The electric power industry is in the midst of a profound transformation, with major progress in reducing emissions and integrating new technologies.
This year is proving to be a busy one for environmental and energy policy, with a new Administration and new Congress in Washington, as well as many new governors, legislators, and regulators in the states. President Trump’s stated support for modernizing and enhancing our nation’s infrastructure (including the energy grid), enacting comprehensive tax reform, streamlining regulations, and creating jobs to help unleash our country’s entrepreneurial potential is positive for the electric power industry and for our economy.

The electric power industry is vital to America’s economy, its communities, and its people. According to a report by M.J. Bradley & Associates,¹ as a whole, the electric power industry contributes $880 billion to the U.S. GDP and supports more than 7 million jobs across the United States (see Figure 1). This includes nearly 2.7 million jobs directly provided through electric power industry employees, contractors, supply chain, and investments, and an additional 4.4 million induced jobs.²

The electric power industry is undergoing a profound transformation driven by many factors, including:

- low natural gas price/decreasing cost of wind and solar;
- customer demand for new and clean technologies;
- new technologies, including smart meters/smart grid, electric vehicles, renewables, energy storage, and distributed generation;
- environmental regulations—air, water, waste, natural resources;
- state renewable energy standards and climate policies;
- increased diversification of generating resources with major growth of non-hydro renewables and future growth of distributed generation, energy storage, etc.; and
- financial incentives for renewables.

In just 10 years, the mix of sources used to generate electricity has changed dramatically and is increasingly clean. Today, one-third of U.S. power generation comes from zero-emissions sources—that is, nuclear energy and renewables, such as hydropower, wind, and solar (Figure 1). Nuclear energy continues to play a dominant role in providing emissions-free electricity, while non-hydroelectric renewables increased from 2.4 percent to 8.4 percent of the generation mix from 2006 to 2016.

In 2016, natural gas (34 percent of the generation mix) surpassed coal (30 percent of the generation mix) as the main source of electricity in the United States.³ By comparison, in 2006, natural gas and coal made up 20 percent and 49 percent of the energy mix, respectively.

As a result of these factors, power plant sulfur dioxide and nitrogen oxides emissions were reduced by 91 percent and 82 percent, respectively from 1990 to 2016 (see Figure 2). The industry’s carbon dioxide emissions in 2016 were nearly 25 percent below 2005 levels (see Figure 3). With low prices for natural gas and declining prices for renewable energy and other technologies, the positive progress on air emissions will continue.

Innovating for a Clean and Affordable Energy Future

The pace of the electric power industry’s transformation is increasing. As it does, the Edison Electric Institute’s (EEI) member companies are making large investments in advanced technologies to meet customers’ evolving needs.

Industry Capital Expenditures

The electric power industry is the most capital-intensive industry in America. Electric companies invest more than $100 billion each year to build smarter energy infrastructure and to transition to even cleaner generation sources (Figure 1). This level of investment is more than twice what it was a decade ago.

Generation constitutes more than one-third of our industry’s total capital expenditures, including considerable investments in clean energy resources. Together, the transmission and distribution segments comprise 43 percent of our industry’s total capital expenditures, driven by efforts to modernize the energy grid and by the expansion of renewable energy resources.

Renewable Energy and Advanced Technologies

EEI’s member companies are building a smarter, more dynamic, cleaner, more resilient, and more secure energy grid with a diverse energy mix that is critical to the reliable, affordable electricity customers expect.

On the renewable energy front, electric companies own or contract for virtually all of the wind energy in the United States. Based on a March 2017 report from GTM Research, universal (or large-scale) solar projects by electric companies accounted for 72 percent of installed capacity in 2016.⁴ Universal solar is cost-effective. The average cost per watt of solar energy from a solar power plant was $1.06 per watt in 2016, compared to the average cost of solar energy from private (or rooftop) solar at $2.89 per watt. EEI’s member companies are leaders in developing renewable resources and integrating them into the energy grid. This trend will continue going forward, particularly if inefficiencies in the current permitting and siting processes are addressed.
Figure 1. Smarter energy infrastructure powers America's economy, homes, and businesses.
The continued deployment of digital smart meters—with more than 70 million installed to date in 55 percent of all U.S. households—is one key building block of a more dynamic and more secure energy grid (Figure 1). Investments that hasten the integration of other new technologies, such as wind and solar, energy storage, microgrids, and other devices in our homes and businesses, are another. Together, these advanced technologies, and the data they produce, enable enhanced management of an increasingly complex energy grid.

One advanced technology that is rapidly evolving is energy storage, with battery storage being a key driver of today’s energy storage market. Energy storage technology can be used to help provide reliability services for the energy grid, to enhance power quality, provide peak power, and enable the integration of renewable energy, keeping supply and demand balanced. The electric power industry uses more than 90 percent of all energy storage. Investment in energy storage is growing rapidly, with more than 220 megawatts installed in 2015 alone, up 243 percent from 2014.

**Customer Solutions**

A major focus for EEI’s member companies is providing customers the energy solutions and control they want. These solutions include onsite power generation, 100-percent renewable energy options, efficiency, timing and control over power usage, and improved reliability. Many commercial and industrial customers continue to request renewable options that meet sustainability goals. Electric companies are providing these options and are working with state regulators to gain approval for offering these customer solutions.

New technologies and innovations in the movement toward smart communities are helping to drive efficiencies, improve sustainability, spur economic development, and enhance quality of life. The growing smart community trend creates new opportunities for collaboration among electric companies, cities, universities, technology companies, other business partners, and citizens. The energy grid is a key platform for smart community innovations, such as smart street lighting and buildings, distributed energy resources, and new transportation options. While each community may have different reasons for specific innovations, all smart communities share common attributes—and they are all powered by smarter energy infrastructure.

As cities and communities seek smart, sustainable mobility solutions, electric transportation is a critical component. EEI’s member companies are working closely with their customers to electrify the transportation sector—from electric vehicles to mass transit systems, to seaports and airports. Electric vehicle sales were up 37 percent in 2016 over 2015, a significant number made even more remarkable by continued low gasoline prices.

Automaker announcements point to more long-range battery electric vehicles coming to market—refueled by higher-power charging infrastructure—making the electric power industry’s role in supporting infrastructure even more important. EEI’s member companies are investing $250 million in customer programs and projects to deploy charging infrastructure and accelerate electric transportation. In addition, they committed $128 million toward expanding the adoption of plug-in electric vehicles.
vehicles (PEVs) in their own fleets and successfully increased the number of PEVs in their fleets by 18 percent in 2016.

EEI and the Institute for Electric Innovation recently released a report, which projects more than seven million PEVs will be on U.S. roads by 2025. According to a study by the Electric Power Research Institute and the Natural Resources Defense Council, the widespread adoption of electric vehicles could reduce greenhouse gas (GHG) emissions by 550 million metric tons annually in 2050, equivalent to removing 100 million passenger cars from the road. Since transportation GHG emissions have surpassed those from the electric power industry for the first time in nearly 40 years, transportation is an increasing area of focus for state GHG-reduction targets.

**Public Policy Issues**

EEI and its member companies will continue to seek policies that support and maintain a balanced and diverse energy mix, including the vital role of 24/7 power (or baseload) sources—such as nuclear energy—in sustaining a diverse, reliable, and resilient energy mix.

EEI will continue to work with President Trump and with key policymakers in Congress and in the states on both sides of the political aisle to develop an agenda that supports investments in infrastructure, grows the economy, and recognizes the vital role of the energy grid and the importance of maintaining reliable, affordable, secure, and increasingly clean energy for all customers.

Protecting the energy grid is the electric power industry’s top priority, and every day EEI’s member companies are working to improve grid security, reliability, and resiliency. The industry protects the energy grid through standards, coordination with government, and incident response exercises. Security strategies constantly evolve and are closely coordinated with the federal government through a partnership called the Electricity Sub-sector Coordinating Council (ESCC). By working together through the ESCC, industry and government greatly enhance our nation’s ability to defend and protect against cyber and physical security threats. Government and industry in North America have conducted five major coordination exercises since November 2015. Electric company investments in the energy grid also have led to streamlined and enhanced storm response and restoration.

One major opportunity that has emerged is comprehensive tax reform. EEI and our member companies believe that tax reform legislation must support investments in America’s critical energy infrastructure and keep energy bills as affordable and predictable as possible for all Americans.

Energy infrastructure is a crucial issue for the nation and the industry. On the environmental front, there clearly is a lot of focus on the U.S. Environmental Protection Agency (EPA) and land management agencies. EEI is tracking developments closely and remains engaged on a number of environmental policy issues, such as coal combustion residuals, GHGs, and other air regulations.

---

**Figure 3.** U.S. power sector carbon dioxide emissions are declining (2005–2016).

*Note: The industry’s carbon dioxide emissions were nearly 25 percent below 2005 levels in 2016—the lowest annual level since 1988.*
Expedited Permitting and Siting
The Executive Order signed by President Trump in August sets a two-year goal for the federal government to complete the permitting process for infrastructure projects and is a positive step forward. The permitting and siting of energy infrastructure on federal lands are subject to a wide array of land-use authorizations and associated environmental reviews and, as a result, the average time frame for permitting and siting an interstate transmission line is approximately 7-10 years. We fully support streamlining and expediting the process for permitting and siting energy infrastructure, including transmission, natural gas facilities and pipelines, and renewable energy facilities, to ensure that energy can get where it is needed, when it is needed. We also support hydropower relicensing reform and better electric-natural gas coordination.

Many of the barriers to expedited permitting and siting of energy infrastructure are a result of underlying federal statutes that need to be updated. We look forward to working with Congress and the Trump Administration to modernize federal laws and to streamline their implementation to ensure that we are protecting the environment and also are removing unnecessary barriers to the energy production so essential to economic growth and prosperity.

Coal Combustion Residuals
EPA’s 2015 Coal Combustion Residuals (CCR) rule established regulations for CCR as a non-hazardous waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA). While the electric power industry supports the regulation of CCR as non-hazardous waste, the self-implementing nature of the rule would have resulted in significant compliance issues since affected facilities were required to comply with the new regulations regardless of whether a state adopted the rule. It required neither regulated facilities to obtain permits nor states to adopt and implement the new rule, and it could not be enforced by EPA. In addition, the rule’s sole enforcement mechanism is through citizen suits brought by a state or a citizen group in federal district court.

The electric power industry achieved a favorable outcome in December 2016 with congressional passage of the Water Infrastructure Improvements for the Nation (WIIN) Act. The legislation contains an important provision that establishes a mechanism for the implementation of the CCR rule through EPA-approved state CCR permit programs. The electric power industry continues to work with EPA to expedite EPA review and approval of state CCR permit programs; revise the rule to include site-specific tailoring of the rule’s requirements and provide greater regulatory flexibility; and extend compliance deadlines to provide time for state permit programs and to ensure alignment with the now-stayed effluent limitations guidelines rule of the U.S. Clean Water Act.

Greenhouse Gases
On March 28, President Trump signed the “Promoting Energy Independence and Economic Growth” Executive Order (EO) that initiated an EPA review of both the final rule addressing GHG emissions from existing power plants (the Clean Power Plan, or CPP) and the final rule addressing GHG emissions from new, modified, and reconstructed power plants (the 111(b) rule), including their possible suspension, revision, or rescission. The EO also initiated a court filing by the U.S. Department of Justice seeking a stay or otherwise further delaying the current litigation in the U.S. Court of Appeals for the District of Columbia Circuit while EPA reviews the CPP and 111(b) rules.

With regard to the CPP, it is important to remember that, regardless of the rule’s ultimate fate, electric companies and states already are transitioning generation assets for the reasons discussed above. One key to that transition is allowing electric companies to use the most cost-effective resources that provide the range of new energy and technology options that customers want.

Since EPA seems likely to repeal the CPP, it is important that the agency issue a replacement rule (as opposed to repealing and not replacing the rule, or seeking to overturn the endangerment finding). A replacement rule consistent with the underlying statute—in which EPA develops guidelines that establish the approach for regulating affected coal- and gas-based units, and states determine both the standards to be applied to affected units and how compliance is demonstrated—provides the most durable and legally defensible solution to carbon dioxide regulation for the electric power industry.

A replacement rule also would: help protect the industry from tort and nuisance suits; provide investment certainty for the current (and future) generation fleet; support state efforts to recognize and value zero-emitting resources, including existing nuclear units; allow states and companies to determine their own emissions glide paths for meeting the guidelines, reflecting cost-effective generation options, reliability and customer preferences; and establish precedent on the meaning and use of U.S. Clean Air Act (CAA) Section 111(d) that will inform regulation of carbon dioxide by future Administrations.
Other Clean Air Act Issues
Numerous traditional CAA issues are active before EPA, including reevaluation of select Obama Administration actions and new actions required per statute and consent orders.

One topic of concern is regional haze. EPA’s January 10 rule establishing requirements for states to implement the haze program’s second planning period, which runs from 2019 to 2028, is being challenged, and EPA has received several petitions for reconsideration. While EPA should retain the changes it made to the deadlines for state plan submissions, many aspects of the rule and associated guidance should be reconsidered, such as overly prescriptive requirements on how states must craft their plans, as well as front-loaded reductions in the second planning period, notwithstanding the national goal of gradually eliminating man-made visibility over the next 50 years. In addition, at the state level, EPA should reassess recent federal implementation plans (FIPs) and related litigation by working with states to craft approvable state plans consistent with the statute.

Regarding hazardous air pollutants, in Murray Energy Corporation v. EPA, EPA’s consideration of costs and co-benefits in regulating hazardous air pollutant emissions by electric generators under CAA Section 112(n)(1)(A) is being reviewed. The Trump Administration is evaluating EPA’s stance in this litigation. Since electric companies already have fully implemented the Mercury and Air Toxics Standards (MATS), the industry is concerned about adverse consequences if the rule is rescinded. In addition, EPA is required to complete Residual Risk and Technology Reviews for MATS and combustion turbines by 2020.

National Ambient Air Quality Standards (NAAQS) and interstate transport are complicated issues for the industry, with multiple actions underway. Further, EPA is evaluating how it wants to move forward regarding the final 2015 ozone NAAQS and is under court order to decide whether to update the sulfur dioxide and nitrogen dioxide NAAQS over the next couple of years. Finally, to implement NAAQS, EPA is in the process of altering its air quality modeling program. For example, EPA has proposed guidance on Significant Impact Levels (SILs) and Modeled Emission Rates for Precursors (MERPs) that should help some facilities with low emission rates avoid complicated and costly air quality modeling. However, additional changes may be warranted.

Conclusion
The electric power industry is in the midst of a profound transformation, with major progress in reducing emissions and integrating new technologies. EEI and its member companies are focused on building smarter energy infrastructure, providing cleaner energy, and creating energy solutions customers want. Together, we are committed to meeting customer’s changing needs and to delivering America’s energy future.

References
2. Note: Induced jobs are spread throughout the economy and include many positions that are the result of paycheck spending by workers and government spending to support the communities around those workers. (As an example, induced jobs can range from elementary school teachers to medical doctors to real estate professionals, not to mention the many jobs in the service economy.)