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ENERGY AT WORK

Upgrading America's Energy Infrastructure

December 2017



AMERICA'S ENERGY OPPORTUNITY

Like other forms of infrastructure, America's energy infrastructure is a key driver of job creation, growth and competitiveness throughout the economy. Maintaining a modern, flexible and secure network of electric power transmission and distribution lines, oil and natural gas pipelines, and storage facilities is essential to delivering affordable and reliable energy to U.S. businesses and consumers, promoting growth across all sectors of the economy, and supporting the country's thriving domestic energy industry.

Unlike other forms of public infrastructure, American energy infrastructure is largely privately owned, operated and financed. The major obstacle for transportation infrastructure renewal — funding — is not a significant problem for energy infrastructure. Until quite recently in fact, privately financed U.S. energy infrastructure renewal has been an American success story. However, technology and policy drivers are rapidly changing the way energy is produced and consumed in the United States, requiring a faster pace of investment and modernization.

Currently, the regulatory framework and permitting systems that surround the energy sector were designed for another age, locking in a pace of infrastructure modernization and expansion that is out of step with the energy sector's rapidly changing needs. Congress and the Administration have a unique opportunity to accelerate investments in energy infrastructure by updating regulations, establishing strong investment incentives and streamlining permitting processes — ultimately putting more private-sector capital to work for America's farms, factories and households.



THE CASE FOR CHANGE

Energy infrastructure is unique in that the vast majority is financed by the private sector and does not depend on taxpayer funding. However, turning on and sustaining this flow of private capital requires a healthy investment environment and supportive government policies. As policymakers consider how the public sector can facilitate the rebuilding and modernization of America's infrastructure systems, they should prioritize actions that have the potential to bring this deep pool of private-sector capital off the sidelines. Actions to advance investments in energy infrastructure represent a unique opportunity to support infrastructure projects in the near term, while locking in sustained, economywide benefits over the long term — *without passing costs on to taxpayers*.

Currently, energy infrastructure projects are subject to a complex regime of regulatory, permitting and siting requirements at the federal, state and local levels. Overlapping and duplicative requirements, inconsistencies across agencies, and lengthy administrative processes at the federal level — not to mention separate processes and requirements at the state and local levels — act as costly speed bumps to breaking ground on critical energy infrastructure projects.⁴

A 2014 federal steering committee on the infrastructure permitting and review process counted more than 35 permitting and review responsibilities — distributed across 18 agencies and bureaus and implemented by staff across hundreds of regional and field offices — at the federal level alone.⁵

The National Environmental Policy Act review process often takes more than a year to complete, and the average time to complete an Environmental Impact Statement (a requirement for all large infrastructure projects) is nearly five years.⁶ Siting interstate transmission lines can be a particularly burdensome process. Most of these projects take anywhere from five to 10 years, although some are forced to wait more than a decade just to secure the necessary permits and settle cost allocation issues among states.⁷

While state and local governments play a significant role in this regulatory landscape, the federal government is uniquely positioned to coordinate and streamline key aspects of the approval process for new infrastructure projects. Regulatory actions taken during both the current and previous Administrations represent promising first steps toward simplifying and accelerating the permitting and approval process for energy infrastructure projects at the federal level. But more can and must be done to accelerate and unlock critical investments in the nation's energy infrastructure system and ensure that the United States remains a global leader on energy and innovation.



To view the full report, including fact sheets on the electric, natural gas, and oil infrastructure systems; the permitting and regulatory framework; and recommendations for policymakers, visit www.brt.org/energy-at-work.

1 BW Research Partnership, "U.S. Energy and Employment Report," prepared on behalf of the U.S. Department of Energy, January 2017, p. 8.

2 U.S. Bureau of Labor Statistics, "Employment, Hours, and Earnings from the Current Employment Statistics Survey (National)," data accessed using Macrobond, accessed November 2017.

3 U.S. Bureau of Labor Statistics, "The Employment Situation — October 2017," October 2017, p. 3.

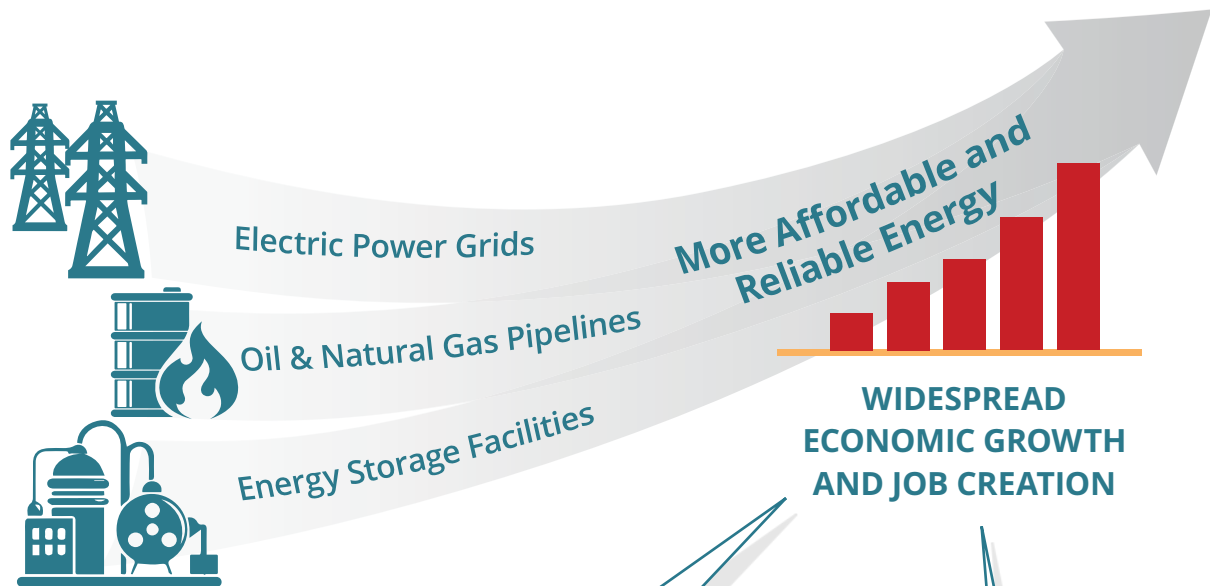
4 Susan F. Tierney and Stephen Carpenter, "Planning for Offshore Energy Development: How Marine Spatial Planning Could Improve the Leasing/Permitting Processes for Offshore Wind and Offshore Oil/Natural Gas Development," Analysis Group, Inc., June 2013, http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/planning_for_ocean_energy_development_complete.pdf.

5 Steering Committee on Federal Infrastructure Permitting and Review Process Improvement, "Implementation Plan for the Presidential Memorandum on Modernizing Infrastructure Permitting," May 2014, p. 7, accessed February 2017.

6 U.S. Government Accountability Office, "National Environmental Policy Act: Little Information Exists on NEPA Analyses," April 2014, p. 14.

7 Common Good, "Two Years Not Ten Years: Redesigning Infrastructure Approvals," 2015; and The Council of State Governments, "Compact Would Give States Power over Power," 2016.

ENERGY INFRASTRUCTURE DRIVES JOB CREATION, GROWTH AND COMPETITIVENESS

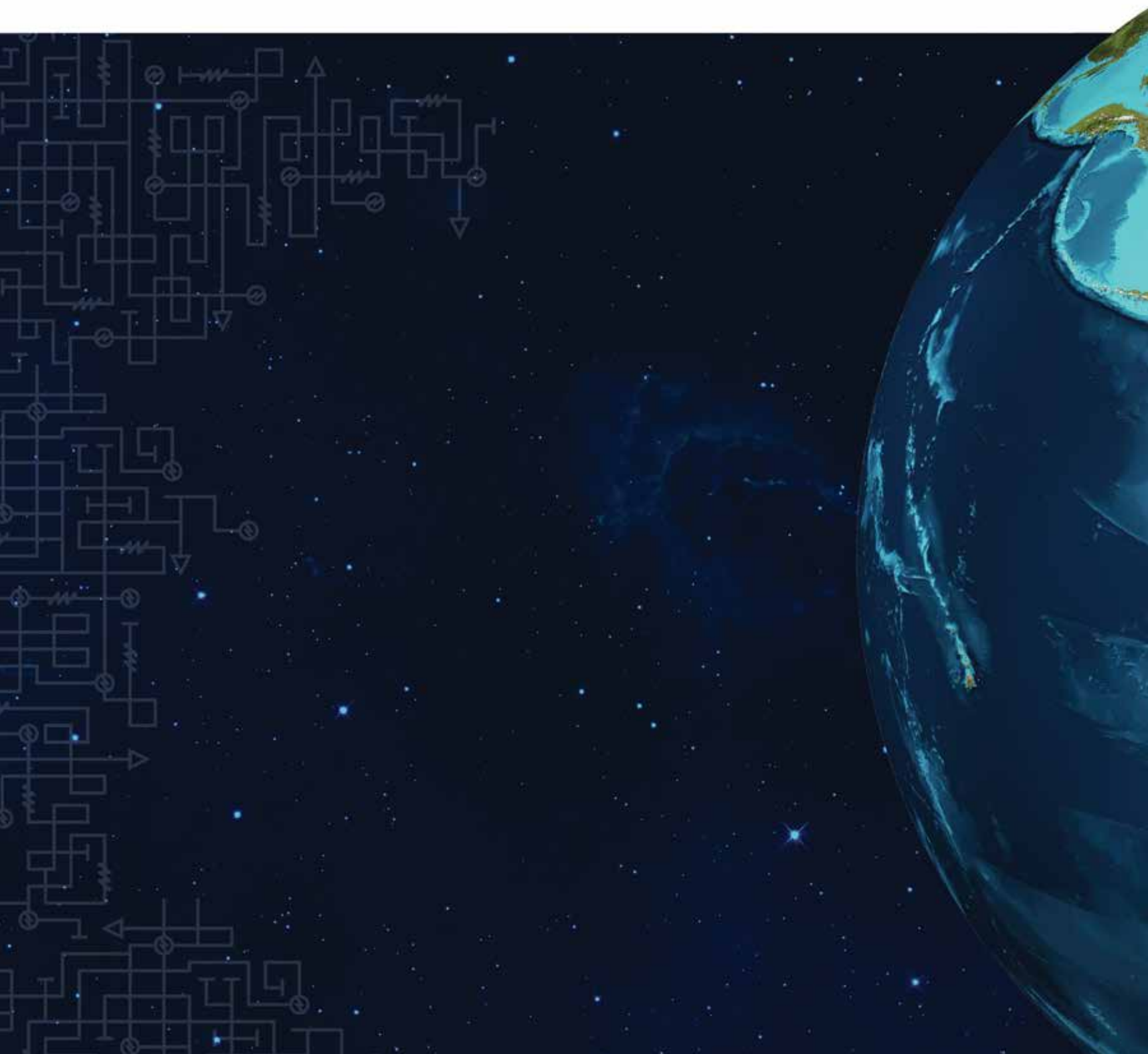


Energy Infrastructure Supports Jobs

Together, the electric power generation, fuels production, transmission distribution and storage, and energy efficiency sectors employ **6.4 million** U.S. workers and represented **14%** of net new jobs created in the United States in 2016.¹

Energy Industry Jobs Pay Well

The average pay for oil and natural gas extraction and electric power generation employees is **nearly \$44 per hour**, which far exceeds the average U.S. hourly wage of roughly \$27 per hour.^{2,3}



The entire U.S. electricity system is experiencing nearly unprecedented change, including slower load growth, retiring traditional baseload capacity, declining costs and increasing deployment of renewable and distributed energy resources, policy changes at the state and federal levels, and rapidly evolving technology. These changes are transforming how end-use customers and electric companies interact, placing pressure on real-time operations and introducing new uncertainties to long-term planning cycles. Investments in the nation's network of transmission and distribution systems — the backbone of the entire electricity system — are critical to enabling the utility and energy industries and the U.S. economy to adapt to these changes, while maintaining reliability and resiliency in the face of emerging challenges, such as severe weather and cyber threats. System statistics include:

- The U.S. electric grid delivers more than 3,800 terawatt-hours of electricity to roughly 159 million residential, commercial and industrial end-users each year.¹
- Approximately 707,000 miles of high-voltage transmission lines and 6.5 million miles of distribution lines deliver electricity from 7,700 operational power plants.²



Fundamental shifts in the fuel sources and structure of electricity generation — driven by changing policy, market and technology dynamics — are placing new demands and pressures on the electric grid.

- Most of the nation's high-voltage transmission infrastructure was **constructed in the 1960s and 1970s** and was not built to accommodate the current or anticipated future uses of the grid, such as efficiently integrating increased wind energy resources.³
- Since 2005, coal has declined from 50 percent of net generation to just 30 percent, while **natural gas has grown from 19 percent to 34 percent**. Wind and solar have expanded from less than 1 percent to 6 percent.⁴
- Penetration of variable renewable energy sources is expected to continue. In 2015, 32 percent of utility-scale capacity additions (net summer capacity) were wind and solar,⁵ and **by 2040, wind and solar are projected to make up 19 percent of net power generation**.⁶
- **Twenty-nine states plus the District of Columbia have a renewable portfolio standard** that requires a certain share of generation from renewable sources, with many states requiring 25 percent or more renewable generation by a target date.⁷
- Successfully integrating variable renewable resources into the grid requires substantial investments in transmission and distribution infrastructure. PJM Interconnection (a regional transmission organization operating from parts of Illinois and Tennessee in the west to the Mid-Atlantic in the east) calculated that **reaching 30 percent renewable penetration would require 1,000–3,000 miles of additional transmission lines, at a total cost of \$5.0 billion–\$13.7 billion**.⁸
- Projected growth in the electric vehicle fleet represents another new demand on the grid's infrastructure. Declining battery costs and state policies are projected to drive **sales of battery electric vehicles to 6 percent of total light-duty vehicle sales by 2040**, up from slightly less than 1 percent in 2016.⁹



In addition to emerging policy, technology and market factors, extreme weather and the threat of cyber and physical attacks place additional pressures on the electric grid.

- Severe weather events — hurricanes, severe storms and floods — represent the most significant threat to overall grid reliability. The **annual cost of weather-related outages ranged from \$18 billion to \$33 billion** between 2003 and 2012.¹⁰
- Cyber and physical threat events are also becoming more frequent and have the potential to cause significant harm to the power system. In 2013, **more than half of the cyber incidents the Department of Homeland Security's Cyber Emergency Response Team responded to were on energy installations**.¹¹





Considerable investments in the nation's grid infrastructure are needed to adapt to new challenges and maintain system resiliency and reliability.

- The utility industry is accelerating investments in electricity infrastructure. For transmission lines, investment increased from \$2 billion–\$4 billion per year between 1995 and 2005 to **\$10 billion–\$16 billion per year between 2010 and 2015.**¹² Investment in distribution infrastructure — including advanced distribution management systems, smart meters and inverters, new poles, and buried power lines — **grew from \$15.5 billion in 2006 to nearly \$22.0 billion in 2015.**¹³
- **Investment needs for grid modernization projects** — which drive reductions in electricity bills, improve system reliability, and increase fuel and system efficiency — **are estimated to range from \$350 billion to \$500 billion.**¹⁴
- An estimated **\$25 billion–\$40 billion in additional transmission infrastructure investment is needed through 2025** just to comply with requirements associated with existing state-level renewable portfolio standards.¹⁵



Investing in the nation's grid infrastructure creates efficiencies and cost savings throughout the entire electricity sector.

- One regional transmission organization (RTO) calculated that every \$1 spent on transmission expansion projects placed in service between 2012 and 2014 will **produce approximately \$3.50 in benefits over the next 40 years.**¹⁶
- Studies suggest that establishing more robust interregional transmission infrastructure would reduce the generation capacity needed to meet reserve margin requirements, **reducing RTO costs by \$250 million–\$350 million per year.**¹⁷
- The electric power transmission, control and distribution industry **directly supported more than 290,000 jobs as of the second quarter of 2015.**¹⁸

- 1 U.S. Department of Energy, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure, Appendix C," Office of Energy Policy and Systems Analysis, April 2015, p. EL-6.
- 2 U.S. Department of Energy, "Quadrennial Energy Review: Transforming the Nation's Electricity System: The Second Installment of the QER," Office of Energy Policy and Systems Analysis, January 2017, pp. 1–3.
- 3 Johannes Pfeifenberger et al., "Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid," The Brattle Group on behalf of Wires, April 2015, p. 1.
- 4 U.S. Energy Information Administration, "Monthly Energy Review," June 2017, Table 7.2a.
- 5 U.S. Energy Information Administration, "Electric Power Annual," November 2016, Table 4.6.
- 6 U.S. Energy Information Administration, "Annual Energy Outlook 2017," January 2017, Tables 8 and 16.
- 7 Jocelyn Durkay, "State Renewable Portfolio Standards and Goals," National Conference of State Legislatures, August 2017.
- 8 Jaquelin Cochran et al., "Grid Integration and the Carrying Capacity of the U.S. Grid to Incorporate Variable Renewable Energy," U.S. Department of Energy, National Renewable Energy Laboratory, April 2015, Table 3.
- 9 U.S. Energy Information Administration, "Annual Energy Outlook 2017 with Projections to 2050," January 2017, p. 98.
- 10 Executive Office of the President, "Economic Benefits of Increasing Electric Grid Resilience to Weather Outages," April 2013, p. 3.
- 11 U.S. Department of Energy, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," pp. 2–12.
- 12 Pfeifenberger et al., "Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid."
- 13 Deloitte, "From Growth to Modernization: The Changing Capital Focus of the US Utility Sector," 2016, p. 5.
- 14 U.S. Department of Energy, "Quadrennial Energy Review: Transforming the Nation's Energy System: The Second Installment of the QER," p. S-20.
- 15 Johannes Pfeifenberger, Judy Chang, and John Tsoukalis, "Investment Trends and Fundamentals in US Transmission and Electricity Infrastructure," The Brattle Group presented to J.P. Morgan Investor Conference, July 2015, p. 8.
- 16 Southwest Power Pool, "The Value of Transmission," January 2016, p. 5.
- 17 Pfeifenberger et al., "Toward More Effective Transmission Planning: Addressing the Costs and Risks of an Insufficiently Flexible Electricity Grid," p. 29.
- 18 BW Research, "U.S. Energy and Employment Report," on behalf of the U.S. Department of Energy, 2016, p. 63.



Advances in drilling and resource extraction technologies have made natural gas one of the fastest growing energy resources in the United States. The abundance of natural gas offers an opportunity for the United States to strengthen its energy independence and security, while providing nearly all sectors of the economy an affordable energy source and feedstock. Substantial investments in natural gas infrastructure — including pipelines and storage and export facilities — are needed to fully capitalize on the benefits that this affordable, abundant domestic energy source has to offer. System statistics include:

- The U.S. natural gas pipeline network includes more than 210 unique pipeline systems and 400 underground storage facilities.¹
- Approximately 300,000 miles of pipelines, 1,400 interconnection points and 24 market hubs carried more than 32 trillion cubic feet of natural gas from production sites to demand centers in 2016.^{2,3}



The shale gas revolution has sharply increased U.S. natural gas output and fundamentally recast the role of natural gas in America's energy landscape.

- Natural gas from **hydraulically fractured wells accounted for 67 percent of total U.S. natural gas production** in 2015, up from just 7 percent in 2000.⁴
- The rate of U.S. shale gas production is not expected to slow anytime soon. **Domestic production of dry natural gas is projected to grow from 26.5 trillion cubic feet in 2016 to 39 trillion cubic feet** by 2040, with shale gas responsible for nearly all of the increase.^{5,6}
- A projected **167,000 to 209,000 miles of natural gas pipelines** (including gathering and transport lines) will need to be constructed through 2035 to increase the system's carrying capacity.⁷
- Plentiful domestic shale gas has fundamentally changed the fuel mix in the electricity sector. Since 2005, natural gas has increased from 19 percent to **34 percent of net electricity generation**.⁸



This surge in shale gas production has positioned the United States as a significant natural gas exporter, placing new and different demands on the industry's transmission and storage infrastructure.

- Much of the United States' existing natural gas infrastructure is oriented around imports. In addition to pipelines from Canada, the country has 12 existing liquefied natural gas (LNG) import terminals, compared to just two operating LNG export terminals. However, the Federal Energy Regulatory Commission has **approved 11 new export terminals** (seven of which are already under construction) and is reviewing **proposals for 16 additional export terminals as of August 2017**.⁹
- Given the need to substantially expand export capacity, predicted expenditures for LNG and natural gas liquids export facilities range from **\$55 billion to \$93 billion through 2035**.¹⁰
- In the northeastern United States, temperature-driven increases in demand for natural gas interact with significant pipeline capacity constraints to produce **sharp seasonal fluctuations in regional gas prices relative to the Henry Hub spot price** (the pricing point for natural gas futures that is used as a benchmark for the U.S. natural gas market).¹¹





In addition to building new infrastructure capacity, the system's aging assets must be updated to keep pace with anticipated supply and ensure that natural gas is transported safely across the country.

- Nearly **50 percent** of the United States' natural gas pipeline infrastructure was built in the 1950s and 1960s.¹²
- Replacing outdated cast iron and bare steel pipes throughout the natural gas distribution system will **cost an estimated \$270 billion**.¹³



Investments in natural gas infrastructure have had a significant and positive impact not only on the domestic energy industry but also on the U.S. economy more broadly.

- Construction spending on new natural gas transmission pipelines in 2015 is estimated to have **contributed nearly \$34 billion to U.S. gross domestic product**.¹⁴
- Natural gas infrastructure — including processing facilities, pipelines and distribution systems — supported nearly **1.3 million U.S. jobs and created \$165.7 billion in value-added** for the U.S. economy in 2015.¹⁵
- **New midstream energy infrastructure** — including processing and gathering equipment, oil and gas transport infrastructure, and natural gas storage and export facilities — is projected to support **261,000–349,000 jobs per year between 2015 and 2035, with wages and benefits worth an average of \$64,000**.¹⁶
- The expansion of onshore gas infrastructure to accommodate shale gas production has reduced the share of system infrastructure exposed to storms in the Gulf Coast **from 18 percent in 2005 to just 6 percent in 2013**.¹⁷

1 U.S. Energy Information Administration, "About Natural Gas: Transporting Natural Gas," June 2007, with selected updates, accessed July 2017.

2 *Ibid.*

3 U.S. Energy Information Administration, "Natural Gas: Data: Natural Gas Withdrawals and Production," June 2017, accessed July 2017.

4 Tim Boersma, "Natural Gas in the United States in 2016," Energy Security and Climate Initiative at Brookings Institution, July 2016, pp. 1–2.

5 U.S. Energy Information Administration, "Monthly Energy Review," June 2017, Table 4.1: Natural Gas Overview.

6 U.S. Energy Information Administration, "Annual Energy Outlook 2017," January 2017, Table: Total Energy Supply, Disposition and Price Summary.

7 Kevin Petak et al., "North American Midstream Infrastructure through 2035: Leaning into the Headwinds," ICF International prepared on behalf of The INGAA Foundation, Inc., April 2016, Table ES-2.

8 U.S. Energy Information Administration, "Monthly Energy Review," June 2017, Table 7.2a.

9 Federal Energy Regulatory Commission, "Natural Gas: Industry Activities: LNG," updated as of May 2017, <https://www.ferc.gov/industries/gas/indus-act/lng.asp>.

10 ICF International, "US Oil and Gas Infrastructure Investment through 2035," prepared on behalf of the American Petroleum Institute, April 2017, p. 57.

11 U.S. Energy Information Administration, "Today in Energy: Northeast Natural Gas Spot Prices Particularly Sensitive to Temperature Swings," August 2014.

12 U.S. Department of Energy, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," Office of Energy Policy and Systems Analysis, April 2015, p. S-5.

13 *Ibid.*

14 Brendan O'Neil et al., "The Economic Benefits of Natural Gas Pipeline Development on the Manufacturing Sector," IHS Economics on behalf of the National Association of Manufacturers, May 2016, p. 4.

15 ICF, "Benefits and Opportunities of Natural Gas Use, Transportation, and Production," prepared on behalf of the American Petroleum Institute, June 2017, p. 4.

16 Petak et al., "North American Midstream Infrastructure through 2035: Leaning into the Headwinds," Tables 1 and 38, Figure 42. Note: U.S. jobs supported include direct, indirect and induced jobs; average wages associated with supported jobs include jobs created in the United States and Canada.

17 U.S. Department of Energy, "Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure," Office of Energy Policy and Systems Analysis, April 2015, p. S-11.



The ability to produce, refine and transport oil is essential to U.S. economic competitiveness. Following several decades of steady decline, U.S. oil production has risen sharply since 2008, presenting a remarkable opportunity to improve the nation's energy security, support increased industrial activity and make energy more affordable for American households. However, significant infrastructure investments must be made to fully leverage the benefits and opportunities afforded by abundant domestic oil resources. Timely updates and expansions to the existing pipeline and storage infrastructure systems will be essential to ensuring that crude oil and refined products are efficiently and safely transported from new and geographically diverse production hubs to refineries along the West and Gulf Coasts, as well as to demand centers across the country. System statistics include:

- The U.S. energy industry is supported by approximately 76,000 miles of crude oil pipelines, more than one-third of which were installed before 1960.¹
- The United States has 141 operable petroleum refineries, with a combined crude oil distillation capacity of 18.6 million barrels per day.²
- Growth in unconventional oil production has relied on expansion of the nation's oil infrastructure system. From 2010 to 2014 U.S. crude oil pipelines expanded by 12,000 miles — the equivalent length of 12 Keystone XL pipelines.³



A rapid expansion in shale and tight oil production is driving fundamental changes in how and where petroleum is produced.

- Oil produced by hydraulically fractured wells expanded from **less than 2 percent of total U.S. production in 2000 to roughly half of the nation's oil output in 2015.**⁴
- Increased shale production has displaced imports, with **net crude imports accounting for just 25 percent of products supplied in 2016**, down from 60 percent in 2005.⁵
- The uptick in unconventional domestic oil production and decline in oil imports have reversed long-standing flows of crude oil within the United States. During the 1990s, imported oil flowed in through the Gulf of Mexico, and the Gulf Coast received just 15 million barrels per year of crude from the Midwest. **By 2013, flows from the Midwest — including the Bakken fields in North Dakota — to the Gulf Coast reached 172 million barrels per year.**⁶
- Bottlenecks and inefficiencies in the oil pipeline system have depressed North American crude prices, with **WTI prices (the U.S. benchmark) trading at a consistent discount to Brent prices** (the EU benchmark) since late 2010.⁷



Robust domestic oil production and increased activity at U.S. refineries are driving investments to improve and expand crude and oil products infrastructure capacity.

- An estimated **\$11.57 billion was spent to construct 6,805 miles of new crude oil transmission pipelines** that began operating in 2015.⁸
- Industry forecasting models suggest that **170–253 miles of oil products pipelines will need to be upgraded, replaced or refurbished each year through 2035**, requiring approximately \$250 million–\$500 million in annual investment, to support increased production at U.S. refineries.⁹





Recent investments made to strengthen U.S. oil infrastructure have generated substantial economic returns, and continued investment will be critical to supporting the domestic energy industry and expanding economic growth.

- The 6,805 miles of new crude oil pipelines that were constructed in 2015 are estimated to have **boosted temporary U.S. employment by 164,111 jobs** — roughly 24 jobs per mile of pipeline — and expanded gross domestic product (GDP) by \$15.6 billion (estimates include direct, indirect and induced effects of construction spending).¹⁰
- In 2015 alone, \$2.3 billion in operations and maintenance expenditures on the country's existing crude oil pipeline network were estimated to have **increased U.S. employment by more than 26,000 jobs, contributing \$3.7 billion to U.S. GDP.**¹¹
- The Congressional Budget Office estimates that **U.S. real GDP will be 0.7 percent higher in 2020** — and 0.9 percent higher in 2040 — **than it would have been without shale resource development.**¹²

1 U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, "Hazardous Liquid Miles by Decade Installed — Crude Oil," accessed November 16, 2017.

2 U.S. Energy Information Administration, "Number and Capacity of Petroleum Refineries," accessed July 24, 2017.

3 Association of Oil Pipelines, American Petroleum Institute, "U.S. Liquids Pipeline Usage & Mileage Report," November 2015, p. 1.

4 U.S. Energy Information Administration, "Hydraulic Fracturing Accounts for About Half of Current U.S. Crude Oil Production," March 2016.

5 U.S. Energy Information Administration, "Monthly Energy Review," June 2017, Table 3.3a.

6 Frank Verrastro et al., "Delivering the Goods: Making the Most of North America's Evolving Oil Infrastructure," Center for Strategic & International Studies, February 2015, p. 19.

7 Steven Levine et al., "Understanding Crude Oil and Product Markets," The Brattle Group, prepared for American Petroleum Institute, 2014, p. 14.

8 Brendan O'Neil et al., "The Economic Impact of Crude Oil Pipeline Construction and Operation," IHS Economics, February 2016, p. 2.

9 Kevin Petak et al., "U.S. Oil and Gas Infrastructure Investment through 2035," ICF International, prepared on behalf of the American Petroleum Institute, April 2016, p. 55.

10 O'Neil et al., "The Economic Impact of Crude Oil Pipeline Construction and Operation," p. 6.

11 *Ibid.*, p. 7.

12 Congressional Budget Office, "The Economic and Budgetary Effects of Producing Oil and Natural Gas from Shale," December 2014, p. 14.



The Permitting & Regulatory Landscape

Energy infrastructure is subject to a complex regime of regulatory, permitting and siting requirements at all levels of government. Actions taken by the current and previous Administrations have made meaningful inroads toward simplifying this complex regulatory landscape and reducing the regulatory burden.

Specifically, the creation and initial implementation of a fast-track process for infrastructure permitting (FAST-41) and the actions specified in Executive Order No. 13766 (Expediting Environmental Reviews and Approvals for High Priority Infrastructure Projects) and Executive Order No. 13807 (Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects) establish a much-needed path forward for streamlining the process of approving energy infrastructure systems. While these executive actions constitute strong first steps, continued efforts are needed at all levels of government to fully implement reforms, eliminate costly delays and uncertainties, and unlock critical investments in energy infrastructure.



Overlapping and duplicative requirements, inconsistencies across agencies, and lengthy administrative processes can cause significant delays or roadblocks to infrastructure construction.

- Energy infrastructure is regulated at the federal, state and local levels. In fact, most energy infrastructure is subject to more than **35 separate permitting responsibilities spread across 18 federal agencies** and implemented by staff located in offices around the country.¹
- Bottlenecks in the permitting and approval process can lead to significant construction delays. For instance, **more than 4,600 miles of interstate pipeline projects have been postponed for more than six months.**²
- The frequency and duration of permitting delays have grown over time, with the share of projects delayed more than 90 days increasing by 28 percent and **projects delayed more than 180 days increasing by 20 percent** between 2005 and 2012.³



At the federal level, the process of conducting Environmental Impact Statements (EISs) — as required by the National Environmental Policy Act (NEPA) — is in need of reform to balance environmental and economic interests.

- Although critical for safeguarding the environment, the current process for producing EISs has grown excessively complex and time consuming; **the average preparation time for the final 197 EISs completed in 2012 was 1,675 days — or nearly 4.6 years.**⁴
- The volume of major infrastructure projects requiring review can overwhelm regulatory resources. **In 2012, federal agencies completed EISs for nearly 400 projects**, which are required by NEPA for all projects “significantly affecting the quality of the human environment.”⁵

1 Steering Committee on Federal Infrastructure Permitting and Review Process Improvement, “Implementation Plan for the Presidential Memorandum on Modernizing Infrastructure Permitting,” May 2014, p. 7, accessed February 2017.

2 Michael Porter, David Gee, and Gregory Pope, “America’s Unconventional Energy Opportunity,” The Boston Consulting Group and Harvard Business School, June 2015, p. 23.

3 *Ibid.*, p. 24.

4 U.S. Government Accountability Office, Report to Congressional Requesters, “National Environmental Policy Act: Little Information Exists on NEPA Analyses,” April 2014, p. 14.

5 *Ibid.*, p. 8.



The case for investing in America's energy infrastructure systems is clear, as are the challenges. With private-sector owners and operators of the country's energy transmission and storage systems poised to inject new capital into upgrading and expanding these networks, Congress and the Administration have an important role to play in creating the conditions necessary to accelerate these investments. Enactment of FAST-41, a fast-track process for infrastructure permitting, and recent executive orders issued by the current and previous Administrations provides a strategic and actionable path forward to improving the nation's approach to permitting energy infrastructure. It now falls to federal agencies to fully and promptly implement the reforms and processes laid out in FAST-41 and these orders and to all levels of government to look for opportunities to update regulations, establish strong investment incentives and streamline permitting processes.



Streamline permitting review procedures.

The federal government should continue to improve the efficiency of federal permitting processes in an environmentally sound manner, consistent with federal law and policy. This work includes aggressive implementation of Executive Order No. 13766 (Expediting Environmental Reviews and Approvals for High Priority Infrastructure Projects), the reforms required in FAST-41 and Executive Order No. 13807 (Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects). Specific actions should include:

- Appoint a new executive director of the Federal Permitting Improvement Steering Council (FPISC), who would report directly to the director of the National Economic Council and be responsible for regularly updating the President and Cabinet on the status of major energy projects.
- Per E.O. 13807, direct executive agencies and departments to begin designating small infrastructure projects (i.e., projects costing less than \$200 million) of national significance as "high priority" and including them on the FAST-41 dashboard.
- Task the FPISC executive director to develop a plan to improve coordination of federal and state permitting efforts and timelines.



Conduct a thorough review of the National Environmental Policy Act (NEPA) review process.

The NEPA review process often takes more than a year to complete and is increasingly being used by project opponents to litigate against validly issued permits. In conjunction with E.O. 13807, the Council on Environmental Quality should undertake a timely and thorough review of the NEPA review process, including options for ensuring that agencies have adequate resources and staffing capacity to handle NEPA review requirements in an efficient and timely manner. Aggressive implementation of E.O. 13807 would constitute a meaningful step that could be taken to streamline and shorten environmental reviews without affecting environmental quality.



Establish effective federal backstop siting provisions for nationally or regionally significant electric transmission infrastructure projects.

Major interstate transmission lines face significant regulatory hurdles. Existing statutory provisions in Section 216 of the Federal Power Act, as enacted through the Energy Policy Act of 2005 (EPAct 2005), have not provided an expedited means for siting nationally significant transmission lines, which was the intent of the legislation.





Expand coordination on transmission infrastructure.

Improved coordination among federal agencies, including the Federal Energy Regulatory Commission (FERC), the Department of Transportation (DOT), the Department of the Interior, the Department of Agriculture, the Department of Energy (DOE), the Army Corps of Engineers, state regulators and other stakeholders, is needed to address the complexity, unpredictability and inefficiency of transmission planning, siting and cost allocation decisions for interstate and interregional transmission projects. It is also needed to address the complex planning and infrastructure decisions associated with hardening the grid and accounting for the increased deployment of distributed energy resources — particularly for those transmission projects that cross federal lands. Within this context, executive agencies should move quickly to fully implement E.O. 13807 by identifying “energy right-of-way corridors” and expediting permitting review processes for energy infrastructure on federal lands.



Maintain supportive regulatory policies for transmission investment.

In accordance with Section 219 of the Federal Power Act, as added by EPAct 2005, FERC should continue to provide transparent rate incentives for cost-effective upgrades to the nation's transmission infrastructure to facilitate grid modernization and support competitive wholesale electricity markets. FERC also should approve returns on equity that reflect the need for and risks of new investments in transmission, physical resilience and cyber security, and energy storage assets.



Maintain supportive regulatory policies for natural gas and oil pipeline investments.

FERC, DOT, DOE and the Environmental Protection Agency should continue to provide a stable regulatory environment for natural gas and oil pipeline investments that is consistent with the following guidelines:

- Addresses known, quantifiable risks that have been demonstrated through data;
- Is supported by transparent, data-driven cost-benefit analysis;
- Eliminates inconsistencies within and across existing laws and regulations;
- Accounts for industry's physical and technological operating constraints and maintains flexibility for operators; and
- Incorporates the latest science and technology, including provisions for further updates to processes and requirements as technology continues to evolve.

