agency (EPA) proposed in August 2018, has just begun the regulatory process. Regardless of the developments at the federal level, Virginia and other states continue to pursue state-level carbon regulation. The company will work to

address the potential for overlapping federal and state carbon regulation.

### Need for Resilience

The National Climate Assessment reports that extreme weather has increased across the United States in recent years, and its models project further increases in the years ahead. In an era of more intense weather, there is a growing consensus on the need for greater investments in electric system resilience. In fact, five of the six largest power outages in our history have occurred in the past 15 years. When confronted by actual damage, power delivery systems must become more hardened to prevent damage and restore service more efficiently. Dominion Energy plans to implement smart grid technology that will detect and respond to outages autonomously—removing the need for customers to report outages themselves, and often before customers realize an outage has occurred. The systems then will either repair the damage, route around it, or notify our operations centers so repair crews can be dispatched as quickly as possible.

We are also transforming the grid to enable growth of renewables in the system. The grid must allow for and respond to an increase in the more intermittent generation posed by

solar and wind resources to ensure that reliability is maintained.

The company's need for resilience is magnified by the nature of its service territory. Many of the nation's most important national defense and homeland security assets and facilities are located within our footprint, especially in Virginia and the greater Washington, DC metropolitan area. These include: the Pentagon, the world's largest naval base in Norfolk, the East Coast Master Jet Base at United States Naval Air Station Oceana, the United States Air Force's Air Combat Command at Joint Base Langley-Eustis, the headquarters of the Central Intelligence Agency in Northern Virginia, and our nation's preeminent naval shipyard in Newport News, Virginia.

Our carbon reduction efforts have been informed by these critical assets and the need to preserve them. We are especially proud of our solar partnership with the United States Navy and the Commonwealth of Virginia, where we have deployed a nearly 20-megawatt solar project on site at Naval Air Station Oceana. More broadly, we are mindful of the importance of the Hampton Roads area in Southeastern Virginia to our nation's security in developing our offshore wind strategy, and we are dedicated to bringing reliable, clean energy solutions to American military bases.



# Our Clean Energy Strategy

Reducing greenhouse gas (GHG) emissions is a major focus of Dominion Energy’s environmental strategy.

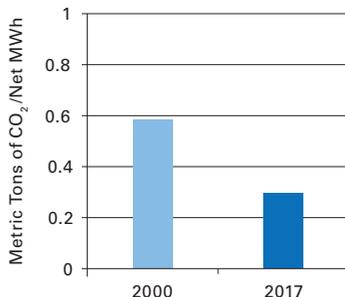
The company’s integrated strategy has significantly reduced both our GHG emission intensity and total emissions. Over the past two decades, the company has made changes to the mix of fuels used for generating electricity and to natural gas operations that have significantly improved environmental performance. For example, Dominion Energy has substantially reduced both its carbon emissions and its carbon intensity by generating electricity with an increasingly clean portfolio. From 2000 through 2017, our carbon intensity decreased by 50 percent. In the last 10 years our carbon dioxide emissions have decreased nearly 50 percent.

This strategy has also produced significant reductions of other air pollutants such as nitrous oxide (NOx), sulfur dioxide (SO<sub>2</sub>) and mercury (Hg), and it has reduced the amount of coal ash generated and the amount of water withdrawn.

The principal components of the strategy, which include initiatives that address electric energy production and delivery, natural gas storage, transmission and delivery and energy management, are as follows:

- Sell, close, place in cold reserve or convert to cleaner fuels a number of coal-fired generation units. The company has executed on this strategy by divesting of its merchant coal units, placing nine regulated coal units at five power plants in Virginia into “cold reserve”, retiring coal-fired units at two stations (with two additional units to be retired soon at a third station) and converting several coal units to biomass;
- Pursue the extension of operating licenses of existing nuclear units, which provide carbon-free generation;
- Expand Dominion Energy’s renewable-energy portfolio to further

**Carbon Intensity**

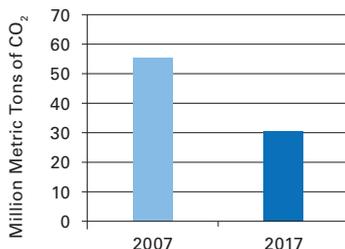


50%

**DECREASE**

of carbon intensity from 2000 through 2017

**CO<sub>2</sub> Emissions**



NEARLY

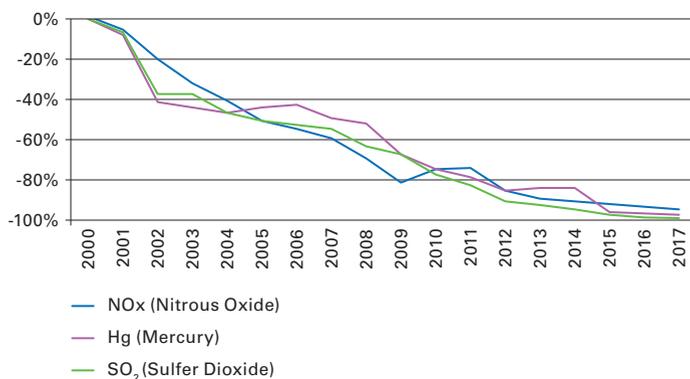
50%

**DECREASE**

of carbon dioxide emissions in the last ten years

**NOx, Hg, SO<sub>2</sub> Emission Rates**

Percent Change 2000-2017



diversify Dominion Energy’s fleet, meet state renewable-energy targets and lower the carbon footprint;

- Continue to evaluate business opportunities presented by a lower-carbon economy and innovative technologies;
- Evaluate effective storage solutions, such as batteries and hydroelectric pumped storage, which help support a grid with increased renewables;
- Enhance conservation and energy efficiency programs on both the electric and natural gas side of our business to help customers use energy wisely and reduce environmental impacts;
- Evaluate behind-the-meter and rate design solutions and other business opportunities;
- Construct new electric and gas transmission infrastructure to modernize the grid, to expand the availability of cleaner fuel, to reduce emissions, to promote energy and economic security and to help deliver more green energy to population centers where it is needed most;
- Continue efforts to reduce methane emissions from our natural gas infrastructure—for example, by replacing aging pipe mains;

→ Pursue disruptive technologies through a dynamic innovation process; and

→ Continue to advance our customer-centric business model by offering innovative, sustainable solutions.

Nationally, Dominion Energy has over 2,600 megawatts of renewable generating capacity in operation or under development in nine states, including opportunities for our customers to reduce their carbon footprint by purchasing renewably-sourced energy. Both Virginia and North Carolina have passed legislation setting targets for renewable power. Dominion Energy is committed to meeting Virginia’s goals of having 12 percent of base year electric energy sales from renewable power sources by 2022, and 15 percent by 2025. We also are committed to North Carolina’s Renewable Portfolio Standard of 12.5 percent by 2021. We are currently pursuing the North Carolina renewable portfolio standard through the purchase of renewable energy credits and we continue to add utility-scale solar capacity. Backed by a \$1 billion investment, Dominion Energy has grown its solar fleet in Virginia and North Carolina over the past two years from near zero to about 1,100 megawatts in service, in construction or under development. We also have committed to developing or supporting an additional 3,000 megawatts of renewables by 2022.

## Shifting to Cleaner Energy

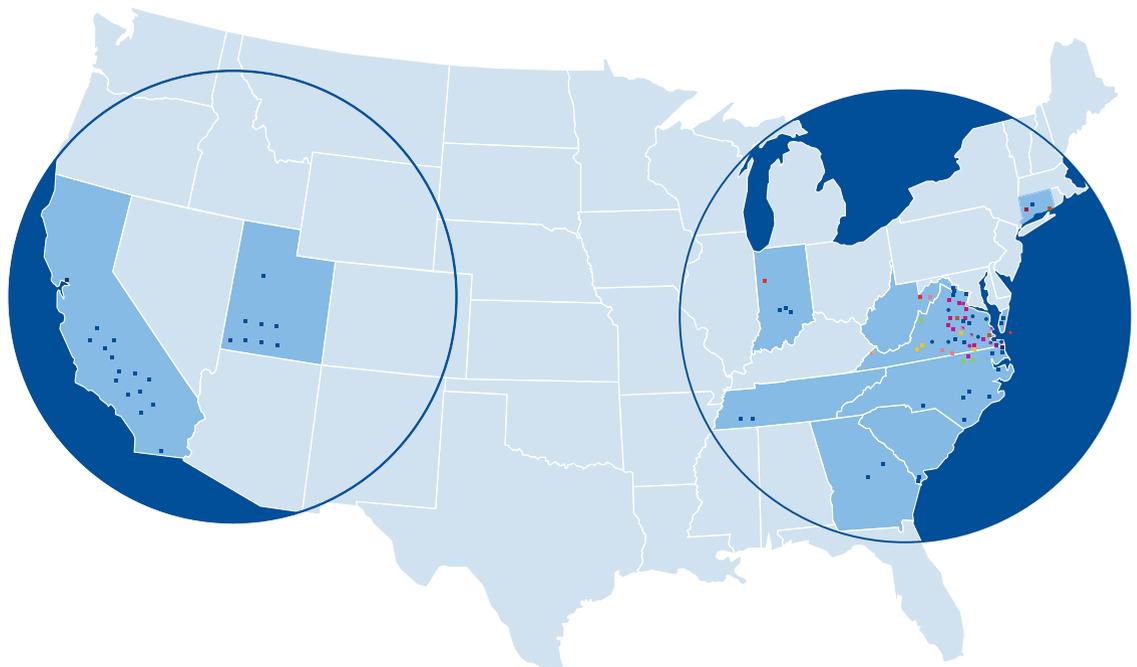
In the past several years, our company has transformed the feedstock mix of our generation fleet from one that consisted mostly of coal and nuclear fuel to one that is predominantly natural gas and nuclear fuel. Natural gas has become the default fuel for baseload power generation in the United States because it is abundant domestically, it is low-cost, and it is low-carbon generation. Natural gas emits approximately half the carbon of the coal that it typically displaces in a generation fleet, and has dramatically lower levels of other emissions.

The company operates state-of-the-art, around-the-clock natural gas generation units in Buckingham, Warren, and Brunswick counties in Virginia. The company is also completing construction of its Greensville Power Station in Virginia, expected to enter service by the end of 2018. When it enters service, it will be one of the largest, most efficient power stations in the United States. It will provide, on a core footprint of approximately 100 acres, the energy equivalent of more than 50,000 acres of solar panels—an area larger than the entire District of Columbia.

Natural gas units—including our simple-cycle units, which can be fired up on short notice—are crucial to supporting renewable power sources such as solar and wind. While battery

### Our Footprint

- Biomass
- Coal
- Fuel Cell
- Hydro
- Natural Gas
- Planned Natural Gas Facility
- Nuclear
- Oil/Gas
- Solar
- Proposed Solar Facility
- Wind
- Proposed Offshore Wind



storage can assist at the margin with today's technology, and pumped storage hydro allows for very large-scale energy storage, natural gas generation is still indispensable to backstop intermittent renewable resources. Supporting renewables, however, requires adequate natural gas infrastructure, most notably robust pipeline capacity, as described below.

### Ensuring Reliability

Service reliability requires effective fuel storage or delivery mechanisms. Coal units have the key operational advantage of onsite fuel storage, sometimes to the extent of a month's supply or more. Natural gas facilities lack this inherent advantage and therefore need robust pipeline capacity to ensure continuous access to fuel. In recent winters, Virginia and North Carolina utility customers have faced significant fuel cost spikes due to pipeline capacity constraints in the region.

These constraints are particularly notable in Hampton Roads, Virginia, where the local natural gas distribution company cannot offer guaranteed capacity to large new users. Moreover, during cold weather, large customers periodically have natural gas service curtailed as a matter of routine in Hampton Roads. During the winter of 2017-2018, customers in certain regions of Virginia had service interrupted to

provide needed supplies of natural gas for residential heating. In early 2018, customers in the region saw natural gas prices spike from \$3 per dekatherm to \$175 per dekatherm (the average residential natural gas customer in that region uses about 15 dekatherms a month during the winter).

Addressing these shortcomings in pipeline capacity is one of the key objectives of the Atlantic Coast Pipeline, which has begun construction. Projects such as these serve an important purpose during the transition to renewable energy by balancing the intermittent generation of renewables and smoothing out price fluctuations. Our customers want cleaner energy. They also want service that is safe, reliable and affordable. We have a plan in place to deliver each of these.

### Diversifying Fuels

The way we provide energy to our customers is rapidly changing. Evolving economics and better technology are coming together to advance renewable and low-carbon energy, enabling us to reduce our reliance on fossil fuels. Our strategy depends on using a diverse and balanced mix of resources to deliver reliable and affordable energy to customers. We focus especially on balancing our portfolio to meet our customers' energy needs in the most safe, reliable, affordable and environmentally

sustainable manner possible.

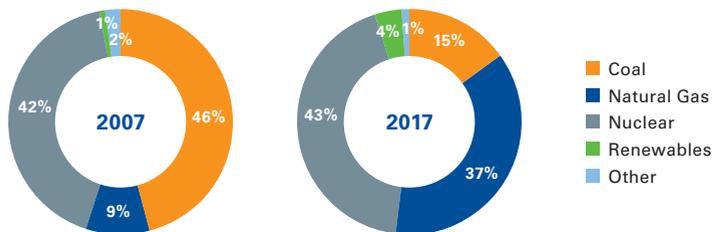
And because supply disruptions can create uncertainty for traditional fuel sources—just as clouds can render solar generation intermittent and calm days can impede wind generation—Dominion Energy is making sure it can supply power without interruption and with minimal exposure to sudden energy price swings, no matter what. So we are investing more in both renewable energy sources and in cleaner natural gas, to serve the need for reliable baseload generation of electricity. We are also investing in grid upgrades to enable this shift to renewable sources.

### Extending Zero-Carbon Nuclear

We are seeking permission to extend the life of our nuclear facilities, which feature a number of advantages—including carbon-free energy, on-site fuel storage and a relatively small geographical footprint. Continuing to operate these units is a key part of our investment in traditional baseload power generation. The Surry Power Station is the fleet pilot for the company (and the first of its kind in the industry) to request the extension of the service life of nuclear units to 80 years (Dominion Energy's six operating nuclear units are licensed for 60 years at present). The Virginia General Assembly supported this approach of nuclear re-licensure by passing supportive legislation in 2017. The company also maintains a Combined Operating License for a third nuclear unit at North Anna Power Station, should economic and market circumstances change enough to warrant moving forward with it.

The company has also made an initial investment in the development of small, modular nuclear reactors. While this technology is not yet commercially available, it does offer an important option for providing around-the-clock zero-carbon energy.

Electric Output by Fuel: Cleaner Generation





## Expanding Renewables

Dominion Energy has greatly expanded renewable energy since 2013. From 2013 to present, the company has grown its solar fleet from near zero to more than 1,700 megawatts in service or under development nationally, with the majority located in Virginia and North Carolina.

In July 2018, the company announced that it would have an *additional* 3,000 megawatts of renewable energy in service or under development by the beginning of 2022. This is an aggressive schedule for fulfilling the policy goal of 5,000 megawatts of wind or solar generation in service by 2028 that was established in Virginia's Grid Transformation and Security Act of 2018 (GTSA), which deems the increase in wind and solar generation to be in the public interest. In the summer of 2018, the company took initial steps towards this goal by filing for regulatory approval of 240 megawatts of regulated solar as well as a 12-megawatt offshore wind pilot project. The latter is a vital first step in tapping the potential of wind off the coast of Virginia—one of the Atlantic Coast's most robust energy resources. This pilot project is being constructed in partnership with Ørsted Energy, a world leader in offshore wind development.

Within its regulated service territory in Virginia, the majority of the company's solar development to date has been in

the form of unregulated partnerships with individual large customers or groups of large customers. This reality reflects initial regulatory apprehension about renewable energy as well as the company's desire to meet customer demand for renewable energy.

These partnerships have involved the development of Virginia's first large-scale solar facilities, an 80-megawatt facility on the Eastern Shore of Virginia and a 100-megawatt facility in Southampton County, Virginia. Dominion Energy also entered into a unique partnership with the Commonwealth of Virginia and the United States Navy to deploy a nearly 20-megawatt solar project on the site of the East Coast Master Jet Base at Naval Air Station Oceana in Virginia Beach.

Dominion Energy has also entered into multiple partnerships with the University of Virginia and a broad-ranging partnership with Facebook. In addition, the company has partnered with the Massachusetts Institute of Technology on the development of a solar facility in North Carolina.

## Maintaining Competitive Advantage

Dominion Energy's reliable service and affordable prices are key competitive and quality of life advantages for the communities we serve. While our

customers want energy that is clean, reliable and affordable, we recognize that transitioning to a lower carbon future comes with a cost. Dominion Energy is very intentional about managing the transition responsibly to support continued affordability for our customers. Accordingly, we have carefully integrated our strategy to ensure continued reliability and affordability while meeting our carbon commitments. This integrated, "all of the above" strategy includes investments in both traditional and renewable generation, as well as energy storage work and the infrastructure needed to reliably and affordably deploy clean energy.

The company also has invested in energy efficiency. We have developed programs to help customers use less energy, such as our Smart Cooling Rewards program, which provides residential customers with an annual bill credit in exchange for permitting the installation of a cycling switch on air-conditioning units that cycle units on and off during peak load times. The company also offers a variety of energy efficiency programs for non-residential customers, such as those providing incentives for installing more efficient lighting, heating and cooling systems.

In October 2018, the company filed a request with Virginia's State Corporation Commission (SCC) for permission to invest \$262 million over five years for 11 energy efficiency and conservation programs. That request makes up the first installment under the GTSA, where the company will propose to invest \$870 million in regulated assets, along with another \$130 million in energy assistance and weatherization programs, over the next decade.

The GTSA will enable Dominion Energy to expand weatherization and energy efficiency programs it operates through a longstanding initiative called EnergyShare, which helps low-income customers pay their energy bills and reduce their energy costs. Expanding these efforts is expected to increase the degree to which the company can help customers lower their carbon footprint. It will also help insulate them—in the most literal sense—from extreme weather, thereby helping to reduce peak loads and enhancing the resilience of the electric grid.

## Pursuing Disruptive Innovations

Dominion Energy is committed to innovation. In fact, one of its five core company values is “Embrace Change.” We are driving innovation not only to meet changes in the energy sector, but to propel them.

This commitment to innovation starts at the top. The President and CEO of Dominion Energy is a Principal of the American Energy Innovation Council, whose mission is to reestablish America’s energy technology leadership through robust public and private investments in developing world-changing energy technologies.

In the past three years Dominion Energy has added both a chief innovation officer and a vice president in charge of innovation. And through programs such as Dominion Energy IDeAS, the company encourages employees to channel their creativity toward the development of innovative products and services, including those geared towards areas such as environmental excellence. We took these measures because transformation and growth are necessary for the long-term prosperity of our company and the long-term well-being of our stakeholders. We are determined to create changes that improve our customers’ experience, exceed our stakeholders’ expectations, and position our company for sustainable, agile and long-term success.

We need not only to foresee technological advancements, but to develop them in order to find new and better ways of serving our customers and bringing them value. Taking these steps is critical to ensure a sustainable business model for the decades ahead.

Those imperatives dovetail with, and

in no small part propel, our strategy of investing in cleaner natural gas and zero-carbon nuclear and renewable power. They also harmonize with other efforts at the company, from smart grid technology that can help consumers conserve energy to grid hardening measures that will help insulate otherwise vulnerable transmission assets from the effects of climate change. Our innovation efforts span the company’s business and geographic footprint, and focus on identifying new opportunities for extending the company’s carbon and sustainability commitments into new lines of business.

Smart meters and other grid transformation investments will also help integrate new technologies, such as private solar and electric-vehicle charging stations, into the grid. Investments in intelligent grid devices, smart meters and automated control systems will enable a “self-healing” grid that will speed the restoration process by quickly identifying and isolating outages. To that end, we recently filed for the first three years of further smart meter deployment in Virginia, along with a concomitant level of investment.

The company also is considering the possibilities of battery technology. At present we operate the biggest battery in the world: our hydroelectric pumped storage facility in Bath County, Virginia, stores more than 3,000 megawatts of power.

Virginia’s GTSA established the case for pilot programs to study electric power storage batteries. Under the pilot program, the company may install batteries with up to 30 megawatts of capacity. We are currently studying the use case for batteries in an effort to better understand the various applications, operational and performance benefits

we can deliver to our customers. The advanced grid potential for batteries is expanding, with possible applications in grid optimization and stability, improved integration of renewable resources, transmission and distribution upgrade deferrals, load shift potential for “level 3” electric vehicle charging, and microgrids. As the grid becomes more digital, batteries are expected to play an important role in intelligently managing a transformed grid.

## Building More Resilient Systems

Virginia’s GTSA authorizes a variety of measures aimed at making the grid more resilient. It provides the company with numerous opportunities, such as:

### Grid Hardening

New construction and material standards will improve grid resilience and reduce outages caused by weather and other events. The company will also take additional measures to protect the energy grid against the growing threat of both physical and cyber-attacks. These measures include hardening substations serving critical facilities and the deployment of new intelligent devices and control systems which help detect and recover from events more quickly. The company has filed a petition with Virginia’s SCC for approval of its new grid transformation plan, which includes grid hardening activities and adopting physical security measures at some substations.

### Strategic Undergrounding

Other efforts aimed at shielding our assets and customers from the effects of climate change include placing more vulnerable and outage-prone distribution lines underground. The latest expansion of the company’s Strategic Underground Program is now under review by the Virginia SCC. Through September 2018, Dominion Energy has invested \$461 million on strategic undergrounding. The company also was recently recognized by the Southeastern Electric Exchange for an innovative project that addressed voltage control and reliability on its transmission system.



# Sustainability Governance

Our Board of Directors recognizes it has a fiduciary duty to preserve our company's long-term value in order to ensure its sustainability.

In fulfilling this responsibility, the Board is committed to the highest standard of corporate governance, which entails oversight of the company's long-term strategy and the various risks it faces, including climate-related matters and risks. The Board understands that the true measure of its stewardship is an effective plan that addresses the interests of all the company's stakeholders—its shareholders, customers, employees, our neighbors in the communities we serve and other vested parties.

The Board believes that oversight over strategy is continuous and should be embedded in its governance activities throughout the year. As a result, our Board has ongoing discussions with management in regular meetings and at semi-annual strategic retreats regarding the shifting market fundamentals, technological advances, evolving regulatory compliance requirements and changing societal preferences that have affected or that could reshape

our operations and asset portfolio in the face of a lower-carbon future. This dialogue also includes assessments of the carbon-related risks and opportunities.

The Board also reviews our company's long-term financial plan, which incorporates expenditures for the development of our renewable generation assets and environmental compliance. This financial plan is updated in a process that dovetails with our annual corporate and business unit risk assessments, which are part of our enterprise risk management program discussed below. In addition, the Board receives reports throughout the year on sustainability, environmental and climate-related trends and matters from members of management, including each of our business unit chief executive officers, our chief risk officer and our chief environmental officer. These reports cover sustainability in its broadest sense, including safety, workforce development, diversity and innovation initiatives, and

regular public policy updates, including customer and public opinion research.

Importantly, the Board's oversight also includes the review of this report and the company's Sustainability and Corporate Responsibility Report.

To further assist it in its oversight, the Board established a Sustainability and Corporate Responsibility Committee. The committee is composed entirely of independent directors and reviews Dominion Energy's approach to environmental, social, economic and reputational issues that affect the company's business and performance as well as our communities and stakeholder groups. The strategies and initiatives within the committee's scope include:

- The company's protection and improvement of the quality of the environment, climate change program and broader environmental policies and program;



- Diversity, inclusion, talent management and supplier engagement; and
- Community and stakeholder engagement.

Among other things, this committee is charged with reviewing societal, governmental, and environmental trends, risks, and issues that may affect company operations; evaluating company sustainability targets and receiving reports from management on the company’s progress in reaching those targets; and examining the company’s relationships with stakeholders and its efforts to support community needs.

## Board Oversight of Risk

The company and the utility industry itself continue to face uncertainty posed by external forces, and the interactions among risks are becoming increasingly complex. Accordingly, appropriate enterprise risk management (ERM) processes are embedded in all critical business processes and are intended to help the company nimbly respond to changes in the business environment. Further, the Board has implemented a risk governance framework designed to help the directors:

- Understand critical risks in the company’s business and strategy;
- Allocate responsibilities for risk oversight among the full Board and its committees;
- Evaluate the company’s risk management processes and whether they are functioning adequately;
- Facilitate open dialogue between management and directors;
- Foster a risk-aware business culture at the company; and
- Assess the risks associated with proposed capital expenditures that are subject to their approval.

The ERM program is designed to identify operational, financial, strategic, compliance and reputational risks that could impair the execution of the company’s plans or the effectiveness of its business model (or, conversely,

facilitate new growth opportunities). ERM processes are used to assess the likelihood and potential impact of these risks and develop strategies to mitigate or manage such risks within the company’s risk appetite.

## Engagement

Dominion Energy devotes itself to a path that benefits everyone: our customers, our communities, our employees, our shareholders. We understand and appreciate the value of dialogue and collaboration. So we consistently seek out other perspectives to help inform our decisions.

To better understand our stakeholders’ perspectives, we hold public meetings with the communities in which we operate, reach out to a wide range of groups, and are implementing new processes that will help us coordinate our efforts to reduce GHG emissions.

Those groups include our shareholders. Shareholder interest in how Dominion Energy manages activities that affect the climate is one of the primary drivers behind this report. Other drivers include our own commitment to ethical business practices and to transparency, both of which are driven by our core value of Ethics.

Our climate-related engagement also includes our employees, who play an important role in the company’s innovation ecosystem. Dominion

Energy maintains an internal channel for innovation, called the IDeAS program, which crowdsources innovative ideas from throughout the company and singles out the best ideas for special attention. The 2018 winner of the Chairman’s Excellence Award came up with an idea to use augmented reality to improve engagement with customers on strategic undergrounding.



We also engage with stakeholders on issues such as offshore wind development. In 2015, the company assembled a stakeholder group of more than 100 people to review a variety of questions related to offshore wind—including cabling, design, cost, and more. Input from that process informed the development of the company’s current Coastal Virginia Offshore Wind pilot project. We maintain ongoing efforts to engage our customers on important initiatives such as strategic undergrounding as well. Three dozen community meetings about strategic undergrounding were conducted in 2017, and another 41 have occurred or are expected to occur in 2018.



# Scenario Analysis

## Scope and Method

We conducted an analysis—with the assistance of an independent consultant—to look at the future make-up of Dominion Energy’s electric generation fleet under hypothetical 60 and 80 percent carbon reduction scenarios. Our entire generation fleet, including our merchant generation assets (which make up roughly 13 percent of our generation portfolio and are 99 percent carbon-free), is within the scope of the analysis.

The guiding concept behind this analysis is the “two degree” framework put forth in the Paris Agreement and the United Nations Framework for Climate Change Convention (UNFCCC) on which the agreement was built. Under the Paris Agreement, which became effective in 2016, the vast majority of countries around the world adopted a global response to the threat of climate change that entails keeping the increase in average global temperatures to less than two degrees Celsius below pre-industrial levels.

## Key Assumptions

The results of any analysis depend to a great extent on the parameters within which it is conducted. The key assumptions for this report are as follows:

- Two scenarios were modeled at the national level, both of which address significant reductions in carbon emissions, 60 percent and 80 percent from 2005 levels by 2050. The year 2005 was selected as the starting point to be consistent with similar analyses by peers.
- The analysis used realistic expectations about technological developments and cost reductions. Future technology options and associated costs should reflect a realistic view based on what is known at this time.

- Other sectors of the economy would cut emissions in tandem with the energy sector. (e.g., reduction in emissions from the transportation sector through accelerated transition to the use of electric vehicles and further improvements in fuel economy).
- Changes in demand from decarbonization of other economic sectors would show up in the energy sector. (e.g., a shift to electric vehicles would show up as greater demand for electricity generation).
- The analysis would apply nationally, with a particular focus on Dominion Energy markets, including those served by the company’s regulated assets in Virginia and North Carolina and those served by its unregulated assets in the places where they reside.
- The analysis would follow the guidance of the public report, “The Financial Stability Board’s Task Force on Climate-Related Financial Disclosures” and the low-carbon scenario outlined in the International Energy Agency’s World Energy Outlook document referred to as the 450ppm Scenario.
- The analysis does not include the merchant natural gas-fired power stations that the company in September 2018 announced it was divesting.

The third-party analysis also made numerous, more technical assumptions that relied on external resources and reports, where available. For instance, it projected how electric load would be impacted from the electrification of the transportation sector. It also made assumptions about future generation technologies including the (1) rate of cost declines for renewable and battery storage resources, (2) fuel and emission prices and (3) projections of future energy demand.

## Scenarios and Sensitivity Considered

Within the framework of those assumptions, the analysis included two scenarios and one sensitivity:

- One in which power sector emissions of GHG fall 60 percent below 2005 levels by 2050;
- A more stringent scenario in which those emissions fall 80 percent below 2005 levels by 2050; and
- A demand sensitivity that doubles the level of energy efficiency included in the 80 percent scenario.

## Key Insights

While the outcomes of the models differed depending on which scenario was considered, several broad points emerged.

### Generation

In both of the hypothetical scenarios modeled, carbon reductions substantially change the way power would be produced. The company’s remaining coal-fired generation would be retired by the mid-2030s as the company transitions its fossil fuel generation to renewable generation. Natural gas generation increases in importance and utilization through the mid-2030s. Beyond 2040, natural gas-fired units would become a balancing resource necessary to ensure continuous electric reliability as



renewable resources grow to represent a significant amount of total generation.

Renewable energy would undergo a substantial buildout beginning in the mid-2030s as the need for zero-carbon generation and declining capital costs of renewable generation converge. Offshore wind in particular, due to a projected significant decline in capital cost, would become a viable zero carbon resource. Under the 60 percent scenario, zero-carbon resources—solar, wind and nuclear—would increase from 47 percent of the company’s total generation in 2017 to 73 percent in 2050. Under the 80 percent scenario, zero carbon resources would increase from 47 percent of the company’s total generation in 2017 to 81 percent in 2050. The rise of intermittent renewables will also require a large expansion of storage capacity.

The company’s zero-carbon nuclear generation would remain an important resource for meeting the carbon

reduction goals outlined in these scenarios. The company’s nuclear units would require re-licensing of units to extend their permissible life, and we have already begun the process to accomplish this. The development of large amounts of zero-variable-cost renewable generation may lower the wholesale price of power in some markets, thereby reducing the revenue available to new and existing zero emission generation. Policy changes would be needed to ensure an additional revenue stream is provided that reflects the value of zero emission nuclear generation.

### Capital Expenditures

Under either scenario, Dominion Energy would need to make changes to its generation fleet that would require major capital expenditures. In order to satisfy the 60 percent scenario, it is estimated that the company would need to invest \$15 billion in zero carbon

generation and \$21 billion under the 80 percent scenario. The majority of that spending would occur after 2030, as prior emission reductions are achieved through plant retirements.

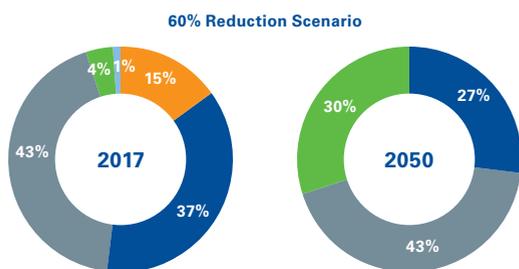
One important caveat: The third-party analysis does not take into account stranded costs related to potential early retirements of fossil generation, which costs would further exacerbate the customer impact of the transition in either scenario.

### Emissions Intensity

By 2050, the carbon intensity for Dominion Energy’s fleet declines from 0.295 metric tons per net megawatt hour today to 0.10 metric tons per net megawatt hour under the 60 percent scenario. Under the 80 percent scenario, carbon intensity declines to 0.07 metric tons per net megawatt hour.

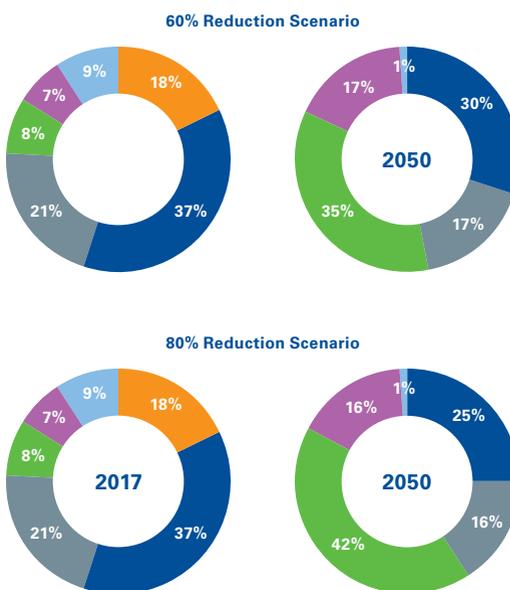
Fleet-wide, this means Dominion Energy’s total carbon emissions

### Electric Output by Fuel



- Coal
- Natural Gas
- Nuclear
- Renewables
- Other

### Generating Capacity by Fuel



- Coal
- Natural Gas
- Nuclear
- Renewables
- Storage
- Other

in these scenarios would fall to 11 million metric tons in the 60 percent scenario and 8 million metric tons in the 80 percent scenario by 2050.

The company's customers and other stakeholders consider not only carbon emissions from Dominion Energy, but also GHGs more broadly across the entire economy. Reductions in Dominion Energy's carbon emissions will help our customers shrink their own carbon footprints as well.

This is not to imply that reductions in GHG emissions should be double-counted; closing a plant that emits 200 tons of carbon dioxide does not take 200 tons of carbon dioxide out of the atmosphere when the utility's environmental impact is measured and another 200 tons when its customers' environmental impact is calculated. At the same time, it is fair to say that a customer who uses 1,200 kilowatt-hours of energy per month has a smaller carbon footprint if that energy comes from offshore wind generation than if it comes in part from coal. The reductions modeled in these scenarios would allow a typical residential customer to lower carbon emissions attributable to their electricity usage by 60 percent to 70 percent by 2050 from 2017 levels.

### Impact of Energy Efficiency

The extent to which carbon emissions are reduced will depend not only on actions that Dominion Energy and other

companies take, but also on the activities of energy consumers, including the individuals and businesses across our service territories. Energy efficiency initiatives at the customer level play an important role in the shift to a low-carbon economy. For that reason, we included an energy efficiency sensitivity case in our scenario analysis.

This sensitivity analysis relied on publicly-available load growth projections published by regional transmission organizations, independent system operators and other organizations responsible for planning of regional power systems. The load outlook in the modeled scenarios includes assumptions of incremental efficiencies, driven by carbon constraints, in addition to those included in the referenced load growth projections. After 2030, incremental energy efficiency is assumed to lower overall load growth. The energy efficiency sensitivity was run on the 80 percent reduction scenario and doubles the energy efficiency assumptions used in that scenario by 2050. In the 80 percent scenario, load growth at the national level averages a little under 1 percent per year while in the energy efficiency sensitivity, growth remains flat through 2050. It is important to note that the energy efficiency sensitivity is not a feasibility or cost effective type analysis; the doubling of energy efficiency was accomplished regardless of economic decisions. The load growth numbers in

both the 80 percent scenario and energy efficiency sensitivity include incremental load from increased electrification of the transportation sector.

Key results from the energy efficiency sensitivity scenario include lower wholesale power prices in the long-term when compared to the 80 percent scenario, which reinforce the need for alternative revenue streams to support existing zero carbon generation and encourage the development of new renewable and energy storage resources required to reduce overall emissions. The generation fleet is similarly affected. The analysis shows Dominion Energy's coal fleet retiring by the mid-2030s and gas generation rising through the same period. Beyond 2040, gas shifts to serving as a backup resource for those times when intermittent sources like solar and wind are not available.

The significantly higher energy efficiency assumptions used in this sensitivity also lower the amount of new renewable generation resources developed relative to the 80 percent scenario, essentially transferring the capital spending from renewable generation resources to energy efficiency programs. Ultimately, the cost effectiveness of renewable generation compared to sizable energy efficiency programs will determine the best path to achieving the significant carbon reduction goals targeted in the scenarios modeled in this analysis.



# Transition Risks

In broad terms, the 60 percent and 80 percent scenarios both present risks to the current generating fleet that must be managed through our planning process and addressed by company strategy.

## Regulatory Risk

Changes in governmental oversight may present increased compliance costs as well as other potential risks. Changes in administration or policy can lead to abrupt changes in the direction of regulatory policy, disrupting company strategies built on long-range scenarios.

Even when regulatory policy concerning climate change does not change direction, it may mandate changes in company operations that are faster than those the company planned, faster than prudent, or faster than acceptable by consumers and energy regulators, or all.

Finally, political divisions between governmental branches, or between jurisdictions, can produce conflicting objectives and rules across the company's generation footprint.

Dominion Energy tries to manage this risk by actively engaging in the regulatory process. (Following our core value of Ethics, we voluntarily disclose the corporate political contributions we make to tax-exempt 527 organizations, as well as the lobbying portion of trade association payments and dues.)

## Developing State Carbon Regulations

Virginia is developing "trading ready" regulations to reduce emissions from electric generating units in Virginia. The proposal seeks to establish, beginning in 2020, a carbon dioxide emissions cap-and-trade program linked to the nine-state Regional Greenhouse Gas Initiative (RGGI). The details of this proposal are evolving.

The company's transition to a lower-carbon electric generation fleet will serve as a critical element in our planning for compliance under any future state or federal carbon reduction directive. We

remain committed to working with our regulators and all stakeholders toward practical carbon reduction policies that set reasonable targets and timelines and flexible compliance options, and that keep fuel diversity, reliability and costs to customers top-of-mind.

## Physical and Climatic Risks

Our company has significant experience dealing with weather fluctuations, extremes, and storms. The company's operations could be harmed, and its physical plants placed at greater risk of damage, should changes in global climate produce more frequent and extreme weather or a change in sea level or sea temperatures.

Fluctuations in weather also can affect demand for the company's services. For example, milder-than-normal weather can reduce demand for electricity and gas that support heating and cooling. In addition, severe weather and other natural disasters can disrupt facility operations and cause service outages, production delays and property damage that impose additional costs. Changes in weather can lead to reduced water levels or changes in water temperatures that could impair operations at some of the company's power stations.

## Financial Risks

Climate change and efforts to constrain it both present a variety of financial risks to the business as a whole or to its various parts.

Under either the 60 percent or 80 percent scenario, the company's remaining coal-fired units face the risk of retirement, and nuclear units would be essential. However, the competitiveness of the company's nuclear units would deteriorate under these scenarios. In fact, absent additional compensation as a zero carbon resource in New England, the company's Millstone nuclear facility is already at risk of closure. Like many nuclear facilities, it has seen its operating margins drop significantly as energy prices have fallen. This margin decline would be exacerbated under either scenario, without an incremental revenue stream that recognizes its zero carbon attributes. Accordingly, there will be a cost to preserve nuclear generation as a reliable, carbon-free resource in order to meet the carbon reduction objectives—one that will need to be shared as our society transitions to low-carbon world.

Natural gas-fired units could see their capacity factor fall from a peak of over 80 percent by the mid-2030s to 40 or 50 percent by 2050 for the most efficient combined-cycle plants. This possibility



follows from the expansion of renewable energy, which could lead natural gas-fired generation to become a balancing energy source to backstop them, rather than a source of baseload generation.

There is also a broader risk that governmental efforts to mitigate climate change or its effects could outstrip the company's own efforts, obliging it to close productive facilities before the end of their useful life or adopt expensive new technology such as carbon capture and sequestration.

The effects of climate change also could impose costs on Dominion Energy more directly. For instance, more frequent and more powerful storms could damage company assets or require their relocation.

## Technology Risk

Technological change presents another risk. As always, the market's response to sector- or economy-wide forces could produce disruptive innovation that leaves the company at a competitive disadvantage. For example, a transformational development in battery storage that increases capacity and slashes prices could make distributed solar and wind generation feasible in a way that complicates grid management and dramatically reduces revenue from electricity sales.

Unlike the risk to specific generation categories mentioned above, these broader considerations do not arise from any specific modeling or analysis;

they remain purely notional for now.

The analysis relies upon the assumption that technology will continue to improve for renewable sources as well as for battery storage. Another potential technology risk would arise if the affordable technology advances do not occur to support the pace of carbon reductions adopted in public policy.

## Managing Risk

### System Hardening

For physical security, cyber security and resilience generally, Dominion Energy uses an "all hazards" approach and seeks to deploy the best technology and techniques to mitigate risk.

Similarly, Virginia's 2018 grid transformation legislation identified other types of system hardening (for example, concrete power poles at the oceanfront) as eligible investments. System hardening will be a key part of the company's activities to mitigate risks to its assets and ensure its service reliability.

Our Electric Distribution design standards meet or exceed National Electric Safety Code requirements. Mitigation measures include routine inspection and maintenance plans, vegetation management, various programs (such as strategic undergrounding) designed to help ensure system reliability and resilience, and potential flooding mitigation and management.

### Strategic Undergrounding

With regard to reliability risk from storms, the company has received legislative approval for its 10-year, \$2 billion strategic undergrounding program to place the worst performing neighborhood power lines underground to improve reliability. The company's analysis shows that once completed, this program will help cut the duration of a major power outage by as much as half.

### Preparedness

Our Emergency Response team adheres to the National Incident Management System Incident Command System structure, and we have an integrated Power Delivery Crisis Response Plan to ensure success regardless of the threat. We continually review and revise response processes by conducting After Action Reviews of all significant events. We also conduct annual training for all colleagues targeted to their storm-critical roles to ensure our workforce is ready to respond safely and efficiently.

### Risk Assessment and Analysis

The company maintains wide-ranging, defense-in-depth internal controls over financial, operational, and environmental activities. The company was an early adopter of the "chief risk officer" concept and uses this role to coordinate and facilitate system-level efforts to reduce and manage risk. This comprehensive approach is being implemented with regard to climate change risks.

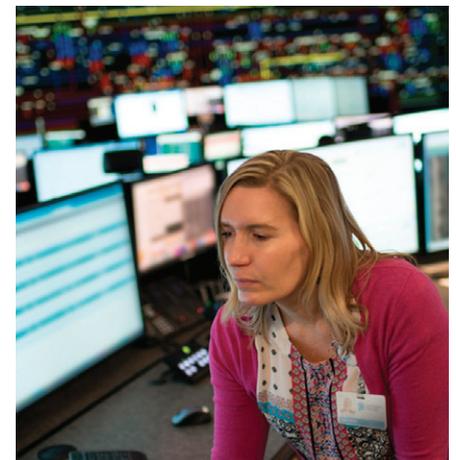




Edison Electric Institute’s (EEL’s) National Response Event, PJM Interconnection’s Gridex, the Virginia Department of Emergency Management’s Vestex, and the United States Department of Energy’s Clear Path drills. These drills replicate a wide array of risks we could face including extreme weather, cyber or man-made incidents. They test key processes and allow us to share best practices between participants, identify gaps, and most importantly, develop relationships between the private and public sectors, which is crucial in achieving combined mission success.

### Long-Range Scenario Planning

Within the company’s regulated electric business, the work of risk management incorporates key planning documents and methods such as the company’s integrated resource plan (IRP) in both Virginia and North Carolina, its initial grid transformation plan filed in July 2018 in Virginia, and the company’s overall strategic development process. Dominion Energy routinely uses a climate-related scenario analysis to develop its business strategies. This is especially true with respect to our generation portfolio. Some examples of scenario analysis used by Dominion Energy are included in the company’s annual IRP. These analyses differ from the scenario analysis included in this report in that they are for the company’s regulated fleet, address a shorter planning horizon and are focused on known regulatory requirements as required by Virginia and North Carolina utility planning requirements.



The company also conducts a comprehensive, enterprise-wide risk assessment as well as risk assessments specific to each business unit. The risks assessed include financial, operating, compliance, environmental (including climatic), legal, regulatory, strategic, and reputation risks as well as emerging risks. The risks of climate change are being incorporated in each of these assessments.

Business units identify specific risks and issues that may affect existing operations and Dominion Energy’s growth strategy. During this process, the Chief Risk Officer and the leaders of each group in the company consider the group’s strategy, threats and opportunities related to that strategy, and all risks entailed in meeting the strategy.

Dominion Energy participates

in a corporate risk management process that culminates in an internal annual enterprise risk assessment report. The enterprise-wide and business unit analyses are led by the Corporate Strategic Risk Management team and involve representatives from all business groups.

### Emergency Drills

In addition to risk mitigation, Dominion Energy devotes significant time and attention to emergency drills beyond those required by law or regulation. These drills involve both top management and leadership at all levels, and are considered a critical part of both operational excellence and leadership and employee development. We are active participants in national, state and private sector drills such as the

# Transition Opportunities

## Electrification

Opportunities for greater electrification include the relevant provisions of the GTSA making energy-efficient street lighting and electric vehicle charging infrastructure eligible grid transformation investments. Microgrids represent another area ripe for development. Heating and cooling offer further opportunities, and advanced metering presents more possibilities for growth.

## Electric Vehicles

Another major opportunity lies in the electrification of the transportation sector. Electric cars and trucks will not only sharply increase the demand for power generation; they will also make clear the need for an extensive infrastructure system to enable refueling. Our analysis indicates potential emission reductions from the transportation sector in our Virginia service territory could be around 13 million metric tons annually in 2050 given the assumptions used in the 80 percent scenario.

Dominion Energy's Virginia service territory is well-suited to electrification of the transportation sector, given the robust, low-cost, low-carbon nature of

the electric utility itself, considerable public policy and consumer interest in electric vehicles, and the endemic traffic congestion in Hampton Roads and Northern Virginia, where electric vehicles are especially efficient given their minimal energy usage during idling and slow traffic.

These inherent advantages for electric vehicle involvement are magnified by strong local and state government interest, as well as interest by the United States Department of Defense, including notably the United States Navy, whose Chief of Naval Operations Office is involved in development of an electric vehicle strategy. Similarly, the Virginia Governor's Office has been directly involved in crafting the state's electric vehicle deployment strategy.

## Shore Power

Shore electrification—the use of mainland power to support ship operations while the vessels are in port—constitutes another opportunity for the company.

As carbon constraints grow tighter, more states could follow California's lead and require vessels docked at port to plug into the onshore grid for their power needs. Virginia has an extensive system

of both commercial and military ports, and obliging ships to use exogenous power supplies would create a new source of demand for power companies.

## Generation Opportunities

The analysis found that achieving the 60 or 80 percent reduction scenario would require large amounts of renewable generation, including offshore wind and battery storage.

As part of our ongoing commitment to bring cleaner energy to customers, we are moving forward on the Mid-Atlantic's first offshore wind project in a federal lease area, subject to regulatory approval. We have signed an agreement and strategic partnership with Ørsted Energy of Denmark, a global leader in offshore wind development, to build two six-megawatt turbines off the coast of Virginia Beach. This project—only the second of its kind in the United States and the first owned by an electric utility company—will be located about 27 miles off the coast of Virginia, beyond the coastal viewshed.

Battery storage offers another promising opportunity. The proliferation of non-dispatchable energy sources is expected to increase demand for power storage. Likewise, the increased



use of electric vehicles could produce an additional shape change to the daily electricity demand curve. The combination of renewable energy and electric vehicles could lead to much higher energy costs at certain times of the day, creating a strong price incentive for improved energy storage. This could lead to consumer demand for as much as three gigawatts of incremental energy storage in the company's service area. The widespread use of batteries also could support the company's solar buildout by preventing solar curtailment, under which available solar energy remains unused because periods of high demand do not match up with periods of high availability.

Dominion Energy operates a 3,003 megawatt pumped storage power station in Bath County, Virginia. Pumped storage operates much like a giant battery: When electricity demand is low, the company pumps water from the lower of two reservoirs to the upper one. When demand spikes, valves open to let water run back to the lower reservoir at a rate of 13.5 million gallons per minute. The station powers 750,000 homes and provides a reliable backup source of energy if other sources go offline. We are also exploring the potential for another pumped storage facility in the coalfields of Southwest Virginia.

Another opportunity to provide zero-carbon energy is re-licensing our existing nuclear fleet and repurposing our strong natural gas fleet as balancing units for the more intermittent renewable resources.

## Microgrids

The nature of the company's service territory and lines of business has made it an early adopter of microgrids, which are small-scale power grids that operate independently or in conjunction with an area's main electrical grid. Dominion Energy has set up microgrid projects in Kitty Hawk, North Carolina, at Randolph-Macon College in Ashland, Virginia, and in its business servicing military bases both within and outside of its regulated service territory.

As the electric utility serving the Outer Banks of North Carolina and coastal Virginia, Dominion Energy has significant experience in storm restoration and long ago identified microgrids as an important strategy



to maintain reliability and resilience in storm-prone parts of its service territory.

Dominion Energy has long been focused on higher education partnerships. This includes its innovative rooftop solar partnership program, which focused heavily on higher education institutions, as well as its work to combine this program with microgrids when appropriate—most notably at Randolph-Macon College. Virginia's 2018 GTSA legislation provides additional opportunities to develop these types of partnerships.

While the company has compelling reasons to develop microgrids in storm-prone communities and at higher education institutions, it has an even more compelling reason to partner with military bases (and related national security facilities) given the criticality of these facilities to our nation's defense. Not only does the company host some of the world's most important defense and national security installations in its Virginia service territory, it also has a robust business privatizing the electric facilities on military bases across the nation. This leading role in serving the needs of the United States military positions the company well to maintain its top position in microgrid development.

## Heating and Cooling

Both electrification for heating and cooling of homes and greater natural

gas deployment offer opportunities for reducing carbon. In the company's regulated electric service territory, there is already significant heat pump deployment, though there remains a small usage of heating oil that could be beneficially replaced by electric solutions.

Similarly, while the company has a strong market position in its natural gas distribution territories in West Virginia, Ohio, Utah, Wyoming, Idaho and Colorado, there remain business and sustainability opportunities for greater penetration of natural gas as an environmentally friendly heating solution.

## Grid Modernization

In order to accommodate increased renewables, investments in the grid would be needed. Efforts to implement such improvements are under way. In its first grid transformation plan filed with the Virginia SCC in July 2018, Dominion Energy laid out a plan for service-territory-wide deployment of advanced metering infrastructure and intelligent grid devices. This infrastructure, combined with the customer experience portal proposed in the same filing, is a key potential backbone for a wide range of home automation applications for third parties, the regulated utility, and a utility affiliate. Home automation opportunities are part of the current focus for the company's innovation team and have the potential to extend well beyond Virginia.

# Conclusion

Overall, the company has already taken significant actions to reduce its carbon intensity and has positioned itself well for the transition to a lower carbon economy. Dominion Energy:

- Has a demonstrated record of reducing carbon intensity and carbon emissions.
- Has greatly expanded solar energy generation over the past five years and plans to develop or support an additional 3,000 megawatts of renewable energy over the next few years.
- Has a substantial zero-carbon nuclear fleet and is pursuing the extension of nuclear licenses.
- Plans to conduct a demonstration project for offshore wind.
- Operates the largest pumped storage battery in the world.
- Has state-of-the-art natural gas transmission, distribution, and power generation businesses that will help it balance intermittent renewables and smooth out price fluctuations.
- Is seeking approval for grid transformation efforts that would significantly harden the electric grid against the physical risks associated with climate change.
- Can expect increased demand for energy from the electrification of cars and trucks, commercial buildings, and possibly oceangoing vessels.
- Has a strong culture of innovation that permeates the company from top to bottom—“Embrace Change” is one of our company’s core values.
- Maintains robust governance practices around sustainability matters, including the establishment of a Sustainability and Corporate Responsibility Committee on the Board of Directors charged with reviewing the company’s approach to environmental, social, economic and reputational issues.

Taken together, these attributes should enable Dominion Energy to move toward a clean energy future irrespective of how the ultimate environmental policies unfold over the years to come.



This report contains statements concerning Dominion Energy, Inc.'s ( Dominion Energy ) expectations, plans, objectives, future financial performance and other statements that are not historical facts. These statements are "forward looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. In most cases, the reader can identify these forward looking statements by such words as "anticipate," "estimate," "forecast," "expect," "believe," "should," "could," "plan," "may," "continue," "target" or other similar words.

Dominion Energy makes forward looking statements with full knowledge that risks and uncertainties exist that may cause actual results to differ materially from predicted results. Factors that may cause actual results to differ are often presented with the forward looking statements themselves. Additionally, other factors may cause actual results to differ materially from those indicated in any forward looking statement. These factors include but are not limited to:

- Unusual weather conditions and their effect on energy sales to customers and energy commodity prices;
- Extreme weather events and other natural disasters that can cause outages and property damage to facilities;
- Federal, state and local legislative and regulatory developments, including changes in federal and state tax laws and regulations;
- Changes to federal, state and local environmental laws and regulations, including those related to climate change, the tightening of emission or discharge limits for greenhouse gasses and other substances, more extensive permitting requirements and the regulation of additional substances;
- Cost of environmental compliance, including those costs related to climate change;
- Changes in implementation and enforcement practices of regulators relating to environmental standards and litigation exposure for remedial activities;
- Difficulty in anticipating mitigation requirements associated with environmental and other regulatory approvals or related appeals;
- Risks associated with the operation of nuclear facilities, including costs associated with the disposal of spent nuclear fuel, decommissioning, plant maintenance and changes in existing regulations governing such facilities;
- Fluctuations in energy related commodity prices;
- Global capital market conditions, including the availability of credit and the ability to obtain financing on reasonable terms;
- Changes in rating agency requirements or credit ratings and their effect on availability and cost of capital;
- Risks of operating businesses in regulated industries that are subject to changing regulatory structures;
- Impacts of acquisitions, divestitures, transfers of assets to joint ventures or Dominion Energy Midstream Partners, LP and retirements of assets based on asset portfolio reviews;
- Changes in demand for Dominion Energy's services, including industrial, commercial and residential growth or decline in Dominion Energy's service areas, changes in supplies of natural gas delivered to Dominion Energy's pipeline and processing systems, failure to maintain or replace customer contracts on favorable terms, changes in customer growth or usage patterns, including as a result of energy conservation programs, the availability of energy efficient devices and the use of distributed generation methods;
- Additional competition in industries in which Dominion Energy operates, including in electric markets in which Dominion Energy's merchant generation facilities operate, and potential competition from the development and deployment of alternative energy sources, such as self generation and distributed generation technologies, and availability of market alternatives to large commercial and industrial customers;

- Changes in technology, particularly with respect to new, developing or alternative sources of generation and smart grid technologies;
- Changes to regulated electric rates and regulated gas distribution, transportation and storage rates, including LNG storage, collected by Dominion Energy;
- Changes in operating, maintenance and construction costs; and
- Timing and receipt of regulatory approvals necessary for planned construction or growth projects and compliance with conditions associated with such regulatory approvals.

Additionally, other risks that could cause actual results to differ from predicted results are set forth in Item 1A. Risk Factors in Dominion Energy's quarterly reports on Form 10-Q and most recent annual report on Form 10-K.

Dominion Energy's forward looking statements are based on beliefs and assumptions using information available at the time the statements are made. Dominion Energy cautions the reader not to place undue reliance on their forward looking statements because the assumptions, beliefs, expectations and projections about future events may, and often do, differ materially from actual results. Dominion Energy undertakes no obligation to update any forward looking statement to reflect developments occurring after the statement is made.

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