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RESPONSIBILITY | RISK | OPPORTUNITY | LEADERSHIP



Entergy®

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**Entergy understands that climate change presents many significant risks to our customers, the communities we serve and our business operations.**

Recognizing the challenges posed by climate change, Entergy Corporation has focused on the issue as a sustainability priority for almost two decades. We have worked to ensure that our concern about climate change translates into action. We have been a leader in limiting greenhouse gases from our operations, in advancing constructive climate policy discussions and in understanding the risks associated with changing environmental conditions in our region.

We also understand that there are important opportunities associated with the transition to a lower carbon energy system. Utilities have a critical role to play in delivering the clean energy solutions that are essential in lowering greenhouse gas emissions. We remain committed to working with our many stakeholders to identify and advance these opportunities. We seek to bring value to our customers while supporting a lower carbon future and communities that are more sustainable and resilient.

The purpose of this analysis and report is threefold: (1) to continue Entergy's long history of engagement on climate change and management of the risks to our business; (2) to use scenario planning to analyze potential impacts on – and opportunities for – Entergy and the regional economies in which we operate; and (3) to inform and engage stakeholders on Entergy's current and ongoing processes for managing climate risk and evaluating future opportunities. The structure of this analysis and report was informed by the Recommendations of the Task Force on Climate-related Financial Disclosures.<sup>1</sup>

TCFD recommends that companies provide information on a broad array of issues that fall generally into four categories: (1) Governance “around climate-related risks and opportunities;” (2) Strategy, including an assessment of climate-related risks and opportunities as they pertain to the business strategy; (3) Risk Management; and (4) Metrics and Targets, including the disclosure of Scope 1, 2, and 3 greenhouse gas emissions. This report addresses these key elements of the TCFD recommendations and provides an important window into how Entergy is working to manage the risks of climate change while pursuing growth opportunities that support our mission of providing sustainable value to our key stakeholders – customers, employees, communities and owners. The following key topics are addressed in this report.

... there are important opportunities associated with the transition to a lower carbon energy system.

**Historic Leadership and a New 2030 Goal.** In 2001, Entergy was the first U.S. utility to cap CO<sub>2</sub> emissions voluntarily, and that goal extends to 2020. With this report, Entergy is announcing a goal beyond 2020 to continue our portfolio transformation to achieve a 50 percent reduction in emission rate (pounds of CO<sub>2</sub> per megawatt hour) from our 2000 level by 2030, even while demand for electricity in our service territory is expected to increase. As the scenario analysis in this report demonstrates, this rate goal likely will reduce total emissions by approximately 28 percent below our 2000 baseline, while at the same time Entergy significantly increases the amount of electricity we produce.



## EXECUTIVE SUMMARY

**Partnerships for Decarbonization.** As we continue to reduce the emission rate of our generating fleet, we also are developing new ways to partner with customers in other sectors of the economy (such as industry, ports and transportation) to help them save money through lower equipment operation and maintenance costs and using energy more efficiently, while also reducing their direct emissions by electrifying their energy needs and operations.

**Scenario Analysis.** Building on climate assumptions currently used by the company, Entergy presents a detailed analysis of several potential carbon abatement scenarios through 2030. The information includes a reference case, a view of Entergy's new 2030 goal, two degree scenarios and a carbon tax analysis.

**Guiding Principles for Climate Policy.** For nearly two decades, Entergy has advocated for national action on climate issues based on Entergy's climate guiding principles. Entergy continues to believe that an economy-wide price on carbon is likely the most efficient and pragmatic path forward for federal climate policy.

**Investments in Clean Generation.** Entergy is investing approximately \$11 billion in capital over the next three years in generation assets and transmission and distribution infrastructure. Initiated in 2002, Entergy's portfolio transformation strategy incorporates cleaner, more efficient generation sources, allowing the retirement of older, less-efficient legacy units. Due to this strategy, we have replaced nearly 30 percent of our older generation with cleaner, more efficient resources, and natural gas now represents approximately 60 percent of our current utility generation capacity. Entergy also works to preserve our nuclear assets and has set a goal of integrating approximately 1,000 MW of renewable energy sources into our utilities' respective generation supply portfolios over the next several years, further reducing the company's already low CO<sub>2</sub> emission rate.

**Grid Modernization, Electrification and Energy Efficiency.** The company is investing billions of dollars over the next five years in grid modernization and resiliency. These investments will help prevent or mitigate system damage due to changing climate conditions and will lay the foundation for incorporating newer technologies and customer solutions, including distributed energy resources and energy storage.





## EXECUTIVE SUMMARY

**Governance and Risk Management.** Entergy has long-standing, robust governance structures and risk management processes to address effectively the risks and opportunities posed by climate change. Entergy's management and board of directors provide effective management and oversight of these and other risks through effective risk assessment and risk management processes and, at the board level, extensive reporting on the full range of risks affecting the company.

**Engagement and Transparency.** Climate change is a key risk for Entergy, but it also presents an opportunity to prepare our business and operations to adapt to a changing climate and to thrive in a carbon-constrained economy. The topic has been a focus of our corporate planning for almost two decades. This report represents a next, important step to inform and engage stakeholders on Entergy's current and ongoing processes for managing climate risk and evaluating future opportunities. As such, the report supplements Entergy's efforts in our annual Integrated Report, EEL Reporting Template, online performance data table and annual participation in the Dow Jones Sustainability Index.

**Continuous Improvement.** This analysis and report illustrate that while a more carbon-constrained economy poses certain challenges, it also provides many opportunities for Entergy to play a meaningful role in decarbonization. As the company continues our generation portfolio transformation strategy that will further reduce an already low emission rate, Entergy can help lead the regional transition to a low-carbon economy. Entergy will continue advancing our planning processes and stress-testing potential investments, our integrated resource plans, and our overall business plan against our point of view on potential carbon emission costs. Entergy also will continue to engage in and monitor various technology developments discussed throughout this report. Finally, Entergy will continue to assess new national, state and local climate policies and play a constructive role in advancing policies that can and will have a meaningful impact on addressing the risks of climate change.



## COMPANY SNAPSHOT

**Entergy Corporation is an integrated energy company engaged primarily in electric power production and retail distribution operations.**

Entergy (NYSE: ETR) owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, including nearly 9,000 MW of nuclear power. Entergy's regulated utility delivers electricity to 2.9 million utility customers in Arkansas, Louisiana, Mississippi and Texas. Entergy has annual revenues of approximately \$11 billion and nearly 13,700 employees.

Entergy provides electric retail and wholesale power to customers in four states through five utility operating companies: Entergy Arkansas, LLC; Entergy Louisiana, LLC; Entergy Mississippi, LLC; Entergy New Orleans, LLC; and Entergy Texas, Inc. We also deliver natural gas services to 200,000 customers in New Orleans and parts of Baton Rouge, Louisiana, through two of our utility companies.

Entergy provides power to wholesale customers primarily from three nuclear facilities located in the northern United States. We also provide services to other nuclear power plant owners. We have announced the sale or closure of all of our merchant nuclear assets, completing our plan to exit the merchant power business and transition to a pure-play utility.

**Entergy has annual revenues of approximately \$11 billion and nearly 13,700 employees.**







*Entergy*  
**VOLUNTEER**  
*We Power Life*

**Entergy has recognized the risk of climate change as a key priority and a matter of corporate planning for almost two decades.**

Climate change presents a challenge for Entergy and the communities we serve; however, it also presents an opportunity to innovate, invest, and improve the world around us. Entergy has been working to prepare our business and operations to adapt to a changing climate and to thrive in a carbon-constrained economy.

The purpose of this analysis and report is threefold: (1) to continue Entergy's long history of engagement on climate change and management of the risks to our business; (2) to use scenario planning to analyze potential impacts to – and opportunities for – Entergy and the regional economies in which we operate; and (3) to inform and engage stakeholders on Entergy's current and ongoing processes for managing climate risk and evaluating future opportunities. Entergy intends to capture resulting growth opportunities while continuing to pursue our mission of providing sustainable value to our key stakeholders – customers, employees, communities, and owners.

In developing this report, Entergy considered the Recommendations of the Task Force on Climate-related Financial Disclosures.<sup>2</sup> The use of scenario analysis is a key recommendation of the task force: "Scenario analysis can be qualitative, relying on descriptive, written narratives, or quantitative, relying on numerical data and models, or some combination of both." TCFD recommends that companies provide information on a broad array of issues that fall generally into four categories: (1) Governance "around climate-related risks and opportunities;" (2) Strategy, including an assessment of climate-related risks and opportunities as they pertain to the business strategy; (3) Risk Management; and (4) Metrics and Targets, including the disclosure of Scope 1, 2, and 3 greenhouse gas emissions. The task force recommendations are an important resource for advancing climate disclosure practices, and Entergy has followed these recommendations in developing this report.





In addition to this report, Entergy has disclosed similar information in other corporate reports. Significant information regarding the four major categories of TCFD recommended disclosure can be found in the documents or publications listed in the table below.

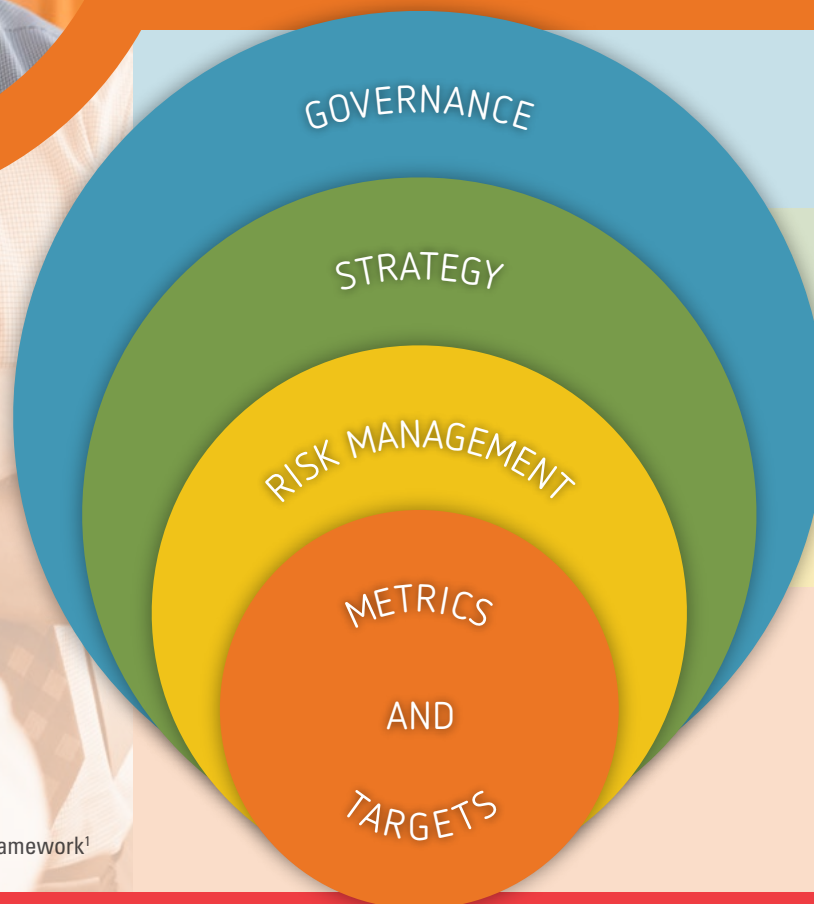
The analysis in this report is supportive of several of the United Nations' Sustainable Development Goals,<sup>3</sup> particularly:

- **Goal 7: Affordable and Clean Energy** – ensure access to affordable, reliable and sustainable modern energy for all; and
- **Goal 13: Climate Action** – combat climate change and its impacts.

Aligning our analysis with the UNSDGs helps Entergy's key stakeholders see how our plans not only help ensure prosperity for local communities, but also support a worldwide purpose to protect our planet and improve quality of life.

## TCFD FRAMEWORK

F1



- This report, pages 3-4.
- [2018 Integrated Report](#), pages 9-13.
- [Corporate Governance website](#) at Entergy.com.
- [2019 Proxy Statement](#), pages 4-6; 18-32.

- This report, pages 5-19.
- [2018 Integrated Report](#), pages 15-18; 49-58.
- [2018 Annual Report on Form 10-K](#), pages 246-249.
- [Environmental Strategy website](#) at Entergy.com.
- IRP process websites for [Arkansas](#), [Louisiana](#) and [New Orleans](#).

- This report, pages 20-26.
- [2018 Integrated Report](#), pages 59-68.
- [2018 Annual Report on Form 10-K](#), pages 273-274; 297-299.
- IRP process websites for [Arkansas](#), [Louisiana](#) and [New Orleans](#).

- This report, pages 27-40.
- [2018 Integrated Report](#), pages 80-84.
- [2018 Annual Report on Form 10-K](#), pages 274-275.
- [2019 Proxy Statement](#), pages 22-24.
- [Annual greenhouse gas inventory and verification report](#).
- [EEI ESG Template for Entergy](#).
- [Entergy's Performance Data Table](#).
- [Investor Guide and Statistical Report](#).

Adapted from the TCFD Framework<sup>1</sup>



# ENTERGY'S APPROACH TO CLIMATE ISSUES

## Climate Risk and Sustainability Governance

Entergy is subject to many diverse risks. These risks include climate change, other environmental issues, technology innovation and integration, other sustainability risks and the need for ongoing capital investments. Entergy's management and board of directors provide effective management and oversight of these and other risks through robust risk assessment and risk management processes and through extensive reporting on risks affecting the company. The board also reviews the company's processes for identifying and managing risks to ensure these processes are effective.

Some critical risks with enterprise-wide significance, such as corporate strategy and capital budgeting, require the full board's active oversight. Because of their significance, our climate strategy and current climate goals also have been developed under the full board's oversight.

The board also leverages its committees to review specific risks within their respective areas of responsibility, and committee meetings are scheduled to allow all board members to participate in these discussions.

The board's corporate governance committee has responsibility for oversight of the company's overall sustainability program and strategy and environmental, social and governance reporting. This responsibility is met, in the first instance, by assuring that recognized sustainability risks are being addressed by the full board or an appropriate board committee. Additionally, our audit committee receives annual reports from our sustainability and environmental policy group on Entergy's greenhouse gas reduction efforts and other climate-related activities. The table below provides information on sustainability oversight by all of Entergy's board committees.

## SUSTAINABILITY OVERSIGHT BY ENTERGY'S BOARD COMMITTEES

T1

BOARD COMMITTEE	PRIMARY SUSTAINABILITY OVERSIGHT RESPONSIBILITY
<b>CORPORATE GOVERNANCE</b>	Overall corporate sustainability strategy and reporting; corporate social responsibility; corporate governance issues; governmental, regulatory, public policy and public relations matters; public advocacy activities and contributions; shareholder concerns
<b>PERSONNEL</b>	Executive compensation policy; employee and human resources issues; employee training and development; talent management; employee and contractor safety; diversity and inclusion; supplier diversity
<b>AUDIT</b>	Environmental compliance and auditing and implementation of environmental policies; ethics and compliance; market and credit risks; cyber-security risks; financial reporting processes and risks; other strategic risks and general risk oversight
<b>FINANCE</b>	Financial stability; major capital investments
<b>NUCLEAR</b>	Safety risks unique to the nuclear fleet; sustainability of our nuclear plants

## CLIMATE RISK AND SUSTAINABILITY GOVERNANCE

Our senior management also provides environmental and sustainability oversight and accountability. For example, our executive vice president and general counsel provides oversight of implementation of our environmental policies and procedures, including our emission reduction goals, and assesses how these align with other parts of our strategy. Our vice president, sustainability and environmental policy oversees a team of professionals that work to collect, analyze and report various sustainability and environmental metrics, including our climate-related performance metrics. This team works with Entergy's various businesses to identify

opportunities to improve performance and disclosure and sponsors our cross-functional sustainability working group.

The company also expects our suppliers to act in a manner consistent with Entergy's Supplier Code of Conduct, which outlines ethical expectations and obligations, including the obligation to supply goods and services in an environmentally conscientious manner. Entergy partners with suppliers on sustainability focus areas, including climate issues, and is an active member of the Electric Utility Industry Sustainable Supply Chain Alliance.



In 2002, our board adopted a forward-looking environmental vision statement that extends beyond a dedication to environmental compliance. This vision committed Entergy to practice sustainability in all that we do, not only through environmentally responsible behavior, but also through our support of initiatives that promote local and global prosperity.

### ENTERGY'S ENVIRONMENTAL VISION STATEMENT

T2

#### ENTERGY WILL

##### SUSTAINABLE DEVELOPMENT:

- Develop and conduct business in a responsible manner that is environmentally, socially and economically sustainable.
- Promote environmentally cleaner and more efficient generation, transmission, distribution and use of energy.
- Encourage employees to conduct their personal and corporate lives in such a way that Earth's environment is preserved for future generations.

##### PERFORMANCE EXCELLENCE:

- Meet, but preferably exceed, environmental legal requirements, conforming to the spirit as well as the letter of the law.
- Understand, minimize and responsibly manage the environmental impacts and risks of our operations, setting goals that reflect continuous improvement.
- Be a good steward of the land that we own, and the wildlife and natural resources that are in our care. Communicate our commitment to the policy internally, and provide the resources, training and incentives to carry it out.
- Track and publicly report our environmental performance using best practice reporting guidelines.

##### ENVIRONMENTAL ADVOCACY:

- Inform employees, customers, shareholders and the public on matters important to the environment.
- Maintain a constructive dialogue with government agencies and public officials.
- Lead by example, demonstrating responsible environmental behavior everywhere we serve and supporting public policy that contributes to an ever-improving global and local environment.





Under the leadership of our board of directors, Entergy has been a longtime advocate for policy action and societal investments to address climate change and to adapt to physical environmental risks. In the late-1990s, we increased our focus on the risks posed by climate change not only to our infrastructure, but also to our customers and the communities we serve. Entergy considers these risks when formulating our position on potential costs to our business. Through various public company reports and disclosures in the early 2000s, the company began communicating to stakeholders the physical, operational and regulatory risks posed by climate change.<sup>4</sup>

#### Entergy's Guiding Principles – Climate Policy

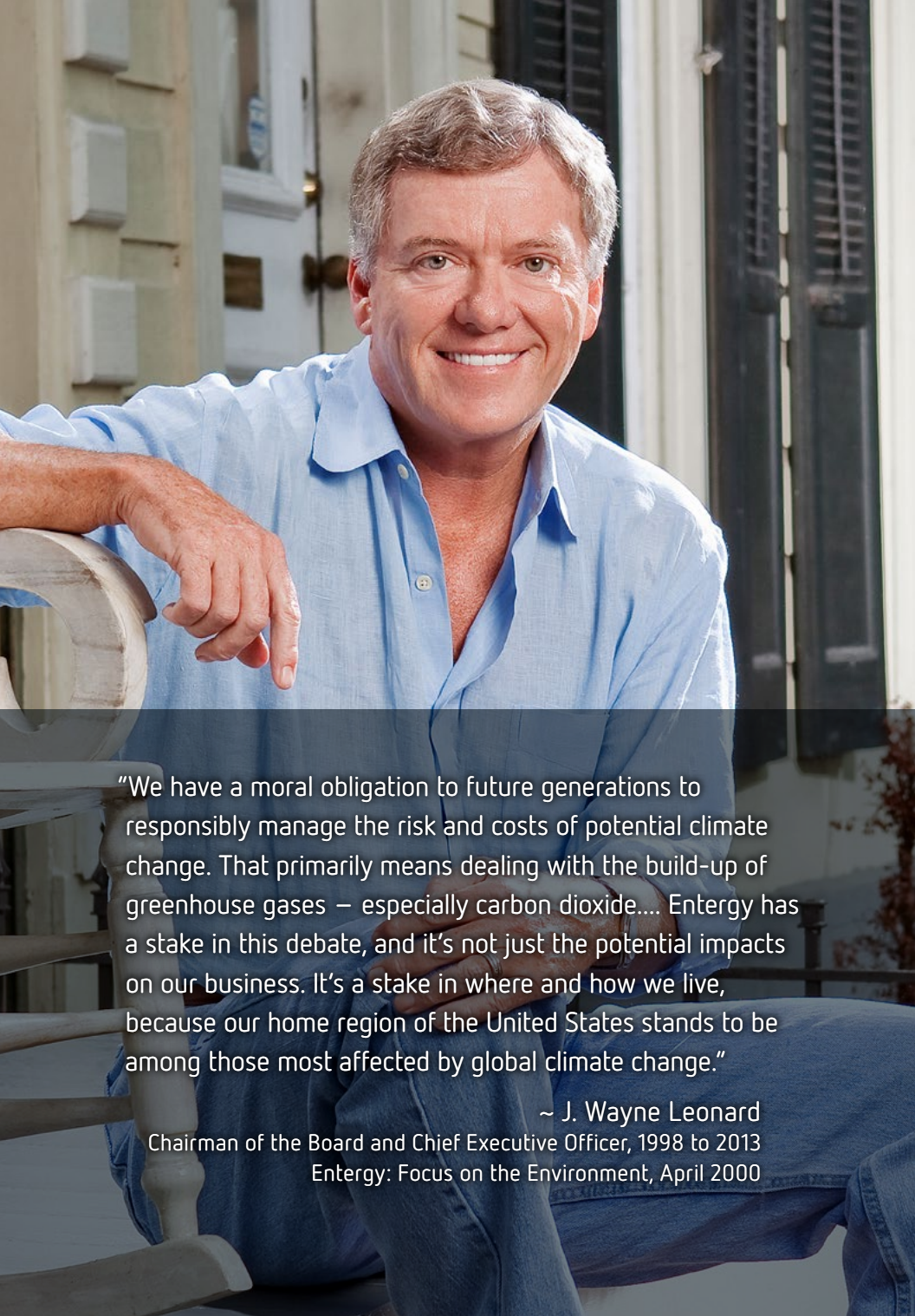
Entergy's fundamental view of climate change – that it poses a significant risk to our region, our business, our society and our planet – has not changed since we adopted our first carbon dioxide emissions goal in 2001. We believe the United States needs to be part of a larger global strategy to reduce greenhouse gas emissions, as well as to adopt adaptation and resiliency strategies for more vulnerable areas.

Entergy has developed “guiding principles” that we believe should drive national and international climate change policies. These principles were first published in our 2007 sustainability report.<sup>5</sup>

Today, the company's position on carbon mitigation policy is guided by the following principles:

- Climate change presents a risk to our corporate assets and to our customers, employees, communities and owners;
- Optimally, greenhouse gas control mechanisms should be economy-wide and send a stable, predictable price signal to stimulate investment in efficient, low-carbon technologies and to take advantage of the potential net emission reductions from the electrification of other sectors of the economy;
- As a society, we need to employ advanced technologies to electrify the more carbon-intensive transportation, commercial and industrial sectors of the economy, even as the electricity sector continues to work to further decarbonize the generation fleet;
- We need to act across the entire global economy to seek balance between CO<sub>2</sub> emission sources and sinks and to increase the resilience of both our natural and built environments;
- We support efforts to engage our stakeholders and partners in the communities we serve to evaluate and deploy adaptation efforts, resiliency investments and natural sequestration opportunities; and
- We support built-in, permanent protection for low-income customers in any greenhouse gas control mechanism.

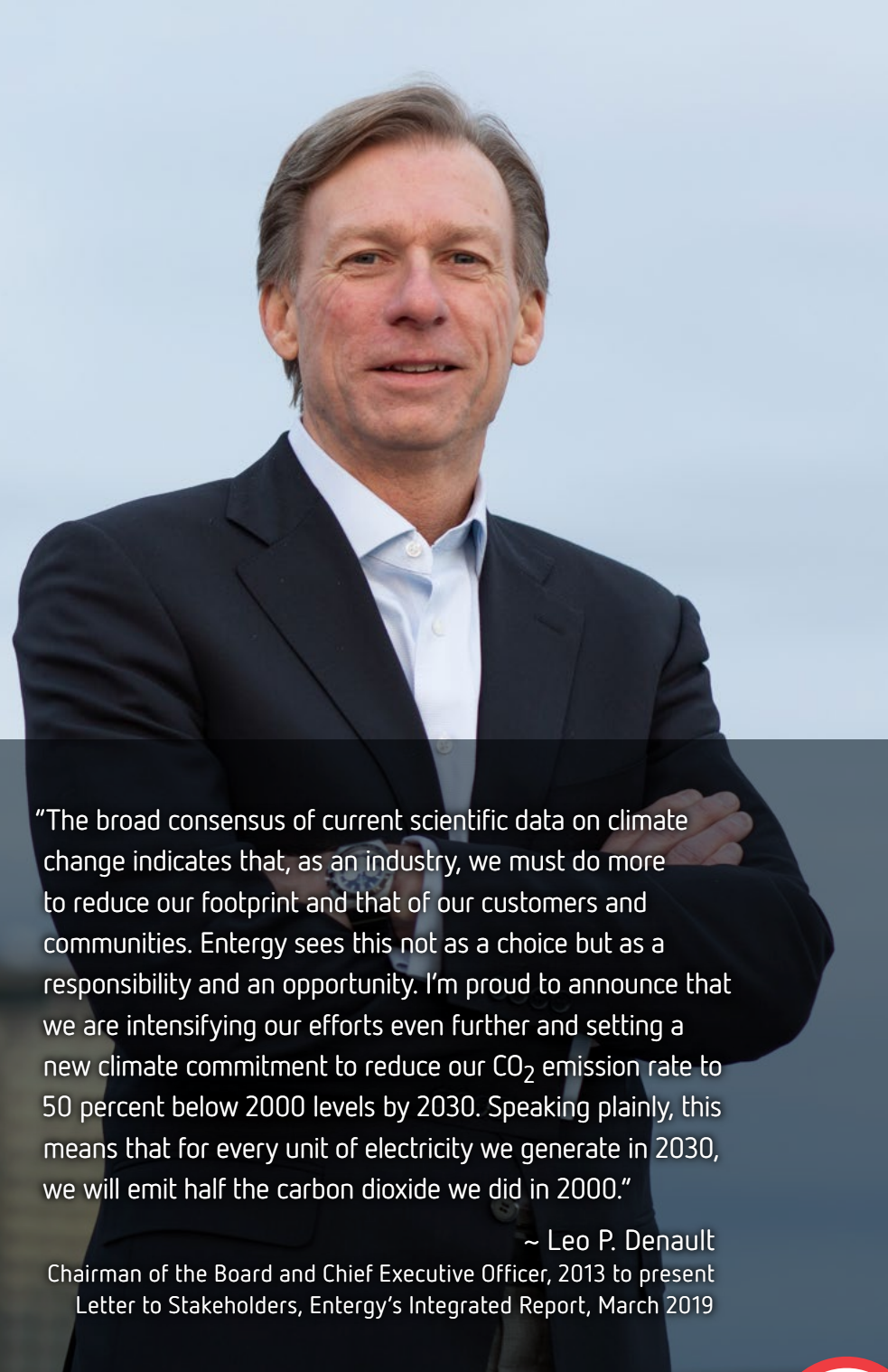
For nearly two decades, Entergy has advocated for national action on climate issues based on similar principles. Entergy has engaged policymakers directly and through collaborative groups and various trade associations. Entergy also has engaged with communities within our utility service area on strategies for adaptation and resiliency.



"We have a moral obligation to future generations to responsibly manage the risk and costs of potential climate change. That primarily means dealing with the build-up of greenhouse gases – especially carbon dioxide.... Entergy has a stake in this debate, and it's not just the potential impacts on our business. It's a stake in where and how we live, because our home region of the United States stands to be among those most affected by global climate change."

~ J. Wayne Leonard

Chairman of the Board and Chief Executive Officer, 1998 to 2013  
Entergy: Focus on the Environment, April 2000



"The broad consensus of current scientific data on climate change indicates that, as an industry, we must do more to reduce our footprint and that of our customers and communities. Entergy sees this not as a choice but as a responsibility and an opportunity. I'm proud to announce that we are intensifying our efforts even further and setting a new climate commitment to reduce our CO<sub>2</sub> emission rate to 50 percent below 2000 levels by 2030. Speaking plainly, this means that for every unit of electricity we generate in 2030, we will emit half the carbon dioxide we did in 2000."

~ Leo P. Denault

Chairman of the Board and Chief Executive Officer, 2013 to present  
Letter to Stakeholders, Entergy's Integrated Report, March 2019



## Overall Environmental Strategy – Environment<sup>2020</sup>

In 2011, we adopted Environment<sup>2020</sup>, a comprehensive environmental strategy and management system that covers six areas of strategic action, including those related to climate change:

1. Environmental footprint
2. Proactive adaptation
3. Compliance leadership
4. Energy efficiency
5. Clean generation
6. Stakeholder engagement

These six areas capture the environmental aspects of Entergy's overall business strategy. More information on each of these areas is provided on [entergy.com/environment](http://entergy.com/environment). Several of these environmental areas of focus support and complement our climate strategy, which includes stabilizing our CO<sub>2</sub> emissions; proactively engaging in adaptation and resiliency efforts such as coastal restoration, investing in grid modernization, conducting emergency and incident response planning and community engagement; partnering with customers to support decarbonization, such as through electrification and energy efficiency initiatives; investing in clean generation; and providing robust disclosure and reporting.

## Climate Leadership – Environmental Footprint Reduction

Entergy is committed to reducing our environmental footprint. In 2001, Entergy was the first U.S. utility to cap CO<sub>2</sub> emissions voluntarily. The commitment was to stabilize emissions at 2000 levels through 2005. After beating that target by over 20 percent, the company renewed and strengthened this commitment twice, while expanding it to include power purchases from which we could reasonably determine a CO<sub>2</sub> emission rate. The company's commitment through 2020 is to stabilize CO<sub>2</sub> cumulative emissions from company-owned power plants and controllable power purchases at 20 percent below year 2000 levels through 2020. This is a cumulative goal over the period, not an annual goal. Building on our past accomplishments, Entergy is announcing a goal beyond 2020 to continue our portfolio transformation to achieve a 50 percent reduction in emission rate (pounds of CO<sub>2</sub> per MWh) from our 2000 level by 2030, even as demand for electricity in our service territory is expected to increase. As the scenario analysis in this report demonstrates, this rate reduction is likely to produce an approximate 28 percent total emission reduction in 2030 from our 2000 baseline.

It is important to put Entergy's emissions profile in context. According to the [2018 Benchmarking Air Emissions report](#) from M.J. Bradley & Associates, based on 2016 data (the

## ENTERGY'S 2030 CLIMATE GOAL

Entergy is announcing a climate goal beyond its current 2020 commitment – we plan to achieve a 50 percent reduction in our CO<sub>2</sub> emission rate from our 2000 level by 2030.



latest year for publicly available benchmarking data), Entergy is the sixth-largest of the top 100 power producers in the United States. Among the top 20 of these power producers that are privately and investor-owned, Entergy ranks fourth in the production of zero-emitting energy and has the fourth-lowest CO<sub>2</sub> emission rate. Due to Entergy's early work in this area and ongoing portfolio transformation efforts, Entergy expects to continue to have one of the lowest emission rates for large generators through 2030. Entergy intends to accomplish this goal even in a region with little to no utility-scale wind resources.<sup>6</sup>

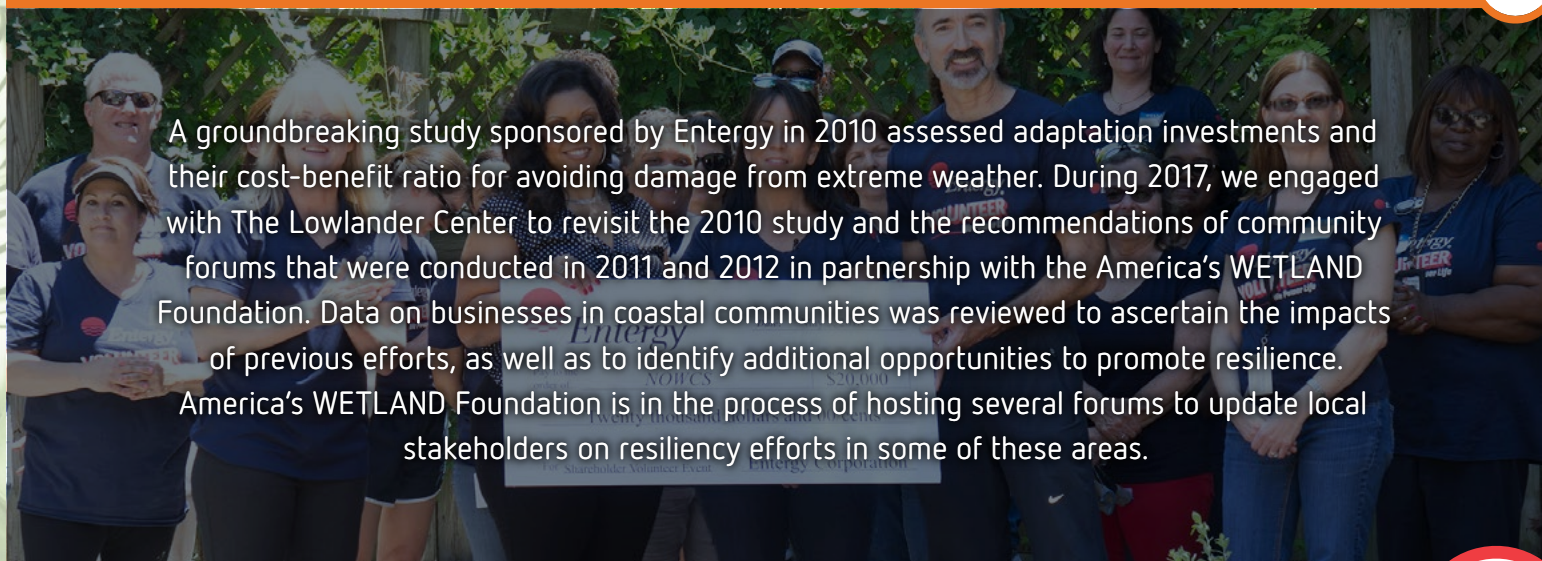
In 2018, Entergy's utility-only emission rate was 763 pounds per MWh, much lower than the most recently published national average of 1009 pounds per MWh. Our 2018 rate represents an approximately 28 percent reduction from our 2000 emission rate level.

### Proactive Adaptation and Resiliency

As stated in our guiding principles on climate change, we support efforts in the communities we serve to evaluate and deploy adaptation efforts, resiliency investments and natural sequestration opportunities to help our customers and communities become more sustainable and better able to withstand changing climatic conditions. Entergy's adaptation and resiliency efforts include coastal restoration, infrastructure modernization, investments and upgrades, including generation portfolio upgrades and renewable generation, robust emergency and incident response planning, support of and participation in several community and customer resiliency initiatives<sup>7</sup> and continued support of adaptation research and projects through Entergy's Environmental Initiatives Fund. Entergy also contributes to publications in this field, having contributed a book chapter on adaptation to "Sustainable Electricity."<sup>8</sup>

### BUILDING A RESILIENT GULF COAST

F3



A groundbreaking study sponsored by Entergy in 2010 assessed adaptation investments and their cost-benefit ratio for avoiding damage from extreme weather. During 2017, we engaged with The Lowlander Center to revisit the 2010 study and the recommendations of community forums that were conducted in 2011 and 2012 in partnership with the America's WETLAND Foundation. Data on businesses in coastal communities was reviewed to ascertain the impacts of previous efforts, as well as to identify additional opportunities to promote resilience. America's WETLAND Foundation is in the process of hosting several forums to update local stakeholders on resiliency efforts in some of these areas.





**Coastal Restoration** - Entergy's utility customer base and infrastructure are in the mid-south United States – an area susceptible to storm impacts potentially made worse by the loss of coastal wetlands and sea level rise. Our utilities own or lease 25 gigawatts of generation, 15,900 circuit miles of transmission lines and 105,000 circuit miles of distribution lines in the region. This area is experiencing one of the fastest rates of wetlands loss in the world, especially along coastal Louisiana. These wetlands serve as natural protection during severe weather events.

Recognizing the importance of maintaining and restoring Louisiana's barrier islands and coastal wetlands, we invest in restoration projects to promote greater resiliency in our service territory and enhance biodiversity and local ecosystems. Wetlands play a crucial role in storm protection and economic prosperity for many of our communities, as well as helping protect Entergy's assets. In addition to mangrove planting, Entergy has sponsored the development of a protocol to account for the carbon sequestration benefits of wetland restoration, which may allow private landowners to monetize the benefits and encourage ongoing restoration of natural assets.

**Infrastructure Investments - Grid Modernization** - The company is investing billions of dollars over the next five years in grid modernization and resiliency. These investments will help prevent or mitigate system damage due to changing climate conditions and will lay the foundation for incorporating newer technologies and customer solutions, including distributed energy resources and energy storage. We also invest in focused hardening of our transmission and distribution systems to better withstand extreme weather risks. We continually look for cost-effective ways to reduce the likelihood of customer service interruption and reduce the time it takes to restore service that has been interrupted. For example, in 2018, we invested approximately \$900 million in transmission capital projects to connect our generation assets, support new industrial customers and enhance system reliability, efficiency and resiliency. This ongoing transformation represents a significant capital investment opportunity for Entergy, while enhancing reliability and resiliency for customers, improving overall efficiency, reducing our environmental footprint, enabling greater customer control and options for energy usage and keeping utility rates among the lowest in the country.

## ENTERGY'S WETLANDS RESTORATION EFFORTS

Entergy recently provided \$150,000 to assist in planting a 60-acre parcel of salt marsh. In partnership with ConocoPhillips, which owns 640,000 acres of wetlands in coastal Louisiana, Tierra Resources developed a three-year pilot program in Terrebonne and Lafourche Parishes to test the theory that planting mangroves by air could be a cost-effective alternative to traditional methods, such as planting by hand on long boat trips. Hand-planting is time-consuming, labor-intensive and almost impossible in more remote areas of the coastline. Mangroves help stabilize salt marsh areas, provide the same habitat quality as marsh grass and are popular for bird rookeries. Finding a way to make coastal restoration more feasible for smaller landowners is a way to help protect the communities Entergy serves.





## ADVANCED METERS

F5

Advanced meters lay the foundation for the next generation of grid technologies. We are evaluating broader grid modernization initiatives, engaging with our stakeholders and bringing forward further proposals as appropriate. We also are exploring technologies to improve grid reliability and resiliency through automation and grid hardening, as well as technologies and devices that enable deployment of distributed energy resources and micro grids. Our goal is to enhance our infrastructure, deploy new technologies and advanced analytics, and develop tailored solutions that anticipate customers' expectations while at the same time managing the required investments to maintain our reliability and low rates.





As discussed further in the Climate Risk Management section, Entergy's enterprise risk management process also takes into consideration the resilience of our other infrastructure assets, including generation, from design and construction to operations and maintenance.

***Robust Emergency and Incident Response Planning*** - Emergency preparedness and response are key components of our company's overall resiliency, helping to ensure that we deliver power safely, reliably and efficiently. The company has a robust and extensive emergency planning and incident response process that allows the company to respond quickly and recover from extreme weather events and other emergencies. We take an integrated approach in preparing for extreme weather events that includes year-round emergency response drills and business continuity planning, asset-hardening investments to improve resilience and reduce the time it takes to restore service, and community and customer engagement to prioritize our investments and minimize business disruptions. We also participate in industry-wide initiatives such as [GridEx](#) and the [electric utility mutual assistance partnership](#). In 2019, the Edison Electric Institute awarded Entergy an Emergency Response

Award for our exceptional assistance in restoring power to citizens following Hurricane Florence in 2018. This was the 21st consecutive year Entergy has earned an EEI national storm-response award. Entergy also participates in the Department of Energy's [Partnership for Energy Sector Climate Resilience](#), a voluntary program related to energy system resiliency planning.

***Community Engagement and Resiliency Initiatives*** - We recognize that our company's success is inextricably tied to the health and resiliency of our communities. Through our Environmental Initiatives Fund and the Entergy Charitable Foundation, the company makes investments in environmental footprint reduction, social solutions, low-income initiatives, education and literacy programs, workforce development and community resiliency. The EIF has committed over \$38 million of shareholder dollars from 2001 to 2018 to invest in generation plant efficiency improvements, coastal restoration projects, internal and external energy efficiency projects, innovative and high-quality carbon offset and research projects, and other internal and external environmental mitigation projects. Several examples of these projects are presented in our [EIF report](#).

## ENTERGY-SUPPORTED NET-ZERO ROOFTOP SOLAR PROGRAM

The Entergy Charitable Foundation, along with Entergy New Orleans, has partnered with St. Bernard Project and Toyota Corporation to construct the new St. Peter Residential project, a mixed-income, affordable apartment community with the primary focus of assisting veterans to transition to civilian life. Entergy's Charitable Foundation has committed to make a \$1.1 million donation to help the project achieve "net zero" status through the inclusion of a rooftop solar photovoltaic system, advanced battery energy storage system and significant energy efficiency upgrades to enhance lighting, appliances and the building's mechanical systems. The project will be Louisiana's first "net zero" apartment complex. Other aspects of the project include features related to water management, greenspace and wellness. Entergy's involvement with this "first-of-its-kind" project in New Orleans will promote an understanding of how better to integrate new technologies while simultaneously providing substantial economic and social benefits to the new residents of the St. Peter Residential project.

### Partnering with Customers and Other Sectors

Entergy recognizes that no one sector can tackle the challenges of climate change alone – an economy-wide effort involving all sectors is required. Entergy is committed to partnering with customers and other stakeholders in the transportation, industrial, commercial, residential and governmental sectors toward decarbonization of the economy. This broader strategic engagement involves actions to move toward the beneficial electrification of other sectors, the implementation of energy efficiency initiatives that help reduce the amount of energy used and the offering of innovative customer solutions for renewable resources. For example, electrification of the transportation and industrial sectors is an important strategy for climate risk mitigation, as the emission rate from the electric generating sector often is lower than that of many transportation and industrial emitters. This is especially true as the electric generating sector's emission rate continues to decline.

**Electrification** - Electrification of other sectors that traditionally use fossil fuels is not only necessary to reduce economy-wide emissions, but also represents a key opportunity for Entergy. Through the Entergy Electric Technology Program known as eTech, we partner with customers to promote the adoption of electric-powered alternatives to many applications that traditionally require fossil fuels. These efforts provide direct customer support by dedicated field representatives to Entergy customers who purchase and install select electric equipment. Electric-powered technologies offer several key benefits to end-users over existing technologies, including

reduced maintenance, lower fuel consumption, increased workplace safety and efficiency, less noise and cleaner and healthier work environments.

Many studies highlight that transportation electrification will be critical to achieving long-term greenhouse gas reduction goals. This presents an ongoing opportunity for Entergy to partner with regulators and key stakeholders on policy and incentive options to encourage adoption of electric vehicles. Entergy has started on this path by:

- Incentivizing customers to purchase electric vehicles and charging infrastructure as part of its eTech program;
- Providing a grant to 16 colleges and universities in our region to install 17 Level 2 (240 volt) electric vehicle charging stations and to purchase electric shuttle vehicles;
- Establishing our PowerDrive program to purchase electric vehicles and install charging infrastructure at company facilities; and
- Participating in the Midcontinent Transportation Electrification Collaborative to study EV deployment and the role of utilities. The effort has developed consensus principles regarding the role of utilities and the group is modeling the load and emissions impact of various EV penetration levels.

Other significant beneficial electrification (and emission reduction) opportunities include transportation fleets, ports, commercial facilities and industrial operations.

The November 2016 United States Midcentury Strategy for Deep Decarbonization illustrates one strategy for decarbonizing the U.S. economy. Recommended actions include:

- Transportation electrification;
- Commercial scale energy efficiency;
- Industrial scale energy efficiency;
- Nuclear power;
- Fossil fuels with CCS;
- Renewable resources;
- Low carbon fuels;
- Electrification; and
- Land sink enhancement.

Entergy believes that its actions taken to date and its strategy going forward touch upon and are consistent with the components of this national strategy and other studies evaluating economy-wide decarbonization.






Electrification of marine vessels while in port is one example of a carbon reduction opportunity. Entergy currently is working on a shore-power initiative that would allow marine vessels to plug into the land-based electrical power grid while at berth. Today, marine vessels at berth typically rely on diesel auxiliary engines to generate electrical power for on-board services and equipment, including communication, lighting and ventilation. The use of diesel auxiliary engines results in significant air emissions. The use of auxiliary engines also creates vibration/noise pollution in port areas, while also causing wear-and-tear on ship-side equipment. Converting marine vessels to electrical power while at berth significantly reduces localized emissions and potentially lowers operating costs for vessel owners. Entergy is partnering with its customers to study the economic and environmental potential for shore-power, as well as identifying and addressing potential barriers for implementation. Entergy's work with customers on viable shore-power solutions is an example of how a utility can facilitate and encourage emission-reduction initiatives. Preliminary analysis indicates that shore-power for marine vessels can result in significant reductions of localized emissions, estimated at as much as 98 percent reduction in nitrogen oxides, a 48 percent reduction in sulfur dioxide, and a 42 percent reduction in carbon dioxide.







**Energy Efficiency** - We help our customers improve their energy efficiency through customer education and outreach, technology and facility improvements and customer incentive programs. We currently offer more than 40 energy efficiency and demand response options with a stated goal of 990 MWh of peak load reduction through 2031. For example, Entergy Arkansas manages a nationally-recognized portfolio of energy efficiency and demand response options, spending an average of \$64 million per year from 2015 to 2019 to help customers of all types reduce their energy usage and environmental impact. These efforts save customers approximately 269,000 MWh per year and defer or avoid the need for more expensive generation sources, helping to keep Entergy Arkansas' rates among the lowest in the country. The Arkansas Public Service Commission oversees the activities of the Arkansas utilities and sets electricity savings targets. This is part of a larger effort in which our utilities have invested approximately \$515 million to deliver approximately 2.22 million MWh of cumulative energy savings.

Entergy has invested in a wide range of energy efficiency programs since 2002. Company-wide energy efficiency offerings include air conditioning and heat pump system tune ups, no-cost energy assessments to identify qualifying EE improvement projects and install cost-effective energy-saving equipment, advanced thermostat rebates, and weatherization measures. Entergy's assistance helped provide almost 20,000

MWh of energy savings in 2017 as part of the CitySmart Program, which provides technical assistance, energy planning and financial incentives for installation of energy efficiency improvements to local public entities such as cities, counties and public/private schools and colleges.

For our large commercial and industrial customers, Entergy also provides custom program support to identify efficiency opportunities and analyze associated costs and savings for projects such as retro-commissioning, process improvements and other system-level projects involving unique equipment, as well as energy efficient lighting and smart energy systems. In one of Entergy's operating companies, the entire large commercial program funding for the most recent program year was reserved within the first week of opening the application process. Entergy also promotes the electrification of agricultural irrigation pumps as part of a load control program. In 2017, over 1,000 Arkansas farmers participated for a total electricity demand savings of over 12.2 MW.

Entergy's utility operating companies now spend more than \$100 million annually on demand-side management efforts (both energy efficiency and demand response), which represents more than a 10-fold increase from just 10 years ago. There is now a wide variety of offerings available to customers in each of Entergy's jurisdictions; these offerings help lower usage and thus customer bills, as well as provide peak load savings.







## EXPANDING CUSTOMER OPTIONS

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Entergy is pursuing the expansion of customer options by engaging with our regulators. Entergy's regulated utilities are responsible for serving the electrical load requirements of the customers in our respective service areas across four states. Entergy's utility operating companies are regulated by various authorities that, among other things, monitor each utility's performance and determine the allowed rate of return for investments prudently made on behalf of the retail customers that each Entergy operating company serves. As a part of the regulatory process, the majority of our operating companies regularly prepare integrated resource plans that evaluate long-term requirements and develop a holistic, long-term supply-side and demand-side plan to meet those requirements. Specific resource investments, as well as demand-side management efforts, are generally subject to regulatory review and approval and involve significant stakeholder engagement and input.





**Renewable Resource Offerings** - Entergy recognizes that our customers increasingly seek more control of their energy decisions and more renewable energy solutions. Working with our regulators, Entergy is expanding and customizing our portfolio of energy solutions. For example, our utilities provide information and resources on connecting self-generation equipment and approximately 20,000 customers had this equipment (virtually all of which are rooftop solar photovoltaic systems) at the end of 2018. Both Entergy Mississippi and Entergy New Orleans made regulatory filings in 2018 to expand the range of products and services available to customers, including renewable energy options such as community solar, increased investments in demand-side management and new efforts involving distributed energy resources, including electric vehicle charging infrastructure in New Orleans and natural gas-fired back-up generators in Mississippi. Separately, both Entergy Arkansas and Entergy Louisiana have requested approval from their respective regulators for new green energy tariffs that would use utility-scale solar PV resources to provide renewable energy

opportunities to interested customers. These initiatives collectively represent the continuation of Entergy's work to provide more options to our customers to meet their individual energy needs.

In 2018, Entergy New Orleans received approval from the New Orleans City Council (its primary regulator) to invest approximately \$15 million to construct and own new large-scale, rooftop solar PV systems to be located on customer-owned property. The first solar PV system of the project was constructed at an Entergy New Orleans service center and came on line in July 2018. Other projects located at customer-owned sites are under construction and are expected to be completed during 2019. Building on these efforts, Entergy New Orleans is expanding the concept to invest in residential-scale solar PV systems that will be installed on qualifying low-income to moderate-income customers' homes. The first home installation was completed in December 2018, and the remainder are targeted for installation during 2019.







By the end of 2030, Entergy will have ceased burning coal in at least 80 percent of its owned-and-operated coal-fired capacity (four of five units).

The company also is monitoring technological developments related to carbon capture and storage on gas generation and advanced generation technology, which facilitates greater integration of carbon capture.

### Clean Generation

Entergy is investing over \$11 billion in capital over the next three years in generation assets and transmission and distribution infrastructure. Initiated in 2002, Entergy's portfolio transformation strategy incorporates cleaner, more efficient generation sources, allowing the retirement of older, less-efficient legacy units. Due to this strategy, we have replaced nearly 30 percent of our older generation with cleaner, more efficient resources, and natural gas now represents approximately 60 percent of our current utility generation capacity. Entergy also works to preserve our nuclear assets and currently has approximately 1,000 MW of renewable projects in various stages of development, which is expected to further reduce the company's already low CO<sub>2</sub> emission rate.

**Natural Gas** - Investments in efficient, dispatchable generation sources result in benefits within and beyond Entergy's utility service territory and allow further integration of additional intermittent renewable generation where the resources are available and cost-effective. Our newest and most efficient natural gas-fired units – in operation, proposed or under construction – represent nearly 4,000 MW of highly efficient generation. Replacing older generation resources with new cleaner-burning natural-gas-fired units offers several advantages. These new units will improve system reliability, reduce environmental impacts, and reduce costs for our customers. These units not only produce up to 40 percent lower emissions than older gas units, they also have lower maintenance costs and consume less water. Since 2000, while our annual utility-only generation grew by approximately 8 percent, our investments in clean energy capacity have resulted in an approximately 23 percent reduction in absolute CO<sub>2</sub> emissions and an approximately 28 percent reduction in CO<sub>2</sub> emission rate (utility-only, through the end of 2018).

Entergy is a member of the Midcontinent Independent System Operator, which is a not-for-profit member-based organization that ensures reliable, lowest-cost delivery of electricity across all or parts of 15 U.S. states and one Canadian province. In cooperation with stakeholders, MISO manages approximately 65,000 miles of high-voltage transmission and 200,000 MW of power-generating resources across its footprint. The emission reductions described above benefit the overall system by allowing more integration and use of renewable energy resources and retirement of older, less-efficient resources throughout the MISO South region.

**Nuclear** - Nuclear generation is an important source of large-scale, clean, reliable, stable, affordable and virtually emission-free baseload power. Entergy continues to invest in our utility nuclear generation assets to maximize their output and ensure safe, reliable operation. The Nuclear Regulatory Commission has renewed the operating licenses for all nuclear units in Entergy's utility fleet to beyond 2030. These facilities also contribute to the financial well-being of our communities by providing jobs and tax revenues. Investing in non-emitting nuclear resources – for example, by upgrading analog systems to modern digital control systems – preserves the long-term benefits of the plants and is an important part of our environmental commitment to deliver low-emission energy to our customers. Additionally, the company is monitoring the development of advanced nuclear. At some point beyond 2030, this technology may become a viable option for Entergy.

## CLIMATE STRATEGY

**Renewable Resources** - Entergy is investing in owned and contracted carbon-free renewable generation. Our 2018 utility energy mix included approximately 2.5 million MWh of renewable energy, consisting of hydro, solar, biomass, landfill gas, waste heat recovery and wind renewable energy credits.

In June 2018, Entergy Arkansas began receiving power from a new 81 MW solar facility in Stuttgart, Arkansas. Overall, renewable resources represent approximately 2.5 percent of our generation used to meet utility demand in 2018. While still a small portion of our utility generation, technological advances are making renewable energy, as well as certain distributed energy resources, more efficient and increasingly cost-competitive.

Currently, Entergy has over 1,000 MW of renewable resources in various stages of development or planning. The table below shows the publicly announced renewable energy projects as of the date of this report, which include the two largest solar installations planned to date in Louisiana.

Currently, Entergy has over 1,000 MW of renewable resources in various stages of development or planning.

### ANNOUNCED RENEWABLE GENERATION PROJECT DEVELOPMENT

Project Name	Capacity (MW)	Type	Location – Operating Co.	Commercial Operation Date
Toledo Bend Hydro	41	Hydro PPA Renewal	Louisiana - ELL	1969 (Existing Resource)
Stuttgart Solar	81	Solar PPA	Arkansas - EAL	2018
Rooftop Solar	5	Solar Asset	New Orleans - ENOL	2019
Chicot Solar	100	Solar PPA	Arkansas - EAL	2020
LA 3 Solar	50	Solar PPA	Louisiana - ELL	2020
South Alexander Solar	29.5	Solar PPA	Louisiana - ELL	2020
New Orleans Solar Station	20	Solar Asset	New Orleans - ENOL	2020
St. James Solar	20	Solar PPA	Louisiana - ENOL	2021
Iris Solar	50	Solar PPA	Louisiana - ENOL	2021
Sunflower County Solar	100	Solar Asset	Mississippi - EML	2021
Searcy Solar (+Storage)	100 (30 MWh)	Solar/Storage Asset	Arkansas - EAL	2021





### Disclosure and Reporting

Part of Entergy's climate strategy focuses on ensuring our stakeholders are aware of the risks, impacts and opportunities related to climate and overall sustainability issues. Entergy has reported our environmental sustainability performance and carbon risks and opportunities over the past two decades through several channels, including:

- Dow Jones Sustainability Index
- Carbon Disclosure Project
- [2018 Integrated Report](#)
- [Annual Report on Form 10-K](#) and other SEC disclosures
- [Annual Greenhouse Gas Inventory and Verification Report](#)
- [Entergy's Environment<sup>2020</sup> website](#)
- [The EEI Environmental, Social and Governance Template](#)
- [Entergy's Performance Data Table](#)
- [Entergy's Statistical Report and Investor Guide](#)

Entergy is among only four U.S. electric utility companies named to the 2018 Dow Jones Sustainability North America Index. This was the 17th consecutive year Entergy has been named to the World or North America index or both. We are the only U.S. electric utility to be included that many consecutive years. The company also reported to the Carbon Disclosure Project until 2015. Although we no longer participate in the CDP process, instead focusing our reporting on the new EEI ESG template (discussed below), we earned a disclosure score of '99' and a performance score of 'A' in 2015.

To encourage comparable industry-wide reporting of ESG goals and performance, Entergy helped lead a partnership with EEI to develop a standard reporting template for

electric utilities – view Entergy's here. This template helps EEI member companies voluntarily provide more uniform, consistent metrics for investors and other stakeholders. Entergy was well-positioned to be one of the first to adopt the new reporting mechanism in early 2018 because the company already provided an annual performance data table and is a leader in offering stakeholders an annual integrated report pairing financial results with sustainability performance.

Entergy's integrated report contains information on the risks and opportunities related to climate change, including transforming the company's generation portfolio and the evolution toward an integrated energy network. Entergy's Annual Report on Form 10-K discloses material risks to the company. The risk factors section lists physical and economic risks to our customers and assets from climate change, including sea level rise, water-related stresses and coastal erosion.

Each year, Entergy develops a comprehensive greenhouse gas inventory, has this inventory verified by a third party, and then publishes the full, verified inventory, inventory management plan and reporting document, and the third-party verification report. These reports are published on the environmental performance page of Entergy's website and on the [American Carbon Registry's website](#).

These combined strategic efforts, under the direction of our board and executive management, link a past of significant climate policy leadership to a future where Entergy is prepared for the transition to a lower carbon economy.



## CLIMATE RISK MANAGEMENT

### Our Risk Management Process

As discussed previously, managing climate risks has been a part of Entergy operations for almost two decades, and we endeavor to capture and mitigate each of these risks through our holistic risk management process. Our enterprise risk management process provides a disciplined approach to identifying, monitoring and mitigating the major risks to which our business is subject and the aggregation of these risks across the enterprise. The result of this risk management process is reported to company leadership on a quarterly basis.

Functional areas of the company have implemented risk management processes to manage the risks within each of their respective areas. Entergy is updating our comprehensive enterprise risk framework to standardize further the identification and assessment of risks and the aggregation of those risks across the enterprise for further visibility and insight. The new process will build on the existing and evolving functional area risk assessments.

For discrete transactions, including capital and other investments that meet a certain cost threshold, the regulated and unregulated corporate risk committees provide a comprehensive risk assessment on the associated investment proposals. The committees ensure that proposals are valued properly and all risks are identified prior to final approval. For example, as Entergy designs and builds new generation, the site selection process involves reviewing the site for access, transmission interconnection, fuel supply and risks from extreme weather events and other climate-related risks, including flood potential. Specifically, facilities are designed to withstand natural phenomena. During the design process, consideration is given to extreme historical events for the area and a sufficient margin is used to account for uncertainty, while still considering the location of the resources in relation to the electrical load to be served. An example is a review against floodplain and site-specific data. Additional considerations go into the analysis of nuclear facility siting, as required by the NRC.







## CLIMATE RISK MANAGEMENT

Under the direction of the sustainability and environmental policy group, Entergy systematically leverages sustainability and environmental policy specialists, broader teams from throughout the company and outside experts and industry groups to monitor and assess legislative, regulatory and policy risks related to climate issues. Our environmental lead team, made up of a group of environmental professionals from across Entergy's operating companies and power generation, nuclear and transmission and distribution business units, along with other internal peer groups established specifically for air, water, waste and biodiversity issues, support these analyses. For broader sustainability planning, the SEP group sponsors a newly-formed sustainability working group, a committee of individuals with diverse expertise from throughout the company who advise on the development and implementation of Entergy's comprehensive sustainability strategy.

As strategic issues are identified, Entergy coordinates with internal and external resources to develop a consistent internal Entergy position across business units, fuel sources, regulatory regimes, and operating companies. The company engages in

advocacy within national and state trade associations so that Entergy's voice is heard by state and federal policymakers and agencies through these groups. When appropriate, Entergy advocates directly with these agencies.

### Identifying Risks and Opportunities

The TCFD categorizes climate risks broadly as either transition risks or physical risks. Transition risks include legislative or regulatory mandates requiring or incentivizing a transition to a reduced carbon economy or changes in the business environment through technology innovation or market disruption. Physical risks include acute physical risks, such as extreme weather events, or chronic physical risks, such as sustained higher temperatures and sea level rise.

The table on the next page identifies key examples of the physical and transition risks and opportunities presented by climate change and the transformation of the power sector. Entergy actively manages these risks and, as discussed previously in the Climate Strategy section of this report, is working to capture many of these opportunities.





	Category	Risks	Opportunities
PHYSICAL	Sea Level Rise	Inundation of coastal assets and communities; changes in population distribution; disproportionate impacts on vulnerable communities	Adaptation and resiliency investment opportunities; investment in communities/preservation of cultural assets; advocacy for protection of vulnerable communities and low-income customers
	Coastal Erosion	Loss of storm surge protection; increased damage to coastal assets, communities and cultural assets	Investment in natural resources such as wetlands restoration; helping private landowners monetize the benefits of wetlands restoration and preservation
	Extreme Weather Events	Increased damage to assets and communities	Investment in grid modernization and hardening; partnering with industry to assist with restorations
	Increased Surface Temperature	Availability of cooling water; heat stress to field employees	Load growth due to increased demand for cooling and refrigeration
TRANSITION	Climate Policy	Increased costs associated with compliance; stranded assets caused by national or state carbon mitigation policy	Engagement with policy makers to advocate for an economy-wide carbon mitigation policy consistent with Entergy's principles; continued investment in portfolio transformation; partnerships with other sectors to reduce societal emissions
	Economic	Changes in supply and demand for generation; inability to meet demand	Electrification of other sectors affected by an economy-wide carbon policy; additional load requirements from electrification of the transportation, commercial and industrial sectors
	Technology	Failure to keep up with technology advancements; disintermediation by third parties; grid management challenges in the integration of new resources	Investment in new and emerging technologies to meet customer needs and deliver lower carbon energy; investments that strengthen system reliability and resiliency





## CLIMATE RISK MANAGEMENT

### Physical Risks

Some of the territories and communities in which Entergy operates face significant physical risks as the result of increases in global average temperature. While various impacts are predicted throughout the company's service territory, they are especially pronounced in coastal Louisiana and Texas. These risks generally include sea level rise and coastal erosion/land loss and the risk of increased damage from tropical weather systems to territory along the Gulf Coast. For example, increasing global temperatures may affect the severity and behavior of tropical weather systems, such as rapid acceleration of intensity and the stalling of storms at coast lines, which results in days of torrential rains.

The physical threats from tropical weather systems for Entergy's coastal service territory could be exacerbated significantly by ongoing coastal erosion/land loss and sea level rise. Coastal marshes act as barriers from the full force of tropical weather systems for communities in Texas and Louisiana. Some estimates indicate that storm surges can be reduced by up to one foot for every mile of existing wetlands.<sup>10</sup> The loss of these wetlands means coastal communities are

closer geographically to the coast. As a result, these areas are exposed to greater risks from increasingly severe effects of tropical weather systems. This increases the areas' physical risks from storm surge, flooding and tropical force winds.

Inland areas are not immune to the impacts of climate change. Increasingly severe tropical systems carry flood and tornado risk well into the interior of Entergy's utility service area. Additionally, increases in air surface temperatures can result in more severe summer thunderstorms. Extreme heat in the summer and milder winters are predicted to change the environmental conditions in all of Entergy's service area, potentially resulting in changes to agricultural production and vegetation distribution.

Evolving adaptation and resiliency methods, plans and strategies to help manage these risks may increase capital, operating or maintenance costs. Entergy also could experience financial and operational impacts resulting from extreme weather events, changing weather patterns or extreme heat. For example, to the extent that weather patterns impact

### WATER CONSERVATION EFFORTS

Reduced water availability and changes to precipitation patterns also are concerns associated with climate change; however, Entergy operates only one facility currently in a water-stressed area, the Lewis Creek Power Plant in Willis, Texas. We work closely with local regulators to optimize water use and will continue to utilize at least 30 percent less water than originally permitted. To detect any future water availability concerns for all of its facilities, Entergy's water peer group periodically monitors water stress using various tools such as the United States Drought Monitor and the World Resources Institute Aqueduct tool. Additionally, the company's portfolio transformation strategy results in lower water usage, as newer gas-fired power plants use less water than legacy units and, in some cases, use air cooling to reduce water requirements and sensitivity to water availability fluctuations.



## CLIMATE RISK MANAGEMENT

### Transition Risks

**Climate Policy Risk** - Implementation of federal, state or local climate change mitigation policies could pose a risk to the company, depending on the design. Existing policies include:

- a. **International Policy** - The Paris Climate Agreement provides a framework for the international community to reduce greenhouse gas emissions globally. The agreement set a goal of limiting global warming to “well below two degrees Celsius above pre-industrial levels.”<sup>11</sup> The agreement applies to nations, not companies. Nations are asked to determine their contributions to global emission reductions. In June 2017, President Trump announced his intention to withdraw the United States from the agreement in 2020.
- b. **National Policy** - The United States Environmental Protection Agency has proposed to repeal the Clean Power Plan and replace it with the Affordable Clean Energy rule. It is uncertain at this time the magnitude of emission reductions the ACE rule will require; however, it is evident that the level is less than the Clean Power Plan simply based on the scope of the rule. Both the Clean Power Plan and the Affordable Clean Energy rules form the basis of sensitivities included in Entergy’s carbon pricing POV. The creation of a carbon emission tax by Congress is another policy option that is being explored.
- c. **Regional/State/Local Policy** - There currently is no carbon emission regulation in Entergy’s four-state utility service territory; however, Texas has adopted a renewable portfolio standard and the City of New Orleans has published a climate action plan.

rainfall, water distribution and temperatures, the efficiency of generation assets that require cool water to operate could be affected and this may result in capacity limitations. Increased air temperatures also can affect the efficiency of generating units. Extreme heat can impact transmission lines, potentially requiring additional capital expenditures, or cause heat stress to field employees. Additionally, our transmission lines can become increasingly difficult to access as the environment around them changes, often requiring specialized equipment capable of operating in marshy terrains to perform construction and maintenance. However, use of this equipment also can reduce wetlands impacts and the need for purchasing wetlands mitigation credits. For information on our adaptation and resiliency investments, including grid modernization and hardening, our coastal restoration efforts and our partnerships to aid in storm restoration, see the Climate Strategy section of this report.

Other impacts of these risks include (1) population shifts due to changing environmental conditions, such as sea level rise and coastal erosion/land loss, (2) potential loss of cultural and social assets along the coastal areas of Louisiana and Texas, and (3) potentially disproportionate impacts on Entergy’s low-income customer base due to increased adaptation and resiliency costs or costs of evacuation or permanent relocation. Entergy actively engages in discussions on various adaptation and resilience investments and initiatives.





## CLIMATE RISK MANAGEMENT

The stringency and design of future climate change mitigation policy is uncertain. Climate change mitigation policy, whether in the form of legislation or regulation, may result in financial impacts such as increased fuel costs, additional capital expenditures, early retirement of generation assets and potentially stranded assets. The financial impact would be dependent on the ultimate form of carbon policy.

Entergy evaluates mitigation policy proposals against our guiding principles discussed further in the Climate Strategy section of this report. Entergy also engages with policy makers, research groups and advocacy groups to encourage an economy-wide carbon mitigation policy consistent with our guiding principles. Entergy manages policy risks by (1) modeling a range of carbon price forecasts, as further discussed in the Scenarios and Analytics section of this report, (2) maintaining a focus on our portfolio transformation strategy, as discussed further in the Climate Strategy section of this report, and (3) seeking to partner with other sectors to electrify their loads to reduce societal emissions, as discussed further in the Climate Strategy section of this report.

**Economic Risk** - Financial and operational risks to Entergy could include changes in the supply or demand for electric utility services. For example, climate change concerns have played a key role in driving interest in customer-owned distributed renewable generation resources. The integration of decentralized grid assets and operation of these assets represent a change in the industry paradigm that could lead to a reduction in demand to the extent these assets are not utility-owned.

Alternatively, Entergy could experience load growth due to continued economic development activity, electrification of customer loads or increased surface temperatures, which could result in a needed supply increase. An inability to meet demand could negatively impact the company, local or regional economies or economic development. Entergy partners with existing or potential customers in different ways to help grow the local and regional economies, while simultaneously reducing societal greenhouse gas emissions through electrification initiatives, energy efficiency offerings and distributed generation resource development, each as further described in the Climate Strategy section of this report.

## CLIMATE RESEARCH LEADERSHIP

Entergy supports climate policy research as a founding member of the Center for Climate and Energy Solutions Business Environmental Leadership Council. C2ES is ranked in the top five environmental policy think tanks globally. The Center's mission is to advance strong policy and actions to reduce greenhouse gas emissions, promote clean energy and strengthen resilience to climate impacts. A key objective is the development of a national market-based program to reduce emissions cost effectively. C2ES produces research regarding issues such as decarbonization pathways to 2050, electrification of other sectors, and corporate carbon pricing. C2ES also features prominently in international climate negotiations, convening working and framework development sessions to lay the groundwork for and work toward agreements. Currently, Entergy's vice president of sustainability and environmental policy serves on the board of directors of C2ES.



**Technology Risk** - As technologies continue to develop and mature, Entergy—like all regulated utilities—will be challenged to integrate technological improvements effectively and at a pace that does not expose it to competition from alternatives that may not be subject to the same regulatory requirements. At the same time, Entergy will have opportunities to invest in and integrate more distributed generation, renewable generation, energy storage assets and other advanced technologies. As noted previously in the report, deployment of renewables is occurring already across Entergy’s utility service area, and other technology investments are under evaluation. These and other technology advancements and investments will be necessary to limit future warming to two degrees Celsius.

Customers not only expect reliability at reasonable rates, but also are increasingly looking for integration of new technologies that are environmentally friendly and easy to use. A transition from provider to partner is key to meeting these evolving customer expectations. Partnering with our customers in new ways includes working with them to improve reliability, save money, integrate new technology, reduce their environmental footprint and enable easy-to-use management systems. These represent new opportunities to provide customer innovations and solutions. For additional information on some of our new products and services, see Partnering with Customers and Other Sectors in this report.

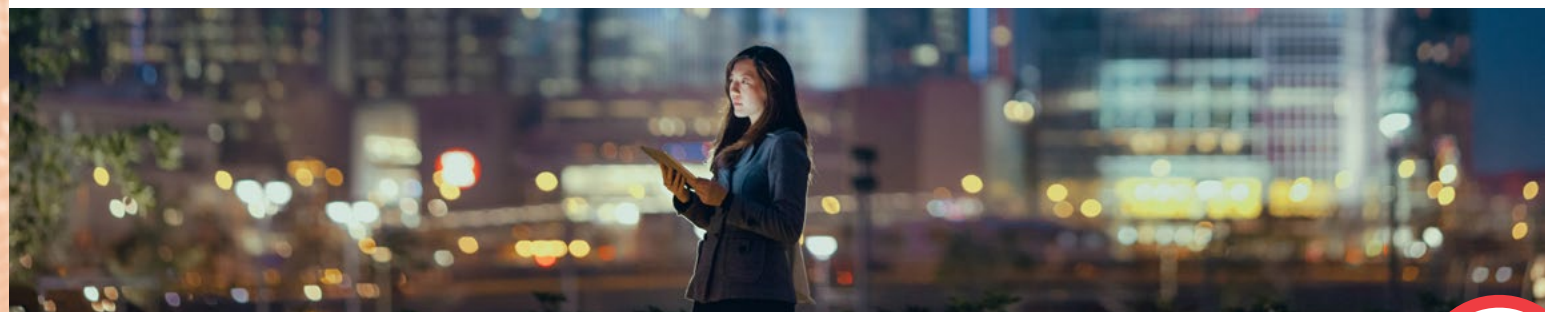
## CLIMATE RISK MANAGEMENT

### Risk Mitigation and Opportunity Capture

Entergy’s climate strategy focuses on minimizing risks while seeking to capture opportunities to invest and innovate. Entergy mitigates the risks described above through the planning and analysis processes, scenario planning and our advocacy for market-based solutions to both physical and transition risks, each as further described in this report.

Entergy already uses a carbon price POV to guide our long-term business planning, as described further in the CO<sub>2</sub> POV Reference scenario. See the Climate Strategy section of this report for the range of activities that comprise the company’s efforts to mitigate climate risk and capture opportunities. While these activities are expected to continue, Entergy anticipates enhancing our efforts based on the scenario analysis conducted and documented in the following sections of this report.

Entergy will have opportunities to invest in and integrate more distributed generation, renewable generation, energy storage assets and other advanced technologies.





Entergy collects, analyzes and publishes environmental, social and governance metrics as part of our climate and sustainability governance process, climate strategy development and climate risk management – see the Introduction section of this report for links to various disclosures and reports. As recommended by TCFD, we are including scenario analysis as a part of our metrics analysis and business planning. This climate scenario analysis is included below. Entergy also has developed a new climate performance goal for 2030.

### Climate Scenario Analysis

**Key Considerations and Uncertainties** - Entergy employs an active and robust scenario planning process to understand better a wide range of future risks and uncertainties, including the climate-related risks described above. We use this process to test our business plans and inform future decision making and priorities. This type of analysis should not be read as an attempt by Entergy to predict the future, but rather as an opportunity to understand better a range of uncertainties facing the organization. Our climate analysis also has given us a better appreciation of the broader challenge (beyond just the electric sector) facing our region of the country in meeting the goals of the Paris Climate Agreement. This information will help Entergy continue to partner with our stakeholders in addressing those challenges.

There are several key considerations involved in preparing a climate scenario analysis. These include:

- The global emissions pathway used as the basis of the analysis;
- The application of this information to a region, state or individual company;
- The future legal and regulatory environment, including environmental laws and regulations and utility regulatory policies;
- Assumptions about technology costs, the rates of technology innovation and future commodity prices; and
- Assumptions about economic development and electric load growth (e.g., from the increased electrification of transportation and other industry sectors).

Each of these key considerations and uncertainties is discussed briefly below.

### Emissions Pathways

Researchers have published a number of studies in recent years that model long-term decarbonization pathways for the U.S. or globally. Entergy has chosen to rely on forecasts developed by the International Energy Agency to help guide our scenarios that explore a two degree pathway, specifically the Sustainable Development Scenario published as part of the World Energy Outlook. The SDS is intended to achieve the objectives of the Paris Agreement on climate change, while also meeting goals for air quality and universal access to energy.





## METRICS AND TARGETS

### Translation of Global Models into Company-Specific Goals

While Entergy believes that the IEA scenarios are helpful in this process, they are not the only credible scenarios published. Recent work by the Electric Power Research Institute has noted that over 400 scenarios for limiting warming to two degrees Celsius have been produced in recent years. This research indicates that a broad range of emissions pathways could be consistent with meeting a two degree temperature increase limitation.<sup>12</sup> The variety of two degree scenarios identified by EPRI demonstrates some of the uncertainties in the climate system, economic development, energy use, technology, policy timing and economic system dynamics.

As the EPRI research indicates, there are challenges in translating global emissions pathways to the actions of a nation, region or sector and even more to the actions of an individual utility company. EPRI notes: "At the highest level, there is uncertainty in the relationship between a global temperature goal and global greenhouse gas emissions. From there, the uncertainty only increases as we move from global to country to local emissions with additional factors entering the story at each level."<sup>13</sup> For example, a company may increase its generation and emissions, but displace higher-emitting generating units within a power market. As a result, assuming emissions reduction targets across all sectors or even for all electric utilities, for example, may not

be appropriate in all cases. For the purposes of this analysis, we focused on the carbon rate of the electric sector in the IEA projections, but also took into consideration the role of electric generation within Entergy's utility service area.

Context is important. As Entergy continues to transform its fleet with cleaner, more efficient units, these units may be dispatched by the system operator more because of their lower operating costs. This will potentially lower regional greenhouse gas emissions, but potentially increase Entergy's absolute emissions. Further, Entergy is seeking to participate in large-scale beneficial electrification efforts that will have a net positive effect on reducing societal greenhouse gas emissions. An example could be the electrification of a major shipping port that would reduce direct emissions at the port. In this case, Entergy's generation to meet the greater electrical load would increase, but overall net emissions would be expected to decrease. Entergy's ongoing investments in newer combined cycle gas turbines to serve additional grid load or to replace older, less efficient, higher emitting plants will help reduce regional emissions; however, if these newer, more efficient units are dispatched more frequently than older, less-efficient generating units in the MISO footprint, Entergy's absolute emissions could increase.





### Legal and Regulatory Environment

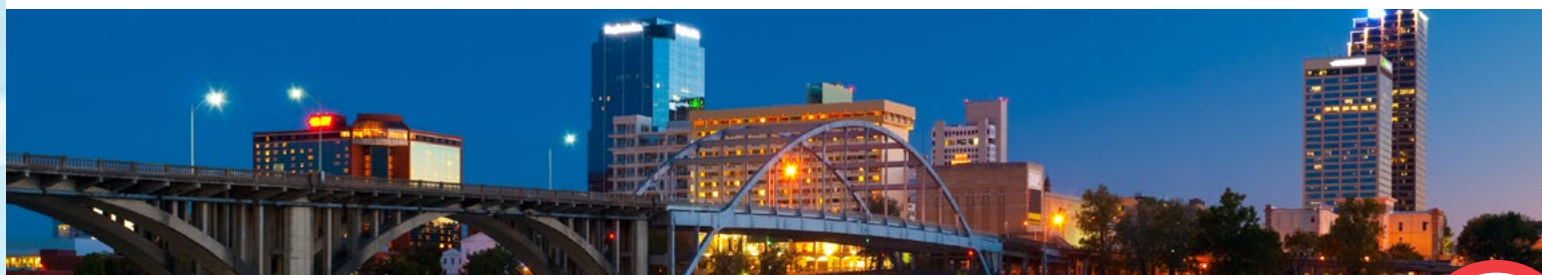
The programs and policies that are used to achieve a carbon abatement pathway will have important implications for Entergy and our future business plans. For example, regulators may choose to rely either on pricing mechanisms, incentives or mandates. These choices will have an important influence on Entergy's business decisions. These past several years have illustrated the dynamic nature of the policy environment in which we operate, from the debate over the Waxman-Markey bill in 2009<sup>14</sup> to the recent efforts of U.S. leaders to withdraw from the Paris Agreement. Given the increasing dialogue concerning a direct pricing approach, Entergy provides a carbon tax analysis to supplement our climate scenario analysis.<sup>15</sup>

### Technological Innovation and Technology Costs

Technology innovation holds tremendous potential for addressing climate change and carbon emissions. Entergy monitors and assesses technology trends in our planning processes. Our goal is to create a portfolio of resources that will meet our customers' needs at the lowest reasonable cost, while maintaining reliability and mitigating potential risks. In pursuit of this objective, Entergy has been piloting solar energy and battery storage projects within our service territory, such as the installation of solar PV projects in Mississippi and New Orleans. The New Orleans project also includes advanced lithium ion battery storage.

Technology advances are difficult to predict. The speed with which new technologies develop and become more cost-effective will inform Entergy's evolving business plans. These changes are taken into consideration in the planning process for each of the Entergy operating companies, including the applicable Integrated Resource Planning processes in Arkansas, Mississippi, New Orleans and Louisiana, which generally occur on a two-year to four-year cycle.<sup>16</sup>

Some of the technologies viewed as necessary to reduce greenhouse gas emissions consistent with a two degree scenario do not exist today.<sup>17</sup> Others currently are not commercially viable and would require significant resource investments to adopt at a scale that is cost-competitive with conventional generation resources. Adoption of technologies such as solar PV, battery storage and wind generation is likely to continue as these resources become increasingly cost-competitive. Advanced nuclear, biomass, renewable gas and carbon capture utilization and storage will require significant additional investment in research and development, infrastructure and scaling. Whether these advancements will occur at the level and speed necessary for integration into the power sector's transition prior to 2030, or even 2050, remains uncertain.



## Economic Development and Load Growth

The electricity sector, including within Entergy's service area, is in a period of historic transformation. Some areas and sectors of the economy are experiencing significant load growth, while others are flat or declining due to market forces or efficiency improvements. At the same time, low natural gas prices, rapid technology development and decreasing renewable resource costs are leading to changes in the way the industry generates power. These factors have led to a steady decline in national and regional emissions from the electricity sector over the last decade. According to EEI, U.S. utility electric generation CO<sub>2</sub> emissions through 2017 have declined 28 percent since 2005.<sup>18</sup> Despite the recent downward trend in emissions in the electricity sector, the future trajectory of emissions in the sector will depend on many factors and how those factors evolve. Some of these factors are:

- Impacts to electricity demand, such as from electrification and energy efficiency;
- Natural gas and other fuel prices;
- The future of coal use and regulation;
- New nuclear development and the preservation of existing nuclear units;
- Technological advances and regulatory requirements regarding carbon capture;
- Renewables cost and development; and
- Technological advances across the power, industrial and transportation sectors.

## Scenario Planning and Analysis

### Overall Approach, Boundaries, and Assumptions

For the purposes of this report, Entergy prepared a detailed analysis of several potential carbon abatement scenarios. The scenarios are driven by selected emission rate or tonnage reduction goals and vary primarily in terms of the carbon policy implemented and goals ascribed. The quantitative analytics include projections of consolidated generation (in MW hours), CO<sub>2</sub> emissions (in tons), emission rate (in pounds per MWh) and the generation mix in 2030. Beyond 2030, the analysis is more qualitative to address the significant number of policy, technology, load growth and other uncertainties.

The analysis below includes only Entergy's utility ownership share of generation – it does not include purchased power, which for 2018 comprised approximately 25 percent of the company's fuel mix used to serve retail customers, nor does it include generation from wholesale assets owned by non-regulated Entergy affiliates.<sup>19</sup> Additionally, the focus of the analysis is on CO<sub>2</sub> from power generation only; other greenhouse gases and company direct sources are not included.<sup>20</sup> Entergy uses a 2000 baseline for this purpose. As described earlier in this report, Entergy adopted a voluntary commitment in 2001 based on a 2000 baseline.

The results of this scenario analysis do not represent near-term planning assumptions for the company. Our near-term business plan is guided by the decisions of the state regulatory authorities where we operate and is informed by integrated resource planning processes overseen by those regulators. We have a long-standing legal obligation to serve all customers in our service area with reliable power at the lowest reasonable cost. Some of the non-emitting



Maintaining low rates is particularly important in the states served by Entergy utilities, where many customers live in poverty. An estimated 25 percent of our customers live at or below the poverty level. Favorable retail power prices also attract new economic development to our service areas.





## METRICS AND TARGETS



Entergy's 2030 Climate Goal - Entergy evaluated several cases in the process of conducting this scenario analysis. To be considered viable, a case was required to meet both projected energy and capacity requirements. We then chose one such case as a potential pathway for meeting our 2030 goal. In this case, we adjusted Entergy's supply plan to meet the 50 percent emission rate reduction goal.

technologies employed in other areas of the country, such as onshore wind, are not expected to be available in our service area or may not be cost effective, but Entergy does expect technological advancements to improve our ability to deploy additional non-emitting resource technologies over time.

The results of the scenarios and analytics described below are presented in the Results and Discussion section of this report.

### Scenarios and Analytics

The discussion below summarizes the various scenarios analyzed and the assumptions made related to carbon policy (and carbon reductions).

**Entergy CO<sub>2</sub> POV Reference Scenario** - Entergy conducts periodic business planning exercises that extend out 20 years. This includes development of load forecasts and supply plans. Plans include capacity mix and demand-side resources. These forecasts then are used, along with the AURORA<sub>xmp</sub> Electric Market Model, to develop a dispatch plan for the entire MISO footprint.<sup>21</sup> The MISO modeling is broken down into two regions, MISO South and MISO North, due to transmission constraints between these two regions. The model forecasts Entergy's electricity generation and CO<sub>2</sub> emissions (short tons) over the 20-year planning horizon that are required to meet expected customer load and energy requirements. As part of this process, Entergy models a range of carbon price forecasts, what we call the CO<sub>2</sub> POV. The Entergy CO<sub>2</sub> POV reference scenario includes the assumptions regarding the costs of a national policy to reduce carbon emissions.

**Two Degree Scenarios** - Entergy presents information regarding the IEA Sustainable Development Scenario in two formats: first as applied in a global emission rate, and second as applied through a 50 percent reduction in absolute emissions. The 50 percent reduction case, in turn, results in an emission rate similar to the rate used by the IEA SDS as applicable specifically to the United States. According to IEA: "The SDS is fully aligned with the Paris Agreement's goal of 'holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C.'"<sup>22</sup>

Entergy recognizes that applying a global or national average rate to a single company is not the intention of the Paris Climate Agreement. These reduction targets are intended to be applied to national economies, and more economic options may exist within a nation than within a single electric generating company or geographic region. However, the scenario provides relevant information for how the Paris Agreement could impact Entergy and stresses the need to apply policy targets to the entire economy as opposed to a single company.

This scenario does not specify the carbon policy resulting in this emissions reduction level. To evaluate the IEA SDS global perspective, we used the required global emission rate as the driving factor and adjusted our supply plan to meet that goal. To evaluate a required 50 percent reduction in absolute emissions, we iteratively adjusted Entergy's supply plan from the reference scenario until a 2030 absolute emissions (tonnage) reduction of 50 percent from 2000 levels was achieved (24.6 million short tons). This scenario also approximates the emission rate applied by the IEA SDS to the United States.

Entergy's CO<sub>2</sub> POV is based on a range of potential policies and timing dependent on federal and major state policy actions, as well as potential longer-term trends and policies to limit CO<sub>2</sub> emissions. The impact of these policies on the power sector is modeled using ICF's Integrated Planning Model platform, including the development of a CO<sub>2</sub> allowance price (\$ per ton). The POV includes a probability-weighted curve based on the likely implementation of high-, medium- and low-impact carbon policies on a national level. Currently, the high case is similar to emissions reductions and the process included in the federal cap-and-trade program under the Waxman-Markey bill that passed the U.S. House of Representatives in 2009. The mid case is based on the United States Environmental Protection Agency's 2015 Clean Power Plan, and the low case is based on a program similar to the current Affordable Clean Energy Rule proposal that would require emission control standards and potential capital expenditures, but that would not place an actual price on carbon emissions. Under a cap-and-trade or a carbon tax/fee policy approach, the allowance price reflects the marginal cost of compliance. Such a policy could be implemented by paying a tax or purchasing a credit or by switching to less carbon-intensive fuels, shifting dispatch toward more efficient resources, or building less carbon-intensive generation sources such as renewables or new/expanded nuclear generation. The individual case model outputs are then probability weighted, according to ICF's professional judgement, based on the likelihood of the various outcomes. The carbon price forecast is used in the Entergy business planning exercise and is reflected in the reference scenario.





## METRICS AND TARGETS

**Carbon Tax Analysis** - Significant discussion has taken place in recent months in an effort to gain bi-partisan support in Congress for the creation of a direct federal price on carbon. In this document, we provide an analysis of how a carbon tax may impact Entergy. We provide this analysis because, pragmatically, we see the creation of a direct carbon price through a tax as the most likely policy option to be adopted on the federal level. Also, the analysis provides a simple but somewhat counterintuitive view of how a carbon price could impact Entergy. As one of the cleaner fleets in the nation, a carbon price may drive Entergy's dispatch up, increasing our emissions as a company, while leading to decreased emissions in the MISO region.

In this analysis, Entergy examines a carbon tax at three levels (\$ per ton of expected emissions) beginning in 2022 and escalating at different rates over the next several decades. The prices examined for this tax range from approximately \$12 to \$56 per ton through 2030 and are based on various carbon fee and tax proposals. From an economic perspective, a carbon tax raises fossil-based fuel costs, which can change dispatch and investment decisions to meet customer load and energy requirements. However, in this analysis we did not attempt to predict changes made by other generators. This analysis assumes that no changes are made to Entergy's supply plan and that no other changes occur within the MISO market. Entergy examines how this policy mechanism potentially would impact our current supply plan as well as the cost of service to customers.

### Results and Discussion

The scenarios analyzed in this report serve as a stress test to Entergy's business plans in a more carbon-constrained economy over the next three decades. The tables for each scenario provide a summary of the outcomes of the analysis, followed by a discussion of the results. An overall summary of the outcome information is provided in Table 5 below, including percentages of generation by fuel type for the various scenarios.

It is important to emphasize that Entergy's five operating companies operate in a highly regulated environment. Actions that are taken regarding long-term supply-side and demand-side resources are subject to review, and in many instances approval, by state regulatory authorities to confirm prudence and consistency with the objective of providing reliable service at the lowest reasonable cost. Further, there are numerous stakeholders actively engaged in those regulatory review processes, which include certifications for new generating resources and development of periodic integrated resource plans or project-specific approval processes that help guide long-term decision-making. State utility regulators and Entergy's other stakeholders will play a necessary and critical role in determining Entergy's compliance actions and associated costs. Their role ensures that infrastructure and other investments, such as purchasing environmental allowances, are prudent and that rates charged to customers are just and reasonable. At the same time, Entergy's five operating companies must ensure that they can recover prudent investments and environmental compliance costs in a fair and timely manner.

*Table 5 on the next page summarizes the results of the scenarios and analysis conducted. More detailed discussion of these results is included in the sections that follow.*



EMISSION AND RATE SCENARIO ANALYSIS RESULTS SUMMARY<sup>1</sup>

T5

Metric	Historical Data		Projections for 2030				
	Base Year 2000	2018	Entergy CO <sub>2</sub> POV Reference Scenario	Entergy Climate Goal: 50% Emission Rate Reduction by 2030	Two Degree Scenario <sup>2</sup>		Carbon Tax Analysis <sup>7</sup>
					Global Emission Rate Scenario <sup>3</sup>	50% Absolute Emissions Reduction <sup>4,5,6</sup>	
<b>CO<sub>2</sub> Emissions</b> (million short tons)	49.1	38.0	40.0	35.6	36.8	24.6	47.6
Compared to Base Year	N/A	-23%	-19%	-28%	-25%	-50%	-3%
<b>CO<sub>2</sub> Emission Rate</b> (lbs. per MWh)	1064	763	598	532	551	384	631
Compared to Base Year	N/A	-28%	-44%	-50%	-48%	-64%	-41%
<b>Generation Mix</b>	~92 TWh	~100 TWh	~134 TWh	~134 TWh	~134 TWh	~128 TWh	~151 TWh
	<ul style="list-style-type: none"> <li>Natural Gas . . . . 42.0%</li> <li>Nuclear . . . . . 39.0%</li> <li>Renewable . . . . &lt;0.1%</li> <li>Coal . . . . . 15.0%</li> <li>Oil . . . . . 4.0%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 51.4%</li> <li>Nuclear . . . . . 36.5%</li> <li>Renewable . . . . . 0.2%</li> <li>Coal . . . . . 11.9%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 60.3%</li> <li>Nuclear . . . . . 31.7%</li> <li>Renewable . . . . . 3.7%</li> <li>Coal . . . . . 4.2%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 60.3%</li> <li>Nuclear . . . . . 31.6%</li> <li>Renewable . . . . . 6.8%</li> <li>Coal . . . . . 1.2%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 63.3%</li> <li>Nuclear . . . . . 31.7%</li> <li>Renewable . . . . . 3.8%</li> <li>Coal . . . . . 1.2%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 45.3%</li> <li>Nuclear . . . . . 33.1%</li> <li>Renewable . . . . . 21.6%</li> </ul>	<ul style="list-style-type: none"> <li>Natural Gas . . . . 67.2%</li> <li>Nuclear . . . . . 28.1%</li> <li>Renewable . . . . . 3.3%</li> <li>Coal . . . . . 1.4%</li> </ul>
Compared to Base Year	N/A	8%	45%	45%	45%	39%	64%

<sup>1</sup> All values in this chart are for the regulated utility only and estimated using many assumptions regarding fuel prices, technology costs, carbon policy, and numerous other financial, environmental, and social factors. Values also are rounded, which may slightly impact calculations.

<sup>2</sup> These scenarios and the associated emission rate for the power sector are similar to the International Energy Agency SDS results released on November 13, 2018. By "similar to", we mean that the emission rates calculated as necessary by the IEA to limit warming to two degrees or less are similar to the rates that Entergy projected for 2030.

<sup>3</sup> Similar to IEA SDS 2018 Global Average Emission Rate and the U.S. INDC.

<sup>4</sup> This scenario also requires over 5 GW of new owned battery storage to accommodate non-dispatchable solar capacity additions.

<sup>5</sup> This is a theoretical view only. Please see report at page 37 for a discussion of additional scenario limitations.

<sup>6</sup> Similar to IEA SDS 2018 – U.S. Emission Rate.

<sup>7</sup> The high case, represented here, starts in 2022 at \$48 per ton and escalates two percent annually to \$56 per ton in 2030. The prices examined for this tax range from approximately \$12 to \$56 per ton through 2030 and are based on various carbon fee and tax proposals at the federal level. A case with a higher escalation rate also was analyzed resulting in a 2030 tax rate of \$65 per ton; however, the results were similar to the high case shown.



## Entergy CO<sub>2</sub> POV Reference Scenario

Entergy's reference projection uses a probability-weighted reference carbon price but no other carbon constraint. Based on the reference carbon price forecast, the model predicts an approximate 19 percent reduction in absolute CO<sub>2</sub> emissions and an approximate 44 percent reduction in CO<sub>2</sub> emission rate from the 2000 baseline year. The projected

2030 generation mix under this scenario is shown in the table below. Additionally, this table includes historical data from our base year 2000 and 2018. In 2030, we forecast a significant increase in total demand, and we expect to meet a higher proportion of our customer needs using utility-owned generation resources.

HISTORICAL EMISSIONS AND ENTERGY'S CO<sub>2</sub> POV REFERENCE SCENARIO<sup>1</sup>

T6

Metric	Historical Data		Entergy's CO <sub>2</sub> POV Reference Scenario Projection for 2030
	Base Year 2000	2018	
<b>CO<sub>2</sub> Emissions</b> (million short tons)	49.1	38.0	40.0
Compared to Base Year	N/A	-23%	-19%
<b>CO<sub>2</sub> Emission Rate</b> (lbs. per MWh)	1064	763	598
Compared to Base Year	N/A	-28%	-44%
<b>Generation Mix</b>	~92 TWh 	~100 TWh 	~134 TWh 
Compared to Base Year	N/A	8%	45%

<sup>1</sup> All values in this chart are for the regulated utility only and are estimated using many assumptions regarding fuel prices, technology costs, carbon policy, and numerous other financial, environmental, and social factors. Values also are rounded, which may slightly impact calculations.



## Two Degree Scenario

In order to test our portfolio against a two degree scenario, Entergy imposed a carbon rate limit on its generating fleet, consistent with IEA SDS. Entergy also modeled a scenario requiring a 50 percent reduction in CO<sub>2</sub> emissions by 2030.

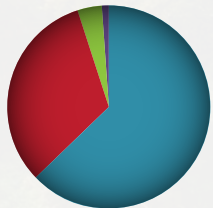
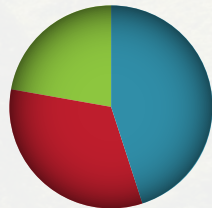
Using a global average emissions rate from the IEA SDS, Entergy's supply plan was adjusted to meet the carbon constraints shown in the table. This plan adjustment removes either a portion or the entire capacity of certain existing resources and planned resources not yet under construction. This capacity is then replaced by non-emitting solar.

Entergy also developed a theoretical scenario based on a requirement to reduce net CO<sub>2</sub> emissions by 50 percent from our ownership share of utility generation. Needed capacity provided by fossil-fueled resources in the reference case is replaced by non-emitting solar and supplemented by a significant amount of storage. Subject to current technological and financial limitations, storage allows the company to shift a portion of that solar energy to overnight hours as needed for reliability requirements, including energy and capacity requirements. For reasons stated below, Entergy does not view this scenario as realistic by 2030 for our utility service area, and the data is provided for information only. The results are shown in the table below for these two scenarios.

### TWO DEGREE SCENARIO EMISSION AND RATE ANALYSIS RESULTS<sup>1</sup>

T7

- 1 All values in this chart are for the regulated utility only and are estimated using many assumptions regarding fuel prices, technology costs, carbon policy, and numerous other financial, environmental, and social factors. Values are also rounded, which may slightly impact calculations.
- 2 These scenarios and the associated emission rate for the power sector are similar to the International Energy Agency SDS Scenario results released on November 13, 2018. By "similar to," we mean that the emission rates calculated as necessary by the IEA to limit warming to two degrees or less are similar to the rate that Entergy projected for 2030.
- 3 Similar to IEA SDS 2018 Global Average Emission Rate and the U.S. INDC.
- 4 This scenario also requires over 5 GW of new owned battery storage to accommodate non-dispatchable solar capacity additions.
- 5 This is a theoretical view only. Please see report at page 37 for a discussion of additional scenario limitations.
- 6 Similar to IEA SDS 2018 – U.S. Emission Rate

TWO DEGREE SCENARIO EMISSION AND RATE ANALYSIS RESULTS¹																
Metric	Two Degree Scenario²															
	Global Emission Rate Scenario³	50% Absolute Emissions Reduction⁴,⁵,⁶														
<b>CO₂ Emissions</b> (million short tons)	36.8	24.6														
Compared to Base Year	-25%	-50%														
<b>CO₂ Emission Rate</b> (lbs. per MWh)	551	384														
Compared to Base Year	-48%	-64%														
<b>Projected 2030 Generation Mix</b>	<p>~134 TWh</p>  <table><tr><td>Natural Gas</td><td>63.3%</td></tr><tr><td>Nuclear</td><td>31.7%</td></tr><tr><td>Renewable</td><td>3.8%</td></tr><tr><td>Coal</td><td>1.2%</td></tr></table>	Natural Gas	63.3%	Nuclear	31.7%	Renewable	3.8%	Coal	1.2%	<p>~128 TWh</p>  <table><tr><td>Natural Gas</td><td>45.3%</td></tr><tr><td>Nuclear</td><td>33.1%</td></tr><tr><td>Renewable</td><td>21.6%</td></tr></table>	Natural Gas	45.3%	Nuclear	33.1%	Renewable	21.6%
	Natural Gas	63.3%														
Nuclear	31.7%															
Renewable	3.8%															
Coal	1.2%															
Natural Gas	45.3%															
Nuclear	33.1%															
Renewable	21.6%															
Compared to Base Year	45%	39%														





## METRICS AND TARGETS

The results of the Global Emission Rate Scenario are similar to the analysis of Entergy's 2030 Climate Goal discussed below. Total emissions and emissions rate are similar in both cases; however, the projected fuel mix in 2030 is different in the two cases. The 2030 Climate Goal results in more solar resources and fewer fossil-fueled resources.

The 50 percent reduction scenario presents a very significant acceleration of changes underway within the power sector. To meet the emissions reduction targets, the amount of zero carbon generation in Entergy's generation mix would increase from approximately 37 percent (2018 levels) to nearly 55 percent by 2030 while also meeting rising demand. In the absence of a viable wind resource, this change would require a large amount of new solar capacity by 2030. The large amounts of solar and battery storage used in this analysis (the addition of 9.8 GW of solar capacity and 5.3 GW of battery storage) assume that every MW of solar receives a 50 percent capacity credit within MISO. Based on renewable integration impact assessments, this will not be the case once the installed capacity of solar generating units reaches these penetration levels. The actual credit received is expected to be lower than 50 percent.

While the supply plan is possible theoretically, this level of change would be very challenging to implement within 10 years, and Entergy does not believe that it is realistic given current and expected market, technology and regulatory conditions. The cost of this supply plan would be extremely high and potentially unaffordable in a region where an estimated 25 percent of utility customers live at or below the poverty level. Entergy would not expect the plan to gain regulatory approval. To make such a supply plan work would require the replacement of significant levels of existing highly efficient and cost-effective natural

gas units, necessitating enormous capital investment and significantly increased operating costs. Technical source integration issues also would need to be addressed along with the significant amount of land area required. However, it is important to note that if this scenario were implemented by legislative or regulatory requirement, and if it were approved by our state utility regulators, Entergy's utility generation is modeled to increase by 36 TWh, or roughly 39 percent, from a 2000 baseline — demonstrating the resilience of Entergy's business in a carbon-constrained economy.

While Entergy understands the importance of striving to reduce emissions by 2030 and beyond, we cannot advise this 50 percent mass emissions reduction goal as a realistic goal for the company or as one that should be required by legislation or regulation. A one-size-fits-all solution like this is not in the best interest of our stakeholders. Instead, Entergy has adopted a realistic and meaningful emission rate goal, explained below, which will allow the company to be a partner in the economy-wide reductions in emissions required to manage climate change risk. This goal also provides for societal emissions reductions resulting from the use of Entergy's generation to electrify other sectors, such as transportation and industrial, and the increase in Entergy's generation that is expected to move from energy purchases (where the scope 1 emissions are accounted for by a different generator) to self-generation (where the scope 1 emissions are accounted for by Entergy).

## Carbon Tax Analysis

Imposing the carbon tax in this analysis results in CO<sub>2</sub> emissions from Entergy's utility operating companies increasing the first year (2022) and then remaining relatively flat through 2030, while CO<sub>2</sub> emissions from MISO South decrease by an estimated 6 percent to 10 percent, depending on the amount of the carbon tax. Beyond 2030, Entergy predicts that a carbon tax would cause our emissions to increase as Entergy's cleaner generating resources are dispatched more frequently.

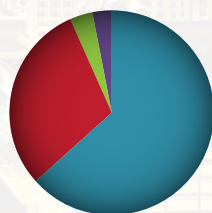
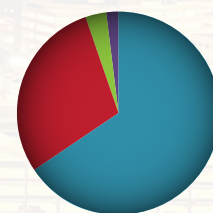
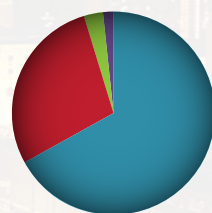
As the carbon price increases, the total MISO South CO<sub>2</sub> emissions decrease. If a specific carbon tax proposal emerges at the federal or state level, Entergy will perform a more

detailed scenario analysis as needed. The projected 2030 absolute emissions, emission rate and approximate generation mix for this scenario are shown in the table below.

For Entergy, a carbon tax likely would manifest itself in increased fuel costs, which would increase our cost of service. Fuel costs are passed through to customers, so Entergy must evaluate any carbon tax proposal in terms of impacts to customers. Assuming an annual customer usage of 12,000 kWh, the carbon tax levels modeled here result in a 20-year average increase of approximately \$60 to \$300 per year for an individual customer, depending on the amount of the carbon tax and its escalation rate.

## CARBON TAX ANALYSIS RESULTS<sup>1</sup>

T8

Metric	Carbon Tax Analysis <sup>2</sup>																									
	Low	Medium	High																							
<b>CO<sub>2</sub> Emissions</b> (million short tons)	42.3	44.9	47.6																							
Compared to Base Year	-14%	-9%	-3%																							
<b>CO<sub>2</sub> Emission Rate</b> (lbs. per MWh)	601	614	631																							
Compared to Base Year	-43%	-42%	-41%																							
<b>Projected 2030 Generation Mix</b>	~141 TWh	~146 TWh	~151 TWh																							
	 <table><tr><td>Natural Gas</td><td>63.5%</td></tr><tr><td>Nuclear</td><td>30.1%</td></tr><tr><td>Renewable</td><td>3.5%</td></tr><tr><td>Coal</td><td>2.9%</td></tr></table>	Natural Gas	63.5%	Nuclear	30.1%	Renewable	3.5%	Coal	2.9%	 <table><tr><td>Natural Gas</td><td>65.8%</td></tr><tr><td>Nuclear</td><td>29.0%</td></tr><tr><td>Renewable</td><td>3.4%</td></tr><tr><td>Coal</td><td>1.8%</td></tr></table>	Natural Gas	65.8%	Nuclear	29.0%	Renewable	3.4%	Coal	1.8%	 <table><tr><td>Natural Gas</td><td>67.2%</td></tr><tr><td>Nuclear</td><td>28.1%</td></tr><tr><td>Renewable</td><td>3.3%</td></tr><tr><td>Coal</td><td>1.4%</td></tr></table>	Natural Gas	67.2%	Nuclear	28.1%	Renewable	3.3%	Coal
Natural Gas	63.5%																									
Nuclear	30.1%																									
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Nuclear	29.0%																									
Renewable	3.4%																									
Coal	1.8%																									
Natural Gas	67.2%																									
Nuclear	28.1%																									
Renewable	3.3%																									
Coal	1.4%																									
Compared to Base Year	53%	59%	64%																							

- 1 All values in this chart are for the regulated utility only and are estimated using many assumptions regarding fuel prices, technology costs, carbon policy, and numerous other financial, environmental, and social factors. Values also are rounded, which may slightly impact calculations.
- 2 The prices examined for this tax range from approximately \$12 to \$56 per ton through 2030 and are based on various carbon fee and tax proposals at the federal level. A case with a higher escalation rate also was analyzed resulting in a 2030 tax rate of \$65 per ton; however, the results were similar to the high case shown.



## Entergy's 2030 Climate Goal

Entergy set our first carbon emission stabilization commitment in 2001. Since that time, the considerations that drove us to make such a commitment have only become more urgent. Informed by evolving customer preferences, increased dialogue with our investors and other stakeholders, and the results of this analysis, Entergy has established a new 2030 CO<sub>2</sub> emissions and climate goal. The analyses discussed throughout this section of the report were used to inform Entergy's new 2030 CO<sub>2</sub> emissions and climate goal. Entergy plans to reduce our CO<sub>2</sub> emission rate by 50 percent from our 2000 baseline by 2030.

While not choosing a specific future supply plan at this time, Entergy has developed a preliminary option concerning how the new climate goal can be achieved while meeting all energy and capacity requirements. This view is not a recommended supply plan; rather, this is an example of how we could reach the goal if it is found to be cost-effective. Specific supply plans will be developed in coordination with our regulators and other stakeholders.

### ENTERGY'S 2030 CLIMATE GOAL ANALYSIS RESULTS<sup>1</sup>

T9

Metric	Entergy's Climate Goal: 50% Emission Rate Reduction by 2030										
	Solar Replaces Most Coal Case										
<b>CO<sub>2</sub> Emissions</b> (million short tons)	35.6										
Compared to Base Year	-28%										
<b>CO<sub>2</sub> Emission Rate</b> (lbs. per MWh)	532										
Compared to Base Year	-50%										
<b>Projected 2030 Generation Mix</b>	<p>~134 TWh</p> <table border="1"> <thead> <tr> <th>Source</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Natural Gas</td> <td>60.3%</td> </tr> <tr> <td>Nuclear</td> <td>31.6%</td> </tr> <tr> <td>Renewable</td> <td>6.8%</td> </tr> <tr> <td>Coal</td> <td>1.2%</td> </tr> </tbody> </table>	Source	Percentage	Natural Gas	60.3%	Nuclear	31.6%	Renewable	6.8%	Coal	1.2%
Source	Percentage										
Natural Gas	60.3%										
Nuclear	31.6%										
Renewable	6.8%										
Coal	1.2%										
Compared to Base Year	45%										

<sup>1</sup> All values in this chart are for the regulated utility only and are estimated using many assumptions regarding fuel prices, technology costs, carbon policy, and numerous other financial, environmental, and social factors. Values also are rounded, which may slightly impact calculations.





## METRICS AND TARGETS

In this illustrative case, Entergy would accelerate the replacement of most of our coal-fired generation with solar. This case also results in a 28 percent reduction in absolute emissions from the 2000 baseline (a reduction similar to the U.S. INDC under the Paris Climate Agreement), while utility generation is projected to increase 45 percent over the same period. Continued reductions in our emission rate also are expected to occur through ongoing portfolio transformation, investments in existing nuclear, renewable integration and the development and integration of new grid and generation technologies. Actions taken to achieve this goal will be developed through continual review of economic feasibility, technology development and cost, reliability and the position of our state and federal regulators, as appropriate.

We believe Entergy is well-positioned with our new emission rate goal to manage climate change risk by continuing our leadership role in reducing emissions from our power generation portfolio and partnering with customers and other sectors to reduce economy-wide emissions through innovative energy solutions. This goal also considers societal emissions reductions resulting from the use of Entergy's generation to electrify other sectors, such as transportation and industry, and the increase in Entergy's generation that is expected to move from energy purchases (where the scope 1 emissions are accounted for by a different generator) to self-generation (where the scope 1 emissions are accounted for by Entergy).





Entergy believes that through our pursuit of this new climate goal, we will create sustainable value for all four of our key stakeholder groups.

Provide education resources and information: identify and provide climate and adaptation volunteer opportunities

EMPLOYEES



Continue support for resilience and adaptation projects; reduce regional emissions by enabling the electrification of other sectors such as transportation

COMMUNITIES



CUSTOMERS



Partner with customers to reduce their direct emissions (scope 1 emissions) and used-energy emission rates (scope 2 emissions)

OWNERS



Continue shareholder engagement and robust disclosure; capture opportunities to make productive and prudent, customer-focused investments in assets

Additional strategic actions we plan to pursue, in partnership with these stakeholders, are discussed on the following pages.





**Customers** - Entergy will continue working to form partnerships with our customers to meet their energy and reliability needs and help them thrive in a carbon-constrained economy. The reduction of energy cost and on-site emissions (customer scope 1) through electrification of their energy needs will help meet this goal. As Entergy continues our generation portfolio transformation, the grid power we provide will also reduce our customers' environmental footprints associated with electricity use (customer scope 2).

**Employees** - Entergy recently established an officer-level position and organization focused on sustainability and an internal working group focused on improving the company's performance in the areas of environmental, social and governance issues. The mission of this organization is to create sustainable value for our customers, employees, communities and owners we serve using sustainable business practices that integrate environmental, social and economic objectives and concerns. This organization will utilize the expertise of employees, educate employees on climate issues in our region and enlist the diverse employee base to help us improve performance, raise awareness and identify and lead community volunteer opportunities.

**Communities** - Entergy recently elevated the management level of our corporate social responsibility leader to vice president. This change allows the company more effectively to pursue our industry and regional leadership roles in adaptation and community resiliency. This is accomplished by engaging regional leaders through supporting partnerships with community improvement organizations. Additionally, the company will engage with other sectors of the economy to reduce regional emissions through electrification and continued portfolio transformation.

**Owners** - Entergy will continue to engage with our shareholders on climate issues, leveraging their knowledge and insights to ensure that our efforts are understood and supported. We will work to provide our shareholders with the data, information and disclosures they need to evaluate our climate risks, relevant strategies and progress against our climate objectives. Our owners will also benefit as we make productive, prudent and customer-focused investments in assets that are consistent with our climate strategy.







## Generation Mix

Entergy's generation mix will continue to evolve in the coming decade and beyond 2030. In fact, the power sector as a whole is continuing its portfolio transformation by retiring coal and older, less efficient gas plants and by preserving nuclear assets, integrating more renewables and continuing to build highly efficient natural gas-fueled generation. For Entergy, this evolution and its pace are largely dependent on advancements and development of various generation and storage technologies. A brief description of each of these technologies and the various considerations are presented below:

**Nuclear** - All of Entergy's utility nuclear plants have obtained a license renewal to operate beyond their original licensed period. Entergy's business case for and ability to obtain a second license renewal for those plants will impact the company's energy mix from 2030 to 2050. Additionally, Entergy is monitoring developments regarding advanced nuclear generation technologies. If certain technical challenges are overcome, small modular reactors, next generation reactors and other advanced nuclear technologies may have applications in Entergy's future generation mix beyond 2030.

**Natural Gas and Advanced Generation** - Entergy is constructing several gas-fired generation facilities over the next five years. This technology continues to develop, and efficiency improves with each new generation. Future improvement is expected to continue because of ongoing technology development and evolution.

Additionally, some modeling studies and emissions pathways include the need for carbon capture on natural gas facilities. Entergy is monitoring the application of this technology, along with other advanced generation technology.

**Renewable Generation** - Currently, with the lack of a significant wind resource in our service area, solar is the renewable energy resource of choice. Entergy is both constructing and contracting for a significant amount of solar generation over the next decade, and this is expected to continue beyond 2030. Entergy also will continue to monitor wind technology development that allows for generation project development, either offshore or onshore at lower wind resource speeds and higher altitudes, while addressing the risk of severe weather. Other renewable energy sources such as biomass, hydro, and landfill gas also will continue to be evaluated through the operating company resource IRP and/or other project-specific approval processes.

**Energy Storage** - Several energy storage projects are under development at Entergy, and as this technology continues to evolve and develop, Entergy expects energy storage to be further integrated into our system. Energy storage technology has applications for generation, transmission and distribution assets and systems. Entergy will continue to monitor storage technology development as well as expected cost reductions.

## Electrification and Technology Acceleration

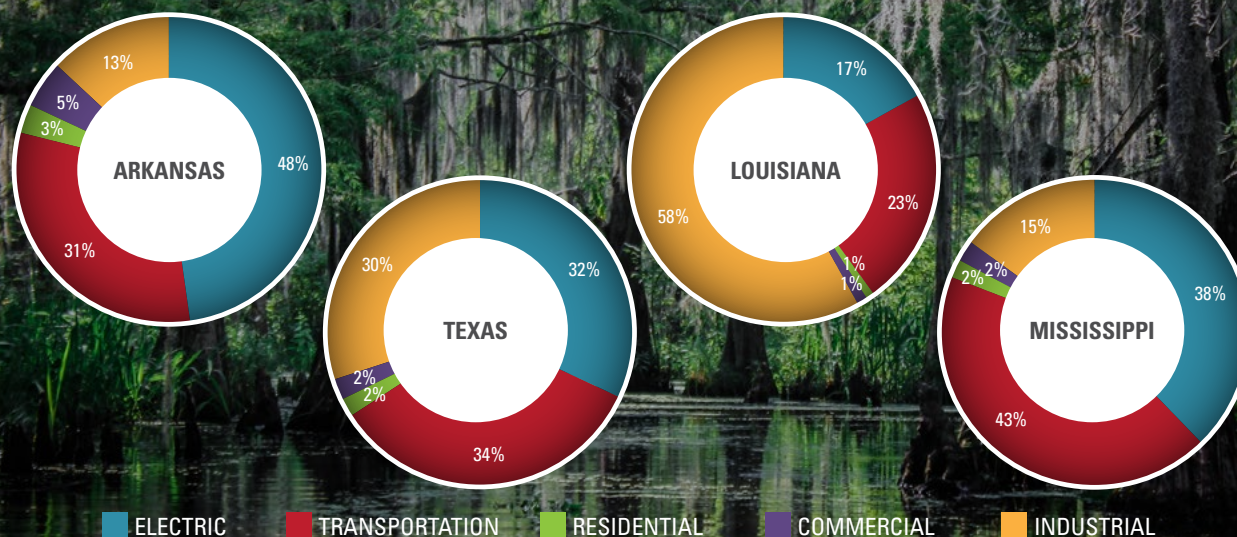
Entergy envisions a future where the company not only accelerates our own portfolio transformation, but also partners with customers and other sectors of the economy to help them use energy more efficiently and electrify their operations. For the commercial, industrial and transportation sectors, a high level of efficiency improvement, emissions reduction technology employment and electrification would be associated with the economy-wide emissions reductions anticipated by the IEA SDS Scenario.<sup>23</sup> The relatively high proportion of regional emissions represented by the industrial and transportation sectors in Entergy's service territories, as shown in the figure

below, represents a significant opportunity for Entergy as those sectors are electrified to achieve emissions reductions.

Entergy envisions working across the regional economy not only to reduce emissions but also to enhance carbon sequestration and sink opportunities, which are described in the Paris Climate Agreement as an important aspect of climate risk mitigation. Economic development and load growth would likely be high in this future, along with higher fuel prices and rapid technology development, resulting in lower technology costs and increased use of distributed energy resources.

CO<sub>2</sub> EMISSIONS BY SECTOR IN ENTERGY STATES: 2016<sup>24</sup>

F12







Entergy and its board of directors have recognized climate change as a key priority and a matter of corporate planning for nearly two decades. In 2001, Entergy was the first U.S. utility to cap its CO<sub>2</sub> emissions voluntarily with a goal extending to 2020. With this report, Entergy is announcing a new goal beyond 2020 to continue our portfolio transformation to achieve a 50 percent reduction in emission rate (pounds of CO<sub>2</sub> per MWh) from our 2000 rate by 2030. This goal reflects our intention to make an already clean fleet cleaner.

The scenario analyses conducted for the preparation of this report informed the development of our new goal. Entergy has adopted a realistic and meaningful emission rate reduction goal that enables us to partner with other sectors to reduce economy-wide emissions.

Entergy will continue to assess new international, national, state and local legislative and regulatory developments that could limit or place a price on CO<sub>2</sub> and other greenhouse gas emissions.


Entergy intends to address the risks and opportunities posed by climate change through its robust governance structures and risk management processes. Entergy will continue to execute on its climate strategy of meeting our 2020 and 2030

climate goals through portfolio transformation; by proactively engaging in adaptation and resiliency efforts such as coastal restoration; by investing in grid modernization, emergency and incident response planning, and community engagement; by partnering with our customers to support decarbonization, such as through electrification, energy efficiency initiatives and the support of distributed energy generation; by investing in clean generation; and by providing robust disclosure and reporting. Entergy also will continue to engage in and monitor various technology developments discussed in this report.

These scenarios and analyses illustrate that while a more carbon-constrained economy poses certain challenges, it also provides many opportunities for Entergy to play a meaningful role in decarbonization. The relatively high proportion of regional emissions represented by the industrial and transportation sectors in Entergy's service territories represents a unique and significant opportunity for Entergy to partner with those sectors to help them use energy more efficiently and to electrify their operations. As we continue our generation portfolio transformation strategy to reduce an already low emission rate, Entergy can help lead the region in reducing economy-wide emissions in a meaningful and practical way.



## CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS



In this report, and from time to time, Entergy Corporation makes certain “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements include, among other things, Entergy’s current and long-term financial and operational outlook, greenhouse gas reduction goals and strategies, expected future cost and benefit analyses, future energy demand, future electricity prices, the availability and cost of natural gas, the market for electric vehicles, the pace of electrification, the growth of solar and other renewable forms of electricity generation and storage, future carbon taxes or regulations, the level of energy efficiency investments, the impacts of demand-side management, Entergy’s corporate strategy and other statements of Entergy’s plans, beliefs or expectations included in this news release. 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. Readers are cautioned not to place undue reliance on these forward-looking statements, which apply only as of the date of this news release. Except to the extent required by the federal securities laws, Entergy undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

Forward-looking statements are subject to a number of risks, uncertainties and other factors that could cause actual results to differ materially from those expressed or implied in such forward-looking statements, including (a) those factors discussed elsewhere in this news release and in Entergy’s

most recent Annual Report on Form 10-K, any subsequent Quarterly Reports on Form 10-Q and Entergy’s other reports and filings made under the Securities Exchange Act of 1934; (b) uncertainties associated with (1) rate proceedings, formula rate plans and other cost recovery mechanisms, including the risk that costs may not be recoverable to the extent anticipated by the utilities and (2) implementation of the ratemaking effects of changes in law; (c) uncertainties associated with efforts to remediate the effects of major storms and recover related restoration costs; (d) risks associated with operating nuclear facilities, including plant relicensing, operating and regulatory costs and risks, including any changes resulting from the nuclear crisis in Japan following its catastrophic earthquake and tsunami; (e) changes in decommissioning trust fund values or earnings or in the timing or cost of decommissioning Entergy’s nuclear plant sites; (f) legislative and regulatory actions and risks and uncertainties associated with claims or litigation by or against Entergy and its subsidiaries; (g) risks and uncertainties associated with strategic transactions that Entergy or its subsidiaries may undertake, including the risk that any such transaction may not be completed as and when expected and the risk that the anticipated benefits of the transaction may not be realized; (h) effects of changes in federal, state or local laws and regulations and other governmental actions or policies, including changes in monetary, fiscal, tax, environmental or energy policies; (i) the effects of technological changes and changes in commodity markets, capital markets or economic conditions; and (j) impacts from a terrorist attack, cybersecurity threats, data security breaches or other attempts to disrupt Entergy’s business or operations, and other catastrophic events.



- 1 Recommendations of the Task Force on Climate-related Financial Disclosures – June 2017 (<https://www.fsb-tcfd.org/publications/final-recommendations-report/>).
- 2 Ibid.
- 3 UN Sustainable Development Goals (<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>).
- 4 Entergy: Focus on the Environment. A report on Entergy Corporation’s environmental policy and performance. April 2000. See also Entergy’s 2001 SEC Form 10-K, pg. 60, filed March 2002 ([http://www.entergy.com/content/investor-relations/pdfs/2018\\_Form\\_10K.pdf](http://www.entergy.com/content/investor-relations/pdfs/2018_Form_10K.pdf)).
- 5 2007 Entergy Sustainability Report: Unlocking Value, pgs. 14-15 ([http://entergy.com/content/our\\_community/pdfs/Sustainability\\_Report\\_07.pdf](http://entergy.com/content/our_community/pdfs/Sustainability_Report_07.pdf)); 2011 Entergy Sustainability Report: Acting With Integrity, pg. 6 ([http://entergy.com/content/sustainability/2011\\_sustainability\\_report.pdf](http://entergy.com/content/sustainability/2011_sustainability_report.pdf)).
- 6 National Wind Resource Assessment. National Renewable Energy Laboratory (<https://www.nrel.gov/gis/wind.html>).
- 7 Building a Resilient Gulf Coast: Executive Report – 2010 ([http://www.entergy.com/content/our\\_community/environment/GulfCoastAdaptation/report.pdf](http://www.entergy.com/content/our_community/environment/GulfCoastAdaptation/report.pdf)).
- 8 J. Fox, Editor, Sustainable Electricity. May 2016. Springer Press.
- 9 Adapted from Recommendations of the Task Force on Climate-related Disclosures, pp. 10-11 (<https://www.fsb-tcfd.org/publications/final-recommendations-report/>).
- 10 National Ocean and Atmospheric Administration; Understand - Conserving Coastal Wetlands for Sea Level Rise Adaptation. See: <https://coast.noaa.gov/applyit/wetlands/understand.html>.
- 11 Entergy recognizes that much of the discussion surrounding global climate change focuses on the goal of pursuing a future where warming remains at less than two degrees Celsius. For example, IEA describes its Sustainable Development Scenario as “fully aligned with the Paris Agreement’s goal of ‘holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C.’” <https://www.iea.org/weo/weomodel/sds/>. In this document, Entergy uses the term “two degrees” or “two degree scenario” to represent the range of temperature increase limitations included in the scenarios discussed.
- 12 Rose, SK, M Scott, 2018. Grounding Decisions: A Scientific Foundation for Companies Considering Global Climate Scenarios and Greenhouse Gas Goals. EPRI, Palo Alto, CA. 3002014510.
- 13 Ibid; page ix.
- 14 Waxman-Markey Short Summary. Center for Climate and Energy Solutions: 2009 (<https://www.c2es.org/document/waxman-markey-short-summary/>).
- 15 Summary of carbon tax bills introduced during the 115th Congress - <https://www.c2es.org/site/assets/uploads/2018/10/comparison-of-carbon-pricing-proposals-in-the-115th-congress.pdf>.
- 16 Although Texas does not sponsor a formal integrated resource planning process, Entergy Texas is required to obtain a Certificate of Convenience and Necessity from the Public Utility Commission of Texas to construct or buy generation assets. As in other states, that process includes an examination of the technology to be acquired, as well as its impact on rates.
- 17 For example, in announcing its December 2018 aspirational zero emission goal for 2050, Xcel Energy stated: “However, achieving the long-term vision of zero-carbon electricity requires technologies that are not cost effective or commercially available today. That is why Xcel Energy is committed to ongoing work to develop advanced technologies while putting the necessary policies in place to achieve this transition.” [https://www.xcelenergy.com/company/media-room/news\\_releases/xcel\\_energy\\_aims\\_for\\_zero-carbon\\_electricity\\_by\\_2050](https://www.xcelenergy.com/company/media-room/news_releases/xcel_energy_aims_for_zero-carbon_electricity_by_2050).
- 18 EEI Website - <http://www.eei.org/resourcesandmedia/industrydataanalysis/industrydata/Pages/default.aspx>.
- 19 The majority of Entergy’s non-regulated wholesale assets, nuclear units in Massachusetts, Michigan, and New York, will be sold to non-Entergy affiliates or closed by early in the next decade. To a large extent, these assets also were not part of the Entergy fleet in 2000. Therefore, the comparison of 2000 generation and emissions to that expected in 2030 is a utility-to-utility comparison.
- 20 Entergy annually prepares a comprehensive greenhouse gas emissions inventory (scopes 1, 2 and 3) that is verified by a third party. The inventory and verification report are then posted on Entergy’s website and also on the American Carbon Registry website.
- 21 Information on the AURORAxmp electric market model available at: <http://epis.com/aurora/>.
- 22 International Energy Agency Sustainable Development Scenario information website: <https://www.iea.org/weo/weomodel/sds/>.
- 23 However, the IEA SDS scenario provides only national level results and therefore may not illuminate how Entergy’s region may respond to a carbon constraint.
- 24 M.J. Bradley and Associates based on U.S. Energy Information Administration data.

## ABBREVIATIONS

°C . . . . .	degrees Celsius	INDC . . . . .	intended nationally determined contribution
2DS . . . . .	two degree scenario	IPCC . . . . .	Intergovernmental Panel on Climate Change
AC . . . . .	air conditioning	IPM . . . . .	ICF's Integrated Planning Model
ACE . . . . .	Affordable Clean Energy rule	IRP . . . . .	integrated resource plan
ACR . . . . .	American Carbon Registry	KWh . . . . .	kilowatt hour
C2ES . . . . .	Center for Climate and Energy Solutions	Lbs. . . . .	pounds
CCGT . . . . .	combined cycle gas turbine	LLC . . . . .	limited liability corporation
CCN . . . . .	certificate of convenience and necessity	MISO . . . . .	Midcontinent Independent System Operator
CCS . . . . .	carbon capture and sequestration	MJB&A . . . . .	M.J. Bradley & Associates, LLC
CDP . . . . .	carbon disclosure project	M-TEC . . . . .	Midcontinent Transportation Electrification Collaborative
CO <sub>2</sub> . . . . .	carbon dioxide	MW . . . . .	megawatt
CO <sub>2</sub> e . . . . .	carbon dioxide equivalent	MWh . . . . .	megawatt hour
CPP . . . . .	Clean Power Plan rule	NRC . . . . .	Nuclear Regulatory Commission
CT . . . . .	combustion turbine	NYSE . . . . .	New York Stock Exchange
DJSI . . . . .	Dow Jones Sustainability Index	PDT . . . . .	Entergy's performance data table
EE . . . . .	energy efficiency	POV . . . . .	point of view
EIA . . . . .	US Energy Information Administration	PPA . . . . .	power purchase agreement
EIF . . . . .	Entergy's environmental initiatives fund	PV . . . . .	photovoltaic
EEL . . . . .	Edison Electric Institute	SDG . . . . .	United Nations sustainable development goals
EPA . . . . .	US Environmental Protection Agency	SDS . . . . .	IEA sustainable development scenario
EPRI . . . . .	Electric Power Research Institute	SEC . . . . .	U.S. Securities and Exchange Commission
ESG . . . . .	environmental, social and governance	SEP . . . . .	Sustainability & Environmental Policy
ETR . . . . .	Entergy NYSE stock symbol	STEP . . . . .	MJB&A's State Emission Pathways Tool
EV . . . . .	electric vehicle	TCFD . . . . .	Task Force on Climate-related Financial Disclosures
DER . . . . .	distributed energy resources	TWh . . . . .	terawatt hour
GHG . . . . .	greenhouse gas	UN . . . . .	United Nations
GW . . . . .	gigawatts	US . . . . .	United States
ICF . . . . .	ICF International, Inc.	WEO . . . . .	World Energy Outlook
IEA . . . . .	International Energy Agency		







ENTERGY'S 2050

**NET  $\emptyset$  ZERO** 

COMMITMENT



*Entergy*<sup>®</sup>





# ENTERGY'S 2050 NET $\emptyset$ ZERO COMMITMENT

This report provides an update on Entergy's continued portfolio transformation and outlines our commitment to achieve net-zero carbon emissions by 2050 while balancing affordability and reliability for our customers. This report serves as an addendum to our 2019 report, [Climate Scenario Analysis and Evaluation of Risks and Opportunities](#). Establishing a net-zero by 2050 climate commitment continues Entergy's two decades of leadership and action on climate change described in detail in the 2019 climate report. We believe that an effective climate strategy should include a near-term goal and a long-term commitment, along with near-term actions supportive of these commitments.

In this addendum, we describe our commitment to achieving enterprise-wide net-zero carbon emissions by 2050, tangible near-term actions the company is taking toward meeting this commitment and our holistic vision of a net-zero future for the communities we serve. We also provide our view on technology developments and breakthroughs that may pave our path to net-zero emissions as described in an illustrative scenario of Entergy's evolving energy resource mix. Lastly, this addendum provides an overview of our three-phased approach to decarbonization over the five-decade span of 2000 to 2050 in the context of climate scenarios that limit warming to 1.5° to 2° Celsius.

## Entergy's Commitment to Net-Zero Emissions by 2050

Entergy is committed to achieving net-zero emissions by 2050 while balancing affordability and reliability for our customers. We believe that the optimal net-zero strategy requires reduction of our own emissions as much as possible, followed by capturing or offsetting remaining emissions through various innovative strategies. Our decarbonization journey to net-zero ensures that our customers can reduce their environmental footprints by relying on our low-carbon generation fleet. Entergy views climate issues not only as a challenge to be addressed by the company and the communities and region that we serve, but also as an opportunity to invest in new technologies and customer solutions.

We take a holistic view of emission reductions. Given our unique role in the economy and our relationships with the customers and communities we serve, Entergy's commitment to net-zero is a critical part of ushering in a decarbonized economy, particularly in our region. As such, our near-term actions and long-term sustainability plans address the emissions profile of our generation portfolio while also considering partnerships with our customers and suppliers.

COMMITTED  
TO NET-ZERO  
EMISSIONS  
BY 2050

DECARBONIZE  
SUPPORT  
INFRASTRUCTURE  
AND SUPPLY  
CHAIN

CUSTOMER  
PARTNERSHIPS  
AND PRODUCTS

#### Conventional Pollutant Reduction Goals

Entergy also anticipates significant reductions in conventional pollutants such as oxides of nitrogen (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>) and mercury (Hg). We project that NO<sub>x</sub> and SO<sub>2</sub> both will be 90% below 2000 levels by 2030 and Hg emission will be near zero. As we move through our regular planning cycles, these projected reductions will be updated.

NET-ZERO 

## 2050 Climate Commitment – Engaging Entergy's Full Value Chain

Holistic View of Decarbonization | All Emission Scopes | All Gases

#### Current Portfolio Transformation Technology:

- Retire coal-powered capacity
- Modernize gas assets
- Utility-scale renewables
- Energy storage (short-to-medium duration)
- Invest in and extend life of nuclear units
- Gas supply pipe upgrade and replacement
- Renewable energy credits and carbon offsets

#### Engage Customers & Other Sectors of the Economy:

- Energy efficiency
- Peak load reduction
- Demand-side management
- Customer solutions
- Distributed energy sources
- Beneficial electrification
- Gulf Coast Carbon Collaborative

#### Technology Developments and Future Options:

- New/advanced nuclear
- Carbon capture, utilization and sequestration
- Green/pink/blue hydrogen usage
- Renewable natural gas/alternative fuels
- Advanced renewables
- Energy storage (long duration)
- Advanced generation technology
- Incremental natural sequestration

#### Engage Suppliers:

- Natural Gas Supply Collaborative – carbon impact of gas suppliers
- Electric Utility Industry Sustainable Supply Chain Alliance – carbon impact of non-fuel suppliers
- Renewable and H<sub>2</sub> collaborations
- Renewable natural gas
- Direct engagement with suppliers

*Committed to Net-Zero Emissions by 2050* – Entergy will continue to transform its generation portfolio to cleaner, low- and zero-carbon resources. This transformation will result in a lower emission rate as conceived by our 2030 climate analysis and goal. It also will result in reducing absolute emissions as additional low- and zero-carbon generation technologies are integrated into our system over the next three decades. In the illustrative scenario presented in this

addendum, this transformation reduces Entergy's carbon emission rate by 90% from our base year, 2000.

Regarding Entergy's gas business, local distribution company operations represented only 0.2% of our direct emissions (fugitive losses – scope 1) and 2.4% of our indirect emissions (customer combustion – scope 3) in 2019. These categories are part of our net-zero commitment, and we will work to





minimize these emissions through efforts to decarbonize the gas fuel supply, replace older supply piping and partner with customers on energy efficiency and beneficial electrification. Additionally, we will continue to engage our gas suppliers to reduce upstream emissions. All of these actions will minimize the full lifecycle emissions associated with these operations.

As we work to reduce emissions through technology solutions, Entergy also will continue its efforts to enhance natural, carbon-absorbing systems. As described in our 2019 climate report, the Paris Climate Agreement identifies the need to seek balance between sources of carbon and natural systems that absorb carbon. Over the last two decades, Entergy has gained valuable experience and supported innovations in the areas of reforestation/afforestation, wetland restoration and agricultural carbon offsets through our [Environmental Initiatives Fund](#). We anticipate continuing and accelerating these actions that enhance natural systems to offset remaining carbon emissions and to improve the quality of life for customers and communities throughout our service area. Additionally, Entergy will account for the environmental attributes associated with renewable generation and natural gas owned and retired on behalf of the utility operating companies.

**Customer Partnerships and Products** – Entergy has identified an opportunity to engage with customers through various innovative offerings and partnerships that help reduce emissions for both our company and our customers. Entergy is working to expand energy efficiency and demand-side management offerings that reduce customer demand – while balancing the need to electrify carbon-intense energy needs in other sectors. [Entergy's eTech program](#) offers incentives to customers who are interested in electrification and is more fully described in the climate report.

In 2019, we shared thought leadership for the development of an economy-wide collaborative to reduce carbon. Entergy sponsored the December launch of the [Gulf Coast Carbon Collaborative](#), which now provides an ongoing platform for regional collaboration on carbon reduction efforts across all sectors of the economy. Additionally, the company is evaluating opportunities for distributed generation solutions to supplement centralized generation resources and improve community resiliency. Our company is uniquely positioned to engage with our customers, many of whom also are setting aggressive climate goals and establishing business models around the opportunities for investing in many of the technologies discussed in this report.

**Decarbonize Support Infrastructure and Supply Chain** – We are engaging both fuel and non-fuel suppliers on decarbonizing the fuel supply and the various materials/goods we procure. We have joined the [Natural Gas Supply Collaborative](#) to engage fuel suppliers on upstream emissions associated with exploration, production and transportation. As a founding member of the [Electric Utility Industry Sustainable Supply Chain Alliance](#), we engage broadly with suppliers of materials and goods to our sector. Additionally, some of our largest suppliers and customers are implementing low-carbon business models. We are engaged in partnerships focused on developing utility-scale renewable generation and the technology and infrastructure necessary to decarbonize our fuel supply through co-firing of green and/or blue hydrogen. We also anticipate opportunities to collaborate on renewable natural gas and other mutually beneficial technology advancements such as carbon capture.



## Entergy's 2019 Climate Report

In March 2019, Entergy published a report titled [Climate Scenario Analysis and Evaluation of Risks and Opportunities](#). The purpose of this report is threefold: (1) to continue Entergy's long history of engagement on climate change and management of the risks to our business; (2) to use scenario planning to analyze potential impacts on – and opportunities for – Entergy and the regional economies in which we operate; and (3) to inform and engage stakeholders on Entergy's current and ongoing processes for managing climate risk and evaluating future opportunities. The structure of the analysis and report was informed by the Recommendations of the Task Force on Climate-related Financial Disclosures. The analysis also informed the establishment of our fourth voluntary carbon goal – to reduce our utility generation asset emission rate to 50% of what it was in 2000 by 2030. Information on our earlier Environment 2020 commitment and performance can be found on [entergy.com](http://entergy.com).

The climate report discussion on strategy, governance, risks, opportunities, metrics and targets remains reflective of our current position on climate issues. On the strategy front, we are continuing to evaluate options and refine our path toward meeting our 2030 goal. Our resource planners continue to evaluate technology options and operational decisions necessary to ensure that we meet this goal. Additionally, a multilevel working group is focused on ensuring all options are explored in order to find the pathway that provides reliable, affordable and sustainable energy to our customers. Since the climate report was published, we have announced several related projects and efforts that can be found in our [Newsroom](#). Here are some highlights:

- August 2019 – [Entergy New Orleans Adding 90 Megawatts of Renewable Energy to Its Portfolio](#)
- December 2019 – [Cross-Industry Gulf Coast Coalition to Tackle Carbon Emissions](#)
- March 2020 – [Lake Charles Power Station Achieves Commercial Operation](#)
- April 2020 – [Mississippi Public Service Commission Gives Green Light to 1,000-Acre Solar Farm](#)
- April 2020 – [Entergy Named 2020 Tree Line USA Utility by Arbor Day Foundation](#)
- April 2020 – [Arkansas Public Service Commission Approves Searcy Solar Project](#)
- July 2020 – [New Analysis Shows Momentum Building To Decarbonize The Power Sector](#)
- August 2020 – [Entergy Arkansas Plans Fourth Solar-generation Resource, Walnut Bend, Near Brinkley](#)
- September 2020 – [Entergy New Orleans Completes Louisiana's Largest Commercial Rooftop Solar Project](#)
- September 2020 – [Mitsubishi Power and Entergy to Collaborate and Help Decarbonize Utilities in Four States](#)
- September 2020 – [Entergy Commits to Achieving Net-Zero Carbon Emissions by 2050](#)

The final section of our climate report is focused on Entergy's future. This addendum expands on Entergy's view of our ongoing portfolio transformation, developing technology options, our commitment to net-zero emissions by 2050 and our holistic vision of a net-zero emission economy for our region.



## Entergy's Ongoing Portfolio Transformation

Continuing the company's portfolio transformation strategy, Entergy expects to meet its 2030 target using technology that exists today. Initiated in 2002, this strategy focuses on modernizing our gas generation fleet, investing in our existing nuclear fleet, integrating renewable resources and retiring older, less-efficient fossil units, including all of the company's coal-powered capacity. Low- to zero-carbon technology developments are necessary to continue reducing both our carbon emission rate per megawatt hour and our absolute carbon emissions to levels consistent with our 2050 net-zero commitment. To achieve this commitment, technology developments and continued innovation are assumed to play a major role in enabling the decarbonization of our generation fleet while balancing customer costs and reliability. Some perspectives on advanced technologies, their role in the future, and our efforts to monitor and develop them are presented below:

**Customer-centric Solutions** – At Entergy, our focus is not on any particular product or service, but instead on the customer. Our customers' goals and objectives drive our planning and operational processes. Reducing demand for energy is an effective way to approach avoiding emissions. Entergy offers customers various energy efficiency-related products, services and programs. Our customers also desire behind-the-meter energy solutions, such as distributed generation and energy storage, which we are committed to helping them identify and implement. Additionally, electrifying energy needs currently served by fossil fuels is a decarbonization strategy employed by many of our customers. We expect all these areas – energy efficiency, distributed generation/storage and electrification – to

continue to develop over the next three decades. Entergy's goal is for these strategies to benefit our customers while also supporting our decarbonization strategy and enhancing economic performance.

**Coal Generation Retirement** – Entergy intends to cease burning coal by the end of 2030. Coal currently makes up only 6% of our generation, less than 5% of 2019 revenue and less than 2% of 2019 rate base. We do not anticipate constructing any future generation assets or securing power purchase agreements from any resources that use coal. Our employee commitment and community focus will continue to be important to Entergy as we transition from coal-powered capacity.

**Natural Gas, Low-Carbon Fuels and Carbon Capture** – We continue to modernize our gas generation fleet through our portfolio transformation strategy. Our analysis shows that natural gas units remain a necessary and economic resource to enable retirements of less-efficient gas units and to maintain system reliability as we transition to a low- to no-carbon economy. These modern, efficient gas units not only produce approximately 40% less carbon dioxide than older, less-efficient gas units, but we expect future gas generation to offer the option of co-firing advanced, lower- and zero-carbon fuels. Hydrogen, renewable natural gas and carbon capture technology provide carbon reduction options for gas-powered infrastructure being built beyond 2020, while also helping our customers meet their need for reliable and affordable power. This flexible, low-carbon generation is critical to meeting the objectives of reliability, affordability and sustainability, and allows for integration of additional renewable capacity.

## Entergy and Mitsubishi Power to Collaborate and Help Decarbonize Utilities in Four States

Entergy has engaged with Mitsubishi Power because of the company's demonstrated ability to provide innovative total solutions, leveraging multiple technologies to reach decarbonization goals. Mitsubishi Power is a first mover in hydrogen-enabled gas turbine and long- and short-term storage solutions.

### Together, Entergy and Mitsubishi Power will focus on:

- Developing hydrogen-capable gas turbine combined cycle facilities.
- Advancing green hydrogen production, storage and transportation facilities.
- Creating nuclear-supplied electrolysis facilities with energy storage.
- Developing utility-scale battery storage systems.
- Enabling economic growth through partnerships with the Entergy utility customers.

### **Entergy and Invenergy Partnership to Focus on Utility-Scale Renewable Development**

Entergy and Invenergy have agreed to co-develop renewable energy facilities in the Gulf South region. Invenergy brings renewable development expertise and access to a robust supply chain for equipment and installation services. Additionally, Invenergy has projects in the Entergy service territory with transmission interconnection rights. All of this will enable the two companies to collaborate to deliver projects at competitive costs and with earlier in-service dates.

### **Entergy and Energy Impact Partners**

Through a shareholder-funded program, Entergy joined the EIP Platform to collaborate with innovators and gain insights. EIP manages \$1.5 billion in global venture capital assets and supports the transition to a sustainable energy future by bringing together entrepreneurs and forward-looking energy and industrial companies.

***Existing and Advanced Nuclear*** – We are continuing to invest in our existing zero-carbon nuclear fleet to extend and preserve those assets. Entergy has not made any definitive decisions or announcements regarding the potential for subsequent license renewals; however, we are considering this as a part of our future, long-term energy mix as shown in the illustrative scenario in this addendum. Additionally, we are monitoring advanced technologies, such as advanced nuclear fuels, as well as small modular fission and fusion reactors to determine what role they may play in our future resource mix.

***Renewables and Storage*** – We currently are investing in [multiple solar generation facilities](#) and expect to continue to expand our renewable energy capacity over the coming decades. As needed, battery storage will complement these clean generation assets. We expect investment in renewables plus storage to continue beyond 2030, eventually becoming a larger part of our resource mix. Entergy is also monitoring wind technology developments both on- and offshore; other renewable options and storage technologies that eventually may represent capacity; and resource investment opportunities.

***Other Technologies*** – Entergy monitors developments not only in the technologies described in this report, but also in new technologies that may represent resource options over the next three decades. Advanced generation technologies and different low- to zero-carbon approaches to generating power likely will emerge and become commercially viable by 2050.

***Uncertainties and Risk*** – The technologies and strategies discussed in this report are in various stages of development and deployment. Some of these are considered “state of the market,” while others are “state of the art” and some are nascent. Those that are less developed or deployed present



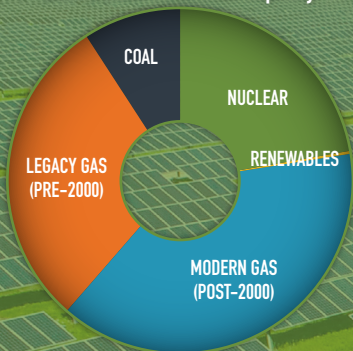
more investment risk today. Some of the technologies have a higher likelihood of reaching maturity than others. Due to our commitment to achieving net-zero carbon emissions by 2050, Entergy is monitoring these technologies as they develop and working to advance these technologies through joint endeavors with other industry partners, research organizations and industry groups. The points of view described above will continue to be refined as these developments occur, and when appropriate, these technologies will be proposed for inclusion in the company’s resource plan.

***Transition Equity*** – Entergy is committed to achieving our environmental sustainability goals and commitments while balancing the reliability of our system and affordability for our customers. Additionally, we believe that sustaining economic development and growth during our transition is essential to continuing to improve the quality of life for customers and communities in our region. Accordingly, as this transition occurs, Entergy considers [human rights, social equity and environmental justice issues](#) important to employees, the communities we serve and society as a whole. Entergy is committed to addressing employees impacted by the transition. Our robust corporate social responsibility efforts have focused on poverty elimination and workforce development for the last two decades. We seek not only to avoid disproportionate impacts of the investments necessary for this transition, but also to ensure the economic, health and environmental benefits of the transition are shared across the communities we serve.

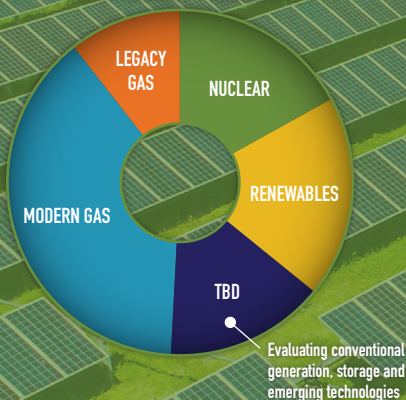
***Entergy’s Capital Plan*** – Our five-year, \$21 billion capital plan is consistent with and supportive of a transition to a low-carbon power generation fleet and our long-term commitment to achieving net-zero carbon emissions, while



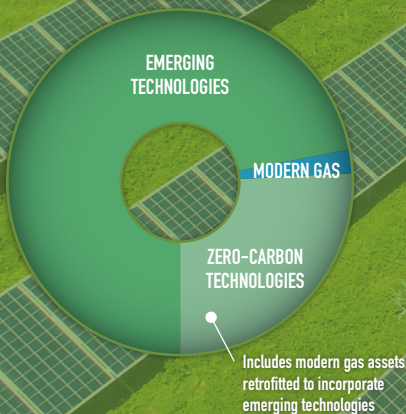
2020 Owned Generation Capacity



2030 Potential <sup>1,2</sup> Illustrative



2050 Potential <sup>1,2</sup> Illustrative



also improving reliability, strengthening system resiliency and facilitating integration of low-carbon resources. The plan also accommodates our ability to create a platform for innovative products and services and provide customer solutions optimized by coupling digital technology with analytics. For the generation fleet, we are investing \$9 billion over the next five years to continue transitioning our fleet to modern, efficient gas units, support our existing nuclear assets and integrate a significant amount of renewable energy generation. Utility-scale renewable generation and hydrogen infrastructure partnerships provide near-term experience with technologies necessary for meeting a net-zero commitment and represent potential future capital investment opportunities.

## Entergy's 2050 Climate Scenario Analysis

The impact of our two decades of action on our portfolio transformation strategy is evident in the evolution of our resource mix since 2000 (our base year). The illustrative projection for 2030 remains generally consistent with the mix presented in our 2019 climate report. Below we present the results of an analysis that includes a comprehensive technology review and development of an analysis tool to evaluate integration of the various technology options described previously in this report. A significant amount of uncertainty exists with respect to the assumptions on which this scenario is based. Additionally, some of the modeling assumptions described below do not necessarily match retirement dates assumed in regulatory proceedings. The charts presented here represent an illustrative capacity and generation mix projection based on Entergy's current technology points of view.

## Assumptions for the Illustrative Scenario

- **Existing coal** – This scenario assumes that all coal-powered capacity is retired by the end of 2030 – Entergy already has announced our intent to cease burning coal by the end of 2030;
- **Pre-2000 gas units** – It is assumed that all pre-2000 gas is retired no later than the 2040s – this would complete the turnover of the company's legacy fossil generation fleet, leaving only post-2000 modern, efficient gas;
- **2000 to 2019 gas units** – It is assumed that most of these units are retired by 2050; however, for some of these units, life extension beyond the current planning assumption of 30 years may be required to support the ongoing deployment of other low- to zero-carbon technologies, but it is assumed that this vintage of gas generation is fully retired by 2050;
- **Gas supply decarbonization** – Strategies such as co-firing of either renewable natural gas or hydrogen are deployed beginning in the mid- to late-2020s on modern, efficient gas units;
- **Carbon capture, utilization and sequestration** – This technology is assumed to be installed on post-2020 modern, efficient gas units beginning in the late-2030s;
- **Existing nuclear** – It is assumed that all nuclear units receive subsequent license renewal, extending the life of the fleet beyond 2050;
- **Advanced nuclear** – Entergy assumes that this technology becomes available in the 2040s, resulting in the deployment of 1 gigawatt of capacity by 2050; and,
- **Renewables and storage** – Deployment of renewable energy sources (some with storage) continues for the next three decades, ultimately resulting in over 10 gigawatts of capacity.

1- Subject to integrated resource planning processes, economic evaluations and regulatory approvals. 2- Potential 2030 and Potential 2050 portfolios assume technology advancements and/or declining costs of carbon-free technologies in order to balance environmental stewardship with affordability and reliability; offsets utilized for remaining emissions.



While not specifying a supply plan, this scenario illustrates how Entergy's 2050 net-zero commitment could be achieved while meeting all energy and capacity requirements. This view is not a recommended supply plan and has not undergone an economic analysis; rather, it is an example of how Entergy could reach net-zero emissions if the technologies develop and a resulting generation portfolio is found to be cost-effective and reliable. Specific supply plans will be developed in coordination with our regulators and other stakeholders and will require regulatory approval consistent with our legal obligation to provide affordable and reliable energy.

This illustrative scenario will be adjusted over time as technology develops and evolves, limited by our ability to

incorporate new technologies into our resource mix due to the long lead times inherent in the regulatory and resource planning processes. Entergy will continue to monitor technology developments that impact the potential use, cost, efficiency and emissions of these projections.

## Entergy's Three-Phase Approach to Decarbonization

The chart below provides some additional context for the illustrative scenario presented in the previous section of this report. Entergy's decarbonization pathway began over the last two decades and now extends over the next three decades, meaning that our phased approach spans five decades.

### 2001-2020

**One of the lowest CO<sub>2</sub> emission rates in the electric power sector**

Since 2001, after voluntarily committing to stabilize and reduce our emissions, Entergy has reduced its carbon emissions by almost 25%.

Entergy maintains one of the lowest CO<sub>2</sub> emission rates in the industry with a combination of nuclear, renewable and natural gas-fired generation.

### 2020-2030

**A plan to reduce our carbon intensity 50% by 2030**

Over the coming decade, Entergy is committed to reducing its carbon emissions intensity by 50% below 2000 levels by 2030, while enabling carbon reductions throughout the economy (e.g., industry and transportation).

This generally is in line with scenarios aimed at limiting global temperature increases to well below 2°C.\*

### 2030-2050

**Committed to net-zero carbon emissions by 2050**

Entergy is fully committed to achieving net-zero CO<sub>2</sub> emissions by 2050.

According to the Intergovernmental Panel on Climate Change (IPCC), to limit global warming to 1.5°C above pre-industrial levels and avoid the most catastrophic impacts of climate change, the world must reach net-zero CO<sub>2</sub> emissions by mid-century.

Technology advancements will be critical to making this step change in performance.

\* Entergy's 2030 goal is to reduce its carbon intensity to approximately 532 pounds of CO<sub>2</sub> per megawatt hour (lb/MWh) of electricity production. The International Energy Agency's 2°C Scenario (2DS) projects a carbon intensity of 514 lb/MWh for the U.S. power sector in 2030, and the Beyond 2°C Scenario (B2DS) projects a carbon intensity of 510 lb/MWh in 2030.



## Conclusion

Entergy's leadership in sustainability and environmental stewardship has been a hallmark of who we are for two decades. Entergy has one of the lowest carbon dioxide emission rates in the electric power sector and was the first U.S. utility to announce a voluntary carbon commitment. This leadership on climate action continues today with our near-term 2030 goal and long-term commitment to achieving net-zero carbon emissions by 2050. Entergy recognizes that technological advancements are critical to achieving these emission reductions and is establishing partnerships and

collaborating across our full value chain on the necessary technology developments. Our capital plan is in line with a low-carbon transition, and our leadership is held accountable for results through Entergy's executive compensation program. Entergy is committed to continuing – and strengthening – its environmental stewardship; actively engaging in partnerships to develop long-term, sustainable climate solutions; realizing the opportunities that lie ahead of us in meeting our climate commitment; and driving toward results that benefit our customers, our communities, our society and our world.

## Forward-Looking Statements Disclaimer

In this report, and from time to time, Entergy Corporation makes certain "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements include, among other things, statements regarding Entergy's operational outlooks and capital plan; statements regarding its environmental plans, goals, beliefs and expectations, including statements regarding its greenhouse gas reduction goals and strategies and statements regarding the planned addition of renewable generation, potential technological advances, legacy asset retirements, nuclear license extensions, offsets and other potential means of achieving its environmental goals; statements regarding opportunities to partner with customers and others to advance technology development or reduce societal emissions; and other statements of Entergy's plans, beliefs, or expectations included in this presentation.

Readers are cautioned not to place undue reliance on these forward-looking statements, which apply only as of the date of this presentation. Except to the extent required by the federal securities laws, Entergy undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise. Forward-looking statements are subject to a number of risks, uncertainties, and other factors that could cause actual results to differ materially from those expressed or implied in such forward-looking statements, including (a) those factors discussed elsewhere in this presentation and in Entergy's most recent Annual Report on Form 10-K, any subsequent Quarterly Reports on Form 10-Q, and Entergy's other reports

and filings made under the Securities Exchange Act of 1934; (b) uncertainties associated with (1) rate proceedings, formula rate plans, and other cost recovery mechanisms, including the risk that costs may not be recoverable to the extent anticipated by the utilities and (2) implementation of the ratemaking effects of changes in law; (c) uncertainties associated with efforts to remediate the effects of major storms and recover related restoration costs; (d) risks associated with operating nuclear facilities, including plant relicensing, operating, and regulatory costs and risks; (e) changes in decommissioning trust fund values or earnings or in the timing or cost of decommissioning Entergy's nuclear plant sites; (f) legislative and regulatory actions and risks and uncertainties associated with claims or litigation by or against Entergy and its subsidiaries; (g) risks and uncertainties associated with execution on our business strategies, including strategic transactions that Entergy or its subsidiaries may undertake and the risk that any such transaction may not be completed as and when expected and the risk that the anticipated benefits of the transaction may not be realized; (h) effects of changes in federal, state, or local laws and regulations and other governmental actions or policies, including changes in monetary, fiscal, tax, environmental, or energy policies; (i) the effects of changes in commodity markets, capital markets, or economic conditions; (j) impacts from a terrorist attack, cybersecurity threats, data security breaches, or other attempts to disrupt Entergy's business or operations, and/or other catastrophic events; (k) the direct and indirect impacts of the COVID-19 pandemic on Entergy and its customers; and (l) the effects of technological change, including the costs, pace of development and commercialization of new and emerging technologies.