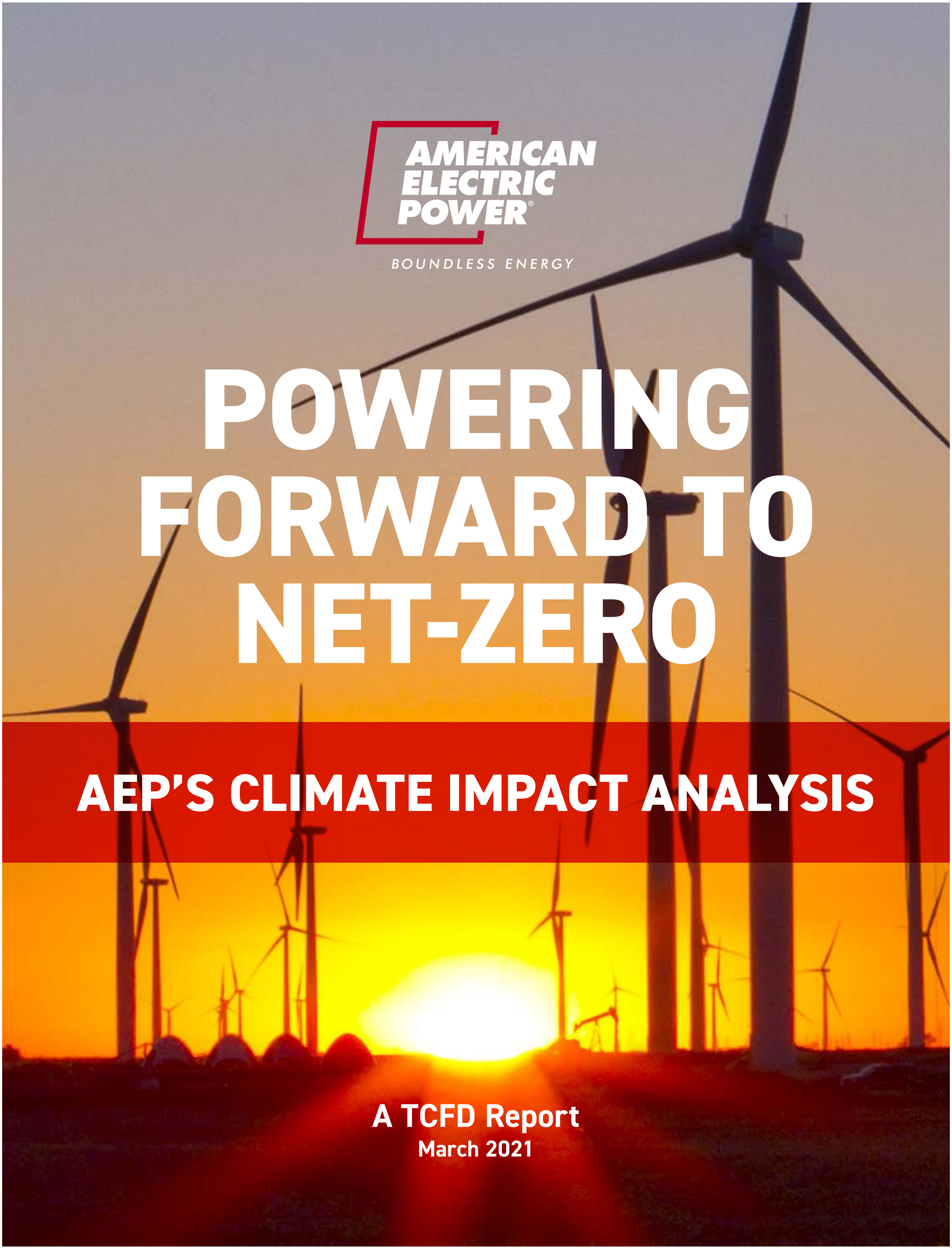

AMERICAN ELECTRIC POWER

BOUNDLESS ENERGY

POWERING FORWARD TO NET-ZERO

AEP'S CLIMATE IMPACT ANALYSIS

A TCFD Report

March 2021

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MESSAGE FROM THE CHAIRMAN: THE PATH TO 2050

Nicholas K. Akins, Chairman, President & Chief Executive Officer
American Electric Power

The journey to a clean energy future is complex and requires a steady, measured approach. At AEP, we are committed to making the energy we provide as clean as possible, as fast as we can, all without compromising reliability, affordability, or the security of the electric power system. We are taking concrete actions, setting aggressive goals, deploying new technologies and analytics, investing in large-scale renewable energy, and working with the states we serve to accelerate the transition. Our most recent analysis of climate-related risks and opportunities created new awareness and will inform our strategic planning and decision-making as we go forward.

Climate change is a top issue of engagement with many different stakeholders. We undertook a year-long effort to analyze the risks to our company from climate change, as well as potential business opportunities it might create. This report reflects our commitment to working toward 100% clean energy while also addressing the physical risks to infrastructure and people from a changing climate and the socio-economic effects that coal-fueled power plant closures have on the workforce as well as local and regional economies. We reviewed our carbon emission reduction goals as part of this process and have accelerated them to achieve an 80% reduction by 2030 and net-zero emissions by 2050 (from a 2000 baseline).

We evaluated three climate transition scenarios to determine the technology and resources that would be needed, the cost to customers and how the market would respond. This analysis provided important insights into what will be required to achieve net-zero carbon by 2050. It showed us that we can get there, but it will require advanced technologies and new fuel sources or offsets to achieve our net-zero clean energy objectives.

February's extreme cold weather in Texas that led to energy supply shortages — leaving millions of customers in that state without power for days — shines a spotlight on the need for a more resilient system that can withstand weather extremes. We will take the lessons learned from this crisis to inform our resource planning for the future. What happened in Texas is a reminder that a resilient system and diverse fuel portfolio capable of meeting demand during even the most extreme situations must be central to the nation's clean energy transition.

While the focus of climate change tends to be on cutting greenhouse gas emissions, there is a human and economic toll that must be considered as we transition away from fossil fuels. As part of our analysis, we examined the social and economic effects of shutting down fossil fuel power plants — what is known as a "Just Transition." The transition of local and regional economies is complex and will require public-private partnerships. We intend to be part of the solution. We see our role as a convener of stakeholders and resources to help support affected workers and local and regional economies. We bring significant economic development experience and a strong track record of working with communities to help them remain strong, more resilient and sustainable. We will be seeking partners to assist us in this journey.

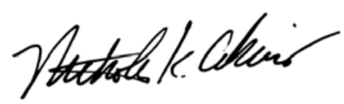
AEP has retired or sold nearly 13,500 megawatts (MW) of coal-fueled generation during the past decade, and by 2030, we will have reduced our coal-fueled generating capacity by 74% from 2010 levels. This is significant progress. As we continue to balance the remaining operating life and economic viability of each of our remaining coal-fueled generating units with other options for delivering power to customers, the sources of our generation will become cleaner. Our most recent renewable investment is North Central Wind, the largest single-site wind farm in North America. Once online, it will deliver cost-effective, carbon-free energy to customers in Arkansas, Louisiana and Oklahoma. We also continue to grow a competitive renewables business within and beyond our regulated 11-state service area.

AEP has had carbon reduction goals since the early 2000s. In 2018, we set new, aggressive goals to reduce our carbon emissions and committed to reevaluating these goals annually. We have raised our targets twice since then as we achieved our goals ahead of schedule. Our 2020 CO_2 emissions were nearly 74% less than in 2000, achieving our 2030 reduction goal of 70% a decade ahead of schedule. Consequently, we set a new goal to cut carbon dioxide emissions by 80% in 2030. We also set a new 2050 goal of net-zero emissions. Although today there is not a well-defined path to achieving net-zero emissions in this timeframe, we are more confident that these trends, combined with our experience, advanced technologies, new resources, public policies and/or carbon offsets will get us there.

We don't have all of the answers today, but we believe net-zero emissions is a critical long-term opportunity for our company and our nation. We are committed to working closely with all of our stakeholders including customers, state utility regulators, lawmakers, community leaders, investors and financial institutions as we work to achieve it.

This report, which is aligned with the Task Force for Climate-related Financial Disclosure (TCFD) framework, is a comprehensive view of our business and the potential risks and opportunities created by climate change, as well as strategies for managing them. During the course of this initiative, we shared our plans with Climate Action 100+ as part of our ongoing engagement. The group reviewed our outline and provided valuable feedback. We recognize this is a first step, and similar to our carbon emission reduction goals, we expect this analysis to evolve over time. But as we evolve, it provides us a solid blueprint for understanding the potential effects of climate change on our business.

Sincerely,



Nicholas K. Akins
Chairman, President & Chief Executive Officer
American Electric Power

EXECUTIVE SUMMARY

As we transition to a clean energy economy, climate change impacts are central to our planning an electric power system that is reliable, resilient and affordable. How fast we make the transition and at what cost remain priorities for regulators, public policymakers and the energy industry. To gain a deeper understanding of the transition, physical risks associated with certain climate variables, and the economic and social toll it presents, AEP initiated a comprehensive climate scenario analysis. The year-long effort identified potential pathways forward to achieving our goal of net-zero carbon emissions by 2050, as well as physical risks to which we may need to adapt. This Executive Summary highlights the key findings of our analysis.

It is imperative this analysis not be viewed as a prescriptive path forward. We still have much to learn as the physical and regulatory environments evolve over time before we can reach any definitive conclusions. But it does show us a way forward, including the uncertainties, risks, opportunities and costs. This report is a first step in the process; we will undertake additional climate modeling to improve our understanding and gain clarity of the future. We are engaged in industry initiatives to advance deployment of new technologies and resources that we will need to reach net-zero. We will continue to engage our many stakeholders, seeking opportunities to collaborate, because we are collectively focused on the same goals. Although there is still considerable work ahead, this effort was an essential first step that lays a strong foundation as we go forward.

This report is aligned with the Task Force for Climate-related Financial Disclosure (TCFD) framework. It also is complementary to AEP's other disclosures, including the Sustainability Accounting Standards Board (SASB) standards.

TRANSITION SCENARIO ANALYSIS

This report presents two transition scenarios — Business As Usual and Fast Transition — that could be indicative of possible future greenhouse gas (GHG) emission reduction strategies. Both scenarios were modeled to 2050. In each scenario, there are specific assumptions around constraints on emissions and the disposition of our current fossil generation facilities. The assumptions also took into account technology advances, changes in customer demand, the price of commodities, and the role of potential public policy changes. The scenarios did not model individual operating companies; rather, it modeled AEP's regulated utilities in aggregate.

Business as Usual

CO_2 price: $15/ton + 3.5%/year escalation, starting 2028

Energy Efficiency: Embedded in load

Electrification: Some

EV Penetration: Business as Usual

AEP Coal Unit Retirements: Book life

Technology Costs: EIA forecasts

Fast Transition

CO_2 price: $30/ton + 3.5%/year escalation, starting 2028

Energy Efficiency: More aggressive

Electrification: More

EV Penetration: Mid-point

AEP Coal Unit Retirements: Book Life less 5 years, or 2040

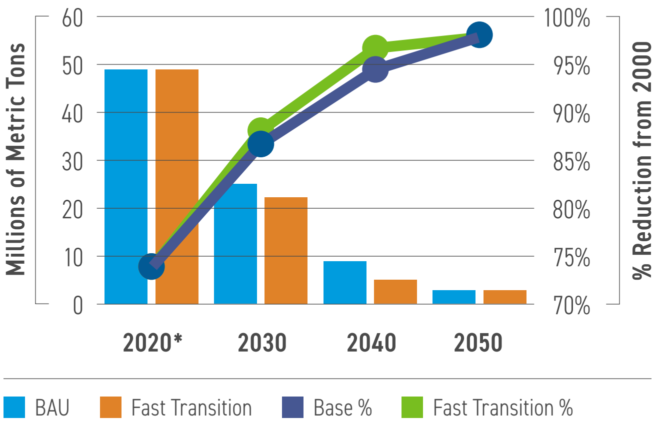
Technology Costs: EIA forecasts

We made the decision to defer modeling a third scenario of 100% Clean Energy because the tool we use to project power market implications and pricing was unable to solve the complexity of the scenario, despite numerous attempts. We will revisit this in future climate modeling efforts.

Key Takeaways

- Both scenarios are projected to reduce carbon emissions more than 90% by the mid-2030s.
- Depending on carbon policy, AEP can reduce carbon emissions to <5% of 2000 levels.
- With our new net-zero carbon reduction goal, any remaining emissions would be offset.

AEP CO_2 Emissions



Emission projections are for AEP's vertically integrated utilities only. Both scenarios arrived at >95% of historical emissions reduction by 2050. Under these scenarios, carbon offsets would likely be needed to achieve net-zero.

Note: 2020* data includes AEP's competitive fossil generation, which will be fully retired by the end of 2030.

- Both scenarios showed an increased build and use of wind and solar and decreasing reliance on coal and natural gas over time. The pace varies by scenario.
- An unexpected outcome was that the model did not select large levels of energy storage or dispatchable non-emitting resources. AEP believes storage plays a critical role; this will be further analyzed.
- Fast Transition assumes accelerated retirement of additional coal-fueled resources.
- Technology advances, non-emitting fuel sources, end-use electrification, continued growth of renewables and distributed resources, and public policies are all critical to achieving net-zero.

CLIMATE-RELATED PHYSICAL RISKS

Climate change presents both risks and opportunities for AEP. In this analysis, we sought to understand both. Changes that cause the most concern are generally subtle and gradual but are more severe in extremes. For example, while the frequency of severe weather may be slightly higher, the severity of storms is more pronounced. In the case of rain events, they may be shorter but more intense, resulting in flooding that can affect our business operations. The variations in climate variables are geographically dispersed across AEP's service territory, and they are gaining more attention from stakeholders as potential financial and operational risks associated with climate change.

In evaluating physical risks and opportunities, we looked across the enterprise to include both regulated and competitive businesses. Our analysis took into account a range of issues, including climate variables, aging infrastructure, capital investments to modernize and harden the power system, public policy, regulatory oversight, technology development and resilience. We examined the potential impacts to physical assets, such as buildings, substations, wind turbines, poles and generating units, and we applied our knowledge and experience garnered from more than a century of severe weather events.

In our assessment, we focused on the most probable climate-related physical impacts to the AEP system:

- Ambient temperature
- Precipitation amount and type
- Severe weather
- Sea level rise
- Wind speed
- Solar irradiance

Physical risk is harder to discretely quantify. The inherent uncertainties and complexities in forecasting what a warmer climate might mean to the interconnected systems we rely upon — physical assets and natural ecosystems — are hard to predict. Our analysis revealed some vulnerabilities as well as demonstrated our experience and ability to effectively manage physical impacts to the AEP system.

Key Takeaways

- Our analysis showed that investments to harden and build resilience and reliability into the system are essential and having a positive impact.
- Weather extremes are becoming noticeably more severe.
- AEP's geographic diversity provides a hedge against physical extremes in many climate-related variables

because the impacts tend to be local or regional and can vary greatly by location.

- An analysis of heavy rain events at six AEP coal-fueled power plants across our service territory showed that subtle changes are occurring over time and that the weather extremes — like Hurricanes Harvey and Laura — may be more intense.

JUST TRANSITION

Community revitalization and workforce development have become central issues in the transition to a clean energy economy. As we shift from fossil-based electricity to cleaner resources, such as wind and solar, there are human and economic impacts. Our climate analysis included consideration of how we manage the transition to ensure environmental sustainability, as we enable

Examples of Climate-related Physical Risks

Climate Variable	Potential Change	Affected Assets	Risk or Opportunity	Physical Impact	Operational Impact
Temperature	Hotter temperatures	All	Risk	Equipment ratings and throughput can be temperature dependent (conductors, transformers, batteries, gear box, etc.); water used for cooling may be too warm	Components may not be able to operate to design basis and need to be replaced. If incoming water temperature gets too high, it can result in reduced cooling water efficiency and reductions in steam-electric generation.
	Increased summer heat	All	Opportunity	Increased summer heat increases demand for electricity	Increased top line revenue
Precipitation	Increased precipitation (rain)	All	Risk	Flooding	Disrupt operation of substation facilities, offices, service centers
Severe Weather	Increased, more intense storms	All	Risk	Severe weather can damage equipment	Outages; storm-related costs; customer experience; cascading impacts from economic disruption caused by reduced demand from severe weather
Sea Level Rise	Sea level rise	T&D	Risk	Flooding and expansion of storm surge zones could severely damage facilities.	Loss of and/or need to relocate facilities, staging areas
Wind	Extreme wind activity	All	Risk	Extreme winds could damage infrastructure and increase debris	Power outages; cost to repair/replace infrastructure
	Increased wind speeds	Wind	Opportunity	Increase in renewable resource	Increased power output from wind

JUST TRANSITION
Good Jobs & Healthy Communities

opportunities for affected workers, social inclusion and poverty mitigation.

The Just Transition is an approach to working with communities, power plant owners and other stakeholders to prepare for and make the transition to new skills, new industries, and sustainable policies for the future. We intend to be an active participant in identifying solutions that empower communities to diversify and thrive long after the power plant is shuttered. Coal-fueled power plants are most often located in remote areas, are the largest employers with the highest paying jobs, are the largest taxpayers and are very involved in their local communities. The effects of a plant retirement are felt far beyond the fence line of the plant itself.

We conducted an economic impact analysis to understand the cumulative regional effects associated with plant closures. We modeled the hypothetical closure of four active coal units to help us quantify the effects of a plant retirement on regional employment, labor income and GDP. We estimated the direct (AEP), indirect (contractors/suppliers) and induced (consumer spending) economic impacts of a retirement. The results show the economic impact can be significant.

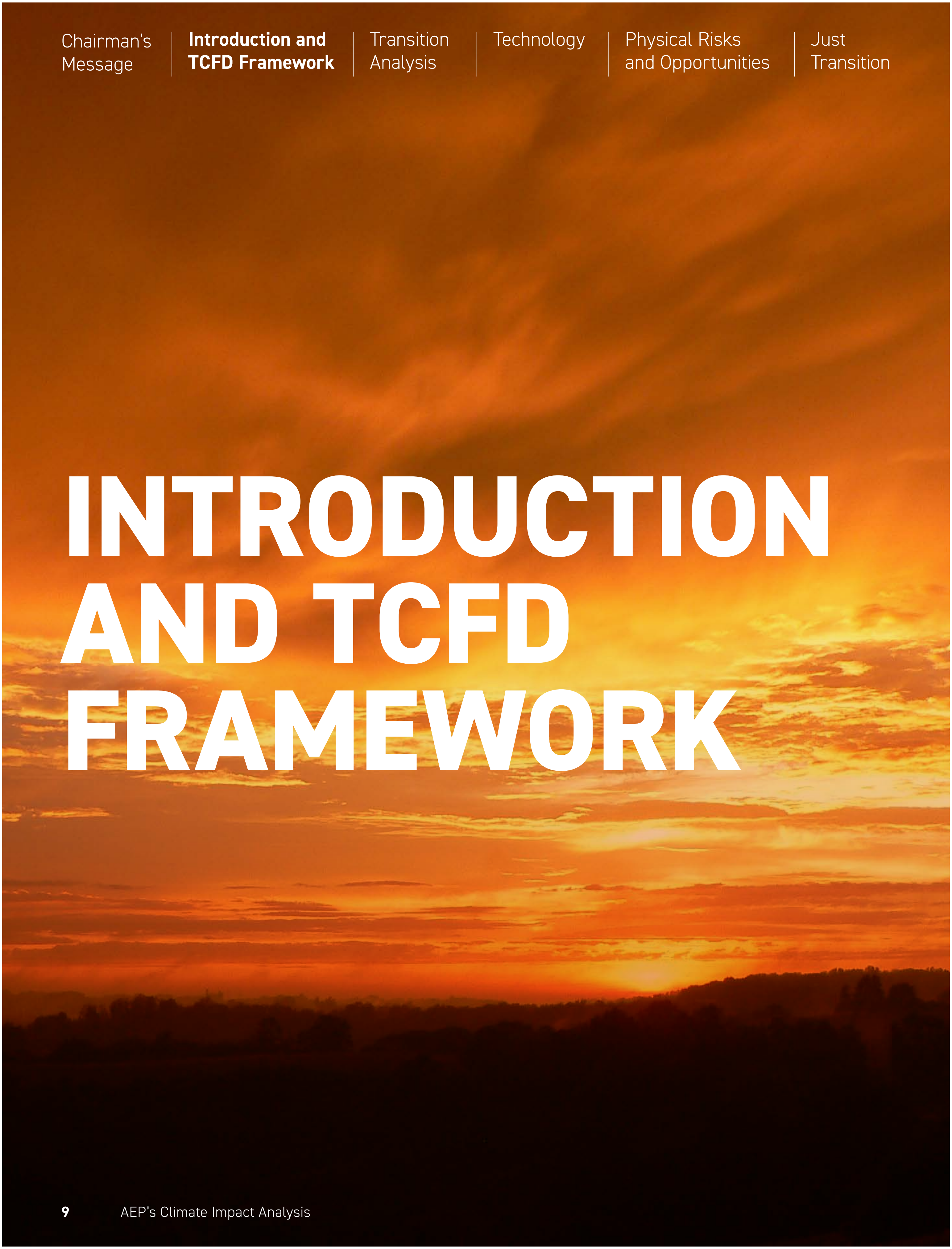
Our intent is to give employees and communities as much advance notice as is feasible, often up to five years, to prepare. We support our employees, including our labor unions, as they plan to reenter the job market. This includes connecting them with programs and services offered by AEP and external organizations to broaden their access to career opportunities.

The Just Transition plays an important role in our ability to move to a clean energy economy without workers and communities being left behind. We know we can't do this alone, and we are committed to helping enable a transition to a resilient, sustainable, and economically strong future for affected communities.

Key Takeaways

- On average, a typical coal-fueled power plant operated by AEP generates $160 million in regional economic activity, provides $63 million in labor income and supports more than 700 regional jobs annually.
- AEP's past experience demonstrates that a successful transition for plant employees includes collaboration with union representatives, transparency about our plans, management of expectations, coordination to tap into internal and external resources, and frequent communications.
- AEP will be part of the solution to help our employees and communities make the transition. To be most effective, we will seek public and private partnerships for maximum impact.
- Early and frequent community outreach is critical.

Welsh Plant will cease coal operations in 2028.



INTRODUCTION AND TCFD FRAMEWORK

INTRODUCTION

Climate change is a defining issue of our time. It is also one of the most debated issues. AEP's position is that there are unmistakable changes occurring to the climate but that the speed of change and the future effects of those changes remain uncertain. We have experienced it in the form of extreme weather events across our service territory, from extreme heat and droughts to more intense and frequent hurricanes. These are some of the visible impacts that have occurred.

For more than two decades, climate change has been a key issue for AEP and its stakeholders. Investors and non-government organizations (NGOs), as well as other stakeholders, ask us about the pace of our transition to cleaner energy resources, the financial and physical risks associated with early retirement of fossil-fueled power plants, the potential reliability risks to the electric power system if we move too fast, and the importance of working with regulators and other public policymakers to arrive at the best solutions for our customers and the environment.

We recognize that climate change is occurring. AEP initiated this analysis because it gave us an opportunity to expand our understanding of how it can affect the company now and in the future. This informs our strategic planning, risk management and how fast we can go. We have long believed that our clean energy transformation strategy is aligned with the Paris Agreement. The climate scenario analysis we undertook demonstrates that our strategy is on course with achieving the goals of the Paris Agreement. And, it reminds us that the transition must build resilience into the system to handle extremes. It also shows us that there are still many uncertainties about technology, resources and the pace and cost of the transition. Our path forward will evolve, and, as it does, we will continue to engage our stakeholders.

As we transition to a clean energy future, our decision-making is informed by:

- Customer preferences for clean energy, particularly those with carbon-free energy and fleet electrification goals;
- Availability and cost of advanced technologies, such as energy storage and modular nuclear;
- New resources, such as green hydrogen;
- Market demand and prices;
- Low natural gas prices; and
- Regulatory innovation, including alternative ratemaking mechanisms and deregulation.

This report presents our findings. It is a first step toward gaining clarity on actions, timing, physical and financial impacts, and possible outcomes. It is not a prescriptive, definitive path to net-zero but it gives us valuable insights into the work that still lies ahead.

PROJECT DELIVERABLES

The project included three focus areas — transition risk, physical risks and opportunities, and the socio-economic aspect of coal plant retirements — and involved a diverse team of more than 50 people, representing all parts of the company and including engineers; resource planners; meteorologists; and experts in generation, transmission, distribution, legal, air quality and environmental, along with enterprise risk and insurance, investor relations, economic development, customer solutions, and corporate sustainability, among others. AEP's internal team conducted the analysis and modeled potential scenarios. In addition, we consulted with numerous external resources, reports and studies, and climate expertise to further inform our analysis. *(See References.)*

In addition to modeling three scenarios, we evaluated the advancement of new and emerging technologies; public policy and regulatory changes that could influence our actions; the pace of transition; and risk mitigation strategies to make the electric grid more resilient. We conducted desk research, benchmarking and interviews to frame our approach, capture legacy knowledge and identify best practices and potential new business opportunities.

This report is aligned with the Task Force for Climate-related Financial Disclosure (TCFD) framework, which is emerging as the preferred approach for reporting on climate risk management. We also referenced the

TCFD Framework

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Fourth National Climate Assessment, among other climate-related documents. *(See appendix for reference resource list.)*

The five project deliverables identified were:

1. Identify risks and opportunities related to climate change
2. Inform capital investment and regulatory strategies
3. Advance electrification and electric vehicles
4. Explore impacts of potential future climate policy pathways
5. Inform strategic planning for the corporation

This comprehensive report includes the process, scenarios developed, modeling outcomes, risks and opportunities, governance, the role of technology, public policies/regulatory considerations, and strategies for mitigation. For ease of understanding, each focus area — transition risk, physical risk, and Just Transition — is a self-contained section, though there is some overlap.

CLIMATE CHANGE GOVERNANCE

AEP's Board of Directors understands the importance of climate change issues and their significance to our employees, customers, investors and other stakeholders. The Board regularly discusses issues related to climate change, including carbon reduction goals, public policy and legislation, renewable investments and AEP's strategy for a clean energy transition. The Board recognizes that climate change poses challenges to AEP but also creates new business opportunities; these challenges and opportunities are discussed during strategic planning sessions.

The Committee on Directors and Corporate Governance leads the governance of climate risks, but the full Board engaged in approving AEP's strategy to invest in renewable energy, reduce carbon emissions and support our local communities and regional economies to make the transition. The various changes resulting from transition and physical risks, employee impacts and community transition are discussed and overseen by the Board's committees. For example, to incentivize management to invest substantial resources to reduce greenhouse gas emissions, the Human Resources Committee adopted a long-term incentive compensation goal measuring carbon-free generating capacity growth. In addition, the Board's Lead Director conducts an annual governance outreach with our largest institutional shareholders, which includes a discussion of climate risks and AEP's clean energy transition. AEP's Board Chairman also meets with investors on a range of issues; and both leaders are actively involved in our engagement with Climate Action 100+.

AEP's Board members bring a wealth of experience and expertise to the company that transcends any single issue or risk. We recruit Board members for their broad skill sets, including business strategy, risk management, regulatory, innovation and technology, business operations, finance, and governmental affairs. These disciplines are critical to the governance of a company as complex as AEP and give the Board members a diverse perspective on climate change. The Board also brings in outside experts on a range of issues, including climate change, to enhance its knowledge.

The implementation of AEP's strategy for a clean energy transition and the Company's advocacy on climate public policy are overseen by AEP's management team. Public policy at the federal level is overseen by the Federal Affairs senior vice president, who reports to the executive vice president of External Affairs. State-level policy matters at each of AEP's regulated electric utilities are managed by a vice president of External Affairs at each company.

AEP's Board of Directors: Governance and Risk Management Structure

Committee on Directors and Corporate Governance

- Oversees risks of climate change
- Oversees the company's sustainability/ESG reporting, including climate risks
- Oversees political engagement
- Oversees AEP's shareholder engagement, including shareholder requests or proposals
- Oversees AEP's Corporate Compliance Program
- Oversees the composition of the Board and committees, including making recommendations on new Board members

Audit Committee

- Oversees the company's process of identifying and managing major risks, including strategic, operational and financial risks
- Oversees the company's financial reporting, internal controls and compliance risks, including those related to climate

Policy Committee

- Invites external experts to meet with the board on various policy issues, including climate change

Finance Committee

- Reviews the financial condition of the Company and makes recommendations regarding capital requirements and capital deployment, including those with respect to renewables and other non-carbon emitting assets

STRATEGY

For the nation to achieve its economy-wide clean energy objectives by 2050 or sooner, as called for in the Biden administration's climate plan, the transformation of the electric sector is vital. Smart investments in clean energy — including renewables and advanced technologies — will help to lower the costs of electricity and stimulate economic growth. AEP's strategy for a clean energy future includes:

- Building and enabling renewables;

- Transforming our fossil fleet for a net-zero carbon future;
- Scenario planning for the future;
- Investing to ensure reliability, resilience, affordability and security of the grid;
- Engaging in the public policy process;
- Engaging employees and supporting those impacted by the transition.

Renewables are only one part of a clean, secure and reliable energy future. AEP's strategy also includes significant investments in its transmission and distribution operations to support the clean energy transition. AEP plans to invest $37 billion in capital from 2021 through 2025, with the bulk allocated to regulated businesses and renewables. This includes $26.7 billion in transmission and distribution investments to update and improve reliability and resilience of the grid. During this same period, AEP plans to invest $2.8 billion in regulated renewable generation and $2.1 billion in competitive, contracted renewable projects. By 2030, we project renewables will represent approximately 40% of our generation capacity.

AEP's largest renewable project to date — the North Central Wind Energy Facilities — significantly advances our on-going efforts to diversify our energy portfolio. Once complete, North Central wind facilities will deliver 1,485 megawatts of clean energy to Southwestern Electric Power Company (SWEPCO) and Public Service Company of Oklahoma (PSO) for our customers in Arkansas, Louisiana and Oklahoma.

TRANSITION TO CLEAN: PROGRESS

In the past decade, AEP has retired or sold nearly 13,500 MW of coal-fueled generation, and we recently announced plans to retire an additional 1,633 MW of coal generation by 2028, including Rockport Plant Unit 1 later this decade. Between 2010 and 2030, AEP will have cut its coal-fueled generating capacity by approximately 74%. This is a significant transformation of our generating portfolio.

AEP's generation transformation includes an ongoing evaluation of our power plants combined with the addition of new renewable resources and significant investments in the development of grid solutions that include energy storage, modular nuclear, and research into the future use of hydrogen. *(See Technology section for more.)*

Pirkey Plant will retire from commercial operation in 2023.

We are also optimizing the use of and continuously evaluating the remaining useful life of our coal-fueled generating units. This process informs how we offer this generation into power markets, how we invest additional capital to keep them operational, and whether we choose to retire or sell them.

SCENARIO PLANNING

AEP routinely reviews its business strategy, evaluating potential scenarios that could affect the company's future. These scenarios help us to identify and understand threats to our business, as well as new opportunities for growth. We typically convene a diverse team from across the company to help us determine trends, risks and uncertainties that could impact AEP's business. We prioritize these drivers to help us develop our scenarios. We ask the team how they envision the electric energy business evolving, through the lens of the scenario framework. We evaluate the value and impact each scenario would have on the company, as well as their complexity to execute.

We have historically included a carbon price as a proxy for potential future climate regulations. Today, we recognize there are other climate change influences that could significantly affect our business beyond climate regulations. For example, our analysis of climate change-related physical risks created a new awareness of potential threats to our facilities and infrastructure. It showed us the vulnerability of some assets located in areas potentially susceptible to damage or loss from rising sea levels and increasing weather extremes. We will use our learnings from this exercise to inform our strategic planning as well as our risk monitoring.

For more information about the scenarios developed for this climate change analysis, please see the *Transition section*.

BUILDING RESILIENCY

A resilient electric grid starts with a system that is designed and built to withstand high winds, powerful storms, cybersecurity threats and other disruptions that could cause customer outages. AEP has a long history of investing in the grid to make it more reliable, resilient and secure. We also have more than a century of experience operating and maintaining a system that is vulnerable to weather extremes. Throughout this time, we have updated design and operational standards, increased our situational awareness of threats to the grid, deployed new technologies to give us real-time views of system operations, and focused our resources to strengthen the grid's resilience and enhance reliability for customers.

AEP is a founder of Grid Assurance, an industry-led initiative to enable quicker recovery of the transmission grid in the event of a catastrophic natural or man-made event. Grid Assurance's framework plans and models for high-impact, low-frequency events. It includes maintaining an inventory of critical, long-lead-time replacement parts, such as transformers and breakers that can be quickly deployed.

AEP seeks innovative ways to serve the needs of specific customers who require a higher level of resilience.

In July 2020, PSO signed a 30-year lease with the U.S. Army for the siting of a proposed energy resilience project at Fort Sill. The project involves construction of four 9 MW natural gas-fired reciprocating internal combustion engine generators, along with 10.9 MW of photovoltaic solar energy at Fort Sill. This project will benefit all PSO customers during normal operations as the company gains experience in using the assets to balance load, including intermittent resources, as well as help to fortify the local system and Fort Sill against service interruptions from weather or other events.

During certain pre-specified conditions and with agreement from PSO, the project would enable the Army to disconnect from the grid and isolate to sustain Fort Sill's critical missions that protect the country for at least 14 days in the event of a power disruption. Fort Sill is a 94,000-acre U.S. Army training center south of Oklahoma City.

Learn more about the Fort Sill resiliency project in this video: https://www.psoklahoma.com/community/projects/fort-sill

Energy storage will play a pivotal role in building resiliency and flexibility into the electric power grid. Storage can serve as a short-term supply resource during an outage, providing backup power. It can also help smooth integration of intermittent renewable resources on the grid, and enable a more flexible and responsive grid as demand grows and changes. As various sectors increasingly adopt lithium-ion batteries, it will be imperative that both feedstock supply and battery manufacturing capacity grow commensurately, otherwise clean energy progress could be slowed. *(Read more about storage in the Technology section.)*

PUBLIC POLICY AND CLIMATE

AEP has long maintained that domestic climate policy can be best implemented through comprehensive Federal legislation that covers all sectors of the economy. This will ensure that emission reductions are appropriately scaled for cost-effectiveness and that everyone has a collective role in reducing emissions.

AEP looks forward to working closely with U.S. President Joe Biden and his administration on climate policy. AEP urges President Biden and his team to carefully evaluate what might be required for moving from an economy that is powered by greater than 60% fossil-based electricity to one that is 100% clean energy — and for doing so in only 15 years. We are concerned that the costs would be extremely high and that the new sources of power that would be needed simply cannot be developed and integrated in such a short period of time. Nevertheless, we believe that a path to a 100% clean energy future is within our grasp. It will take a major national commitment of the magnitude rarely seen in our modern history, and we will work with the Biden administration to develop practical and effective solutions.

Comprehensively addressing climate change will require fundamental structural changes in how we use energy and materials. Since carbon emission objectives will require development of new technologies or accelerated deployment of specific technologies at a new scale, climate policy also should provide significant and appropriate financial and regulatory incentives to ensure that technologies can be cost-effectively deployed when needed.

In terms of program design, AEP prefers a cap-and-trade system or a clean energy standard (CES). A CES offers clear advantages and lower costs for our customers. A CES requires customers to pay only for the cost of compliance, which would be achieved by either building clean energy resources or purchasing power from non-emitting generation. Conversely, a carbon tax requires customers to pay for the cost of cutting emissions and pay a tax on remaining emissions.

It is important that a CES provide partial credit for natural gas in the near-term as well as full credit for nuclear. In the first decades of such a program, natural gas and nuclear are critical to providing "firm" energy sources to support intermittent renewable energy. For example, the system must be robust and able to fully power the economy in the most severe winter storms. In the later stages of a CES, when the percentage of clean power approaches 70% or more, the nation will depend on sources of power that are now not fully developed and cost-effective. These include carbon capture, utilization and storage (CCUS) for natural gas, advanced energy storage, and new power sources that are today more conceptual than reality, such as the use of hydrogen. It will take decades to develop those new technologies to support a clean energy economy and require a federal research and development program and coordination with the energy sector that would be unprecedented in scope and scale.

Additional policy considerations should include the removal or replacement of duplicative or overlapping GHG regulatory requirements currently existing under the Clean Air Act (CAA) with passage of comprehensive federal climate legislation. Specifically, the legislation should contain provisions that exempt all stationary sources from GHG regulation under the CAA, including any existing and future rules. Duplicative and overlapping regulations increase the costs of developing clean energy without commensurate environmental benefits.

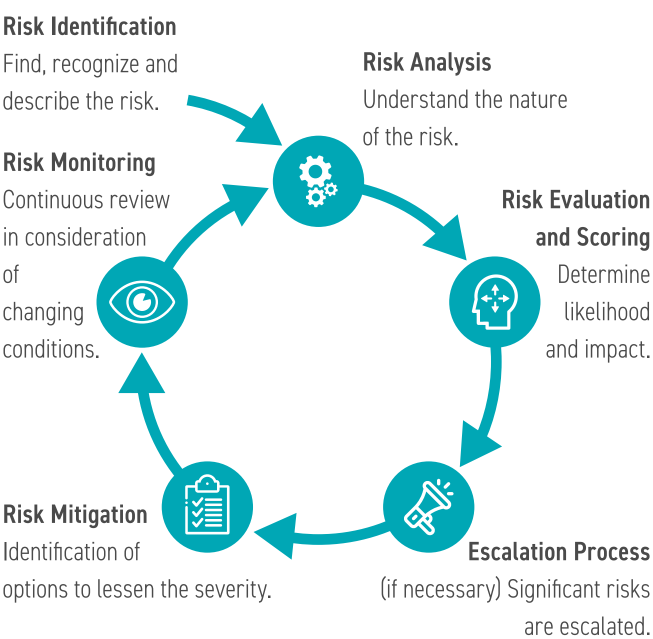
MANAGING AND MITIGATING RISK

Enterprise Risk Oversight (ERO) defines and oversees the consistent application of AEP's risk management process in coordination with our business units and operating companies. The risk management process helps us identify strategic, financial, operational and regulatory risks, assess the threats and controls, evaluate the risk, plan mitigation strategies and monitor risks for changing conditions.

Risks are reported by business units or operating companies to the Enterprise Risk Oversight group. The Chief Risk Officer reports a summary of risks to the Risk Executive Committee, which consists of senior leaders, to illustrate risk ranking and planned mitigations. This summary of risks is then discussed and reviewed by the Audit Committee of the Board of Directors.

In evaluating risk, AEP considers potential events that could affect our business. In 2019, climate change was assessed using AEP's risk management framework and added to the summary view of risks reported to the Risk Executive Committee and Audit Committee. The physical impact assessment of climate change and the climate change transition scenario analysis will provide additional detailed insights into future risk assessments for our assets and facilities.

Risk Impact Assessment



AEP's Structured Risk Framework

Strategic	These are risks that affect our long-term or overall business goals and ability to achieve them.
Financial	Potential risks that affect our financing needs, financial standing, and/or reporting requirements.
Operational	Those risks that affect our ability to operate the power grid.
Regulatory	Risks that can affect our legal and compliance requirements.

For purposes of this report, climate change was examined through two separate lenses — physical risk and transition risk with unique causes, controls, and recovery measures examined within the broader climate risk categories.

While we can't predict exactly what will occur or when, our experience and risk management activities across the organization will enable us to make sustainable and strategic decisions to prevent, prepare and recover.

INSURANCE RISK

AEP's Risk and Insurance Management team uses a combination of purchased insurance and self-insurance to mitigate the adverse financial impact of accidental losses such as floods and wildfires. We purchase several types of coverage to mitigate different loss exposures. For example, AEP recovered $18 million from its property insurance carriers due to ensured losses caused by Hurricane Harvey.

We also maintain liability insurance, which has become a significant concern due to increased frequency of wildfire losses allegedly caused by utility operations. Should climate change result in increased frequency or intensity of insurable losses, our insurance products will play a role in mitigating the financial impact of these events.

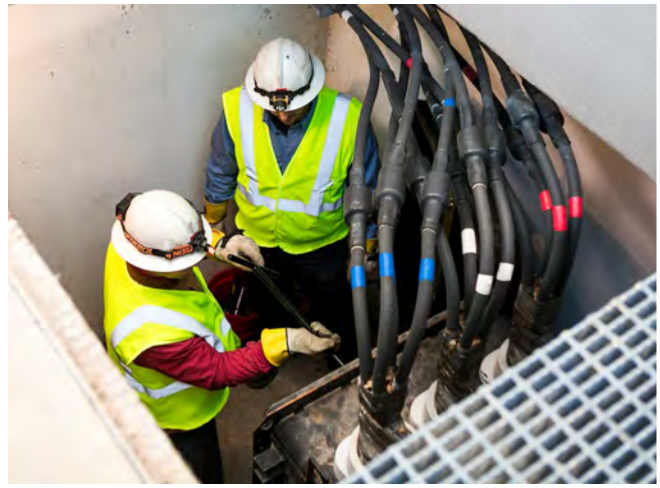
Insurance companies are beginning to restrict the coverage available to companies with coal-fueled generation exposure and setting restrictive thresholds for their portfolios. The insurance companies that provide our coverage are increasingly weighing climate change risks and evaluating AEP's exposure to more frequent hurricanes, floods, storm surges and wildfires. Losses that are insurable today may become uninsurable in the future. For example, many insurance carriers now exclude liability coverage for California wildfires due to their recent frequency and severity.

ENTERPRISE RESILIENCE

Identifying and managing risk is only one part of the equation. It is equally as important to be prepared in the event a worst-case scenario — such as the loss of a data center — occurs. AEP's Enterprise Resilience team is charged with sustaining the enterprise's emergency management and business continuity capabilities. Our Emergency Management Core Plan aligns with the National Incident Management System and adopts the principles of the incident command system, which government agencies across the U.S. use to respond to local emergencies and large disasters. AEP's emergency management framework is an integral part of how we efficiently respond to and manage events to keep critical operations functioning.

The Enterprise Resilience team works closely with ERO to identify the drivers that could trigger an event; the controls for preventing it or reducing the frequency of it occurring; and mitigation strategies if it does happen. We try to anticipate high-impact, high-probability events to prepare for and to limit the negative consequences. We've established business-unit-based and hazard-specific plans aligned to our emergency management framework to manage response and prioritized recovery plans to maintain business continuity.

Building resilience into the power grid helps to mitigate physical damage and customer outages, and protects business operations and infrastructure. AEP's transmission and distribution systems are building system redundancies to reroute power in the event portions of the grid are temporarily disabled. AEP's modern underground monitoring system is one of the nation's most robust monitoring systems for urban underground distribution networks. The advanced network monitoring provides real-time visibility and control of AEP's underground distribution network assets in 15 cities and is enabling us to perform risk-based decision-making to ensure resilience.



AEP's Underground Network enables AEP to collect, communicate and use information and data to support operation of the distribution grid. It provides real-time monitoring to help discover network issues before they cause costly systemwide problems, adding a dimension of operational resilience to the system.

AEP's Enterprise Resilience program ensures that processes and workarounds are in place to minimize the impacts of losing facilities, technology, critical skill sets and internal/external dependencies. For example, if we lose access to one of our Distribution Dispatch Centers, we can transfer operations to another facility and have some employees perform work from home. Our Emergency Management Core Plan, response plans and business continuity plans help to bolster our resilience, and we routinely practice our response and recovery capabilities through a culture of preparedness.

Potential Financial and Business Impacts from Climate Change

Potential Climate-Related Risks and Opportunities	Potential Financial/Business Impacts
Transition Risk	
Policy/Legal • Increased pricing of carbon emissions or adoption of a carbon tax • Enhanced or mandated emissions reporting requirements (new regulations) • Exposure to litigation	• Increased operating costs (e.g., higher compliance costs, insurance premiums, etc.) • Increased cost to customers • Asset impairment • Erosion of brand, reputation
Technology • Advanced technologies not mature or commercially available • Costs associated with transition to new technologies • Phase-in of more stringent lighting efficiency and appliance standards, and building codes	• Accelerated early retirements of existing assets • Reduced demand for products, services • Ability to recover costs • Costs to adopt/deploy new technologies • Higher standards that could have pronounced effect on energy consumption, affecting revenue
Market • Changing consumer behaviors • Uncertainty in market signals • Distributed energy resources growth (e.g., installed solar or storage costs decline)	• Reduced demand due to changing consumer preferences • Increased production costs • Fuel prices that affect the economic dispatchability of units • Net-metering constructs that provide customers excess monetary credit for self-generation and don't account for grid use
Reputation • Shifts in consumer preferences • Increased negative stakeholder reaction/feedback	• Reduced revenue from decreased demand for products/services • Reduced revenue from decreased production capacity • Availability of cost-effective capital • Erosion of brand, image • Erosion of customer satisfaction • Negative effect on new business development

Potential Financial and Business Impacts from Climate Change

Risks and Opportunities	Potential/Business Impacts
Physical Risk	
• Increased severity and/or frequency of extreme weather events such as hurricanes and floods • Changes in precipitation patterns and extreme variability of weather patterns • Rising sea levels • Extreme changes in temperatures • Water temperatures in lakes and cooling ponds increase	• Increased capital costs from loss of or damage to facilities (substations, office buildings, service centers, poles, etc.) • Loss of productivity in extreme weather that could cause loss of revenues (absenteeism, reduced work hours, etc.) • Reduced revenue from lower production capacity • Increased operating costs (e.g., inadequate water or too much water for hydro facilities; replacement parts for equipment) • Supply chain disruptions • If incoming water temperature gets too high, it can result in reduced cooling water efficiency and reductions in steam-electric generation
Opportunities	
• Fleet electrification • EV adoption • Reduced water usage/consumption with coal retirements, particularly in high-stress regions • Use of more efficient production and distribution processes, technologies • Use of low-to-no carbon emitting generation resources • Development and/or expansion of low-emission goods and services • New climate adaptation solutions • New energy and data platforms • Broadband (middle mile) • Smart City applications	• Increased demand and revenues • Customer satisfaction • Reduced operating costs • Increased value of fixed assets • Increased production capacity • Reduced operational costs • Reduced exposure to fuel market pricing • Reduced exposure to GHG emissions and less sensitivity to cost of carbon • Increased capital availability • Enhanced reputation, brand • New revenue opportunities • Better competitive positioning to reflect changing customer preferences, resulting in new/increased revenues • Increased market valuation through resilience planning (e.g., infrastructure, buildings, etc.) • Increased diversification of financial assets (e.g., green bonds) • Supply chain reliability and ability to operate under various conditions

METRICS AND TARGETS

Metrics used to assess climate-related risks and opportunities are in line with AEP's strategy

INCENTIVE COMPENSATION TIED TO CARBON-FREE CAPACITY

Long-term incentive plans (LTIP) are designed to promote the interests of the company and its shareholders by strengthening AEP's ability to attract, motivate and retain employees and directors; to align the interests of AEP's management and directors with those of shareholders; and to provide additional incentive for employees and directors to contribute to the financial success and growth of AEP.

In 2020, AEP adopted a new long-term incentive plan for the company (excluding the Board of Directors) that supports the company's clean energy transition and is aligned with increasing carbon-free generation capacity in the AEP fleet. The plan is measured in a three-year cycle, with the expectation that future targets will improve substantially as we execute on our clean energy strategy.

Carbon-free Generation Capacity (10% weight): the percentage of total AEP-owned generating capacity and capacity acquired through power purchase agreement (PPA) at the end of the performance period.

Carbon-free capacity includes nuclear, hydro, wind, solar, demand-side management (energy efficiency and demand response) and energy storage.

Performance will be measured as a percent of total AEP-owned and PPA generation capacity. At the time the goal was set, carbon-free generation capacity was 26.5% of total capacity. Awards are measured according to the achievement of performance milestones:

- Threshold: 30.15% of total non-emitting capacity. This includes all known plant retirements, sales and PPA expirations plus all regulator-approved items as of February 2020 and 156 MW of competitive renewables under construction.
- Target: 31.67% of total non-emitting capacity. Includes all threshold items plus 675 MW of additional non-emitting generation capacity, assuming no additional plant retirements.
- Maximum: 33.89% non-emitting capacity. This includes all threshold items plus 1,044 MW of additional non-emitting generation capacity, assuming no additional plant retirements.

New Carbon Emissions Reduction Goals

80%
reduction by 2030

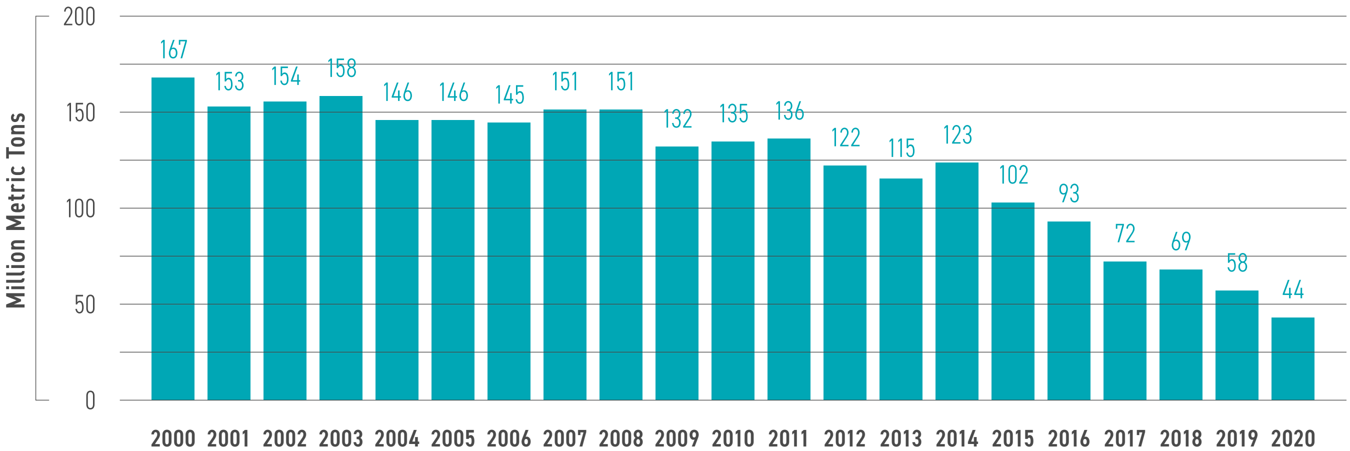
Net-Zero
by 2050

Goals are from a 2000 baseline.

CARBON PRICING IN INTEGRATED RESOURCE PLANS

Integrated Resource Plans (IRPs) are planning documents that allow utilities to plan for future needs to meet peak loads and energy obligations for a period of time, such as 15 years, and they are based on the best information available at the time they are prepared. They are planning documents and are not intended to represent firm commitments or financial decisions about specific future generation resources.

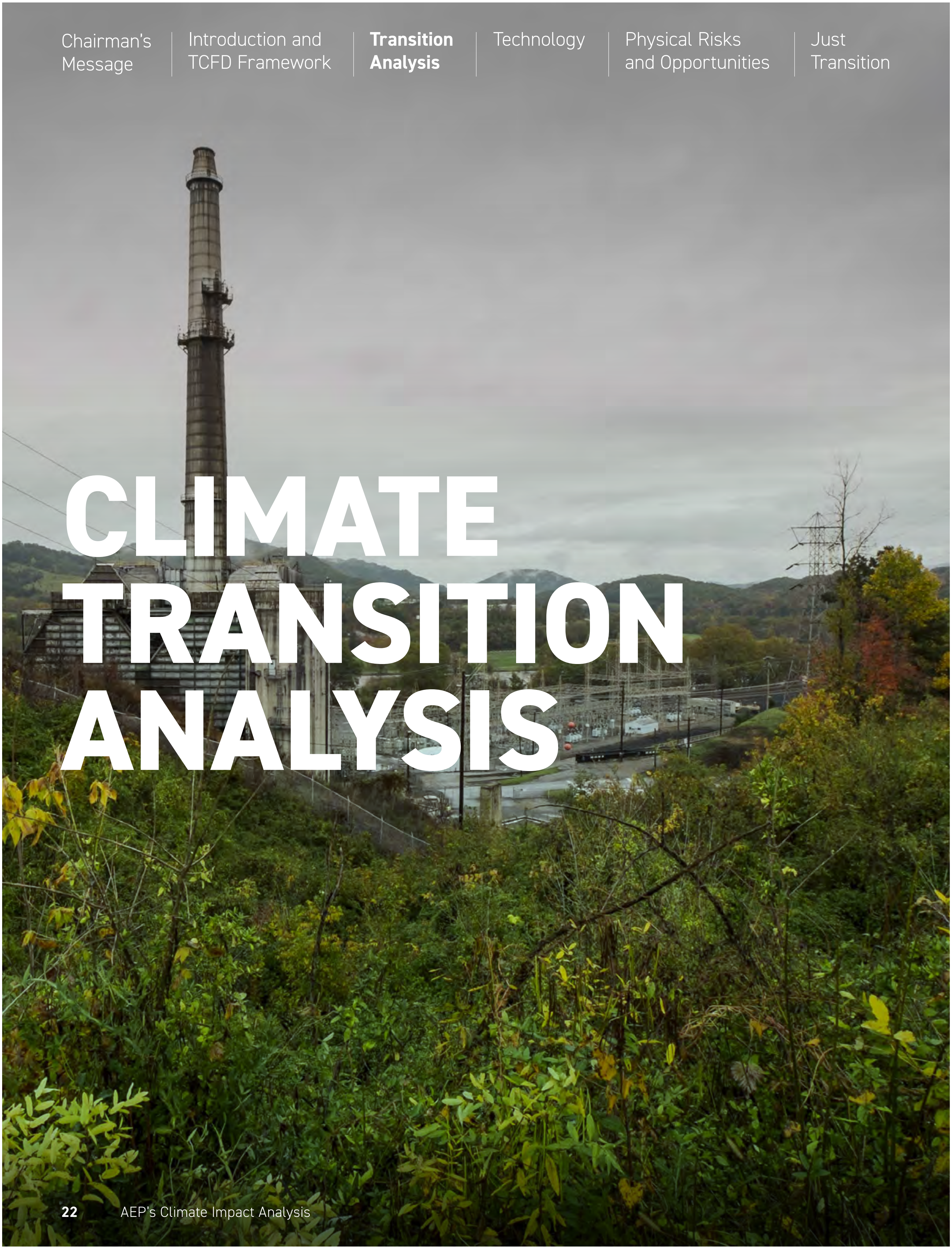
Total AEP System — Annual CO_2 Emissions



AEP has integrated a carbon price in its commodity forecasting as a proxy for future climate regulation. The carbon price begins in 2028 at approximately $15/metric ton of CO_2 emissions, escalating at 3.5% per year on a nominal basis. In the Fast Transition scenario for this report, we used a carbon price beginning at $30/metric ton, which escalated 3.5% per year on a nominal basis.

DISCLOSURE OF GREENHOUSE GAS (GHG) EMISSIONS

AEP discloses greenhouse gas emissions in absolute and intensity-based form on an annual basis. Our baseline year is 2000. We measure and report our year-over-year progress toward reducing carbon emissions. For a comprehensive view of AEP's emissions profile, please visit the ESG Data Center for the most current data.



CLIMATE TRANSITION ANALYSIS

TRANSITION SCENARIO ANALYSIS

AEP developed three different scenarios to assess potential climate change transition impacts:

Business As Usual (BAU)

- Our current generation plans, as informed by our Integrated Resource Plans (IRPs) with a $15/ton + 3.5%/year carbon price beginning in 2028.

Fast Transition (accelerated CO_2 reduction)

- BAU plus accelerated AEP coal retirements with a $30/ton + 3.5%/year carbon price beginning in 2028.

100% Clean Energy (aggressive CO_2 reduction)

- Fast Transition case plus additional coal retirements, restrictions on natural gas build and 100% Clean Energy by 2050.

Note: As described later, modeling of the 100% Clean Energy scenario was not fully completed due to challenges with the models and input constraints. The Fast Transition scenario resulted in de minimis emissions for AEP and is the most plausible clean energy scenario at this time. Both the BAU and Fast Transition scenarios would require offsets for the remaining carbon emissions to get to net-zero. The process identified significant modeling and input constraints that will be addressed in future work. This is our first attempt at this type of modeling and we expect future efforts will provide greater clarity.

INTRODUCTION

As we transform our generation portfolio to support a clean energy economy, we are mindful of the impacts this has on our customers, communities, employees, and environment. To be successful, the transition to a lower-carbon economy needs to include significant changes to public policies and regulations; research, development and deployment of new technologies; market shifts; and energy conservation. These may pose varying degrees of financial, operational and reputational risks for AEP and its stakeholders.

Because AEP has made significant progress toward achieving this transition, we have accelerated our carbon reduction goals to achieve an 80% reduction by 2030 (from a 2000 baseline) and net-zero emissions by 2050. To understand what it would take to get there, AEP conducted scenario modeling and analysis in line with the Task Force for Climate-related Financial Disclosure (TCFD) recommendations. The results we share in this report provide insights into the cost, pace, and scale of actions that would be required to achieve these goals.

SCENARIO PLANNING

Scenario modeling is a process by which alternative futures or assumptions are considered to provide insights on strategic directions in the face of uncertainty. In developing our transition scenarios and our approach to analysis, we evaluated potential pathways for greenhouse gas mitigation through potential changes in AEP's generating fleet, which represent the bulk of AEP's emissions. We also considered existing and future technologies and resources that would enable the transition to net-zero. We used a carbon price as a proxy for regulations, as we do in our IRPs, and developed market assumptions, such as the price of wholesale power.

AEP evaluated potential climate transition scenarios that could be indicative of possible future GHG emission reduction strategies and the associated electric generation profiles for each. Following is a description of the scenarios, inputs to the models, outcomes and associated implications for customers, the role of technology, new fuel sources, public policy and regulatory considerations, and potential costs.

The scenarios were modeled through 2050. AEP did not consider changes to the distribution or transmission grid that might be needed due to changing customer load and resource mix. Those changes will be examined in future modeling, in conjunction with entities responsible for reliability of the bulk electric system (e.g., Regional Transmission Operators), as generation resource changes become more clear. Our focus for this exercise was on AEP's generation fleet.

Scenario Assumptions Table

Parameter	Business As Usual (BAU)	Fast Transition	100% Clean
CO_2 Price	$15/ton + 3.5%/yr, starting in 2028	$30 + 3.5%/yr, starting in 2028	100% Clean Energy Mandate
Energy Efficiency	Embedded in Load	More Aggressive	Most Aggressive
Electrification	Some	More	Most
EV Penetration	BAU	Mid-Point	100% by 2050
AEP Coal Retirements	Book Life	Book Life Less 5 yrs or 2040	N/A
Technology Costs	EIA (see table)	EIA (see table)	EIA (see table)

The table shows the three scenarios AEP developed for this exercise. The third scenario — 100% Clean Energy — was tabled after several attempts to model it failed to produce credible or realistic results. For the purposes of being transparent, we are showing the assumptions that were used in that scenario. We intend to pursue this in future scenario analysis work.

The use of scenarios helps us to better understand the medium- and long-term challenges of the low-carbon transition. Transition scenarios consider possible changes in socio-economic systems that could cut GHG emissions and limit temperature rise to 2°C or 1.5°C. The scenarios AEP developed are consistent with the Paris Agreement. In addition to modeling plausible pathways to a low-carbon future, AEP also examined the potential physical impacts *(see Physical Risks & Opportunities)* and social aspects related to retiring coal units *(see Just Transition)*.

These scenarios may be indicative of AEP's future generation profile. However, they are not meant to predict the future; rather, they are simply "plausible representations of uncertain future states." The output from our scenario modeling provides a future snapshot of what may occur given different variables, such as changes in support for more aggressive emission reduction goals and what is plausible for others, not necessarily those futures likely to occur. AEP is not drawing conclusions about the likelihood of any of the scenarios. The intent is to capture the relationships between human choices, emissions and the availability of electricity supply alternatives to ensure a reliable, secure and resilient power grid that meets society's needs.

In each of the three scenarios, there are specific assumptions around constraints on emissions or clean energy requirements. However, there may be multiple policy mechanisms to reach these scenario outcomes. Our analysis was guided by the TCFD framework, setting specific parameters related to geography and macro-economic variables. Also in accordance with TCFD, we developed assumptions related to technology development/deployment, energy mix, price of key commodities or inputs, timing of potential impacts, and potential policy changes. Finally, we considered which scenarios to use as a guide, time horizons, and supporting data and models.

In addition to the assumptions above, for the Fast Transition scenario AEP assumed that the Donald C. Cook Nuclear Plant would extend its operating license for a third time.

METHODOLOGY

AEP focused its transition scenario modeling on its vertically integrated utilities, which have an obligation to serve customers either through owned generation or power purchased on their behalf. Fossil-fueled generation represents the majority of AEP's carbon footprint, and thus it is the most exposed to climate transition impacts. Other parts of AEP's business, including its competitive subsidiaries, and transmission-only business units

AEP has retired or sold nearly 13,500 MW of coal-fueled generation in the past decade. We recently announced plans to retire an additional 4,264 MW of coal generation between 2021 through 2030, which includes the Rockport Plant Unit 1, pictured above.

were not included in this scenario analysis. While these businesses stand to benefit from new opportunities in a clean energy economy, it would be highly speculative to quantify what those opportunities might be. In addition, AEP has already announced the retirement of its last remaining coal-fueled unregulated generating asset in 2030 and has no future plans to add grid-scale fossil-fueled resources to its competitive portfolio. By 2040, all of AEP's regulated coal-fueled power plants would be retired under the Fast Transition scenario.

AEP relied on its internal resource planning experts to examine possible climate transition scenarios. We have extensive experience planning to meet the resource and capacity needs of our customers in the future through our IRP process. The IRP process seeks to develop a utility-specific plan that balances customer electricity demand with the required generation resources that represent the least-cost option for customers. In many cases, these plans present more than one scenario (similar to this analysis) to inform regulators and stakeholders about the costs, impacts and tradeoffs of alternatives. While IRPs are meant to seek to match customer activity with resource needs, they are not prescriptive. Rather, they provide a framework for determining energy and capacity needs and identifying cost-effective options while leaving final selection and approval to state utility regulators. The IRPs are reevaluated periodically to ensure they continue to meet customers' needs.

In developing our transition scenario analysis, AEP took an enterprise-wide view of our vertically integrated operations. Aggregation of AEP's footprint was necessary because of the complexity of the scenarios, significant uncertainties in assumptions, and computational constraints. This is an important distinction as the scenario results should not be viewed as directly applicable to an individual utility subsidiary's integrated resource plan.

We did rely on the same models, resources and staff who normally develop IRPs for our operating companies to develop these scenarios. We believe this work will inform future IRPs, opening new dialogue about AEP's future generating resource mix with regulators and other stakeholders.

LOAD FORECASTING

The first step in creating a resource plan is to forecast, or predict, future customer load. Load forecasting plays an important role in power system planning, operation and control. Load forecasts include a series of underlying forecasts that build on one another. An economic forecast provided by Moody's Analytics is used to develop a customer forecast, which is then used to develop a sales forecast, which is ultimately used to develop a peak load and internal energy requirements forecast. In the case of the 100% Clean Energy and Fast Transition scenarios, the forecasts were adjusted to account for potential changes in load that could result from changes in public policy and/or consumer behavior. The load forecasts were developed using a combination of external data and internal resources.

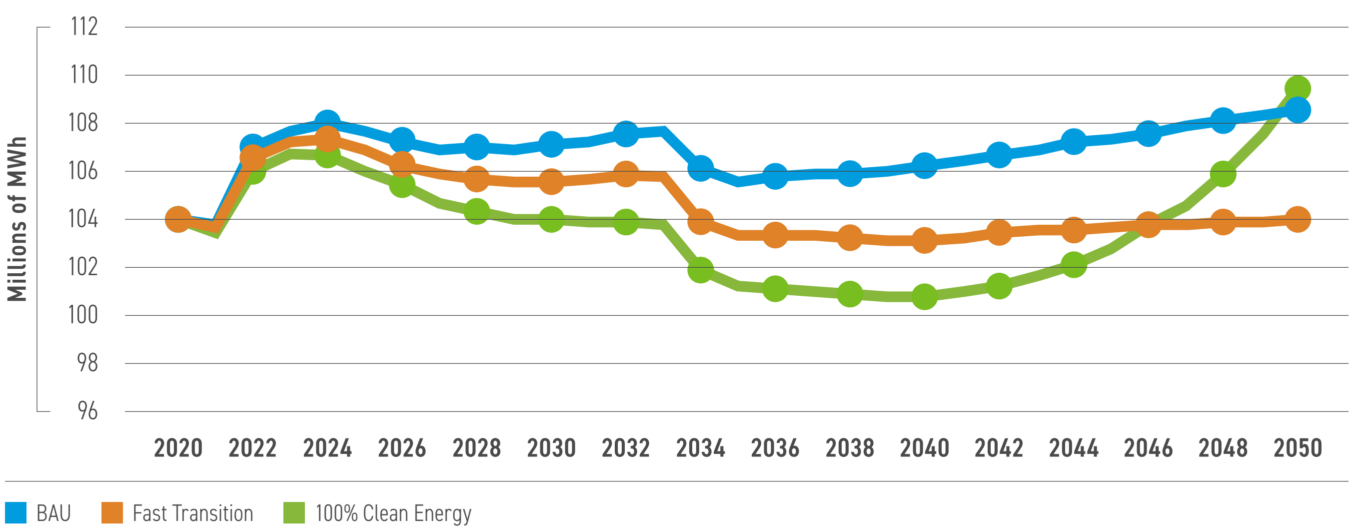
These forecasts take into account various changes in the economy, households, appliance efficiency, energy use, and consumer behavior over time. The impacts of energy efficiency (EE) and demand-side management (DSM) are also embedded within the forecasts. AEP included more optimistic assumptions about DSM/EE measures in both the Fast Transition and 100% Clean Energy scenarios. We rationalized that the transition to a clean energy economy would foster increased adoption of these measures, either mandated or induced.

Key Takeaways

The load scenarios produced some unique load changes with different assumptions. First, within the Fast Transition and 100% Clean Energy scenarios, overall load initially declines from the Business As Usual scenario. This can be attributed to assumed reduction in overall fossil fuel demand consistent with the clean energy transition. AEP's service territory has a high concentration of fossil fuel extractive and processing industries, and, as they reduce their output, electricity consumption also declines. The indirect impacts include reductions in labor force and associated wages, disposable income and other economic activity as these industries reduce operations or shut down completely. The Fast Transition and 100% Clean Energy scenarios include more aggressive assumptions for increased energy efficiency adoption, which also reduces demand.

At the same time, the scenarios show countercurrents that drive increased demand as electrification grows. Presuming carbon emissions mitigation/reduction will accelerate, we assumed that increased adoption, deployment and use of electric vehicles (EVs) would follow. It is expected this would occur through a

AEP Vertically Integrated Load



combination of public policy, economics and consumer preference.

In the 100% Clean Energy scenario, 100% of light-duty vehicles are assumed to be replaced by EVs by 2050. However, the speed of the change will be gradual. It is likely to take decades to achieve full conversion due to the long turnover rate of conventional vehicle stock. In addition, AEP's service territory is more rural in nature with household incomes that are largely below the national average — factors likely to affect the pace of EV adoption.

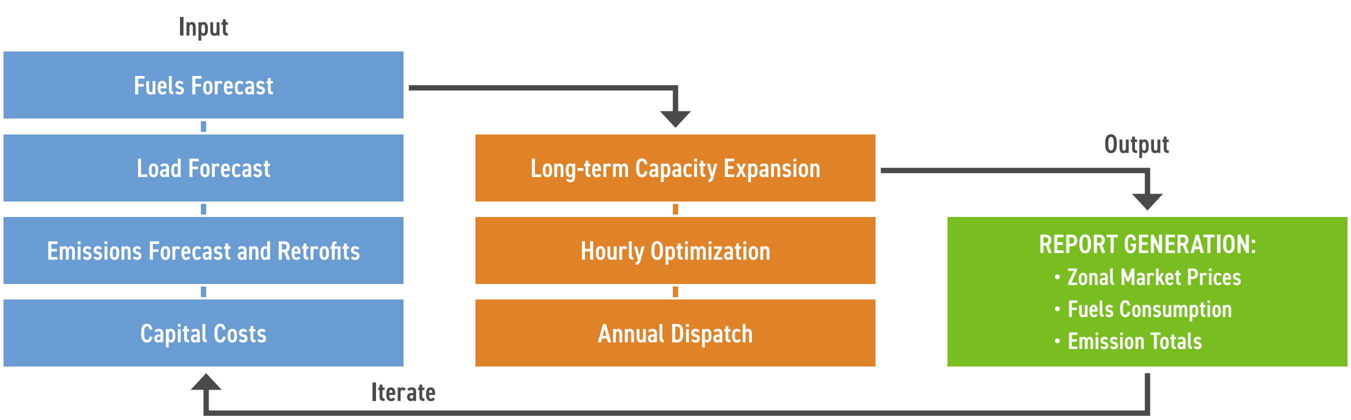
FUNDAMENTALS FORECAST

Underlying the resource planning process is the Fundamentals Forecast, which is a long-term, weather-normalized commodity market forecast. AEP's operating companies use the Fundamentals Forecast for fixed asset impairment accounting, capital improvement analyses, resource planning and strategic planning. These projections cover the electricity market within the Eastern Interconnect, which includes the Southwest Power Pool and PJM, where AEP's vertically integrated utilities are located. The Fundamentals Forecast includes:

- Monthly and annual regional power prices (in both nominal and real dollars)
- Prices for various qualities of Central Appalachian (CAPP), Northern Appalachian (NAPP), Illinois Basin (ILB), Powder River Basin (PRB) and Colorado coals
- Monthly and annual locational natural gas prices, including the benchmark Henry Hub
- Uranium fuel prices
- Sulfur dioxide (SO_2), nitrogen oxide (NOx) and carbon dioxide (CO_2) values
- Locational implied heat rates
- Electric generation capacity values
- Renewable energy subsidies
- Inflation

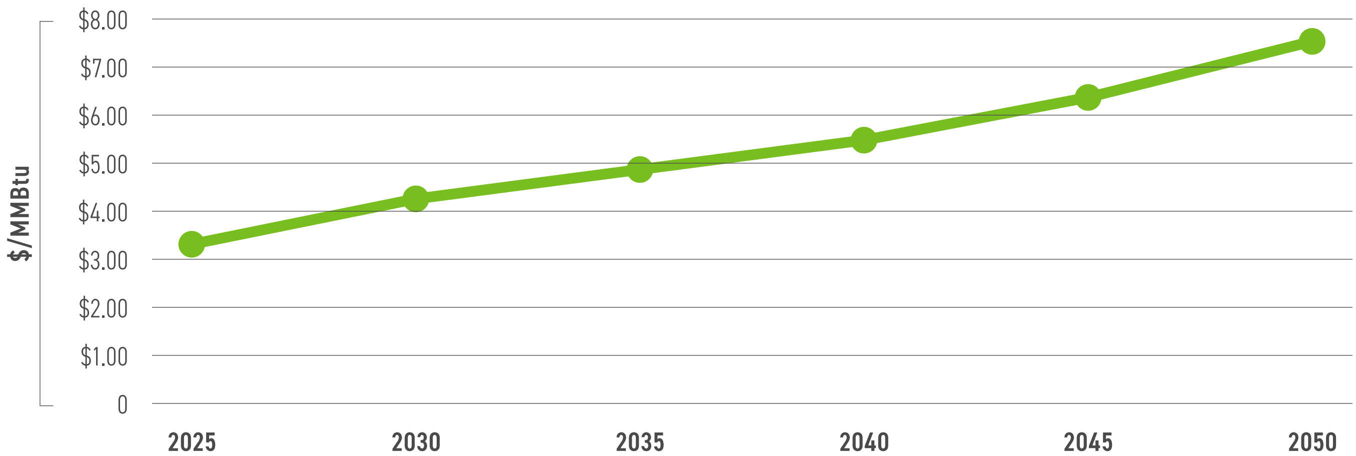
The primary tool used for the development of the North American long-term energy market pricing forecasts is the Aurora energy market simulation model. The Aurora model is widely used by utilities for integrated resource and transmission planning, power cost analysis and detailed generator evaluation. It iteratively generates zonal, but not company-specific, long-term capacity expansion plans, annual energy dispatch, fuel burns, and emissions totals from inputs that include fuel, load, emissions, and capital costs, among others. Ultimately, Aurora creates a weather-normalized, long-term forecast of the market in which a utility operates. We also have access to extensive energy market research information, including third-party consultants, industry groups, governmental agencies, trade press, investment community, internal expertise, various stakeholders and others.

Overview of Aurora Modeling Process

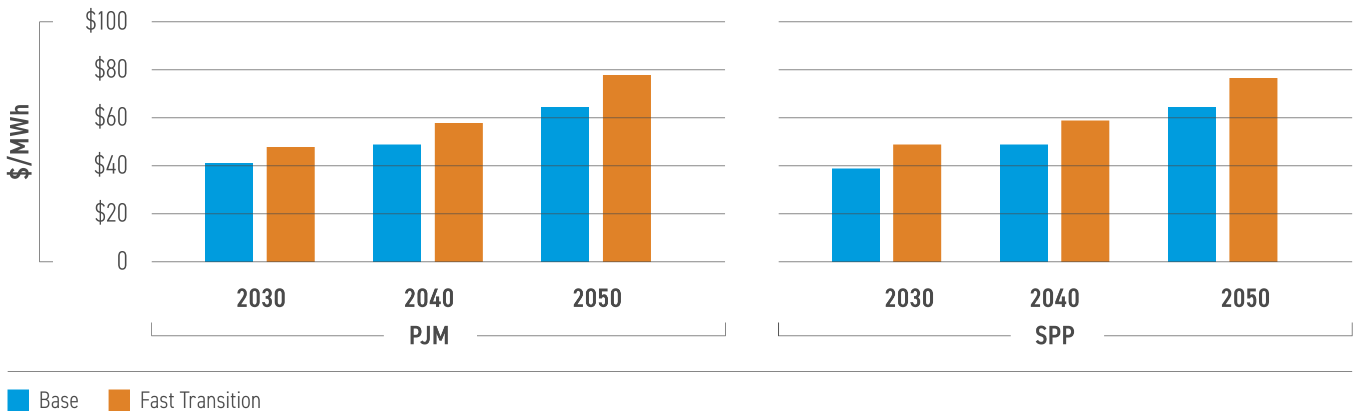


For purposes of this analysis, AEP mirrored the assumptions of the Annual Energy Outlook 2020 for most available parameters. The resulting natural gas prices and energy prices are shown in the following charts. AEP dispatches energy into two Regional Transmission Operators (RTOs) — PJM and SPP.

Natural Gas Price — Henry Hub



Average Power Prices



The BAU Fundamentals Forecast employed a CO_2 dispatch burden on all existing fossil-fueled generating units that escalates 3.5% per year from $15 per metric ton starting in 2028. The direct effect of a $15 per metric ton allowance price is equivalent to ~$15 per MWh increase in operating costs for a coal unit and $6 per MWh for a natural gas-fired combined cycle unit. The CO_2 burden was increased to $30 per metric ton in the Fast Transition scenario. The increase in carbon prices results in an uptick in power prices between the two scenarios.

MODELING 100% CLEAN ENERGY

We made the decision to defer modeling a 100% Clean Energy Scenario because the tool we use to project power market implications and pricing (Aurora model) became bogged down and was unable to solve the complexity of the scenario despite numerous attempts. The issue was rooted in not having adequate resources available to ramp up and down during the course of a day to meet swings in demand and to smooth out the variability of renewables. While energy storage was an allowed solution within the model, the added complexity of trying to balance demand with intermittent resources severely impacted the model's ability to solve.

The scenario required zero carbon emissions from generation by 2050, and in some states before 2050, with no opportunity for offsets and insufficient information on the costs and efficiency of anticipated new carbon-free technologies. The results created more questions than answers, producing an unrealistic market dispatch and prices. There also were challenges with using a 100% clean energy constraint without causing unintended consequences, such as negative energy prices. These challenges highlighted the current policy and regulatory framework governing bulk electric supply that will need to be significantly adjusted moving forward.

Following several attempts to adjust the model, and given that our other two scenarios were consistent with a low-emission future, we opted to stop modeling this scenario until we can further refine our tools and assumptions. We intend to pursue future modeling of this scenario as part of our ongoing analysis of climate change impacts to AEP, which will be integrated with our strategic planning and enterprise risk management processes.

RESOURCE PLANNING/GENERATION SCENARIOS

The results of the Aurora model were used to populate a second model that allows us to evaluate generation supply options available to meet customer load. The Plexos® LP long-term optimization model, also known as "LT Plan®," enables us to evaluate capacity requirements for each of the three scenarios. The LT Plan® finds the optimal portfolio of future capacity and energy resources by finding a solution that minimizes generation costs over the planning horizon. By minimizing costs, the model will provide optimized portfolios with the lowest and most stable customer rates while adhering to the company's constraints. Low, stable electricity rates benefit all customers and regional economies by attracting new and retaining/expanding commercial and industrial customers.

To achieve the best solution, Plexos® is designed to minimize the aggregate of capital and production-related (energy) costs of the resource portfolio. These include:

- Fixed costs of capacity additions, i.e., carrying charges on incremental capacity additions (based on a weighted average cost of capital), and fixed Operation & Maintenance (O&M) costs;
- Fixed costs of any capacity purchase;
- Variable costs associated with AEP's generating units. This includes fuel, start-up, consumables, market replacement cost of emission allowances, and/or carbon "tax" and variable O&M costs;
- Distributed resources, which were valued at the equivalent of a full-retail "net metering" credit to those customers; and
- A "netting" of the production revenue earned in the PJM and SPP regional power markets from AEP generation resource sales and the cost of energy — based on unique load shapes from PJM and SPP and purchases necessary to meet AEP's load obligation.

In addition, Plexos® takes into account the following possible constraints that must be met:

- Minimum and maximum reserve margins;
- Resource additions (i.e., maximum number of units built);
- Age and lifetime of power generation facilities;
- Operation constraints such as ramp rates, minimum up/down times, capacity, heat rates, etc.
- Fuel burn minimums and maximums;
- Emissions limits on effluents such as SO_2 and NOx; and
- Purchased power contract parameters, such as energy and capacity.

Note: The Plexos® simulation tool does not develop a full regulatory Cost-of-Service (COS) or retail rate profile. Rather, it is a tool that considers the relative load and generation changes from a scenario. Fixed "embedded" costs associated with existing generating capacity and demand-side programs and changes to transmission and distribution requirements and costs, while important to customers and regulators, are not included.

EXISTING CAPACITY RESOURCES

Resource planning requires a demonstration of the capacity resource requirements. This "needs" assessment must consider projections of:

- Existing capacity resource — current levels and anticipated changes;
- Anticipated changes in capability due to efficiency and/or environmental considerations;
- Changes resulting from decisions surrounding unit disposition evaluations;
- Regional and sub-regional capacity and transmission constraints/limitations;
- Load and peak demand;
- Current demand response/energy efficiency; and
- RRO capacity reserve margin and reliability criteria.

Note: RRO is the Regulated Rate Option, similar to the traditional month-to-month method of paying for electricity.

The following chart shows the current coal resources available in the AEP scenarios. Of particular note, the Fast Transition scenario assumes that additional coal-fueled resources are retired prior to the end of their current expected lives. Any decision to retire remaining coal-fueled units prior to the end of their book life would be subject to regulatory approval.

For the purposes of this analysis, in addition to the coal-fueled generation retirements, we assumed that natural gas assets are retired at the end of their currently projected useful lives. Most of these assets are used in large part for their capacity attributes and do not run often enough to significantly contribute to overall emissions.

The objective of a resource planning effort is to recommend a system resource expansion plan that balances "least-cost" objectives with planning flexibility, asset mix considerations, adaptability to risk, and conformance with applicable NERC and RTO criteria. In addition, the planning effort must ultimately align with anticipated long-term requirements established by the EPA-driven environmental compliance planning process. Resources selected through the modeling process are not location specific. The three scenarios assume compliance with all environmental regulations that were final and in the Federal Register as of January 1, 2021. The only differences in environmental assumptions between the scenarios are around the constraints put on carbon or clean energy to allow for the evaluation of carbon transition pathways.

Coal Retirements*

Unit	Fast Transition	BAU
Amos 1	2035	2040
Amos 2	2035	2040
Amos 3	2035	2040
Dolet Hills		2021
Flint Creek	2033	2038
Mitchell 1	2035	2040
Mitchell 2	2035	2040
Mountaineer	2035	2040
Northeastern 3		2026
Pirkey		2023
Rockport 1		2028
Rockport 2		**
Turk	2040	2067
Welsh 1		2028
Welsh 3		2028

* Retirement occurs by end of listed year and dates prior to 2030 same across both cases

** Lease of unit assumed to be terminated per I&M IRP in 2022

NEW CAPACITY RESOURCES

New generation options available to Plexos® were the same as the Aurora model. The following table highlights the parameters modeled.

For this study, we took a unique approach to addressing less-well-defined energy technologies and opted to model them generically as a Dispatchable Non-Emitting Resource, or DNER. For this technology, we used the operating and cost profile of a small module nuclear reactor as a proxy for a number of technologies that could potentially meet that need. Given current uncertainties in technology development, deployment, performance and cost, we do not have high confidence that using specific assumptions for a variety of future technologies would accurately predict the actual generation sources to be included. The DNER proxy could include modular nuclear, future

AEP System New Generation Technologies (key supply-side resources option assumptions[1, 2, 3, 4])

	Capability (MW)[5]			Installed Cost[4, 6]		
Type	Std. ISO	Summer	Winter	$/kW)	Capacity Factor %	LCOE[7] $/MWh
Base Load						
Small modular reactor nuclear power plant, 600 MW	600	580	630	7,700	90	135.9
Ultra-supercritical coal with 90% CO_2 capture, 650 MW	650	630	690	6,700	75	174.5
Combustion turbine H class combined-cycle single shaft with 90% CO_2 capture, 430 MW	370	370	390	1,400	75	94.1
Combustion turbine H class, 1,100 MW combined cycle	1,080	1,060	1,110	1,100	75	52.6
Combustion turbine H class, combined-cycle single shaft, 430 MW	420	410	430	1,300	75	59.5
Peaking						
Combustion turbine F class 240 MW simple cycle	230	240	250	700	25	92.4
Combustion turbine aeroderivative, 100 MW simple cycle	100	110	110	1,200	25	118.9
Internal combustion engines, 20 MW	20	20	20	2,000	25	167.3
Intermittent						
Battery energy storage system, 50 MW/200 MWh	50	50	50	1,471	25	119.1
Solar photovoltaic with battery energy storage system, 150 MW x 200 MWh	150	150	150	2,003	24	82.1
Onshore wind, large plant footprint, 200 MW	200	200	200	1,370	35	38.8
Solar photovoltaic, 150 MWAC	150	150	150	1,420	25	56.8

[1] Costs and performance data informed by EIA report Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies (February 2020)

[2] Installed cost, capability and heat rate numbers have been rounded

[3] All costs in 2020 dollars, except as noted. Cost adjustments made based on EIA report Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies, Annual Energy Outlook 2020 – Region 11-(PJMW)

[4] $/kw costs are based on a summer capability

[5] All Capabilities adjusted by the Performance Adjusted Factors defined in the reference report[1]

[6] Total Plant Investment Costs w/AFUDC (AEP rate of 6.4%, site rating $/kw)

[7] Levelized cost of energy based on capacity factors shown in table

natural gas with carbon capture and sequestration options, renewables coupled with advanced energy storage, various hydrogen-to-electric pathways, or new technologies that have not yet been developed.

SCENARIO RESULTS

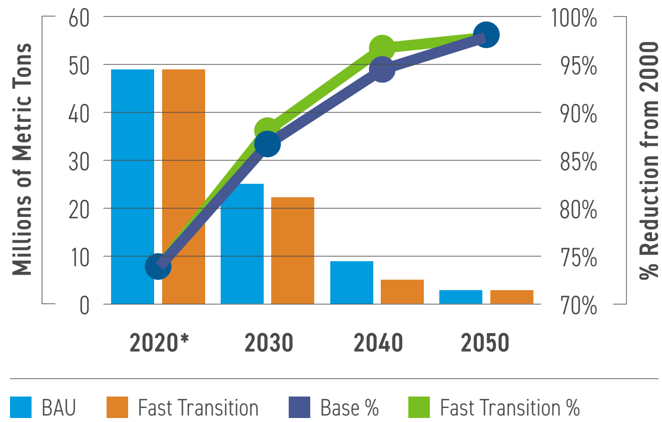
EMISSIONS

The scenarios developed represented a unique approach to examining potential carbon emissions and generating fleet changes for AEP's operations over time. With increased constraints on carbon emissions through carbon pricing and accelerated coal retirements, renewable energy dominated the future energy portfolio and emissions trended significantly lower. However, even in the BAU Case, emissions are projected to be only a small fraction of historic levels. This reflects AEP's current strategy to transition to clean resources. In both scenarios, emissions are reduced more than 90% below 2000 levels enterprise-wide by the mid-2030s.

With varied assumptions on carbon pricing, it is very possible to get to less than 5% of our 2000 CO_2 emission levels. However, we were not quite able to get to zero emissions given the assumptions. That is because the modeling required some level of natural gas-fueled capacity to provide energy, albeit in a very limited capacity. We will continue to seek a viable 100% clean energy scenario to model in future efforts, as we also look to advanced energy storage and green hydrogen to further reduce emissions.

The 100% Clean Energy option, although not completed in this exercise, provided important insights into what will be required and what still needs to be done to achieve net-zero carbon by 2050. The scenarios we developed and the outcomes of the BAU and Fast Transition scenarios are well-aligned with the Paris Agreement. Of course, this depends on assumptions around mitigation by other companies, sectors, and countries.

AEP CO_2 Emissions



Emission projections are for AEP's vertically integrated utilities only. Both scenarios arrived at >95% of historical emissions reduction by 2050. Under these scenarios, carbon offsets would likely be needed to achieve net-zero.

Note: 2020* data includes AEP's competitive fossil generation, which will be fully retired by the end of 2030.

GENERATION MIX

The changing assumptions regarding generating unit retirements and the stringency of carbon policy produced significant changes in the generating mix across scenarios. The following charts show the capacity and energy of the resulting generation mix. The capacity chart illustrates the share of total available resources to serve customers by fuel source. The generation chart represents how those resources are used to actually produce energy over the course of the year to serve customers.

Both scenarios show an increased build and utilization of wind and solar resources with a decreased reliance on coal and natural gas over time. The key distinction between the two scenarios is the pace of the transition. As expected, the Fast Transition scenario builds more renewable resources to displace fossil resources sooner.

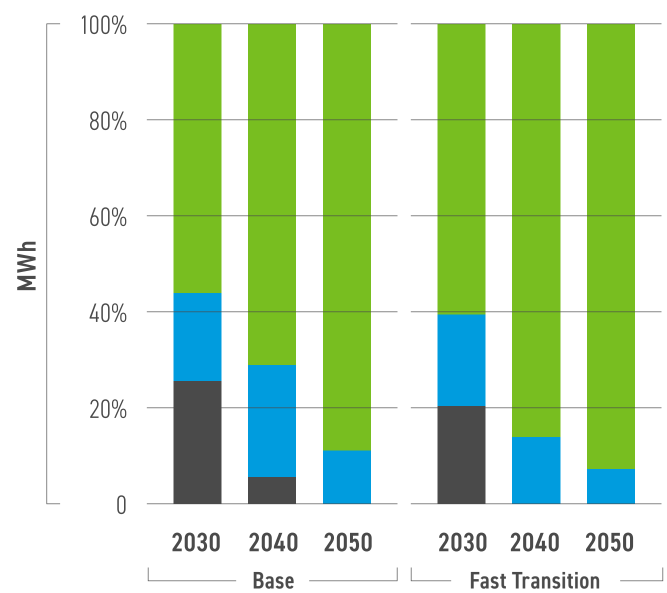
While natural gas continues to be used throughout the forecast period, the units being built and utilized are combustion turbines, which are mainly used as a fast-ramping resource to provide power at times of peak demand to meet capacity obligations. Their intermittent operation is not a significant contributor to the emissions profile, but they still do emit some carbon dioxide. These natural gas units could also be future candidates for refueling with green hydrogen to convert them to non-emitting resources. In addition, as we move toward net-zero carbon, these generating units could be replaced with other more expensive solutions, such as energy storage and carbon offsets. Carbon offsets would be generated by enabling emission reductions in other sectors of the economy that on balance would have the same net effect on climate change as direct emissions reductions from the electric sector. Examples of potential offsets include terrestrial carbon sequestration through biomass (e.g., tree-planting or avoided forest clearing) and direct-air capture of carbon dioxide combined with geological sequestration.

An unexpected outcome, based on the assumptions we used, was that the model did not select large levels of energy storage or the DNER. We believe this is because the model assumes it was more economic to rely on grid energy than to build storage or higher-cost dispatchable non-emitting resources. This could be problematic if other entities build a similar resource profile as AEP as there will be a need for additions in both energy storage and dispatchable low-carbon emitting power. AEP intends to conduct additional analysis of this issue and work with our RTOs to further refine assumptions around renewable penetration and the need for alternative electricity sources. AEP also will refine our modeling efforts to examine additional scenarios where energy storage and the DNER resources might have a more prominent role in the transition.

POLICY AND REGULATORY IMPLICATIONS

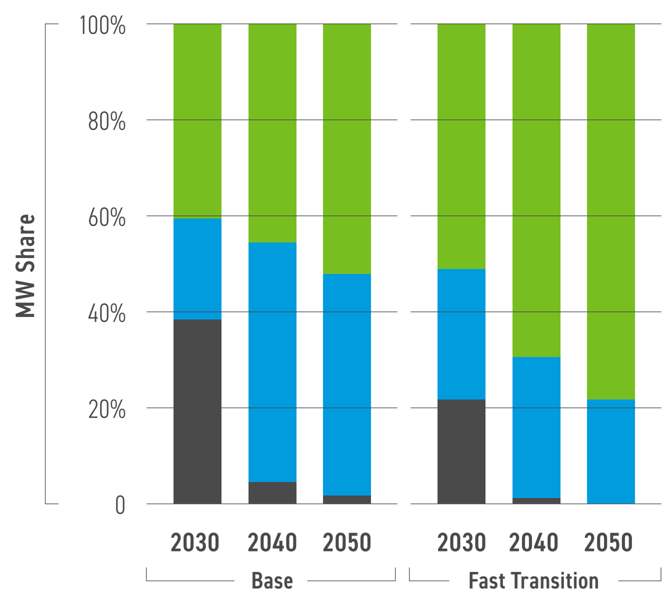
All of the pathways would require some level of regulatory or public policy changes. AEP cannot unilaterally make decisions about resources and emissions reductions without approval from regulators or legislative support. Decisions about the retirement of

AEP Generation Mix



IIncludes long-term PPAs; EE/DSM are factored into load forecast.

AEP Capacity Mix



Includes long-term PPAs; EE/DSM are factored into load forecast.

Coal | Natural Gas | Clean

aging coal-fueled assets and their replacement with clean energy require regulatory approval, particularly if their retirement is to be accelerated.

AEP has made substantial capital investments in its coal-fueled generating units to comply with environmental regulations. These units continue to provide around-the-clock reliable energy and capacity to serve customers. Early retirement of coal-fueled generation must ensure that customers are not unfairly burdened with additional costs and that AEP can recover its capital investments made on behalf of its customers, and approved by regulators, in an equitable manner.

TRANSITION OPPORTUNITIES

The scenario analysis highlights opportunities for AEP as we transition to a clean energy economy. Tens of billions of dollars in capital investments will be needed for new, clean energy infrastructure. This represents a significant opportunity to reduce carbon emissions, provide stable energy costs, and grow corporate earnings while also helping to insulate customers from variable costs associated with fossil fuels.

As the country transitions from fossil fuels to non-emitting resources, there also is an opportunity for the electric sector to provide cleaner energy to meet the energy demands of other sectors. Electrification, particularly of the transportation sector, will drive additional electric sales. With a higher volume of sales, fixed costs can be spread over a larger number of MWh, which can reduce electricity rates. Additionally, AEP would be able to grow top-line revenue, which can have financing and shareholder benefits.

There also are opportunities to invest in new technologies and resources and develop new services that support the clean energy transition, optimize operations, and meet emerging customer demands. Massive amounts of renewable energy will require additional transmission investment to move the energy and manage its intermittent production. Customer-centric solutions that support clean and resilient energy including microgrids, small-scale storage, and advanced communication networks also will be a part of the grid of the future.

CARBON GOALS

AEP is committed to an annual review of our carbon goals, as we learn more about developing technologies and resources, changing policies and regulations, and energy prices, among other factors. In 2020, AEP achieved a 74% reduction in carbon emissions (from a 2000 baseline) — exceeding our 2030 goal a decade ahead of schedule. Based on our most recent analysis, we are revising our carbon goals to cut more emissions sooner. This reflects the progress AEP is making toward a clean energy future, as we have accelerated our carbon emission reduction targets each of the past three years.

The decision to adopt a net-zero goal was made with the understanding that we don't have every step of the way mapped out. No one does. We do know that additional technology development will be critical and that it will be more expensive than near-zero, based on today's economics. We believe setting a net-zero goal is the right decision for AEP given the policy shifts related to climate change, and doing so will give us the opportunity to help shape our nation's clean energy future.

We are clearly on a pathway to net-zero carbon emissions, but how quickly that occurs and how much it will cost remains uncertain. This analysis represents our first in depth evaluation about how we might transition to net-zero operations. We have been an industry leader in technology, efficiency, and ingenuity for 115 years, and we intend to continue leading the way while addressing the challenges and opportunities presented by climate change.

TECHNOLOGY

ACHIEVING NET-ZERO CARBON: THE ROLE OF TECHNOLOGY

The path to a low-carbon energy future relies heavily on technological advances, non-emitting fuel sources, increased end-use electrification and energy efficiency, continued growth of renewables and distributed resources, and innovative and enabling public policies. AEP is exploring all options as we visualize and plan for a new energy economy that is as diverse as it is clean, economically sustainable, resilient, reliable and secure.

AEP'S POSITION ON ENERGY TECHNOLOGY

AEP believes it is important to fund basic technological research, and to support collaborative research development and deployment to further those technologies that show promise or are capable of being revolutionary. It is important to not pick winners prematurely and to allow a variety of technologies to mature or fail appropriately so we end up with well-proven solutions that balance environmental attributes, cost, and reliability considerations.

TECHNOLOGIES

RENEWABLE ENERGY

Mature renewable technologies include hydropower, wind and solar. For 140 years, hydropower has been widely used to generate electricity. In fact, it is one of the original sources of clean energy. However, a number of factors, including the lack of suitable locations and aging infrastructure, make substantial expansion of large-scale hydropower unlikely. Additionally, shifts in water availability if weather becomes more extreme (e.g., severe drought or flood/high water) would impact future hydropower generation. Alternative water-based technologies, such as tidal and wave-based energy conversion, are not quite commercially mature at this point nor do they have a high probability of serving AEP's needs, given the location of our service territory.

On the other hand, wind and solar are now commercially viable across the country. These technologies have advanced rapidly during the past several decades and now directly compete economically with fossil-fueled energy sources. In many cases, wind and solar resources are more cost-effective.

AEP's current resource development plan for 2020 through 2030 suggests that wind and solar will provide roughly 80% of new generation capacity to serve our customers. The greatest challenge with these technologies is the fact that they are highly dependent on backup resources in the absence of wind and sunlight. The shift to renewables is also highly dependent upon regulatory support. The intermittency of renewables also challenges the operation of the electric grid, which must constantly adjust to the ebbs and flows of renewables while meeting constant customer demand. Consequently, the need for 24/7 dispatchable energy and capacity resources will continue until cost-effective technologies such as energy storage can back up renewable energy sources.

In competitive markets where customers have a choice about their generation providers, AEP Energy's customer base that is choosing green energy options is growing.

Renewable energy plays a critical role in the transition to a clean energy future.

North Central Wind: Clean Energy, Energy Savings

In 2020, AEP's Southwestern Electric Power Company (SWEPCO) and Public Service Company of Oklahoma (PSO) subsidiaries received approvals needed to acquire 1,485 MW of new wind generation being built in Oklahoma. The approximately $2 billion investment will deliver clean, renewable energy to customers in Arkansas, Louisiana and Oklahoma and will save our customers in those states approximately $3 billion over the next 30 years. The project also will support local and regional economic and business development and help commercial and industrial customers meet their renewable energy goals.

Construction is underway on the 1,485 MW North Central Wind.

North Central Wind Facilities

The map shows the service territories of PSO (green) and SWEPCO (blue) that will be served by the North Central Wind in Oklahoma.

From 2015 – 2019, AEP Energy saw an 850% increase in Ohio residential customers enrolling in its Eco-Advantage 100% renewables product. These customers are choosing to invest in a renewable energy future, despite the fact that Eco-Advantage rates are often higher than their local utility's default rates. Through these offerings, customers have invested in 271,429 megawatt hours of green energy — the equivalent of removing 41,461 passenger vehicles from the highway for one year.

ENERGY STORAGE

As we increase the use of renewable generation in the energy mix, the need and uses for scalable, flexible and cost-competitive energy storage will expand. Energy storage helps to smooth out the variable flow of power from intermittent resources, like renewables, ensuring the supply of generation matches demand. Energy storage is part of the balancing act of managing the grid. It can also help to minimize the impact of an outage by meeting short-term power needs while repairs are made and service is restored. Energy storage helps to improve electric reliability by providing grid stability services, reducing transmission constraints, and meeting peak demand.

Energy storage will become increasingly critical in balancing short-term supply and demand to ensure we have adequate capacity to deal with fluctuations that occur in solar output over the course of day. Lithium-ion batteries may be well suited for these short-term storage issues. However, as renewables play a larger role in our energy supply, energy storage will also be needed to cover demand when renewable output is not adequate over a longer period, such as an extended period of cloudy days with little wind. This will require a different level of energy storage and that is why we are looking at alternative energy carriers such as hydrogen to manage these periods.

The cost of commercially available energy storage technologies is declining, particularly those that leverage lithium-ion technology. According to the International Energy Association, global patents on new battery and other energy storage technologies grew four times faster than the average of all technology fields between 2005 and 2018. Innovation and collaboration among inventors and utilities are helping to fuel this growth.

Electric mobility is a big driver of advances in lithium-ion technology development as electric vehicle producers are focused on reducing costs while improving power output, durability, the speed of charge/discharge and recyclability. The growing need to integrate large amounts of renewable energy into electric power networks is also advancing storage technology development. AEP did not study the energy storage value chain; we assumed technology production would meet demand.

AEP is pursuing energy storage options in several ways. We have paired storage with renewables on a small scale in some of our competitive generation projects and are actively pursuing the application of Bulk Energy Storage Systems as transmission assets in situations where it is more affordable than building new transmission lines to maintain or improve reliability. We are also evaluating storage options on the distribution system to support local reliability.

The 138 kilowatt solar panels and pair of batteries (pictured) will help the zoo cut energy costs and reduce its carbon footprint.

Appalachian Power has filed a plan with Virginia utility regulators — as required by the Virginia Clean Economy Act — that outlines how it will become 100% carbon-free by 2050. Energy storage will play an important role as Appalachian Power adds 3,400 MW of solar, 2,200 MW of wind and 400 MW of energy storage to its current portfolio by 2050.

In Ohio, energy storage is part of AEP Ohio's first microgrid project that now powers the Columbus Zoo and Aquarium's Polar Frontier exhibit. A 308-panel solar array charges a pair of batteries to support the exhibit, providing an experimental glimpse into the future of electrical service and energy conservation. The solar panels have the potential to supply 25% of the water filtration system's annual energy needs, and the data collected from this microgrid operation will enable AEP Ohio to simulate outages to test its operational capability. The company expects to expand similar pilot projects at two additional sites in the state.

NUCLEAR ENERGY

Nuclear energy has been used as an electricity source within the United States for nearly 70 years. Today's commercial reactors safely and reliably provide carbon-free electricity. Carbon-free nuclear power is an important resource to meet customer demand for clean energy, but the cost to build new, large-scale reactors and concerns about spent nuclear fuel present a significant challenge. The most recent nuclear power plant under construction in the U.S. has cost more than

AEP owns and operates two nuclear units in Bridgman, Michigan. When both units of the Donald C. Cook Nuclear Power Plant are at full power, more than 2,100 MW of electricity are generated — enough to power 1.5 million homes. Our Fast Transition scenario assumed an additional 20 year license extension for both units.

$20 billion, exceeding initial estimates and remaining behind schedule for completion.

There are efforts underway to design new, smaller, less costly nuclear reactors that include passive safety systems. Small Modular Reactor (SMR) nuclear generation is the closest to reach commercialization. Some of the benefits of SMRs include improved efficiency, lower capital costs, a smaller physical footprint that offers flexibility with siting, and enhanced safety. This is an important technology for the future that is still under development. The first generation of this advanced technology is likely five to ten years away from deployment, and the costs of operation remain uncertain.

CONVENTIONAL FOSSIL-FUELED ENERGY

Conventional power generation burns fossil fuels — coal and natural gas — to release stored energy and convert it into electrical energy in a combustion or steam turbine generator. But the combustion process creates byproducts, some of which are greenhouse gases that contribute to climate change. Due to current economics, the existing coal-fueled generating assets in the United States will not likely be replaced with new coal-fueled generation when they are retired. And, prior to such assets' retirements, carbon legislation or regulatory constraints also could potentially limit their use.

Fossil-fueled generating resources have historically been the primary source to deal with fluctuations in electricity demand, hourly, daily and seasonally. The elimination of these dispatchable and flexible resources presents a significant near-term challenge for maintaining stability of the electricity delivery system, particularly with a greater reliance on renewable resources.

Natural gas is expected to be part of the resource portfolio to ensure reliability of the power grid. It is likely that gas-fired combustion turbines would be built mainly to act as a "fast-ramping" resource to provide power during peak demand periods and to meet capacity obligations. The intermittent operation of these units is not a significant contributor to the emissions profile, but the units still do emit some CO_2. These gas units could be candidates for future fueling with green hydrogen, converting them to non-carbon-emitting assets. In addition, as we move toward net-zero carbon, these assets could be replaced with other, more expensive solutions, such as energy storage or carbon offsets.

FOSSIL ENERGY WITH CCUS

Carbon capture with utilization or storage (CCUS) is one potential, but technically challenging, option to reduce the emission profile of fossil-fueled generation. CCUS works by capturing carbon dioxide (CO_2) emissions and placing them deep underground for long-term storage or by using the CO_2 in products such as concrete building materials, enhanced oil recovery or the accelerated growth of algae as feedstock for plastics. In any case, the carbon emissions entering the atmosphere are reduced or eliminated. R&D and demonstration projects have focused on capturing CO_2 emissions from coal-fueled generation for the past two decades. However, going forward the research focus will need to shift towards CO_2 emissions from natural gas. In addition to the high cost and energy consumption that is required to capture the CO_2 from a power plant flue stream, safe storage of carbon dioxide is a significant barrier that currently makes CCUS technology infeasible on a large scale.

AEP's 20 MW CCUS project at the Mountaineer Plant in West Virginia validated the technology but was very expensive and disallowed by regulators in Virginia.

AEP's experience with CCUS demonstrated the high cost and inefficiency of the technology. The integrated carbon capture and storage validation facility installed at our 1,300-MW Mountaineer Plant in West Virginia showed that CCUS can work on a small scale. We successfully captured, transported and geologically stored CO_2 emissions from an existing coal-fueled power plant for the first time in 2009. But it was very expensive and not without challenges. Mountaineer's 20 MW project cost more than $5,000 per kilowatt (kW), without government subsidies. Regulators in Virginia disallowed recovery of a portion of the project's expenses, signaling a greater reluctance by regulators to pay for developing technology. For CCUS to be a viable option for the future, public policies will have to change or financial incentives will have to be offered, or CCUS could further elude commercialization for the electric power sector.

HYDROGEN AND OTHER RESOURCES

The production of hydrogen from renewable energy, known as green hydrogen, has the potential to help the world achieve net-zero emissions. Green hydrogen splits hydrogen molecules from oxygen molecules in water using renewable energy resources. The hydrogen can then be converted to electricity with combustion turbines or fuel cells.

Hydrogen-fueled Electricity Generation Technologies

Technology	Scale/ Application	Comments
Gas Turbines	Large-scale generation (small-scale "microturbine" configurations also exist)	Many commercial gas turbines in industrial settings use hydrogen-rich gas. Efforts are underway by turbine manufacturers to develop gas turbines that can operate on up to 100% hydrogen
Reciprocating Engines	Distributed generation	Original equipment manufacturers (OEMs) report that current spark engines designed for natural gas can accommodate hydrogen blends. Operation on 100% hydrogen is being explored
Fuel Cells	Distributed generation	The largest stationary fuel cell deployments today are ~50 MW. This scale would address distributed generation needs, such as back-up, off-grid, or smaller-scale flexible power.

Source: Low-Carbon Resources Initiative

Hydrogen as a non-emitting fuel is promising, but its commercial development will require substantial investment including advances in the production, transportation, storage and use of hydrogen as a fuel for electricity generation.

AEP's participation in the Electric Power Research Institute's Low Carbon Resource Initiative includes research to advance the use of hydrogen. Renewable natural gas, ammonia and other new fuel resources also could play an important role in the future of clean energy.

LCRI LOW-CARBON RESOURCES INITIATIVE

INDUSTRY-LED LOW-CARBON INITIATIVES

LOW-CARBON RESOURCE INITIATIVE

AEP is a founding member of the Low-Carbon Resource Initiative (LCRI), an industry and global partnership with the Electric Power Research Institute, the Gas Technology Institute, and technology developers. The five-year initiative, started in September 2020, will provide a framework, coupled with technology advancements, to leverage existing assets and provide the tools necessary for an economic transition to a low-carbon future. The LCRI is intended to better coordinate efforts between the energy sector and government, and to align public policy and rulemaking with the need to incent research and deployment of technologies and alternative options. This includes advanced nuclear; CCUS; advanced compatibility between renewables and energy storage; gas technologies that burn carbon-free fuels, including ammonia and hydrogen; and "renewable" natural gas, among others. We are confident this consortium of industry sectors will enable us to leverage existing infrastructure while deploying new technologies that achieve deep carbon reductions cost-effectively.

Pathways to CO_2 Mitigation

The Source	Displacement: Nuclear, Renewable, Storage
The Fuel	Low Carbon Fuel: Hydrogen, Ammonia, Biofuel
The Process	CO_2 Capture: Pre-combustion, Post-combustion, Oxy-combustion
The Destination	Carbon Dioxide Removal: Direct Air Capture, Bio-energy with CCS, Land Use and Mineralization

> "Harness the collective energy and motivation of businesses in the Gulf Coast to create measurable, long-term impact in reducing carbon emissions in the region, and build a replicable model for business action in other regions."

GULF COAST CARBON COLLABORATIVE

AEP is a member of the Gulf Coast Carbon Collaborative, a multi-industry decarbonization effort in the Gulf region, led by the U.S. Business Council for Sustainable Development, with a goal to reduce carbon emissions while preserving and enhancing the region's economic vitality. The Collaborative is seeking to identify strategies to advance equipment modernization; technology and operating improvements; electrification; shifts to renewable energy sources; land-based sequestration; and CCUS.

GLOBAL COLLABORATION

AEP is a long-time member of the Global Sustainable Electricity Partnership (GSEP). This CEO-led alliance of leading global electricity companies advocates and promotes clean energy-sourced electrification and social advancement globally, including in their own businesses and communities. Together, GSEP members supply 25% of all electricity consumed globally — 70% of it is produced with clean resources. GSEP provides a forum to share experience and knowledge with stakeholders, including policymakers, serving as a global hub for all dimensions of electrification — clean energy, advanced technologies, partnerships, enabling public policies, strong economic growth, and customer relationships. AEP Chairman, President & CEO Nick Akins is the 2020 – 2021 Chair of GSEP. Under his leadership members are collaborating with customers and end users of electricity to learn how they want to accelerate the electrification of their businesses. The results will be released globally in May 2021.

DOWN-STREAM TECHNOLOGIES

ELECTRIFICATION

Electrification is the process of converting end-uses — such as HVAC, transportation, and industrial machinery — to electricity and away from fossil fuels. Economics and climate goals are key factors in the pace of electrification, as well as the availability and reliability of electric alternatives.

The advance of electrification of end-use technologies in industry, buildings and the transportation sector has the potential to accelerate the shift to renewables as well as drive up consumption of electricity. Electrification enables customers to be more energy efficient through the use of more — and increasingly cleaner — electricity while replacing direct fossil fuel use. This trend continues to grow as society seeks to replace fossil fuels with clean electricity to heat homes and buildings, power vehicles, and operate industrial equipment. The benefits are significant for the environment, society and business. However, the shift to an electrified economy requires planning to ensure infrastructure is in place to meet our customers' needs and the right policies and regulations to support them.

Electrification of natural gas pipeline compressor stations is a growth opportunity for AEP. In addition to economic advantages, moving to electric motor-driven compression requires a smaller footprint, reduces emissions at the site and makes operation and maintenance of the equipment more attractive. AEP is working with several pipeline companies to support their electrification efforts.

One of AEP's large retail customers is using electric-powered forklifts and hand truck units in its newest distribution center in Longview, Texas. The main drivers for converting to an all-electric fleet were safety, cost, reliability, and federal incentives to support the conversion. The choice also improves indoor air quality, eliminating the hazard of carbon monoxide poisoning.

Among the reasons businesses are choosing electric forklifts over other types include no tailpipe emissions, they are quieter and do not require outside storage of fuel tanks, they require minimal maintenance, and the total cost of ownership is lower.

As efficient electric technologies become less expensive and more advanced, the business case for capital investment in electrification becomes more attractive. AEP is introducing programs and rates in the states where we operate to support consumer adoption of electric transportation, as well as to manage the charging of vehicles during times of peak demand. Doing so will allow us to maintain reliability and optimize the use of the grid while keeping costs low, benefiting all customers.

Learn more about electrification options at AEP's Energy Conversion Hub.

BUILDINGS AND CARBON

Buildings account for nearly 40% of annual global greenhouse gas emissions. In 2019, according to the International Energy Agency (IEA), the fastest-growing end-uses are space cooling, appliances and electric plug loads. AEP Ohio has launched a building electrification initiative to work closely with developers to design efficient uses of electricity in buildings. We are providing information on end-use applications that reduce carbon emissions and costs.

ENERGY MANAGEMENT

While we encourage our customers to electrify portions of their energy consumption, we also want to maintain the focus on efficiency. Energy efficiency and demand response programs can effectively reduce customer energy use and reduce the need for additional electricity capacity.

AEP also is increasingly considering Distributed Energy Resources (DERs) to meet customers' specific energy needs at times of peak demand and to alleviate the need for more costly transmission and distribution investments. They also provide a self-sufficient generation resource that can be isolated from the rest of the grid in the event of an outage. These are all important attributes for grid resiliency and reliability.

ELECTRIC TRANSPORTATION

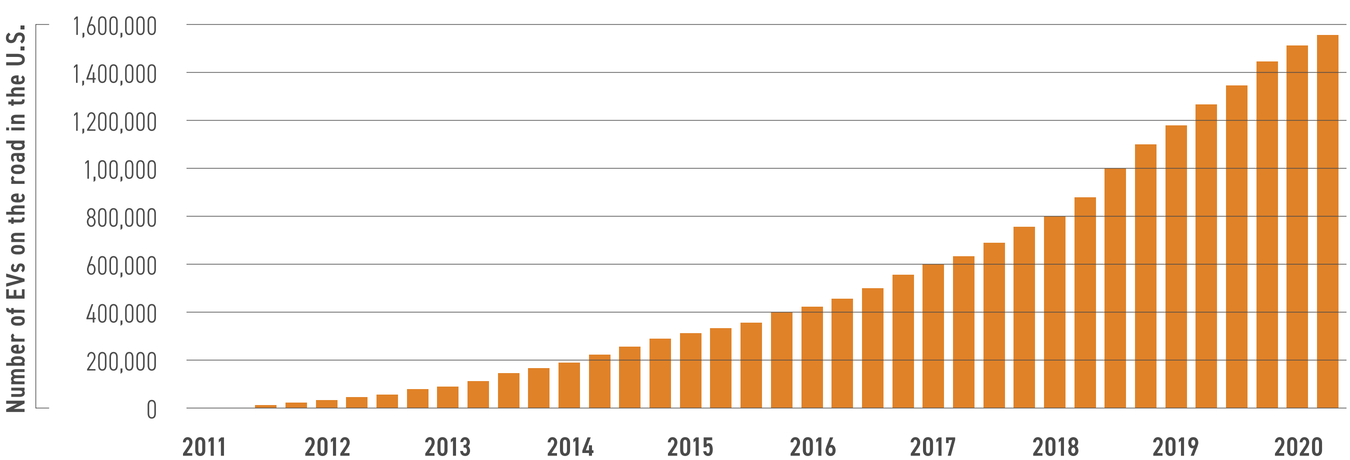
Transforming the transportation sector to move people and goods using electricity as a fuel is integral to achieving long-term carbon reductions and enhancing the nation's energy and economic security. According to the Edison Electric Institute (EEI), CO_2 emissions for the electric power sector are now 15% below transportation sector emissions.

Today, there are more than 1.5 million Electric Vehicles (EVs) on U.S. roads. EVs are cost-effective, saving drivers both fuel and maintenance costs. EEI estimates EV drivers spend the equivalent of about $1.20 per gallon, based on average residential electric rates, and this can be significantly less where off-peak charging programs are offered.

Benefits of electrifying transportation:

- EVs are approximately 3 times cheaper to fuel than gas-powered vehicles.
- EVs are 2 times cheaper to maintain than gas-powered vehicles.
- EVs don't have tailpipe emissions, which improves public health by reducing emissions where we live, work, and play, especially in areas where people already experience unhealthy levels of air pollution.
- EV adoption results in less overall greenhouse gas emissions and the benefits will grow as the grid continues to get cleaner.
- Improved driving experience — powerful, smooth, quiet, and dynamic.
- Improved fueling experience — no out-of-the-way gas station visits or harmful fumes, just charge where you park.

EV Sales in the United States (more than 1.5 million EVs are on U.S. roads)



Source: Edison Electric Institute and Atlas Public Policy, EV Hub

ELECTRIC HIGHWAY COALITION

In March 2021, AEP joined five other major utilities in announcing a plan to ensure that electric vehicle (EV) drivers have access to a seamless network of charging stations connecting major highway systems from the Atlantic Coast, through the Midwest and South, and into the Gulf and Central Plains regions.

The Electric Highway Coalition — made up of American Electric Power, Dominion Energy, Duke Energy, Entergy Corporation, Southern Company, and the Tennessee Valley Authority — announced a plan to provide EV drivers with seamless travel across major regions of the country through a network of DC fast chargers for EVs. The companies are each taking steps to provide EV charging solutions within their service territories. This represents an unprecedented effort to offer convenient EV charging options across different company territories and allow EV travel without interruption. Sites along major highway routes with easy highway access and amenities for travelers are being considered as coalition members work to determine final charging station locations. Charging stations will provide DC fast chargers that are capable of getting drivers back on the road in approximately 20-30 minutes.

Electric Highway Coalition

The map shows the Electric Highway Coalition connections across portions of the United States.

AEP's Electric Transportation Strategic Framework

Education & Outreach
- Proactively engage customers to normalize electric car ownership
- Advise customers on benefits, economics and program offerings

Lead by Example
- Procure AEP fleet EVs
- Increase employee access to charging at AEP workplaces

Increase Off-Peak Load
- Deploy residential solutions to accommodate load and move charging off-peak
- Design and deploy customer fleet charging solutions

Improve Public Infrastructure
- Design and deploy customer workplace charging solution
- Advise and support municipalities on electric transit opportunities and vehicle corridors

Get the Rules Right
- Advocate for policies that support increased EV sales and access to charging infrastructure
- Advocate for active utility role in transportation electrification

As of September 2020, there were more than 17,300 EVs in AEP's 11-state service territory. All-electric vehicles surpassed plug-in hybrid EVs as the leading vehicle type for the first time in March 2020, and growth rates suggest this trend will continue. Ohio leads the way with adoption in AEP's service territory, aided by the Columbus metropolitan region. At AEP our electric transportation mission is to increase adoption of electric vehicles in our service territory and provide customer charging options that optimize the use of the grid for the benefit of all customers. We continue to pursue this mission within our strategic framework.

Across our service territory, AEP's operating companies are working with regulators to create programs that benefit all our customers, such as off-peak charging programs, incentives for charging station installations, energy efficiency rebates, and consultative services to encourage electrification.

In AEP Ohio's service territory, Smart Columbus has been a catalyst for promoting EV adoption. In 2018, AEP Ohio launched a $10 million program to deploy 375 charging stations in partnership with local governments, workplaces, and multi-family dwellings to increase publicly available charging sites. The program also demonstrated the benefit of public-private partnerships. The program included a requirement that 10% of charging stations would be in low-income areas, a benchmark that we exceeded. By early 2020, the program was fully subscribed, quadrupling EV charging infrastructure in the city of Columbus and supporting customer EV adoption throughout our Ohio service territory.

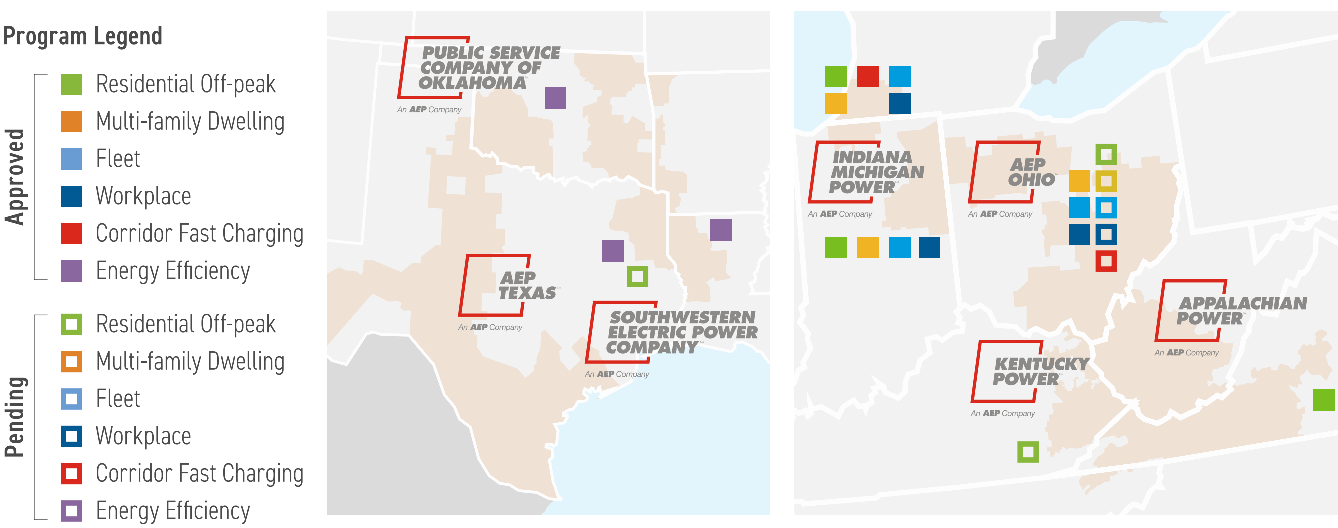
There are many programs throughout our service territory to support EV adoption, including:

- A residential off-peak charging program in Virginia for Appalachian Power customers, provides accurate and reliable on-bill EV usage information, as well as credits for charging during off-peak hours.

A Level 3 Charging Station in Breaux Bridge, Louisiana.

- Indiana Michigan Power's IM Plugged program offers fast charging for residential, multi-family dwellings, fleet, workplaces, and transportation corridors.
- In Louisiana and Texas, customers of PSO and SWEPCO are eligible for energy efficiency rebates on qualified EV chargers.
- Additional programs are pending for AEP Ohio, Kentucky Power and SWEPCO.
- Virginia launched *Destination: Zero Carbon* — the state's campaign to electrify all new cars in the state by 2035.

AEP Electric Transportation Programs



To demonstrate our commitment to EVs, AEP set a goal to convert our diesel and gasoline-powered vehicle fleet to electric.

AEP has partnered with ChargePoint™ to offer tailored evaluations for commercial and industrial customers considering electrifying their fleets. This partnership helps streamline the information gathering and decision-making process for businesses interested in switching their fleets to EVs.

In 2020, AEP committed to converting our own fleet of vehicles from diesel- or gasoline-powered to electric. We announced a new goal to replace 100% of AEP's 2,300 cars and light-duty trucks with EV alternatives by 2030. In addition, AEP will convert medium- and heavy-duty vehicles as electric or hybrid models become available, resulting in the electrification of 40% of AEP's entire 8,000 vehicle, on-road fleet in less than a decade.

AEP expects to realize first-year fleet emissions reductions of up to 70% while also reducing fuel and maintenance costs by more than 50%. In addition, AEP will electrify 50% of its forklifts by 2030. The switch to EVs is estimated to save more than 10 million gallons of fuel, amounting to a $40 million reduction in fuel costs over the life of the vehicles.

We are also working directly with customers to support their plans to electrify their fleet vehicles. For example, we are working with the Edison Electric Institute, peer utilities, and industry vendors to identify solutions and improved processes for customers who want to electrify their fleet vehicles. This collaboration allows us to share best practices while providing the best experience for our customers.

PHYSICAL RISKS AND OPPORTUNITIES

PHYSICAL CLIMATE IMPACTS

Climate change presents physical risks for the AEP system as well as business opportunities. AEP operates a large interconnected network of facilities that generate, transport and deliver electricity across the United States to serve approximately 5.5 million residential, commercial, industrial and wholesale customers. Within these diverse operations, equipment, facilities operations, and employees are exposed to environmental variables that may be influenced by a changing climate. In this section, we highlight some of the potential physical risks and opportunities posed by climate change, risk mitigation measures and lessons learned from past events, and how interrelated factors may affect our long-term business strategy.

Changes that cause the most concern are generally subtle but are more severe in extremes. For example, the frequency of storms may be slightly higher, but the severity of them is increasing. Rain events may be shorter in duration but more intense, resulting in flash flooding. These variations, which are geographically dispersed, are gaining more attention from insurance underwriters, investors, lenders and others who are concerned about financial and operational risks associated with the physical aspects of climate change as they affect AEP.

The February 2021 deep freeze that crippled the Texas energy system is a sobering reminder of the critical need for specific policy changes and investments to support reliability and resilience of the power grid. The industry must be better prepared to counteract the frequency, intensity and impact of severe weather.

As we learn more about mitigation and adaptation to a changing climate, the uncertainty around timing and the magnitude of impacts make it challenging to identify a single solution. This analysis of climate-related physical risk takes into account a range of issues, including climate variables, aging infrastructure, capital investments to modernize and harden the grid, public policy, regulatory oversight, technology development and resilience. We examined the potential impacts to physical assets, such as buildings, substations, poles and generating units, as well as what we've learned through experience of more than a century of severe weather events.

The severe winter weather in February 2021 that affected Texas and surrounding states serves as a cautionary tale of the effects extreme weather can have on energy facilities and supplies.

Our analysis of physical risk revealed some vulnerabilities that we are addressing. It also showed us that our efforts to harden and build resilience into the system are essential. Our capital investment strategy, changes to design standards for vulnerable infrastructure, increased automation and digitalization, and efforts to have critical spare parts at the ready are all part of our grid modernization plan to enable the clean energy transition.

The analysis also pointed to business opportunities. For example, our regulated utilities stand to gain from increased load due to electrification of other sectors. This would have positive effects on the environment as well as the revenues of our utilities.

CLIMATE IMPACT EVALUATION PROCESS

To identify and understand the most relevant physical climate-related risks and associated variables for AEP, we consulted with internal experts from business units across AEP's system (engineers, system operators, meteorologists, modeling experts, regulatory affairs, and operations experts, among others). Some business units conducted their own risk analyses, which we used to inform this broader analysis. We reviewed the Fourth National Climate Assessment and other climate studies, and conducted research on physical risk concerns being raised by stakeholders. We also conducted numerous interviews with internal subject matter experts, peers and industry experts. Our review of physical risk encompassed our regulated businesses (seven utilities) and our competitive businesses.

Our work reflects the changing environmental conditions that impact our operations today and for which we routinely plan. Business units are managing these risks and opportunities as they exist today while planning to manage variations in the future.

There is recognition that although changes in climate variables may not support major shifts in how we conduct business today, when extreme weather strikes, it is increasingly more powerful, particularly with heavy rainfall events, heat waves and tropical cyclones. This is supported by several sources reviewed for this report, including analysis by insurance underwriters, lenders and investors. As we plan for and invest in a modern, cleaner and more interconnected grid, these issues will inform our capital investment, growth and regulatory strategies.

CONSIDERATIONS IN AEP'S CLIMATE IMPACT ASSESSMENT

In a review of climate science literature, many projections of likely climate impacts are focused on 2050 and beyond. AEP's business model and infrastructure will look much different at that time; as a result, we

Changes in extreme weather, such as hurricanes and thunderstorms, are the main way that most people experience climate change.

believe that overlaying a 2050 physical climate impact assessment on today's business and infrastructure can be misleading and potentially lead to inappropriate or inaccurate conclusions.

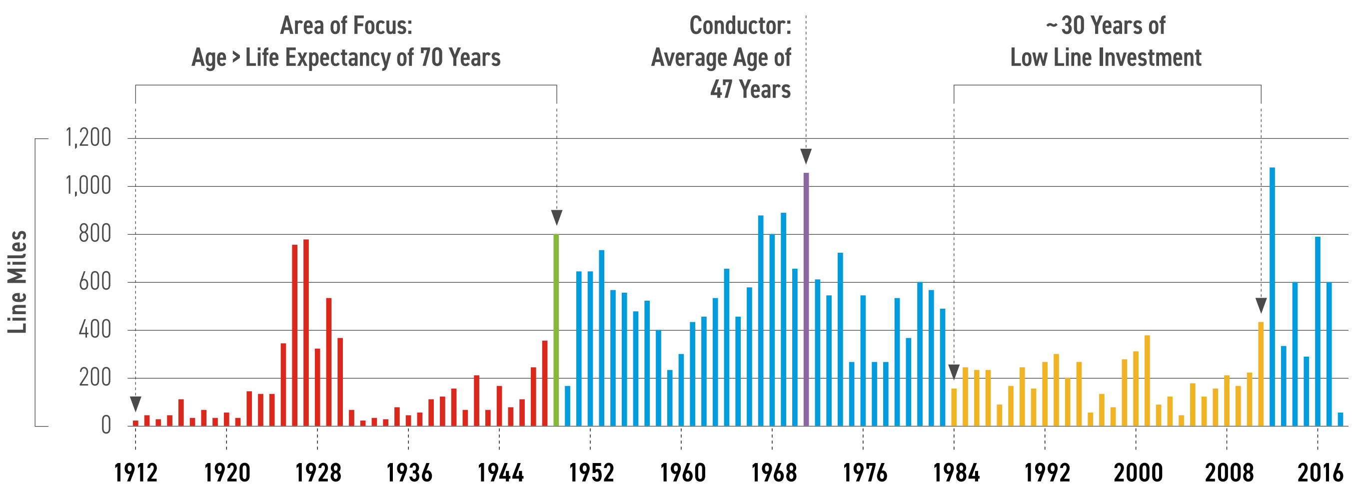
For example, AEP invests significant capital annually to replace and modernize aging infrastructure, often to higher design standards, taking into account experience and observed changes over decades. Over time, this enables us to harden the power grid cost-effectively and more efficiently so that the infrastructure can better withstand severe weather that may occur and improve reliability for our customers.

The evaluation of climate-related risks and opportunities should consider when risks are likely to manifest themselves, and the assets that may or may not be present at that time. For example, water availability is critical to operating steam generating units today. But in 2050, most, if not all, of the steam generating units currently operated by AEP will have long been retired. In addition, the replacement generation for those steam electric units will mostly be wind and solar, which does not rely on water availability to operate. Thus, this specific risk is mitigated through the resource transition already underway.

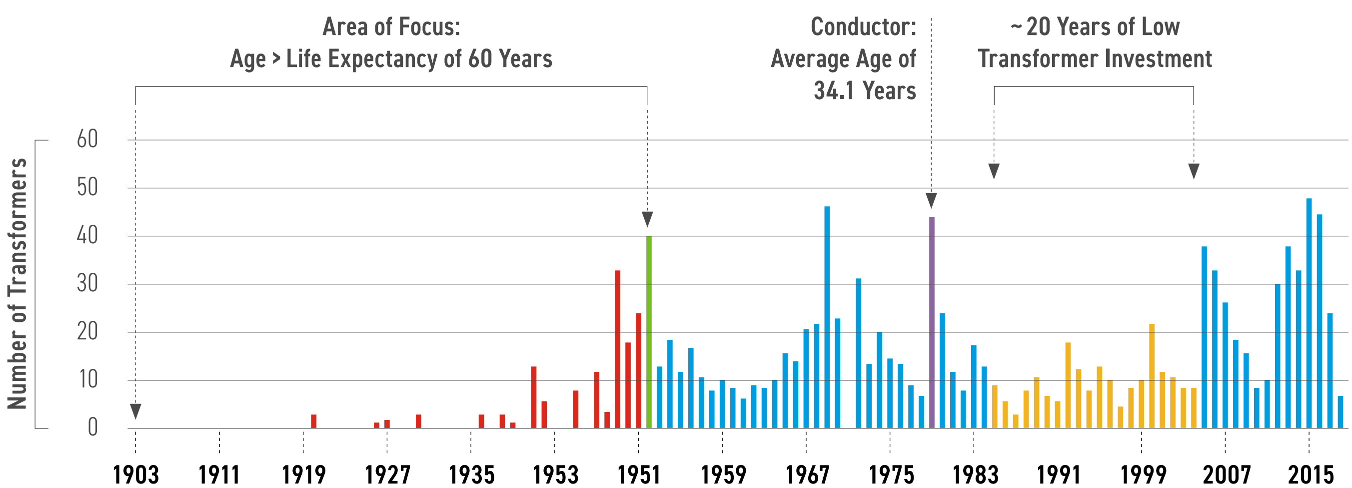
Climate-related risks and opportunities should be weighed in relative terms. AEP has an enormous asset base of $76 billion. While a single climate-related impact may sound meaningful in the abstract, actual implications for the business might be much different. For example, severe storms have been a significant physical risk to AEP's system for more than a century. Severe weather includes thunderstorms, wind storms, ice storms, wet snow storms and hurricanes. Severe weather causes damage to the physical system, disrupts service to customers and is costly to repair.

Texas experienced its second coldest week on record in February 2021 — in a state that normally is a summer peaking region of the country. Fuel shortages and frozen equipment that resulted in massive power outages

T-line Age Profile (line mile age based on oldest conductor age)



AEP Transmission Transformer Age Profile



The histogram on the bottom shows the age profile of AEP's transmission line system, based on conductor age, including those exceeding the average life expectancy of 70 years. The histogram on the top shows the age profile of AEP's transmission transformers, which have an expected life of up to 60 years. Some assets have a shorter lifespan while others last longer. These are important data points as AEP invests to replace aging infrastructure and modernize the grid.

provide a sober reminder of how essential it is that the electric power system is resilient and reliable in a net-zero carbon future.

Although not all weather events are a product of climate change, weather extremes are becoming noticeably more severe and vary by location. This is a defining feature of climate-related physical risks — the landscape where it is occurring is so dynamic. Hurricane Harvey in 2017 dumped record amounts of rainfall on southeast Texas, causing massive flooding and high winds that left more than 220,000 AEP Texas customers without power. It was one of the costliest natural disasters in U.S. history. *(See Hurricane Harvey Case Study)*

Some climate impacts can be self-balancing. For example, warmer winter weather could lead to decreased sales from lower heating demand. However, this could be offset by higher sales from cooling demand during the summer. In addition, AEP's geographic diversity provides a hedge against physical extremes in many climate-related variables because, more often than not, the impacts are local or regional and can vary greatly depending on location.

CLIMATE ASSESSMENT AND SCIENCE

AEP has expert capabilities to readily assess how climate-driven physical variables might affect our infrastructure, operations, business model and people. We conducted a literature review of climate science — mainly the Fourth National Climate Assessment prepared by the U.S. Global Change Research Program — to inform our view of potential climate change impacts and develop the substance of this report. We also relied on recent research initiatives AEP participated in with the Electric Power Research Institute (EPRI), including a two-year study to understand climate scenarios, transition risk and goal-setting.

Unlike climate transition impacts, which can be more easily quantified based on the required rate of change in emissions and associated changes in operations and cost, physical risk is harder to discretely quantify. The inherent uncertainties and complexities in forecasting what a warmer climate might mean to the interconnected systems we rely upon — physical assets and natural ecosystems — are hard to predict. For this exercise, we viewed climate change as a continuum of physical impacts that are subject to change. We focused on certain areas where changes in climate could have an impact, albeit with significant uncertainty in probability of occurrence, severity and timing. For purposes of this report, we have not examined specific scenarios relating to possible temperature outcomes, given the broad range of operations and assets covered. However, we intend to do additional analysis of specific risks and assets in the future, as informed by this initial assessment.

There are tradeoffs in assessing potential physical and transition climate impacts. Chiefly, coordinated efforts to decrease greenhouse gas emissions and limit increases in global temperature will reduce the risk of physical impacts posed by climate change. Conversely, in a business-as-usual scenario, transition risks can be minimized but the threat of physical impacts is likely to increase. Aligning this with our climate transition scenarios, and assuming similar action from other companies and sectors, the 100% clean energy scenario presents the least amount of exposure to physical climate risk.

The inherent uncertainties and complexities in forecasting what a warmer climate might mean to the interconnected systems we rely upon — physical assets and natural ecosystems — are hard to predict.

CLIMATE-RELATED VARIABLES IMPACTING AEP

AEP's assets and operations are subject to a number of factors that could be impacted by physical climate change. The degree of vulnerability from these risks depends on the probability of it happening, the geographic location, and the magnitude of the impact when it occurs. While the Fourth National Climate Assessment presents a range of possible interactions of climate change with the physical environment and society, some are more directly meaningful for AEP, given our assets, operations and geography. Specifically, exposure of physical assets (towers, poles, wires, substations, etc.) to extreme weather and the environment are likely to be the most material for AEP and our stakeholders.

In undertaking this assessment, we focused on the most probable climate-related physical impacts to the AEP system, including:

- Ambient Temperature (extreme heat or cold)
- Precipitation Amount and Type (drought/flood/water level and ice/snow/rain)
- Severe Weather (lightning, hurricanes, tornados, damaging winds)
- Sea Level Rise
- Wind Speed
- Solar Irradiance (measurement of solar radiation that reaches a point of the earth's surface

EXTREMES REQUIRE A RESILIENT ELECTRIC POWER SYSTEM

The extreme cold weather that plunged millions of Texas electric customers into the dark for days in February demonstrates the need to invest in energy choices that meet climate goals while building a resilient, reliable and sustainable energy system that can withstand the extremes that could come from climate change. The planning for the transition to a clean energy future must account for how the nation will power its future and treat the electric power system as critical infrastructure. The investments made to modernize the electric power system will be expected to deliver clean, affordable and reliable energy to customers. The lessons we learned from Texas further demonstrate the need for caution and pragmatism as climate policies are developed. If policies don't provide a firm account of changes needed to make the system resilient to extremes and afford enough time to implement them, the risk to societal well-being and prosperity will be high.

Other climate impacts could potentially be material to AEP through less direct pathways. As a provider of an essential service, electricity, the strength of AEP's business is highly correlated with economic output. To the extent that climate change presents impacts to areas such as agriculture, transportation, infrastructure, and/or recreation and tourism, there could be positive or negative implications for AEP's business.

The extreme cold weather in Texas in February 2021 caused record electricity demand. Normally, the state's peak demand for electricity comes in the heat of summer.

Physical Climate Risks, Opportunities, and Impacts At-A-Glance

Climate Parameter	Potential Change	Assets	Risk/ Opportunity	Physical Impact	Operational Impact	Potential Risk Mitigation Measures
Precipitation	Decreased Precipitation	Hydro	Risk	Less precipitation will reduce hydropower production	Need for more costly replacement generation	None
		T&D	Risk	Increased wildfire threat in drought conditions	Loss of infrastructure and potential lives due to wildfires, reputation risks	Increased inspections to AEP infrastructure; vegetation management
		Facilities	Risk	Drought conditions increase damage to facilities (cracks, foundation, damage pipes, uneven surfaces)	Damage to facilities increases O&M costs and impacts safety	Incorporate cooling landscape designs and siting for new facilities
		Fossil	Risk	Less precipitation will change intake water quality and create challenges for water usage (service water, boiler make-up water, cooling water, FGD make-up, etc.); algal blooms	Need for more costly water pre-treatment; potential impact on ability to run	Water balance reviews to identify new approaches to water intake and usage
	Increased Precipitation	Hydro	Opportunity	Increased precipitation can increase hydropower production	Increased renewable power	N/A
			Risk	Excessive precipitation can reduce hydropower production with increases in debris and sediment, increased safety risks.	Reduced power output, need for more costly replacement generation	None
			Risk	Flooding causes increased need for water releases and potential equipment failure	Increased risk for upstream flooding, property damage to nearby residents, unable to maintain FERC required water levels	More active water management (limited mitigation)
		T&D	Risk	Increased heavy rainfall can lead to flooding which can reduce access to facilities, potential changes or increases in 100-year flood plain	More frequent power outages	Siting facilities at higher elevations, outside 100-year flood plain, relocating high risk facilities, flood barriers
		All	Risk	Damaged and/or loss of facilities and access roads	Financial impact to repair roads, increased O&M for repairs	Potential changes to siting and design
		Fossil	Risk	Increased heavy rainfall can lead to flooding of cooling ponds	Increased discharges that exceed permit requirements for effluent limits, reputation	Active pond management, decreased use of ponds for water management
			Risk	Wet coal piles and fuel delivery disruptions	Disruptions in normal operations of the plant	Coverage for coal transport and storage units
Sea Level	Sea Level Rise	Facilities	Risk	Flooding and expansion of storm surge zones could severely damages facilities	Loss of and/or need to relocate facilities	Siting of facilities outside expected sea level rise and storm surge predictions
		T&D	Risk	Increased sea level will damage sub-stations, lines and poles near coast	Potential for circuits to be taken out of service storm restoration staging areas could be affected	Upgrade Drop-in Control Modules to coastal specifications, consider in siting
Severe Weather	Increased Hurricane Activity	T&D	Risk	Increased hurricane activity could lead to increased flooding and wind-related damage to AEP Texas facilities	Outages, storm related costs	Siting facilities at higher elevations, storm surge hardening

Physical Climate Risks, Opportunities, and Impacts At-A-Glance (continued)

Climate Parameter	Potential Change	Assets	Risk/ Opportunity	Physical Impact	Operational Impact	Potential Risk Mitigation Measures
Severe Weather	Increased Storms	All	Risk	Severe weather (winter and summer) can damage equipment	Outages, storm related costs, customer experience suffers	Equipment hardening
		Wind	Risk	Wind turbines curtailed if wind speeds are too high	Need for more costly replacement generation	None
		Wind	Risk	Wind turbines curtailed if wind speeds are too high	Need for more costly replacement generation	None
		Wind	Risk	Increased winter storms cause icing of blades	Ice on turbine blades can affect safety, performance, durability and reliability	Ensure turbines are equipped with cold weather packages, regular O&M blade inspections
		All	Risk	Storms decrease or eliminate outside work productivity	Major construction, routine maintenance etc. will experience increased delays	Determine effective ways to continue work safely during precipitation events
Temperature	Increased Summer Heat	All	Opportunity	Increased summer heat increases demand for electricity	Increased top line revenue	N/A
		All	Risk	Equipment ratings and throughput can be temperature dependent (conductors, transformers, batteries, gear box, generators, etc.)	Components may not be able to operate to design basis and need to be replaced more often	Change design basis, add cooling systems
		Hydro	Risk	Higher air temperatures increase surface evaporation	Increased surface evaporation reduces water storage and power output, loss of revenue	None
		Employees	Risk	Increased risk for heat stress	Reduced productivity for employees and contractors	Requires workflow changes to build in additional breaks to prevent heat illnesses
		Fossil	Risk	Increased temperatures cause cooling ponds to heat up — fish kills possible	Risk to reputation, potential for fines for noncompliance	None
		Solar	Risk	Negative impact to efficiency of photovoltaic cells if temperatures rise above ratings	Reduced power output	None
		Wind	Risk	Increasing air temperatures result in declines in air density	Declines in air density result in mismatch of expected power output	Incorporate predictions of air temperature changes into resource predictions
	Warmer Winter Temperatures	All	Risk	Warmer winters can reduce demand for electricity	Decreased top line revenue	None
		T&D	Opportunity	Warmer winters could reduce the frequency of ice storms	Less ice-related equipment damage	N/A
		Solar	Risk	Less ice coverage on lake could cause lake effect cloud cover	Cloud cover reduces output from regional solar farms in the Great Lakes region	None
Wind	Extreme Wind Activity	All	Risk	Extreme winds could damage infrastructure and increase debris	Increased power outages and cost to repair/replace infrastructure	Increase inspections, hardening
	Increased Wind Speeds	Wind	Opportunity	Increase in renewable resource	Increased power output	N/A

REGULATORY OVERSIGHT AND DESIGN BASIS

As one of the most highly regulated industries, the electric utility sector is subject to an array of regulations and oversight. Understanding AEP's regulated business model is important to appreciating the financial and strategic impact of climate-related risks.

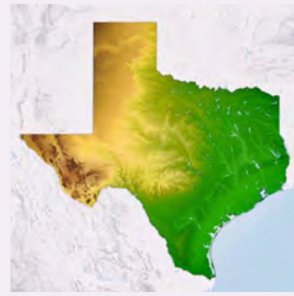
Regulations can vary from requirements from the Institute of Electrical and Electronics Engineers (IEEE) that govern specific pieces of electric equipment due to regulations from the North American Electric Reliability Corporation (NERC) that govern the reliability and resiliency of the bulk electric power system. Compliance is a priority for AEP, and we invest significant resources to ensure we are designing, building and operating to the required standards at all times.

AEP currently designs, builds and maintains its transmission and distribution facilities to meet and/or exceed the current National Electric Safety Code (NESC) and American National Standards Institute (ANSI) standards established for particular geographic regions. These standards take into account known physical risk parameters, such as wind speed and ice loading, based on solid engineering judgment. In fact, AEP has design

AEP's Utilities

Vertically Integrated Utilities	Wires-Only Utilities
Appalachian Power Company	AEP Ohio
Indiana Michigan Power Company	AEP Texas
Kentucky Power Company	
Public Service Company of Oklahoma	
Southwestern Electric Power Company	
Wheeling Power Company	

Texas: Where Climate Variables Converge



Texas is one state in AEP's service territory that experiences multiple climate-related variables. AEP Texas and Southwestern Electric Power Company (SWEPCO) both serve portions of the Lone Star State. AEP Texas is based in Corpus Christi and serves customers in south and west Texas to the Mexico border. SWEPCO's service territory is in East Texas and the Panhandle area of North Texas. The climate variables affecting areas of the state include:

- Rising sea level, flooding
- Coastal storms, hurricanes
- Precipitation (rain, snow, ice)
- Tornados, windstorms
- Wildfires, drought
- Extreme temperatures (heat, cold)

Texas is home to some of the nation's hottest cities, and, according to a study published in Earth's Future, the state faces drier summers and decreasing water supplies for the rest of this century. Meanwhile, on the Gulf Coast, the state is at increasing risk of coastal flooding, hurricanes and sea level rise. In the western part of the state, freezing precipitation in the winter can be problematic for transmission, distribution and renewable facilities. In fact, Texas ranks as the most at-risk state in the U.S. for natural disasters.

We use our experience managing weather variations to plan differently for storm recovery and for hardening the system to mitigate future damage. Storm surge during Hurricane Harvey taught us that we need more locations for staging crews and equipment for restoration, since some of the locations we historically relied upon were flooded from storm surge and heavy rain.

standards that allow for lines and poles to withstand greater wind speeds and ice loading, especially where they are most susceptible to that kind of damage. For example, transmission lines and structures in hurricane-prone areas are designed beyond NESC requirements and include longitudinal strength loading criteria to improve resistance to cascading failures. We have also relocated and strengthened circuits to make them less vulnerable to weather-related damage and limit damage to equipment that requires long repair times.

Resilience is focused on risks and consequences that can come from anywhere. AEP's capital investment strategy includes investing in local reliability projects that enhance grid resilience by replacing vulnerable assets, upgrading our telecommunications network and maintaining spare parts.

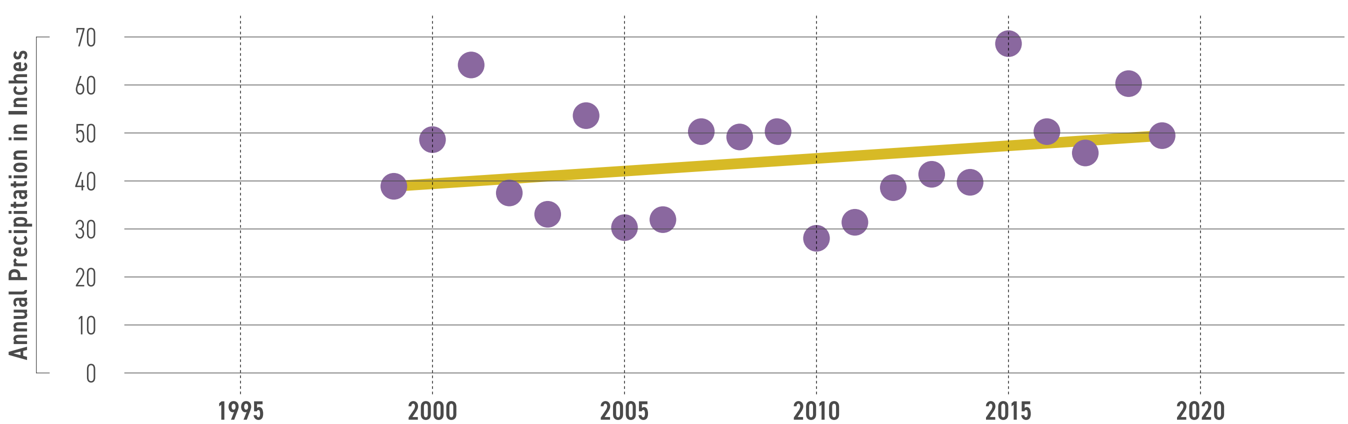
Recognizing the disruptions that can be caused by extreme weather events, some states are exercising increased oversight to ensure the grid is "hardened" to preserve service during these events. For example, Texas electric utilities have to file system hardening plans with the state to demonstrate they are implementing cost-effective strategies to increase the ability of transmission and distribution facilities to withstand weather extremes.

PRECIPITATION AND WATER-RELATED CLIMATE IMPACTS

The water-energy nexus is critical to the production of electricity and energy security. Although AEP's water dependency has decreased and will continue to as we transition to less-water-dependent sources of electricity, access to water in the interim remains vital to electricity production. Water serves many functions, including the power production from our hydroelectric facilities; the transfer of energy in steam-based generating units; a medium for cooling equipment; and the transportation of materials, such as barge deliveries of fuel and other consumables to plants located on rivers. As dependent as the energy industry is on water, the availability, quantity and quality of water is highly dependent on weather and the environment. When these are out of balance, there can be operational risks for AEP.

For example, an analysis of rainfall trends in northeast Texas shows that heavy rainfall events have increased the average annual rainfall amount over the past 20 years.

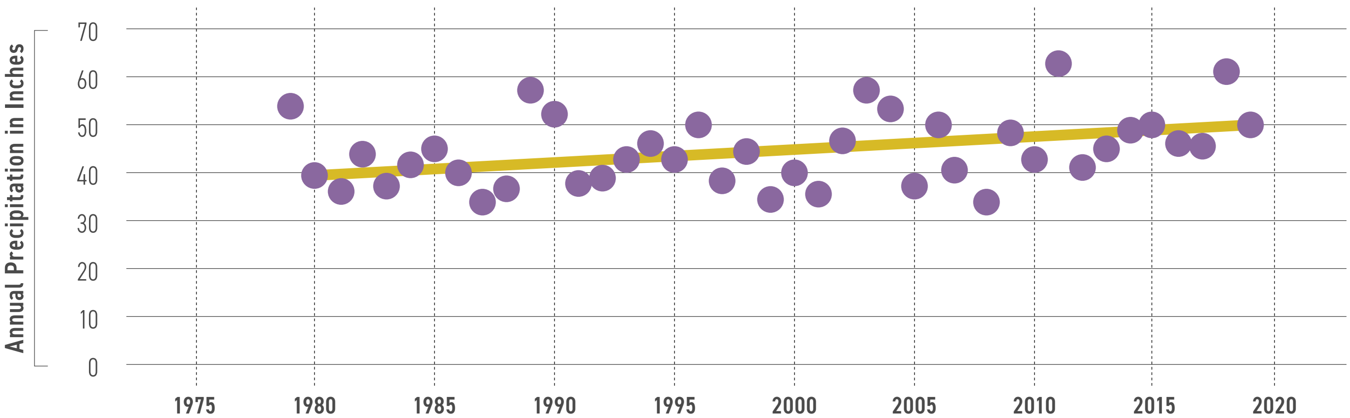
Longview, Texas



Annual precipitation trends over the past 20 years in Northeast Texas show an increase in average annual precipitation by about 7 inches since 1999.

Another analysis of rainfall trends over the past 20 years in Huntington, West Virginia, shows an increase in annual precipitation amounts and supports research claims that heavy rainfall events are increasing in the Ohio Valley.

Huntington, West Virginia



An analysis of annual precipitation trends at a point near the Ohio River (Huntington, WV) shows that annual precipitation has increased about 10 inches since 1999. This data supports climate research suggesting heavy precipitation events will become more frequent/severe in the Ohio Valley — including areas served by Kentucky Power, Appalachian Power and southern AEP Ohio.

This can affect the operation of power plants because intense rainstorms leave wet coal piles that are temporarily unsuitable for energy production. This has occurred in Texas as well as at plants in Indiana and West Virginia where flooding has affected fuel supplies. Extreme rainfall can affect dams, spillways, coal ash ponds and other reservoirs by exceeding design standards, which could require mitigation and expensive retrofits or upgrades.

Heavy precipitation can also affect operation of renewable facilities. It can cause soil erosion at the foundation of a wind turbine or wash out access roads for both wind and solar facilities. Heavy precipitation also can accelerate erosion on the leading edge of turbine blades, which might not be covered under warranty, creating additional operational costs.

Climate-related water impacts are an issue of growing importance to stakeholders who are increasingly asking for water-related disclosures. This includes measures related to water risk in their value chains, the environmental and regulatory conditions where they operate, and internal governance around water management and risk mitigation. AEP has been very transparent about these issues for more than a decade through our Corporate Accountability Report and GRI Report, as well as our CDP Water Survey disclosure.

BUSINESS & OPERATIONAL EFFECTS OF CLIMATE-RELATED WATER RISK

AEP recently participated in a study led by EPRI, finding that projected changes to the climate will affect precipitation and temperatures, including in areas where AEP operates. The findings indicate that these changes could affect surface waterbodies, such as lakes, rivers and streams, through increased water temperatures, poorer water quality, more erosion, and disruptions to water flow.

The assessment identifies potential risks to: (1) thermal generation, (2) hydroelectric generation, (3) land-based renewable generation and (4) transmission and distribution facilities. These risks may result from projected reductions in water availability (e.g., for hydroelectric or once-through cooling), increased water temperatures (e.g., decrease in cooling efficiency, inability to meet discharge permit conditions) and decreased water quality (e.g., from increased transport of sediment and dissolved solids). On a region-specific basis, the report notes key water-related impacts to the AEP system that would primarily occur in the Midwest, Southeast and Southern Plains areas.

The potential changes in water quality, availability, temperature and quantity identified by EPRI extend beyond generation facilities. For example, we might need to take mitigating actions to stabilize a stream bank if we were relocating or siting new transmission or distribution infrastructure in an area at risk for this type of erosion. Strategies to mitigate these impacts would add to project costs.

Next steps for continuing this work may include the evaluation of individual or groups of assets for key risks in selected regions. Those facilities with vulnerabilities may be further evaluated using a quantitative risk

Midwest Water Risk Impacts

- Impacts to agriculture could lead to increased stress on water availability for electric power generation.
- Projected increases in frequency and intensity of extreme precipitation events could affect transportation of fuel and related products due to damage to roads, rail, bridges and dams.

Southern Plains Water Risk Impacts

- Increases in the frequency of warm nights, increasing energy demand.
- Projected increases in extreme rainfall and extreme weather events (hurricanes, tornados, thunderstorms) could impact infrastructure used to transport fuel and goods.
- Extreme single-day and multi-day rainfall amounts due to systems that stall over geographic regions, causing record rainfalls.
- Large swings between dry and wet periods may occur in the region, causing stress on agriculture, power generation and transportation.
- Increased frequency and intensity of extreme events could threaten infrastructure within the region, as well as the entire cycle of mining, refining, exporting and consumption.

Other Water Risk Impacts

- Potential dam failures, impacts to coal ash ponds, and expensive upgrades and retrofits due to extreme rainfall events.
- More frequent and damaging wildfires due to drought, leading to widespread damage to assets and service disruptions.
- Decreases in efficiency of thermal generation facilities due to increased source water temperatures.
- Growth of nuisance biota (e.g., algal blooms) due to increases in water temperatures, potentially damaging condensers and strainers.
- Impacts to coal and biomass deliveries to generation facilities due to decreased stream flow (e.g., Ohio River) and less water depth/draft in navigable rivers.
- Facilitation of invasive aquatic species leading to reduced populations of vulnerable species due to changes in water temperatures and flow patterns. Impacts to rare, threatened, and endangered species may also occur.

Hurricane Harvey dumped more than 27 trillion gallons of rain over Texas, making Harvey the wettest Atlantic hurricane ever measured.

analysis to characterize risks in terms of cost, time, injuries/illnesses or fatalities, system downtime, decreases in revenue, loss of customers, or fines and penalties.

PRECIPITATION ANALYSIS

Throughout our history as a company, extreme precipitation events have often had operational impacts to AEP facilities and infrastructure. From hurricanes and heavy rainfall of short or long duration to heavy snowfall and ice, there are slight but noticeable changes occurring in our service territory.

We conducted an analysis of heavy rain events at six AEP coal-generating plants, split between our eastern and western service territory, using 1960 rain event maps and comparing them to newer 2014 National Oceanic Atmospheric Administration (NOAA) maps. The comparisons were based on intervals of five, 10 and 25 years, as well as hour duration (24- and 12-hour) precipitation events. The results demonstrate increased heavy precipitation events, some of which coincided with hurricane activity in the Southwest over the past several years. This shows that subtle changes are occurring over time and that the extremes — like Hurricanes Harvey and Laura — are becoming more intense.

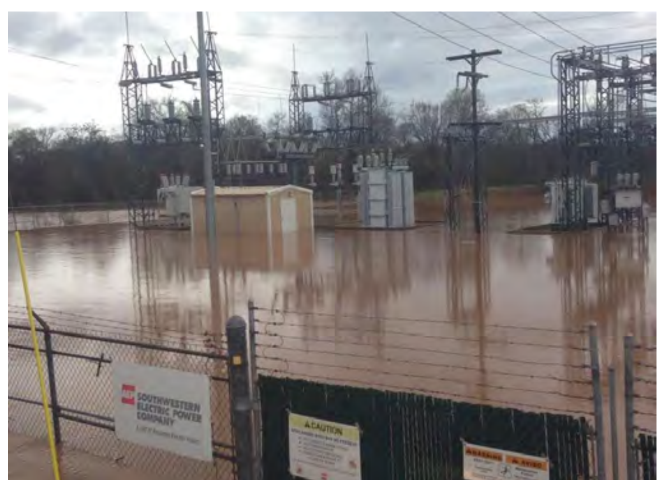
In response, several states are taking a new look at how they plan for flooding events. For example, Arkansas, Oklahoma, Louisiana and Mississippi updated their flood design criteria in 2019 following historic floods in those states. In addition, Texas is expected to initiate regional flood planning groups similar to the regional water planning groups that have been in place in other parts of the country since the late 1990s. This is in direct response to the impacts on the state from Hurricane Harvey in 2017 and Tropical Storm Imelda in 2019.

In 2020, AEP Transmission conducted an informal assessment of climate impacts to the transmission network. That assessment identified regional variations in the predicted precipitation rates expected by 2050. For example, while the eastern part of the AEP system (PJM Region) is expected to see an increase in annual precipitation, portions of the western part of AEP's system (SPP and ERCOT Regions) may see a decrease in annual precipitation that could increase the risk of wildfires and drought.

Increased precipitation threatens flooding of substations, as we have seen in multiple states in recent years. In addition, water can affect the wires business in a less direct way. High levels of precipitation can saturate soil and lead to erosion and soil slippage on steep slopes, which can compromise the integrity of the foundations and positioning of transmission and distribution support structures. Excessive rainfall also causes vegetation to grow faster, creating significant reliability concerns.

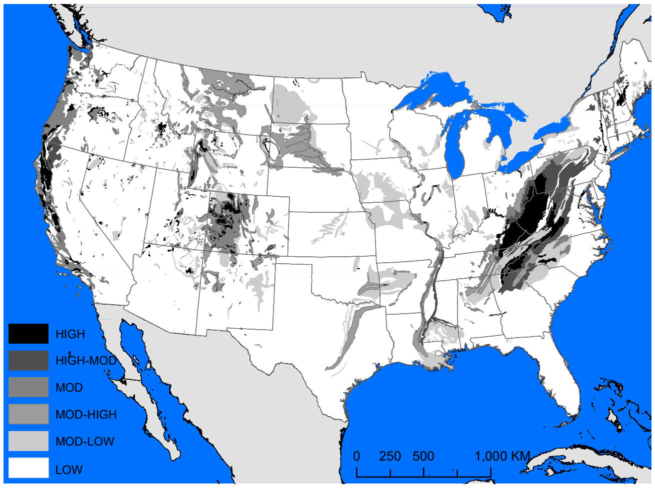
Heavy rain events that saturate the ground also can result in landslides and mudslides, especially in mountainous terrain, that can undermine electric facilities. According to the U.S. Geological Survey, the type, severity and frequency of landslides varies by location and is dependent on terrain, geology, and climate. USGS data show a high incidence of landslides that affect Appalachian Power Company, whose service territory is mountainous.

Next steps for continuing this work may include the evaluation of individual or groups of assets for key risks in selected regions. Those facilities with vulnerabilities may be further evaluated using a quantitative risk analysis to characterize risks in terms of cost, time,



Flooding of substations can affect the power transformer's secondary oil containment system, risking an oil spill.

Landslide Overview Map of the Conterminous United States



This USGS landslide overview map of the conterminous U.S. shows areas of high, moderate, and low landslide susceptibility. The dark shaded areas in the east show the potential risk for this affecting portions of Appalachian Power Company and AEP Ohio. Image courtesy of the U.S. Geologic Service.

injuries/illnesses or fatalities, system downtime, decreases in revenue, loss of customers, or fines and penalties.

HYDROELECTRIC POWER

Hydroelectric power is a clean energy source that does not directly emit greenhouse gases and is entirely dependent on water availability to operate. Hydro plants can be affected by changing rainfall patterns, which can affect river flows and energy output. AEP operates 15 hydroelectric facilities and one pumped storage facility in five states. Together, these facilities can generate up to a maximum of 909 MW of electricity.

The precipitation within each watershed directly influences the ability of these units to generate electricity. Too little precipitation results in decreased power production from these facilities. When there is too much precipitation, it creates an imbalance of the upstream and downstream elevations, threatening flooding and potentially an outage if the plant's power house is flooded. More concerning is the potential flood threat to communities along the rivers and lakes where these hydro facilities operate.

Water that goes over the spillway is water that cannot be used to produce electricity. Additionally, high water conditions downstream of the dam reduce the output of these facilities. AEP has specific permit requirements and procedures for managing water levels upstream and downstream of its dams. However, these facilities were not designed to be flood control projects.

Weather forecasting and water elevation management also are critical at our Smith Mountain Pumped Storage facility in central Virginia. This facility consists of an upper reservoir, Smith Mountain Lake, and a lower reservoir, Leesville Lake. While the two dams that created the reservoirs are both able to generate electricity, AEP is also able to pump water from Leesville Lake back up into Smith Mountain Lake when demand for electricity is low so the water may be reused when demand is higher. The system acts like a giant battery that can be discharged and recharged when needed.

Smith Mountain Lake is a very large body of water with more than 500 miles of shoreline and is a popular recreation spot for swimming, fishing and boating. As development around the lake's shores has grown through the years, the potential impact of water level fluctuations has become more pronounced. These fluctuations affect shoreline use and recreation on the water. Appalachian Power Company, which operates the Smith Mountain Pumped Storage Facility, maintains

AEP's 75 MW Claytor Lake Hydroelectric Facility in Virginia.

Appalachian Power's Smith Mountain Pumped Storage Facility in Virginia can provide up to 586 MW of electricity.

a comprehensive Shoreline Management Plan with the Federal Energy Regulatory Commission (FERC).

Weather forecasting is an important tool to minimize disruptive impacts by providing information that enables plant operators and dispatchers to proactively control water levels upstream and downstream. The reservoirs can be drawn down in advance of major precipitation events and can conversely be filled with more water than normal during high-flow events to mitigate downstream impacts. Increases in precipitation or heavy-precipitation events due to climate change could increase the need for active water management. Heavy-precipitation events also increase debris and sediment in the lake, especially at the Leesville Dam, requiring divers to clear the intake screens. This creates potential safety hazards for divers who must work in turbulent water to keep the plant running smoothly.

STEAM GENERATION AND COOLING WATER USE

Steam-electric power plants rely heavily on water to operate high-pressure boilers, turbines, cooling towers and, in some instances, emission control equipment. In this type of plant, water is heated using coal, gas or nuclear fuel to create steam, which spins a turbine and drives an electrical generator. Cooling systems, which are the most water-intensive part of a steam-electric plant, circulate water to absorb heat from the steam and lower the water temperature. The water we use is generally returned to its original water source, and, often, it is cleaner than when it was withdrawn.

AEP relies on water withdrawn from water-stressed areas in the Mississippi, Sabine, and St. Lawrence watersheds. We use the WRI Aqueduct water risk analysis tool to understand if we have facilities operating in high-stress regions. Four facilities met this criteria in 2020.

The quality of the water is also important to protect equipment and to ensure compliance with water quality standards. For example, the John W. Turk Plant, a coal-fired power plant in Arkansas, draws cooling water from the Little River, a tributary of the Red River. The Little River has experienced problems with water quality, resulting in high concentrations of total dissolved solids in the intake water and requiring the plant to curtail load or use water from back-up water supply ponds.

At some plants, especially in AEP's western footprint, water is recycled through cooling water reservoirs. These reservoirs were built specifically to serve as a source of water and as the receiving water body for cooling water used at the plants. These facilities "recycle" nearly 100% of the water they withdraw.

WILDFIRES, DROUGHT & FLOODING

The effects of drought and flooding conditions have the potential for significant disruption, especially if they become more severe as the climate changes.

Portions of AEP's service territory are more frequently susceptible to drought conditions, such as West Texas. Lack of precipitation can lead to an increased risk of wildfires in these areas. However, given the vegetation profile of West Texas and low population density, the overall wildfire risk in this region remains low. Wildfire risk is reviewed as a regular course of AEP's risk management practices.

WILDFIRE RISK

Following the devastating California wildfires in 2018, AEP conducted a risk analysis of its risk exposure to wildfires. The findings show that AEP's most substantial risk exposure is due to the sheer amount of transmission line miles that we must maintain. This means there is a greater opportunity for a conductor to make contact with vegetation that could potentially cause a fire. We monitor these risks as they change.

While AEP has thousands of line miles of exposure, there is limited climate risk from wildfires in our service territories. The risk varies widely across AEP's service territory from both climate and line-miles perspectives. For example, Texas has over 9,300 miles of transmission lines, while Kentucky has 1,200 miles. As a result, the relative difference in exposure is significant. The three main climate risk factors associated with wildfires are averaged maximum daily wind speeds, aridity (inverse of humidity) and relative annual drought (inverse of annual rainfall). Critical wildfire climate conditions are uncommon in the eastern part of AEP's service territory. Texas is most likely to experience the climate conditions that would contribute to wildfires.

We will continue to evaluate the threat of wildfires to the AEP system as part of our ongoing risk management function. In addition, AEP participates in the CEO-led Electricity Subsector Coordinating Council (ESCC), which serves as the principal liaison between the federal government and the industry. The ESCC has made wildfire mitigation and response a priority because of the growing threat of wildfires to the power sector and to the life, health and safety of communities.

Risk Types and Factors

Risk Type	Risk Factor
Probability Risk	• Climate: Average Max Daily Wind Speed • Climate: Aridity • Climate: Annual Drought • Transmission Line-Miles • Fuel Type
Consequence Risk	• Customer Density • Wildland Urban Interface (WUI) Ranking • First Responder Accessibility • Historical Vegetation Outages

Risk is defined as the product of probability and consequence. The data elements we looked at to analyze the risk were separated into factors that determined probability (likelihood) vs. the consequence (impact). We used this to complete a relative comparison across operating companies to determine an AEP-specific wildfire heat map.

DROUGHT

Aside from creating conditions conducive to wildfires, drought can affect AEP's operations in other ways. For example, power plants that rely on cooling water reservoirs or lakes could be forced to curtail operation when drought conditions cause water levels to drop below what is needed to operate a generating unit. In 2013, low water levels made it necessary to dredge intake canals at western coal-fueled units to provide adequate access to cooling water.

AEP operates several power plants in drought-prone regions of the country that require careful water management. Since 1999, the Texas Commission on Environmental Quality has mandated that all Texas water rights holders implement a water conservation plan. The plan must include voluntary, site-specific five-year and ten-year water conservation goals, as well as cost effective solutions to ensure adequate water supply for all users in their regions. We update these plans every five years.

In addition, we file annual updates with the Texas Water Development Board. We have comprehensive water conservation plans in place for the Pirkey, Welsh, Wilkes and Knox Lee power plants (Pirkey will retire; Welsh will cease burning coal by the end of this decade). We also have a Drought Contingency Plan for the Knox Lee Plant and must comply with Drought Contingency Plans for three water providers who supply water for plant operations.

Drought conditions also can affect the daily operation of our 400 offices and service centers. In Oklahoma and Texas, where a heavy clay-based soil is the norm, drought conditions cause uneven settling of buildings that leads to foundation and building infrastructure damage.

FLOODING

Heavy rain events can disrupt the operation of substation facilities, offices and service centers located across AEP's service territory. For this exercise, we overlaid AEP's facilities (excluding power plants) on FEMA's 100-year flood map. We learned that several facilities that were hardened to withstand high wind impacts remain vulnerable to flooding. The effects of flooding to some of those facilities could be disruptive — from flood damage that dislocates daily operations to complete loss of a facility.

The immediate negative impacts to substations due to flooding may include:

- Loss of the HVAC system
- Loss of AC station service
- Communications failure
- Loss of DC battery system(s)
- Water damage to protection & control equipment (i.e., relays)
- Damage to major equipment (i.e., transformers, circuit breakers)
- De-energization of a substation
- Fire and catastrophic loss of a substation
- Oil spills from equipment into the water

All of these potential impacts are the result of water coming into contact with part of the energized or insulating components of the electric grid. In addition, catastrophic damage — such as the de-energization of a substation or fire and loss of a substation — can be triggered by other minor damages or failures. And once a substation is flooded, we cannot make repairs until the water recedes or is pumped out.

Flooding has other effects on substations over the longer term, including compromising the integrity of foundations and positioning of transmission and distribution support structures. In addition, heavy rains or floods can wash away substation stones, which are important to protect employees from inadvertently touching or stepping on a surface that has become an unintentional pathway of stray electrical current flows. Flooding also damages metal equipment, enclosures, structures, fences, and grounding conductors/rods, which can be corroded over time.

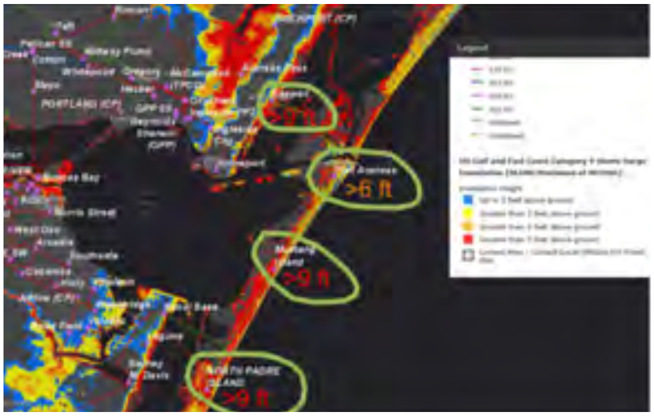
Flooded Clendenin Station in Kanawha County, West Virginia.

This could also cause increased damage to roads, laydown yards (important for storm restoration and construction), and site drainage (including retention/detention ponds). These impacts would increase the cost of maintenance, necessitate identification of new laydown yards and staging areas, and potentially force redesign or upgrades to affected buildings. In the future, the location of new facilities will take into consideration elevation and road access during flood conditions, with the intent of locating outside of areas most vulnerable to severe flooding. We have also developed a process for prioritizing mitigation strategies for at-risk facilities.

A 2020 review of existing AEP stations identified that there are nearly 260 substations located within a 100-year flood plain. We will be monitoring the evolution of floodplain maps due to climate change and are prioritizing higher risk stations for remedial action as the cost of moving all of them in the near term is prohibitive.

To understand the risk of storm surge and flooding along coastal Texas, we overlaid our substations in the Corpus

Potential Storm Surge Impacts



Category 4 hurricane storm surge map for part of the coastal area of Corpus Christi, Texas. The areas circled reflect the locations of four substations and the level of storm surge to which they could be exposed.

Christi area over a storm surge map using the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model developed by the National Weather Service (NWS) to estimate storm surge heights (as shown in the figure above). We modeled how a Category 4 hurricane creates storm surge in this area; the red, orange, yellow and blue colors on the map show storm surge of 9 feet, 6 feet, 3 feet, and no flooding, respectively. The exercise showed us four substations vulnerable to storm surge and flooding in a Category 4 hurricane.

AEP CEO Nick Akins thanks line crews for their efforts to restore power after Hurricane Harvey.

Too much water from heavy precipitation events also can affect operations at our power plants. In 2019, Southwestern Electric Power Company's Flint Creek Plant in Arkansas experienced flood damage that cut off the plant's supply of water from its cooling lake for nearly a year while repairs were made.

Prolonged periods of high water on the Ohio River due to heavy precipitation events during the winter and spring can affect the ability of AEP's Mountaineer, Mitchell and Rockport plants to off-load coal and limestone supplies from barges. In 2019, high water levels on the river caused a slight reduction in unit output to reduce the need for coal until the river returned to normal levels. If heavy precipitation events become more frequent, the risk of operational disruptions could increase.

HURRICANES AND SEA LEVEL RISE

An extension of flood risk is posed by sea level rise, hurricanes and storm surge. AEP's facilities and service territory cover a portion of the Texas Gulf Coast, which is prone to these risks. Sea levels have been gradually increasing due to melting ice caps in the Arctic, and scientific literature supports that warmer ocean temperatures could push destructive storm surge from hurricanes further inland.

There are short- and long-term variations in sea level. Short-term variations in sea level are caused by changing tides and flooding brought on by melting ice and hurricanes. Long-term variations are gradual and intermittent, such as El Niño. In urban areas, such as the Gulf Coast, rising seas can threaten public infrastructure, such as roads and bridges that support local jobs and regional industries.

AEP's Texas service territory has been subjected to a number of severe coastal storms over the years. Hurricane Celia in 1970 and Hurricane Harvey in 2017

The photos show catastrophic wind damage to the Tatton Substation in Texas from Hurricane Harvey.

made landfall near Corpus Christi, Texas, in AEP Texas's service territory. More recently, Hurricane Hanna was AEP Texas's biggest weather-related outage event since Hurricane Harvey. Hanna made landfall in Padre Island in July 2020. This storm caused damage in Deep South Texas and left over 200,000 customers without power.

As part of this risk assessment initiative, AEP identified seven buildings that could be at risk for storm surge inundation made worse by sea level rise. While seven of 35 facilities in the coastal area have already been hardened for wind damage, our review revealed they remain at risk for flooding.

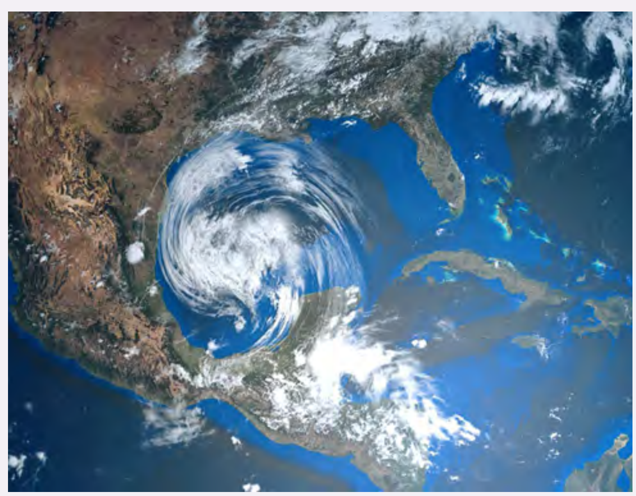
The potential business impacts from catastrophic flooding in this region include loss of facilities and access roads, increased need for building resiliency and backup power and the need to locate new facilities at higher elevations to protect them from high water. This analysis provided greater clarity on which facilities are operationally critical and may require further actions to protect them.

Hurricane Harvey: Impacts and Adaptation

Hurricane Harvey hit the Middle Texas Coast in August 2017 as a Category 4 hurricane, making landfall in Rockport, Texas — just 30 miles from the AEP Texas home office in Corpus Christi. With sustained winds of 130 miles per hour (mph) and gusts up to 145 mph, the National Weather Service (NWS) issued a rare Extreme Wind Warning, reserved for hurricanes with winds of 115 mph or higher.

Storm surge reached more than 12 feet above ground level at the Aransas Wildlife Refuge. Severe flooding from storm surge and unprecedented torrential rain — as much as 40 inches in less than 48 hours in Southeast Texas — made the storm one of the most significant tropical cyclone rainfall events in U.S. history. While the major story of Hurricane Harvey was the rainfall, at its peak the

National Weather Service (NWS) Map



Hurricane Harvey hit the Middle Texas Coast in August 2017 as a Category 4 hurricane.

storm also cut power to 220,000 AEP Texas customers after winds knocked down or broke more than 5,000 distribution poles, damaged over 500 transmission structures and destroyed the Aransas Pass Distribution Center. The storm caused approximately $415 million in transmission and distribution-related damage and prompted a review of and modifications to planning criteria and design standards as the system was rebuilt.

AEP Texas initiated a long-term program to harden the distribution system to reduce outages and minimize future tropical cyclone damage. Hardening refers to physically changing the infrastructure so that it is less susceptible to damage from extreme wind, flooding or flying debris. This included the development of a Storm Outage Prediction Model to help predict and prepare for weather-related impacts to the transmission and distribution grid *(see sidebar on page 71)*.

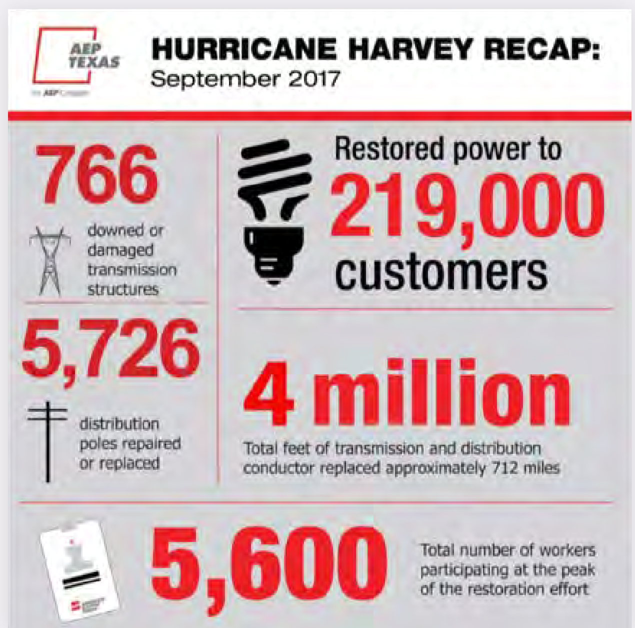
In 2010, the Public Utilities Commission of Texas adopted the Electric Utility Infrastructure Storm Hardening rule, requiring that storm hardening reports be filed with the Commission every five years. In its report, AEP Texas details specific actions being taken to strengthen the distribution and transmission system to withstand extreme weather conditions and to minimize customer outage time. Actions could include elevating substations above flood plains, deploying sensors and control technology, strengthening poles with guy wires, managing vegetation, and relocating facilities.

AEP designs, builds and maintains transmission and distribution facilities to meet and/or exceed the current National Electrical Safety Code (NESC) and American National Standard Institute (ANSI) standards for the region. For example, NESC Extreme Wind Loading criteria are from 130 mph to 140 mph; AEP Texas designs distribution lines to withstand wind loading of 150 mph.

We also continuously look at risk mitigation strategies using GIS to overlay our facilities (existing and new) on known flood plains so that we can see where there might be greater risk to physical assets.

AEP's new advanced Underground Network Monitoring (UNM) system provided added protection during Hurricane Harvey, enabling real-time monitoring to troubleshoot problems with and determine the status of network equipment. As the hurricane approached the Texas coast, AEP Texas relied on the system to help ensure critical equipment on the grid was working normally; in addition, the network's high water alarms alerted crews about which underground vaults had filled with water from the storm. The underground network monitoring system enhances operational capability, increases situational awareness, and decreases risk.

With sustained winds of 130 miles per hour (mph) and gusts up to 145 mph, the National Weather Service (NWS) issued a rare Extreme Wind Warning, reserved for hurricanes with winds of 115 mph or higher.



TEMPERATURE IMPACTS

One of the most direct and transparent impacts of climate change is the change in observed temperature. These changes could present as either higher variability in observed temperatures on a local or regional level, or in general directional shifts from present-day temperatures. The impacts of both scenarios have to be considered for their potential impacts on the grid.

Increased temperatures could increase cooling load (a revenue opportunity) and decrease heating load (a revenue risk). A large portion of AEP's electric load is currently dedicated to heating and cooling buildings. In 2019, heating demand represented 4.9% of AEP's load and cooling demand represented 8.5% of AEP's load (total retail sales). Forecasted load growth tied directly to temperature increases across AEP's service territory are expected to be modest compared with forecasted load growth due to economic or policy activities related to climate change, such as electrification.

When extreme heat occurs, the physical toll affects people, the environment and equipment. Higher ambient temperatures decrease the efficiency of the grid by pushing electric equipment, such as transformers and conductors, closer to their maximum allowable operating temperatures. When that happens, we have to reduce capacity to cool the equipment, increasing the probability of system congestion. If these adjustments are not made, equipment can overheat and fail.

Higher temperatures also increase surface evaporation on rivers and lakes where hydro plants operate, reducing power output of this clean resource. And critical equipment such as conductors, transformers, batteries, system monitoring equipment and solar inverters could be pushed beyond their maximum operability ratings. Higher temperatures could also shorten the lifespans of critical parts, risking equipment loss, an outage or reduced output. Increased water temperatures caused by higher ambient temperatures affect water sources used in power production. Most importantly, extreme hot temperatures increase heat stress for employees, raising the risk of heat-related illnesses and the need for changes in workflow, such as working at night versus during the heat of the day.

Ambient temperature swings in the winter present different challenges. Warmer winter temperatures in the Great Lakes region, for example, mean less ice coverage on Lake Michigan. This could cause lake-effect cloud cover, diminishing solar generation output in the region. Warmer temperatures also reduce demand for electricity for winter heating, affecting revenues. When temperatures are extremely cold, as we saw in the 2013–2014 winter and most recently in Texas in February

Heat Index Guide*

Heat Index	Risk Level	Protection
Less than 91°	Lower	Basic Heat Safety
91°–103°	Moderate	Use Precautions and Awareness
103°–115°	High	Use Additional Precautions
Greater than 115°	Extreme	Aggressive Precautions

* The Heat Index and temperature are not the only indicators of when heat illness can happen. Every body responds differently to heat.

Climate change impacts people, as well as infrastructure.

2021 (commonly referred to as the "polar vortex"), equipment can freeze, fuel supplies can be disrupted and output can be reduced when it is needed most. The human toll from extreme events can also be significant.

WATER TEMPERATURES

Indiana Michigan Power Company's Donald C. Cook Nuclear Power Plant relies on water from Lake Michigan for cooling. The safety systems at the Cook Plant in Bridgman, Michigan, were designed and built in accordance with federal regulatory requirements to withstand extremes in weather and natural hazards. This includes flooding, tornados, earthquakes, temperature extremes, local intense precipitation and a seiche (a very large wave on an enclosed body of water) in Lake Michigan.

The original design of the Cook Plant incorporated a maximum lake water temperature of 76° F. While we have seen increasing water temperatures from Lake Michigan during the past decade, the plant has taken proactive measures to ensure its cooling systems can operate independently of the lake through a modification to an internal cooling system. In addition, the plant upgraded the ice condenser unit, improving our ability to maintain cooling conditions required for normal operations. Similarly, the Cook Plant has upgraded cooling systems for other plant equipment (e.g., main transformers, containment building, etc.). These measures have effectively mitigated the impact of increasing water temperature, enabling sustained normal and safe operations.

For thermal generating units, colder cooling water is more effective in the efficient generation of electricity. When water is too warm for power plant cooling, it decreases plant efficiency, making plants less economical to operate. In once-through cooling systems, the water heats up and is warmer than the source water, where it is returned. Absent proper management and remediation, these discharges could have ecological impacts, including harming aquatic life and impacting local ecosystems.

The Donald C. Cook Nuclear Power Plant, on the shores of Lake Michigan, has upgraded its cooling systems to mitigate rising water temperatures from the lake.

EXTREME WEATHER

A tornado over Tulsa, Oklahoma, in May 2019.

Tulsa Power Station, as seen from across the flooded Arkansas River. PSO's Riverside Power Plant, which is further south, also was threatened by flooding.

Extreme weather can take many forms including severe thunderstorms (tornados, damaging winds, and lightning), wind storms, ice storms, snow storms, heat waves and cold snaps. Although some of these events have not been directly linked to climate change, the frequency and magnitude of these events is subject to change along with a changing climate. The biggest risk to operations from extreme weather is typically exposed infrastructure, such as transmission and distribution structures. As we shift to more renewable resources, they also become more vulnerable to weather extremes. High winds from severe storms can topple structures or blow debris into energized equipment, leading to outages. Tornados and derechos can damage or destroy distribution and transmission facilities, including buildings.

Public Service Company of Oklahoma is no stranger to weather extremes and natural events — but 2019 was exceptional. In May 2019, Oklahoma was battered by a series of severe weather events — from heavy rain, high winds, hail and major flooding to more than 60 tornados and a 4.5 magnitude earthquake. Floodwaters surrounded the Tulsa North Substation (a major substation for the Tulsa area). Flooding also threatened to cut off access to Tulsa Power Station and Riverside Power Station as the Arkansas River spilled its banks and a nearby dam spillway was opened to try to minimize flooding. In addition, straight line winds and a tornado knocked down a 138-kV transmission line in a neighborhood in Broken Arrow, a suburb of Tulsa. Together, these severe events caused significant and costly property damage and disrupted electric service to thousands of PSO customers. As the climate changes, the risk of more of these types of intense weather events could potentially grow.

Lightning can present a significant challenge for the electric power grid. When lightning strikes, it can ignite forest fires, damage electrical infrastructure, and cause many other forms of loss and damage. The transmission system can withstand some disruptions caused by lightning, but more severe lightning strikes can damage equipment, including knocking critical circuits offline.

When lightning strikes the transmission grid, it can cause momentary outages of a half-second or less, or it can cause damage that results in a prolonged outage. Some customers, particularly industrial and manufacturing customers, are sensitive to any lapse in power because it can take their production lines down. Lightning can also knock out power on the distribution grid with damaged transformers and other equipment and affect operation of wind farms.

EXTREME WEATHER AND RENEWABLES

Climate change is often framed in terms of temperature change. But it is more often the extreme weather events that have the greatest impact. As renewable energy, such as solar and wind, will play a larger role in meeting our customers' energy demands, its weather dependent variability can challenge reliability and a stable energy supply. There are not clear predictions of how wind speeds and solar irradiance will change as a result of climate change, but it is important to consider different possibilities since renewable resources will be integral to our future energy supply and a key solution to addressing climate change.

A small change in wind speed can have a substantial impact on the production of electricity from wind turbines. Wind energy production is also, to a lesser extent, a function of air density, which helps to spin the turbine blades. As temperatures increase, air density decreases, having a negative effect on wind energy production, which will need to be accounted for in the quantifying of the wind resource for a geographical region.

Solar photovoltaic installations directly convert sunlight into electricity. For these facilities, the amount of energy produced is a product of solar irradiance — how much sunlight shines onto the solar panels. This can be diminished by precipitation and cloud cover and, in turn, affect energy output. Extreme heat can also affect energy output.

As construction of solar farms becomes more common in areas with colder climates, impacts from snow or ice covering solar panels and reducing their ability to collect sunlight should be considered. Conversely, warmer winters could mean less freezing precipitation, enabling additional solar output. If warmer winters lead to less ice coverage (which is a barrier to evaporation) on the Great Lakes, cloud cover could increase in areas downwind of the lake, particularly over solar farms in I&M Power's service territory.

AEP Energy's OnSite Partners sees snow cover loss in the range of 2% to 10% per year at customer-sited solar facilities. Snow loss is often modeled in production forecasts being developed for new projects, but actual results can vary widely. In a mild year, we can see virtually no snow loss, while a cold, snowy winter will far exceed forecasts.

Similar to traditional generation facilities, wind and solar are subject to damage from severe weather occurrences. Hail has the ability to damage wind turbine blades and solar panels. Likewise, both types of facilities are vulnerable to damage from lightning and extreme wind. Significant damage to turbine blades from lightning is a common occurrence at facilities where lightning storms regularly occur. In addition, extreme cold periods can affect performance and durability of wind turbine blades (caused by icing on the blades). AEP continues to rely on the best available information to aid in the planning and operation of these facilities and will continue to monitor trends to adapt to changing conditions as needed.

In 2018, AEP Renewables completed a major project to repower or replace 207 wind turbines at Desert Sky and Trent Mesa wind farms in west Texas. The project increased generating capacity of these facilities to 322.4 MW, up from 310.5 MW. More importantly, the repower increased production by 20%. The photo shows a completed wind turbine at Trent Mesa.

Storm Outage Prediction Model

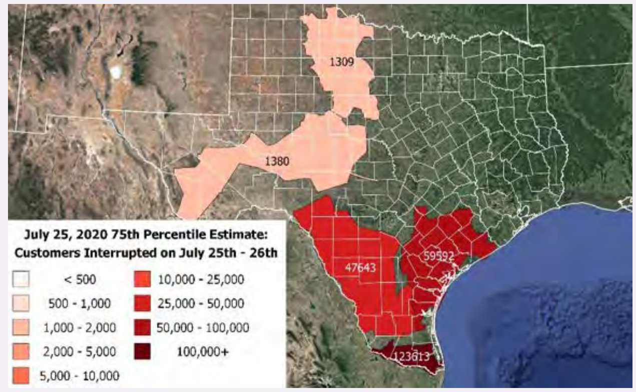
We wanted a tool to help us enhance our ability to assess and predict customer outages and damage caused by severe weather. Understanding the potential for and impacts of extreme weather is important because it helps us manage risks more effectively. Knowing when and where these events will occur, their duration and their likely impacts to customer service is critical to being ready to restore power when the storm passes. This is especially important as our transmission and distribution system grows, and we continue to invest significantly in system hardening and vegetation management, which can change how the system is affected by the weather. The system is becoming more dynamic and complex, and customer expectations for reliable power are increasing.

Using artificial intelligence (AI) technology and historical internal data, we collaborated with The Ohio State University and the University of Michigan to develop a Storm Outage Prediction Model (SOPM). The tool provides decision-makers additional data and, when coupled with AEP Meteorology weather alerts, enables our companies to make more informed decisions around pre-storm preparations and post-storm restoration. With the predicted number of affected customers and the predicted equipment damage, we can be more confident in the number of resources and equipment requested. The result is increased potential to shorten restoration times for impacted customers — leading to a better overall customer experience.

The SOPM was developed using storm outage data from the previous eight years, starting with the 2012 derecho that caused massive damage in AEP's eastern service territory. The model is regularly populated with data from current events, including information about vegetation, weather, damaged equipment, number of damage locations and customers interrupted. The populated weather data includes rainfall amounts, temperatures, soil moisture, wind speeds, snow amounts and thunderstorm activity.

We began using the SOPM in 2020 with the forecast of Hurricane Hanna, which made landfall in July as a Category 1 hurricane on Padre Island in the AEP Texas service territory. The model predicted that as many as 238,000 customers were at risk of losing power. When the storm was over, more than 200,000 customers had actually lost power — proving the model provides valuable information in preparing for a hurricane.

Hurricane Hanna Customer Interruptions Map



This map shows the SOPM's 75th percentile estimate of customers interrupted by Hurricane Hanna. The model correctly predicted that the largest number of customer outages would occur in the Rio Grande Valley District located at the southern tip of Texas.

SWEPCO crews work as quickly and as safely as possible after major storms to assess damage, repair transmission lines and restore power to critical community services such as hospitals, nursing homes and police and fire stations.

The SOPM results are one of many variables considered when preparing for a significant weather event. Of course, the model results are only as good as the weather forecast information data that is provided. Hurricanes, derechos, severe thunderstorms and ice accumulations are difficult to confidently forecast in advance. We continue to work with our academic partners to sustain the model and improve its results.

CLIMATE-RELATED ECOLOGICAL IMPACTS

Climate change, with its many direct and indirect effects, is ranked as the third-leading driver of species extinction, according to the Inter-Governmental Science-Policy Platform on Biodiversity and Ecosystem Services. As climate change impacts increase, there is a high likelihood more species will be listed under the Endangered Species Act of 1973 (ESA). This is important to AEP's growth strategy, which includes new construction and rebuilding of transmission lines and substations and building and operating of new renewable projects across the U.S. in our regulated and competitive businesses.

Habitat Conservation Plans (HCPs) play a critical role in preventing species extinctions through anticipating impacts to listed species. An HCP ensures that any impacts are minimized and mitigated, most often by conserving habitat. HCPs are approved by the U.S. Fish and Wildlife Service (USFWS) under the ESA.

In 2019, we began implementing an HCP across several transmission regions for the American burying beetle, a threatened insect with habitats across several states

Habitat Conservation Plans (HCPs) play a critical role in preventing species extinctions through anticipating impacts to listed species.

The threatened American Burying Beetle has moved from the endangered to the threatened species list but is still in jeopardy. (Photo courtesy of U.S. Fish & Wildlife Service)

in our service territory. This multiyear HCP has allowed us to use pre-approved practices to minimize impacts to the beetle and its habitat and to encourage its recovery. The HCP covers portions of Arkansas, Oklahoma and northern Texas where AEP currently has operations or the potential for future development.

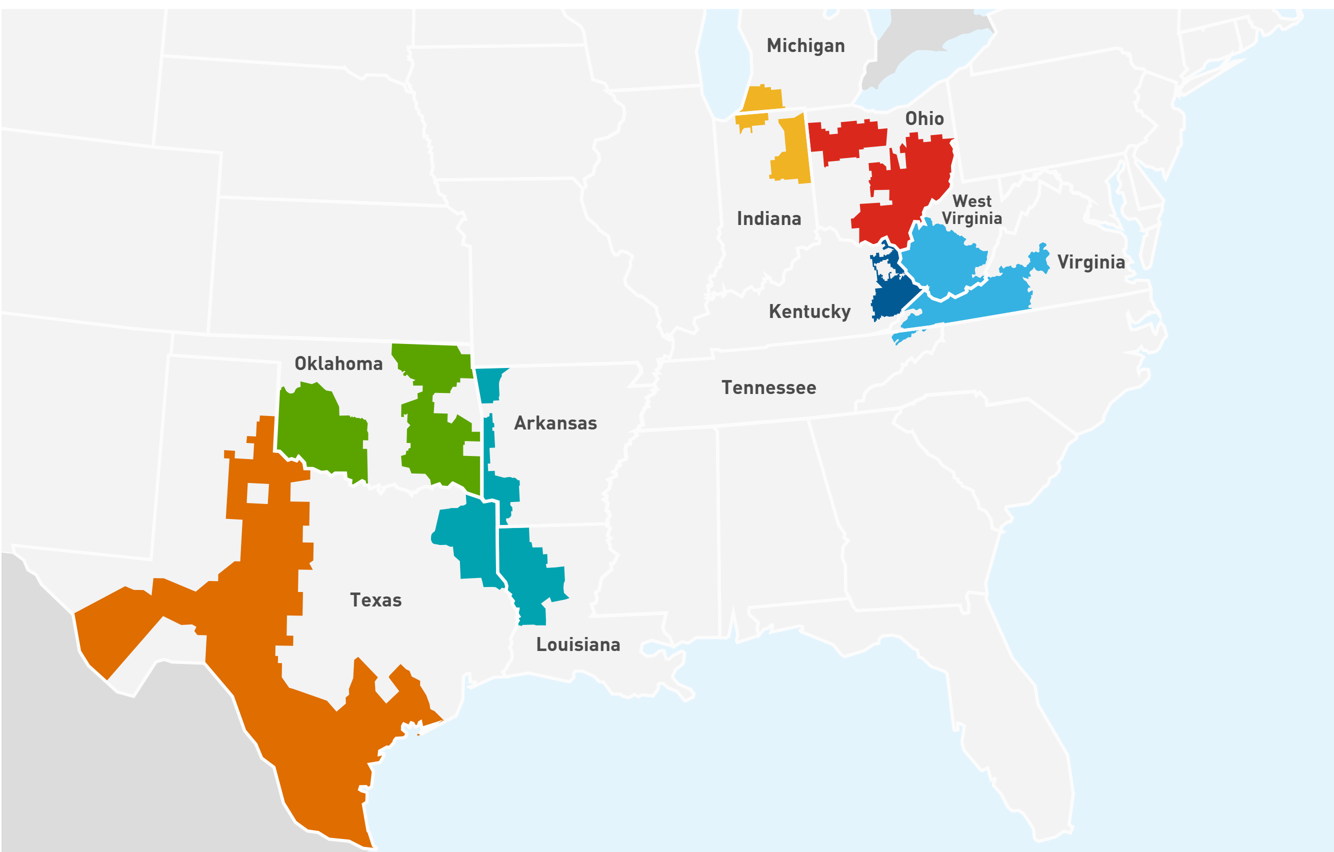
We are developing a 30-year, system-wide multispecies HCP, which will not only protect the covered species but also generate cost and time savings for our customers and AEP. Because climate change has the potential to alter the effectiveness of the HCP mitigation and conservation strategy, we are now incorporating climate adaptation approaches into our HCPs. Through our collaboration with the USFS, we expect to assess these potential additional threats, including how habitats may shift due to climate change.

REGULATORY APPROVAL AND RECOVERY

Our priority is to maintain and operate a safe and reliable grid that is resilient and adaptive. The investments we make to harden the grid and improve reliability and resilience directly affect our customers and shareholders. And these investments must coexist with regulation and policy considerations, such as affordability. AEP's vertically integrated utilities and its wires-only companies have business structures through which state public utility commissions govern rates to ensure investments made are in the public interest.

This structure also allows AEP to recover expenses that are deemed to be prudently incurred and to earn a fair and reasonable return on invested capital. This business model somewhat insulates AEP from physical climate impacts that could otherwise materially affect AEP's longer-term financial outlook, as customer rates can be adjusted to reflect the changing cost of providing electric service over time. As the company experiences greater or more costly storm events, there is additional prudence risk associated with our ability to effectively mitigate the risk of outages and the efforts necessary to restore power to our customers.

American Electric Power's Service Territory Map



AEP Ohio | Appalachian Power Company | Indiana Michigan Power Company | Kentucky Power Company
AEP Texas | Public Service Company of Oklahoma | Southwestern Electric Power Company

JUST TRANSITION

MAKING THE TRANSITION TO A CLEAN ENERGY FUTURE

The transition from a fossil fuel-dependent economy to a clean energy economy has practical challenges affecting people, communities, and society at large. These challenges are especially apparent in communities and regions dependent on the fossil fuel industry for jobs, tax base, and corporate philanthropic support, such as grants from the AEP Foundation. The call for action on climate change shines a spotlight on the need for partnerships and collaboration between the public and private sectors to ensure communities are equipped to diversify their local economies and ensure their long-term resilience and sustainability.

Many point to the concept of "Just Transition" as a path forward to prevent people from being left behind. Just Transition was created as part of a trade union movement, encompassing a range of social interventions to secure workers' rights and livelihoods as the economy transitions to sustainable production — in this case, the sustainable production of electricity. Just Transition suggests that we have choices about how we manage the transition, ensuring environmental sustainability as we enable opportunities for decent work, social inclusion and poverty mitigation.

As the nation transitions to a clean energy economy, there is mounting realization that there are trade-offs. As we shift from fossil-based electricity to cleaner resources such as wind and solar, there are human and economic impacts. These include a loss of jobs at the fossil-fueled plants and in the broader economy, tax payments that support public services, including education, and economic activity that is supported by the plant's ecosystem.

Increasingly, policymakers are showing more interest in these trade-offs. For example, regulators in Michigan and Arizona now require utilities to file community transition plans with their coal retirement plans. In January 2021, newly inaugurated U.S. President Joe Biden signed an executive order on climate change that includes provisions to revitalize energy communities. The order establishes an Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization. The intent is for the government to develop programs, policies and activities to assist with the revitalization of communities affected by the clean energy transition, including the retirement of coal-fueled power plants.

History and Intent of Just Transition

According to the Climate Justice Alliance, Just Transition is a

"vision-led, unifying and place-based set of principles, processes, and practices to build economic and political power to shift from an extractive economy to a regenerative economy."

JUST TRANSITION
Good Jobs & Healthy Communities

Just Transition is rooted in labor and environmental justice movements through history that fought to phase out industries that harmed workers, community health, the environment, and low-income communities of color. Advocates stress the need for strategies that enable thriving economies that provide good jobs, build strong, resilient communities, and facilitate racial justice and social equity. It is designed to ensure those who are impacted by the transition to a clean energy future are not left behind.

Kanawha River Plant is a coal-fueled power station owned and operated by American Electric Power near Glasgow, West Virginia. The power station was shut down in May 2015.

At AEP, we help our workers and our communities prepare for and make the transition to new skills, new industries, and new partnerships that enable them to diversify so they thrive after we close a power plant. Our power plants are the primary employers and tax paying entities in many communities. We also serve many of these communities and we want them to be economically stable, long after the plants cease operations.

The transition to a clean energy economy requires collaboration, resources and a commitment from all levels of government, public and private partnerships, technology providers, political leaders, regulators and others. In our experience, broader community development efforts can help a community attract new industry. When a plant is identified for future retirement, AEP's Economic & Business Development team is activated early, often years ahead of a planned retirement. This gives them time to assess options and scout the area for other developable properties in or near the impacted communities that may be more marketable than the plant site itself. At the same time, we help to identify resources available to communities and research options for site redevelopment, where feasible.

The journey to a clean energy future is exciting, disruptive and extremely challenging. Our responsibility to provide safe, reliable and affordable electricity to customers is at the core of our transformation. At the same time, we must responsibly balance the desire for a clean energy economy with the financial, physical, and social costs of making the transition.

The Risk of Stranded Assets

A typical coal-fueled power plant has an initial design life of 30 to 40 years. The expected life of the plant can be extended through investments that replace aging parts, reduce environmental impacts, and increase efficiency and economic feasibility of the plant's continued operation. AEP's coal fleet ranges in age from 8 years to over 60 years, with most of the remaining units reaching 50 to 60 years by 2030.

As coal-fueled generation has become increasingly economically challenged by low natural gas prices, a rapid drop in renewable energy prices, and state and federal policy support for clean generation technologies, the expected lifespan of some AEP coal-fueled generating units may be reduced. When plants retire before the end of their previously expected life, the risk of stranded assets becomes more pronounced. When that expected life is reduced, regulators and electric companies must find a way to account for the remaining book value of the plant.

We are working with regulators on options such as accelerated depreciation and regulatory asset recovery to address the remaining value of these plants.

The president's climate goals to reach net-zero by 2035 could potentially result in additional premature retirements of coal-fueled generating assets. Between 2000 and 2021, AEP invested an estimated $9 billion in environmental controls in its coal-fueled generating fleet. These investments resulted in significant reductions in emissions and were made in compliance with environmental regulations.

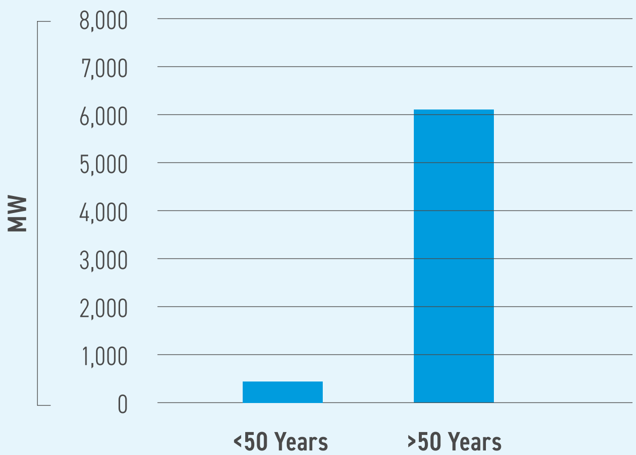
The investments we make in the electric power system are long-term investments, not short-term solutions. Federal and state regulations and policies must be consistent to protect customers from paying for mandates that leave them vulnerable to significant financial obligations with no long-term benefit.

Coal-Fueled Fleet Optimization

As we invest in cleaner energy options, we are committed to mitigating risk around our current coal-fueled fleet. We are focused on managing our remaining coal-fueled generating assets to reduce the need for capital investment over time while continuing safe and reliable operation of the units. As renewables become more attractive in the market, we will run our remaining coal units consistent with a market approach on an as-needed basis.

We will seek opportunities, as appropriate for our customers and when approved by regulators, to accelerate retirement dates and associated accounting depreciation rates. This has the potential to mitigate risk for both our customers and shareholders.

AEP's Coal Unit Age in 2030



In 2020, we completed the retirement of the Oklaunion Plant near Vernon, Texas.

COAL RETIREMENTS: POTENTIAL ECONOMIC IMPACT

Coal-fueled power plants require highly skilled employees and provide well-paying jobs. The plants also provide sizable tax revenues and stimulate associated employment in other sectors that support both the plant and its employees. Coal-fueled power plants and their employees often are significant supporters of the communities where they are located, and when plants are retired and decommissioned, they can leave a significant economic void.

AEP conducted an economic impact analysis to understand the cumulative regional effects associated with a coal-fueled power plant closure. We modeled the hypothetical closure of four active coal units using IMPLAN modeling software to understand and quantify how a plant retirement affects regional employment, labor income and GDP. We estimated the direct (AEP), indirect (contractors/suppliers) and induced (consumer spending) economic impacts of a retirement.

WHAT WE LEARNED

On average, a typical coal-fueled power plant operated by AEP generates $160 million in regional economic activity, $63 million in labor income, and supports more than 700 regional jobs annually. Our analysis shows that plant operations also stimulate significant activity in external supply chains. As those employed directly at the plant and in the supply chain spend their wages, hundreds more jobs are created in the regional economy — in restaurants, retail, and leisure establishments. When all channels are considered (direct, indirect and induced), each direct job at the plant is found to support an additional 2.3 jobs in the region.

Economic Impact Summary — Average Effect of Coal Plant Retirement*

Typical AEP Plant	Estimated Impacts
Employment (number of jobs)	
Direct	216
Indirect	303
Induced	198
Total	**716**
Labor Income (000)	
Direct	$31,246
Indirect	$21,989
Induced	$9,301
Total	**$62,536**
GDP (000)	
Direct	$95,203
Indirect	$48,727
Induced	$16,111
Total	**$160,041**

* Economic impact varies by plant size and geographic location.

The industries in the supply chain most impacted are:

- Subsectors of the trade, transportation and utilities sector (electric power transmission and distribution, rail and river transportation, pipeline transportation);
- Natural resources, mining and financial activities;
- Professional and business services (employment services, legal services, etc.).

When you look at the broader economy, major beneficiaries of the plant include:

- Education and health services (hospitals, doctor offices, schools);
- Trade, transportation and retail stores;
- Leisure and hospitality.

Conversely, these sectors are negatively impacted when the plants are no longer part of the regional economy.

REPOSITIONING OUR EMPLOYEES

The decision to retire a coal-fueled power plant has profound life-changing implications for the hundreds of employees and contractors who operate and maintain the plants. It is not uncommon for power plants to employ generations of families or serve as the sole employer for many workers during their careers. Our employees are loyal to the plants and their communities, so closure often brings significant challenges — finding new employment, or learning new skillsets, obtaining additional education, certification or training, and sometimes relocation.

When AEP announced a wave of plant retirements in 2011, a cross-functional team developed a comprehensive workforce repositioning strategy with the goal of treating our employees with dignity and respect and providing support and resources to enable them to move to new jobs within or outside of AEP. The company provided severance benefits for employees who were displaced, held jobs at other facilities and provided relocation benefits for employees who were willing to move.

The timing of a plant retirement announcement is critical; greater lead time gives employees and contractors more time to find a new job or plan their next career move and acquire new skills. Our intent is to give employees as much time as is feasible, often as long as five years, to prepare for reentering the job market, including taking advantage of AEP's education assistance program to pursue a college degree. The resources we provide include:

- On-site support to provide training for applying for jobs and calculate pension benefits;
- Education assistance repayment forgiveness (normally, if employees leave the company less than a year after completing a degree, they would repay AEP; this is forgiven for affected plant employees);
- Engaging outplacement services to help employees prepare for re-entering the workforce, resume building, improving interview skills, etc.;
- Inviting outside organizations, such as a state's worker displacement unit, to work with employees on how to apply for jobless benefits;
- Holding internal job fairs with other business units to inform employees about other types of job opportunities that exist within AEP;
- "Loaning" plant employees to other AEP business units (e.g., Transmission) to learn about other jobs and job opportunities; and,
- Encouraging plant employees to shadow peers in other business units (such as a line crew, welder or mechanic in Distribution or Transmission).

Our experience has taught us that a successful transition for plant employees includes collaborating with union representatives, being transparent about plans and milestones along the way, managing expectations, tapping into internal and external resources to broaden employees' access to career options, and communicating frequently and clearly during the process. We also set clear expectations about continued safety and health performance, managing expenses and ensuring environmental compliance.

AEP 2021–2030 Planned Coal Retirements

Year	Plant	Capacity
2021	Dolet Hills	257 MW
2023	Pirkey	580 MW
2026	Northeastern 3	469 MW
2028	Rockport 1	1,310 MW
2028	Welsh 1 and 3	1,053 MW
2030	Cardinal 1	595 MW

Reduced coal generation by approximately 4,264 MW from AEP plant retirements 2021 – 2030 with an additional 1,310 MW from Rockport 2 lease expiration in 2022.

WORKING WITH OUR LABOR UNIONS

As we continue to grow our renewable portfolio, we recognize that the transition to a clean energy future also affects our skilled labor and transient workforce. Workers at coal-fueled power plants are highly skilled and uniquely qualified for the work they do. They include engineers, welders, mechanics, electricians, heavy equipment operators, boiler makers and maintenance staff. At AEP, 14 trade unions perform critical functions to support the operation and maintenance of our coal-fueled generation fleet, logging approximately 10 million craft hours per year doing this work.

When a generating unit is retired, the members of the transient workforce that supports the plant also lose their jobs. This has an economic impact on the affected trade unions, which lose dues-paying members as a result. And all of these workers live in and around the community where the plant is located. At the height of its operation, the Conesville Plant in Ohio had more than 700 union members working at the plant. By the time the plant retired in 2020, fewer than 100 people remained, and all will eventually lose local jobs as the plant is decommissioned.

The skills and number of people needed to operate and maintain a coal-fueled power plant are different than those for a wind farm or solar array; however, AEP has committed to working with the building and construction trade unions to support union labor in the construction of new wind and solar facilities on the AEP system. In Indiana, five renewable projects were built with union labor. We have made a similar commitment to include our unions in the jobs mix in Ohio, West Virginia, and Virginia. In addition, AEP's Labor Relations team is developing project labor addendums to modify local contracts so those unions can be considered for construction of renewable resources. We're also collaborating with labor to support workforce transition provisions in federal energy legislation, including the Clean Energy and Deployment Act of 2020.

2020 Organized Labor at AEP

Labor Unions	Number of Employees
International Brotherhood of Electrical Workers	3,149
Utility Workers Union of America	476
United Steelworkers of America	282
United Mine Workers of America	106
International Union of Operating Engineers	2
Total	**4,015**

As of 12/31/20

The energy generated at the John Amos Plant in West Virginia is enough to power about 2 million homes. The plant employs around 300 people with a payroll of $27.1 million dollars. A retirement analysis is to be conducted at Amos with a report due in 2022. The analysis, which will gauge the plant's economic viability and market conditions, is part of an agreement between Appalachian Power and the Sierra Club.

REPOSITIONING OUR COMMUNITIES

Coal production and consumption in the U.S. has been on the decline since peaking in 2007-2008. This is due to a combination of low natural gas prices, an aging coal fleet that is facing economic challenges and less costly renewable energy generation. The corresponding loss of coal-related jobs has hit the central Appalachian region most severely.

In the heart of Appalachia, the states particularly affected by this are Kentucky, Ohio, Virginia and West Virginia. These states have experienced the loss of jobs, the loss of tax revenue to support local public services, and the loss of indirect economic benefits from having a locally employed workforce. Without action, the loss of jobs and population migration away from the region would continue to put pressure on those who remain. Disproportionate rates of poverty and joblessness would be exacerbated by higher electric bills with fewer customers to share the fixed costs of the electric system.

A solution lies in determining how the valued skills of the current workforce can transfer to other industries. AEP's Kentucky Power operating unit partnered with government, business, and regional leaders to commission a comprehensive regional workforce analysis of the Kentucky Power service territory. The research showed that coal miners and steelworkers, many of whom lost their jobs when coal operations closed in recent years, have the metal working skills that many aerospace companies need. The study concluded that there were eight times the national average of skilled metal workers in the region. This was bolstered by Kentucky's ranking as the No. 2 state for aerospace manufacturing exports in the country. This effort gave birth to Appalachian Sky, an economic development initiative to market the region to the aerospace industry.

Thanks to this study and a strong regional commitment to economic development, Kentucky Power, AEP Ohio and Appalachian Power worked with its partners to identify and certify 37 counties as AeroReady™ in the Tristate region of eastern Kentucky, southeastern Ohio and southern West Virginia. This assures aerospace companies that the certified regions, sites and communities are suitable for their operations. Eight additional counties in Virginia are being considered for future study.

In 2019, the seven-county region surrounding Raleigh County Memorial Regional Airport in southern West Virginia and the six-county region around Yeager Airport in Charleston, West Virginia, received AeroReady certification, meaning a total of 21 counties in the state and four commercial airports are now certified. In addition, the AEP Foundation awarded Marshall University, in Huntington, West Virginia, a $750,000 grant to establish an aviation program.

In addition to counties in Kentucky, Ohio and West Virginia that are part of Appalachian Sky, AEP-served counties in Texas, Oklahoma, Louisiana and Indiana also have been independently validated as AeroReady. These efforts help us to pair the aerospace industry with the displaced, highly skilled workforce of the coal and steel industries.

The success of Appalachian Sky has led it to be formed as an independent entity, based in West Virginia at the Huntington Area Development Corporation. Appalachian Sky is seeking 501(c)3 nonprofit status to enable it to secure funding to expand its efforts. For example, Appalachian Sky is applying for a POWER grant from the Appalachian Regional Commission (ARC) to ramp up its efforts. ARC POWER grants are designed to help communities and regions affected by the energy transition to cultivate economic diversity, enhance job training and re-employment opportunities, create jobs in existing or new industries, and attract new sources of investment. Appalachian Sky is the type of initiative that aligns with President Biden's creation of a Working Group on Coal and Power Plant Communities and Economic Revitalization.

COMMUNITY OUTREACH

When a power plant is scheduled for retirement, the sooner we can engage the local community the more time they have to plan for the loss of direct and indirect revenue. The most important action is to notify the local community as soon as possible. This includes local government leaders as well as the school superintendent, as they need significant lead time to prepare for the loss of direct and indirect tax revenue. In some cases, we also provide economic support to help a community with the transition. When Big Sandy Unit 2 retired, Kentucky Power agreed to contribute $233,000 per year for five years to help the region around the plant transition and attract new industry.

We also provide training opportunities to help local communities develop their economic development skills and connect them with state and regional agency resources. This includes h elping to identify state and federal grants to suport this effort. Our economic development team serves on more than 30 boards and commissions, dedicating time to local Chambers of Commerce, economic development organizations, workforce boards, and a variety of other nonprofits. We use this network to connect community leaders with available resources and help them explore potential new opportunities for economic growth.

Kentucky Power Economic Growth Grant is a partnership between customers and the company to provide economic development funding in the 20-county Kentucky Power region. Commercial and industrial customers pay $1 per month on their bills, and Kentucky Power matches that money dollar-for-dollar with shareholder funds. This partnership generates about $800,000 per year for economic development in the region. A combined public/private partnership with key local stakeholders meets to review the grant applications and award the funds. Kentucky Power Economic Growth Grants have been used for workforce development studies, site development and funding of local economic development offices.

Plant Retirement
Notification Timing Process

2 Years Out	**Notify employees, including union leadership** **Notify communities**
1 Year Out	**Notify Regional Transmission Organizations**
As Early as Possible	**Notify regulatory agencies when retirement date is firm**
Additional Actions	**Notify State Labor Department** **Hold small meetings with targeted local leaders to discuss plan** • Mayor • County commissioners • School superintendent (School officials are one of the most important stakeholders) • Other elected officials **Communicate with local farmers and neighbors who border the property** **Notify and support local civic groups** (e.g., Conesville made local contributions, one of which was to support a community fund to support local commerce and economic development)

These are estimations and subject to change.

Kentucky Power Economic Growth Grant is a partnership between customers and the company to provide economic development funding in the 20-county Kentucky Power region.

Conesville Plant in Coshocton County, Ohio, which opened in 1957, retired from commercial operation in May 2020. Through most of its life, the coal-fueled generating facility operated six units.

Challenges to coal-fueled plant site redevelopment can range from the lack of a modern transportation system and remote geographic locations to the lack of a market for available skills. This is especially true for new industrial uses. Additionally, decommissioning yields a very limited amount of developable acreage, making the former plant sites challenging and less likely to be attractive locations for new businesses. To overcome this, AEP often works with organizations in neighboring communities to identify and certify sites for new business development.

AEP has retired or sold nearly 13,500 MW of coal-fueled generation in the past decade. The retirement of all or part of these seven plant sites across five states involved working with third-party specialists to decommission and demolish the sites and encourage redevelopment of portions of the sites that were suitable for redevelopment. For example, the Tanners Creek Plant site in Lawrenceburg, Indiana, was targeted by the state for conversion into an inland port because of its location on the Ohio River; however, in 2020, the state decided not to move forward with the plan.

Many state and federal entities offer training programs, loans and grants to encourage redevelopment and help communities diversify. Such entities include JobsOhio and the Appalachian Regional Commission. In Ohio, the state established Ohio Opportunity Zones in 320 economically distressed census tracts among 73 of its counties. The program provides tax incentives for eligible investments in qualified projects located within those zones.

As we prepare for future retirements, we intend to continue our tradition of engaging in economic development, bringing our expertise and resources to attract job-creating investment to affected communities and regions. In addition to scouting for new opportunities, we market retired plant sites for brownfield economic development opportunities. Our team has more Certified Economic Developers (CEcD) than any other utility-based economic development program, providing extensive training and support to local economic development practitioners. We do this because the best thing we can do for our communities is to empower them to be self-sustaining and resilient for the long term.

BROADBAND ACCESS

In addition to delivering modern-day technology to unserved or underserved areas, expanding broadband is a potential new business opportunity for AEP. Providing the means to extend high-speed internet to these areas creates new opportunities for home-based work and helps to power economic stability for customers and communities.

Broadband technology has proven to be critical to the economic development and well-being of rural America and underserved areas where internet coverage is lacking. It helps communities improve their growth capabilities and enhances workforce-training opportunities. It also enhances the communities' ability to attract large-scale businesses, such as data centers and hospitals.

We are exploring options for the dual use of fiber for grid modernization and enabling Internet Service Providers (ISPs) to make the final connection to areas that lack broadband coverage. We are advocating legislation in many states that would specifically authorize us to invest in "middle mile" fiber infrastructure that we could then lease to ISPs for the purpose of their broadband service expansion, and we are making progress. In 2020, Appalachian Power received approval from the Virginia State Corporation Commission to proceed with the Grayson Broadband Pilot — a program to install approximately 238 miles of fiber optic cable at a cost of at least $17 million. A second pilot location is being identified in Virginia.

In West Virginia, with the Broadband Enhancement Council's support, we have proposed pilot projects to expand broadband access to 31,000 unserved or underserved customers in Mingo and Logan counties. In Ohio, we are working to update the law to allow electric utilities to act as broadband facilitators — a role that would allow us to work with ISPs to provide middle mile fiber to expand broadband offerings to rural areas. We expect Ohio to review a comprehensive broadband package in 2020. We are also working with legislators and regulators in other states to gauge interest, explore options and support additional initiatives, such as Kentucky's KentuckyWired Program, which will expand access to technology and its benefits.

WEST VIRGINIA BROADBAND ENHANCEMENT COUNCIL

Kentuckywired

BEST PRACTICES AND LEARNINGS

AEP has considerable experience with power plant retirements. Always at the forefront of our planning and decisions are our employees and the communities affected by these decisions. While retirement and decommissioning are eventual realities in the life of a plant, the time horizons for this to occur are becoming shorter and shorter. Through the process of researching, benchmarking, and analyzing in preparation for this report, we validated that AEP already has many best practices in place. We also learned that there are areas for improvement. We are developing a resource playbook to capture what we learned and catalog resources and best practices as we prepare for additional plant retirements in the coming years.

Best Practices

- Encourage early and frequent stakeholder engagement (internal and external)
- Timely, actionable and transparent information on an ongoing basis
- Engage community leaders ASAP, especially the school superintendent
- Provide communities with information about future tax revenue loss after the plant is retired/decommissioned
- Hold internal job fairs to expose employees to other parts of the business
- Invite outside agencies and organizations to provide training, resume building, interview skills and job fairs
- Conduct skills transferability analysis
- Offer mentors to support transition
- Ask employees to conduct self-assessment to help them determine their future course
- Encourage job shadowing with other business units
- Engage labor leaders in plant
- Communicate with neighbors who could be affected (e.g., a farmer who abuts plant property)
- Remain engaged in the community
- Activate Economic Development team to begin work with local leaders
- Ensure high standards for safety, environmental compliance, budget expectations remain at the forefront
- Challenge each other to be the best
- Stress importance of learning life skills
- Engage other parts of the company early on to support repositioning of plant employees
- Expand community development efforts to address competitiveness of local community
- Leverage capabilities to review workforce transferability into other occupations, including analyzing the skills and knowledge of an occupation and how they could transfer to other occupations in line with economic development targeted industries
- Identify/evaluate other developable properties in/near affected community (which may be more marketable)
- Be clear about what is or is not possible with site redevelopment up front
- Identify grant availability as early as possible
- Know that constant education and engagement are critical as political/government leadership changes occur during the years prior to unit retirement

JUST TRANSITION: THE PATH FORWARD

The decision to accelerate the retirement of coal units creates significant burden for many of the communities where the plants will be decommissioned. Losing the economic underpinning of a community brings major change to communities. Ensuring our employees, labor unions, and communities are equipped to make the transition and are supported is important to AEP. We have experience working with all stakeholders through this process from earlier plant retirements, and we have identified best practices along the way. We remain committed to doing all we can to ensure the strength and vitality of our communities because their strength is tied to our own success. This includes partnering with communities, local and regional economic development agencies, government leaders, and other third-party stakeholders.

Just Transition, though not a new concept, plays an important role in our ability to move to a clean energy economy without workers and communities being left behind. We can't do this alone, but we are committed to helping enable a transition to a resilient, sustainable and economically strong future for these communities.

We will do this by providing access to tools, training and other resources, as well as forming public-private partnerships and exploring public policies that can help pave the way forward for communities and workers.

As our nation transitions to a clean energy future, policymakers are considering how to manage the impacts on people and communities. In May 2020, the Michigan Public Services Commission required a local utility to file a community transition plan for the planned retirement of a coal-fueled generating unit. A similar requirement is in place in Arizona. In June 2020, the U.S. House of Representatives' Special Select Committee on the Climate Crisis, in a sweeping roadmap for achieving net-zero carbon emissions by 2050, offered policy recommendations to protect communities considered to be disproportionately at risk from climate-related economic and racial inequities. Specifically, the committee wants a plan to enable new jobs in the clean energy economy to be good-paying, high-quality jobs, ensuring workers in today's fossil fuel economy are not left behind. The Biden administration also is accelerating climate policy in the U.S., including initiatives to support the revitalization of energy communities affected by the transition.

As AEP prepares to retire its coal fleet in the years to come, we will support our employees and communities through the transition.

CONCLUSION

This analysis represents the most comprehensive evaluation of climate change risks and opportunities that AEP has undertaken. The results provide valuable insights to inform our clean energy transition, and the process helped to raise situational awareness of the potential future risks associated with climate change. We also learned more about potential new business opportunities that not only meet carbon reduction goals for AEP but also have positive impacts in other sectors.

At the outset of this effort, we identified our project objectives:

1. Identify risks and opportunities related to climate change
2. Inform capital investment, regulatory strategies
3. Advance electrification and EVs
4. Explore impacts of potential future climate policy pathways
5. Inform strategic planning for the corporation

The desire to accelerate the clean energy transition must be tempered by the absolute societal need for a resilient, reliable electric power system that can meet consumer needs regardless of climate extremes that may occur. The deep freeze that severely hampered the electric grid in Texas this winter was a sobering reminder that the decisions we make about how we power the future must be supported by modern, resilient infrastructure that gives consumers the flexibility and reliability they need, at an affordable price.

We are still learning what went wrong in Texas and identifying the actions needed to prevent it from happening in the future. What it does tell us is that the decisions and policies to advance a net-zero carbon economy must balance this desire with society's need for reliable, resilient and affordable electric power. These events elevated the risks associated with poor planning, and customers paid a heavy price. Stakeholders must be part of the discussion on solutions, but the decisions must be focused on the customer.

The deep freeze in Texas severely hampered the electric grid this winter and was a sobering reminder of the importance of having modern and resilient energy infrastructure.

Although there is still much more work ahead to gain greater clarity on the path forward to net-zero, this climate scenario work has delivered on our five objectives. We are already integrating climate change risks and opportunities into our strategic planning, which informs our capital investment and regulatory strategies. We are having robust Board-level discussions on these issues, and, in light of what we learned, we have revised our carbon reduction goals to include a net-zero carbon target for 2050.

This initiative was a first step. We will continue to model different scenarios and learn more about technologies and resources as they mature. We also will be active partners with our local communities, working with them and others to help ensure they can successfully transition to a clean energy future.

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In addition to these resources, we relied on resource planning models (identified in the report) and other company reports and data. We also benchmarked with peers and conducted interviews with employees (past and present).

AMERICAN ELECTRIC POWER

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