

Climate Change and Energy



America's Oil and Natural Gas Industry

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Our Energy, Our Climate

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Introduction to Energy and Climate Change



Credit: Hector Argue

In the United States, **oil and natural gas supply 66 percent** of the energy Americans use today, and the U.S. Energy Information Administration projects that these fuels will continue to furnish more than 66 percent of the energy we use through 2040 and beyond¹.

Without modern fuels, [our world would be harsher, less healthy and less convenient](#) – an existence far removed from what we often take for granted living in the 21st century. We know this is true because, unfortunately, more than a billion people across the planet are living that existence right now, often with little or no opportunity to hope for anything better – largely because they lack access to energy².

“Energy is the golden thread that connects economic growth, social equity, and environmental sustainability.” — former U.N. Secretary General Ban Ki-moon

Right now, the United States is leading the world in the production and refining of oil and natural gas, as well as in the reduction of GHG emissions. CO₂ emissions from power generation in 2016 were **near 30-year lows**, in large part due to greater use of natural gas³. And increased use of natural gas in the power generation sector has helped to reduce total

CO₂ emissions to their **lowest level in nearly 25 years**⁴. This proves that Americans do not have to make the false choice between utilizing our nation’s energy resources and protecting the environment.

The oil and gas industry considers climate change a very important issue and is engaging constructively to address this complex global challenge. United States climate policy must recognize the vital role of petroleum products in modern society, and the many benefits that oil and natural gas provide our nation and the world.

Affordable energy helps to secure life’s basic needs: clean water and sanitation; food production and storage; lighting, heating and cooling of homes; and transportation. Beyond their uses as fuels, oil and natural gas serve as the feedstocks for thousands of products like medical devices, cellphones, clothing, building materials and pharmaceuticals.

Domestic production, refining and delivery of oil and natural gas strengthens the American economy, enhances national security and reduces our trade deficit, thus maintaining the competitive position of the United States in the global marketplace. Modern life as we know it would be impossible without the fuels and products derived from oil and natural gas. As such, policy proposals must balance environmental, economic and security concerns.

1. U.S. EIA, Annual Energy Outlook 2017, January 5, 2017.

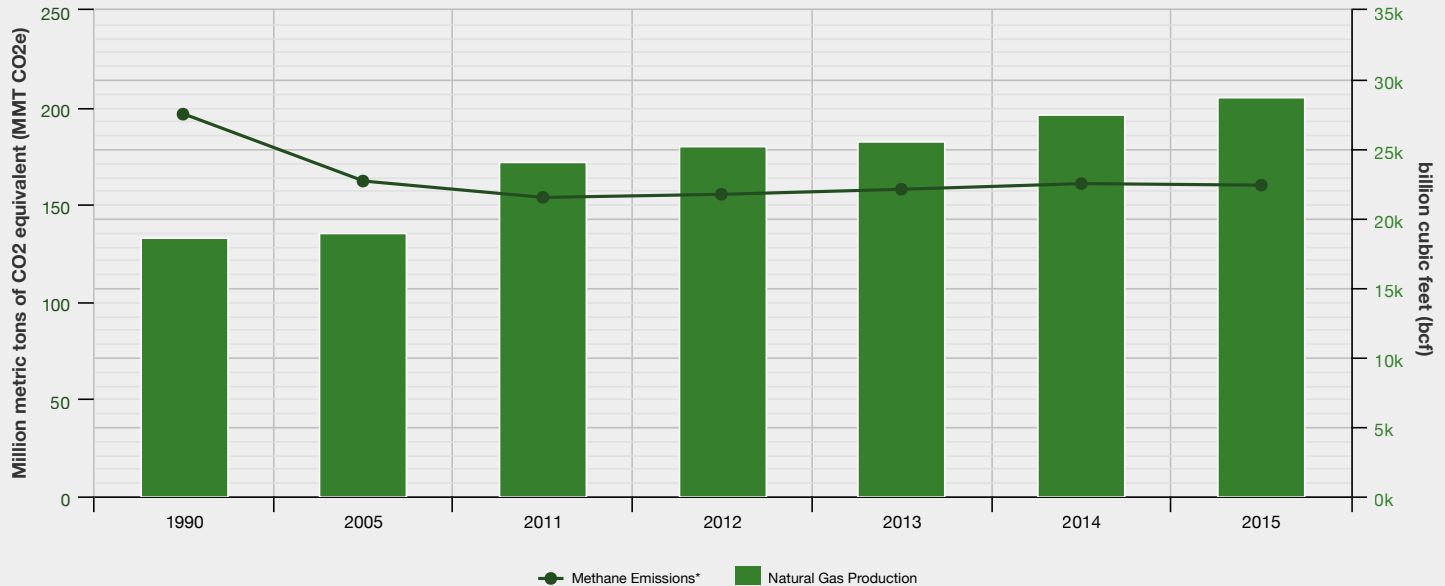
2. International Energy Agency, World Energy Outlook 2016, November 2016.

3. U.S. EIA, Monthly Energy Review, March 2017. Lowest since 1988.

4. U.S. EIA, Monthly Energy Review, March 2017. Lowest since 1992.

The U.S. Is Leading in Emissions Reductions

Natural Gas Production and Methane Emissions from Production



*U.S. CH₄ net emissions from natural gas systems field production
Source: EPA and EIA data

When you compare the top 20 economies in the world, the United States is **second to none** in reducing greenhouse gas emissions from energy consumption since 2005⁵.

For many countries, GDP growth is associated with emissions growth, but this is not true for the United States. Natural gas is enabling this rare combination of increased economic growth and falling emissions. Thanks in part to big investments in production and innovation by U.S. oil and natural gas companies, the U.S. economy is growing while simultaneously reducing emissions.

Nine of the top twenty economies in the world lowered carbon emissions between 2005 and 2014 (the last year for which full data is available). And, from 2013 to 2014, the U.S. oil and natural gas industry directly reduced emissions by the equivalent of **55.5 million metric tons of CO₂**⁶ – equal to the carbon sequestered by 5.27 billion trees over 10 years⁷.

The United States is leading the world in the production and refining of oil and natural gas. And due primarily to greater use of natural gas, 2016 carbon dioxide emissions from power generation were at **nearly 30-year lows**.

Industry places a high priority on the capture of methane during oil and natural gas development and production. And because methane is the major component of natural gas, containing it means that more product can be delivered to customers. Methane emissions from 1990-2015 associated with the natural gas industry **declined by 18.6 percent as U.S. natural gas production increased by more than 50 percent**, according to EPA and EIA data.^{8,9} This shows U.S. emissions of methane from the natural gas sector decreased noticeably during one of the largest increases in natural gas production in the nation's history.

5. U.S. EIA, International Energy Statistics Browser, Accessed April 3, 2017.

6. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.

7. U.S. EPA, Greenhouse Gases Equivalencies Calculator – Calculations and References, February 14, 2017, <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>.

8. U.S. EPA, Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015, February 2017.

9. U.S. EIA, Monthly Energy Review, March 2017.

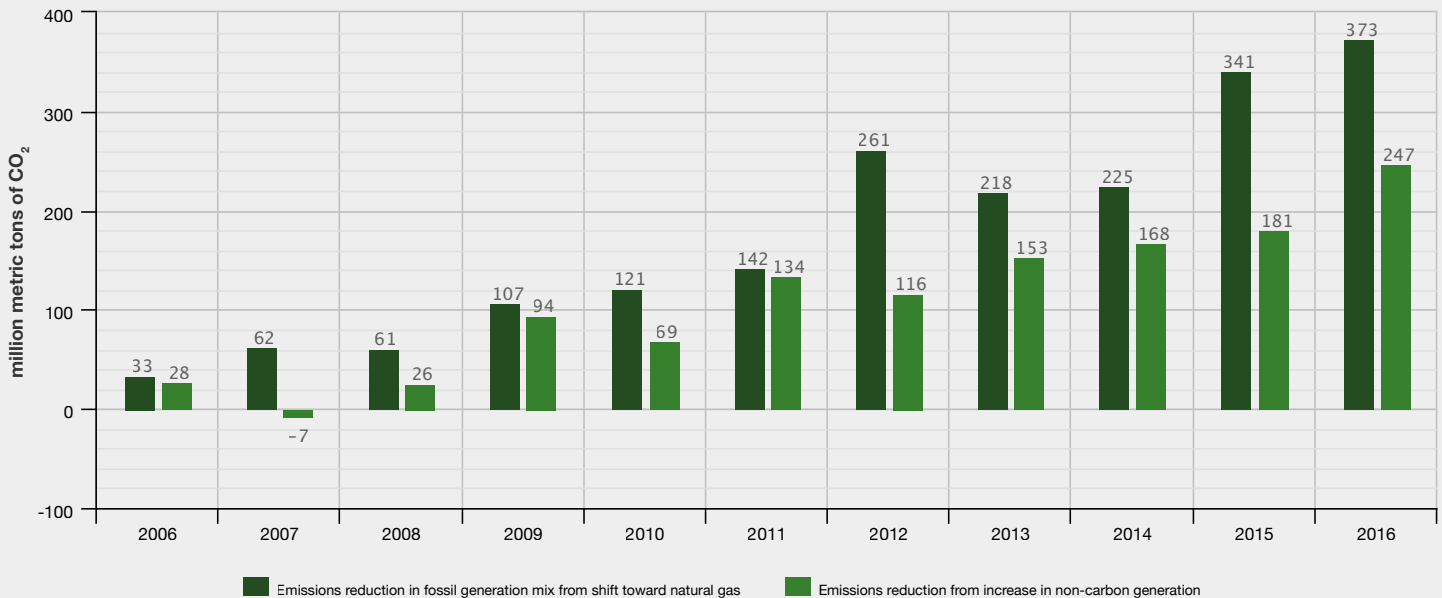
Power Sector Success More U.S. Energy, Less Carbon Emitted

America's energy renaissance has had many important positive outcomes; global leadership, national security, consumer savings, emissions reductions, environmental benefits, and more.

Let's start with emissions of carbon dioxide (CO₂). The U.S. Energy Information Administration (EIA) tells us that in 2016, carbon emissions from electricity generation were at their lowest point in nearly 30 years. This is due largely to greater use of natural gas – now our nation's largest fuel source for electricity.

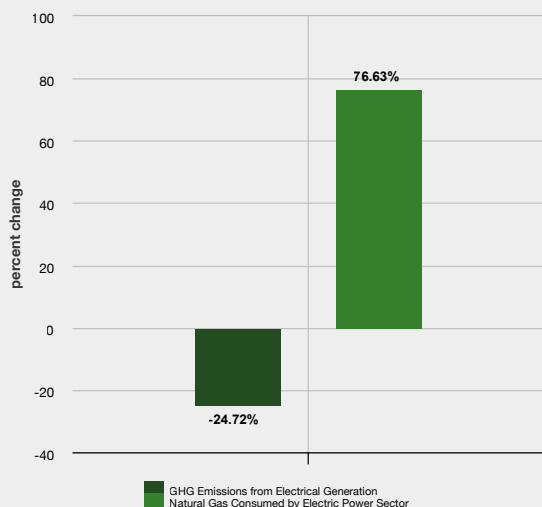
Electric Power Sector CO₂ Savings

(from changes in the electricity generation mix since 2005)



Source: U.S. EIA, March 2017 Monthly Energy Review.
Note: Includes data on distributed generation.

U.S. Change 2005 to 2016



Sources: EIA, Monthly Energy Review March 2017.

Natural gas availability and use are direct products of an American energy renaissance built on shale reserves and safe hydraulic fracturing and horizontal drilling.

The availability of affordable, clean-burning natural gas is directly impacting the power sector in positive ways – among them, helping to drive down CO₂ emissions. The inescapable climate point here is that while many talk about ways to reduce emissions, the United States already is achieving results largely due to increased use of natural gas. From 2005 to 2016 natural gas consumed by the electric power sector for generation **grew 76.6 percent**. During that same period carbon dioxide emissions from electrical generation **fell 24.7 percent**.¹⁰

10. U.S. EIA, Monthly Energy Review, March 2017, Tables 7.3b and 12.6.

Embracing U.S. Energy and Climate Leadership



Credit: Aaron Burden

The dramatic resurgence of the United States as an energy superpower has provided tremendous economic and environmental benefits. Even as America is leading the world in oil and natural gas production, methane emissions have fallen, thanks to industry leadership and investment in new technologies. U.S. carbon emissions from power generation are now at nearly 30-year lows due to increased use of natural gas. The U.S. energy renaissance reduces fuel costs for drivers, estimated to be a **savings of \$550 in lower fuel costs** in 2015, according to the AAA.¹¹ In addition, American households saved an **average of \$1,337 in lower home energy costs** and other related expenditures in 2015.¹²

Methane emissions from 1990-2015 associated with the natural gas industry **declined by 18.6 percent** while U.S. natural gas production **increased by more than 50 percent**, according to EPA and EIA data. This shows U.S. emissions of methane from the natural gas sector decreased noticeably during one of the largest

increases in natural gas production in the nation's history. Furthermore, America's oil and natural gas industry continues to lead all other industries in zero- and low-carbon investments. Between 2000 and 2014, the oil and natural gas industry **invested \$89.9 billion** in such investments, more than double that of the next largest private sectors (automotive at \$38.2 billion and electric utilities at \$37.1 billion) and nearly as much as the federal government (\$110 billion).¹³

In a dynamic, innovation-driven industry like energy, the U.S. should be careful not to adopt prescriptive regulations that prevent technological improvements or shrink opportunities for investments that could deliver environmental benefits and consumer savings for years to come. Moving forward, our government leaders should embrace our nation's energy renaissance that has lowered costs for consumers, benefited American workers and improved the environment.

11. AAA News Room, "2015 Gas Prices Second Cheapest in a Decade AAA Year-End Gas Price Report," 2015, <http://newsroom.aaa.com/2015/12/2015-gas-prices-second-cheapest-in-a-decade-aaa-year-end-gas-price-report/>

12. IHS Economics and the National Association of Manufacturers (NAM) Center for Manufacturing Research, "Energizing Manufacturing: Natural Gas and Economic Growth," May 2016, <http://www.nam.org/Data-and-Reports/Reports/Natural-Gas-Study/Energizing-Manufacturing-Executive-Summary/>.

13. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.

The Natural Gas Solution



An October 2016 report by President Obama's White House National Economic Council¹⁴ is a significant reminder that our nation's leadership in clean natural gas production has meant lower costs for American manufacturers and consumers. Not only has the success of natural gas sharply reduced electricity costs and delivered huge economic benefits, but the development of America's natural gas resources is making a significant positive impact on our nation's environmental and energy sustainability goals.

"The surge in American natural gas production has lowered energy costs for manufacturers and driven job growth, with U.S. natural gas costs one-half that of Europe and one-third that of Asia," according to the White House National Economic Council report.

"Recent analysis estimates that industrial sector consumers of natural gas were **better off by about \$22 billion** between 2007 and 2013 due to abundant, inexpensive shale gas."

The White House's October 2016 report is in addition to two EIA reports showing that American consumers are paying less in electricity costs due to abundant natural gas¹⁵ and that carbon dioxide emissions for power generation dropped to near 30 year lows in 2016,¹⁶ due in large part to cleaner-burning natural gas.

14. White House National Economic Council, Revitalizing American Manufacturing, October 2016, https://www.whitehouse.gov/sites/whitehouse.gov/files/images/NEC_Manufacturing_Report_October_2016.pdf.

15. U.S. EIA, Today in Energy: Wholesale power prices in 2016 fell, reflecting lower natural gas prices, January 11, 2017, <https://www.eia.gov/todayinenergy/detail.php?id=29512>.

16. U.S. EIA, Monthly Energy Review March 2017, Table 12.6.



Market forces and environmental policy are driving the ongoing shift in our nation's power generation mix. The challenge of ensuring environmental compliance, reliable generation and affordable electricity rests on states and regional transmission organizations that must consider the interests of electricity consumers as well as the overall well-being of the state economy. The final U.S. Environmental Protection Agency's (EPA) Clean Power Plan (CPP) is a sweeping and complex rule affecting most power generation in the country. The fate of the CPP is uncertain, given both legal challenges and the forthcoming EPA review of the rule.¹⁷ Nevertheless, grid operators must balance their goals to reduce emissions, maintain reliability and reduce costs. Natural gas generation meets all three objectives, providing a generation solution that is clean, reliable and affordable.

America's energy revolution continues to deliver broad economic benefits while helping to reduce emissions of carbon dioxide (CO₂) from electricity generation to **nearly 30-year lows**. These reductions are the result of market forces. They have little to do with government programs and everything to do with the affordability of the United States' natural gas resource. With such an abundant supply of affordable fuel on hand, power plants already have an incentive to use cleaner-burning natural gas without government interference.

The challenge to provide more energy while lowering greenhouse gas emissions is clear. Government mandates like the Clean Power Plan are not the most cost-effective means to lower greenhouse gas emissions; the market demand for natural gas is doing that on its own. And **a market-based, all-of-the-above energy policy** that encourages innovation and meets demand is the best combined economic and environmental option for our future.

¹⁷ 82 FR 16329

Leading Investment, Leading Innovation

Since 2000, the oil and natural gas industry has invested **\$89.9 billion in emissions-reducing technologies**, according to a study by T² Associates – nearly as much as the rest of U.S.-based private industries combined and more than double the amount invested by each of the next three industry sectors: the automobile industry (\$38.2 billion), the electric utility industry (\$37.1 billion) and agriculture (\$13.0 billion).

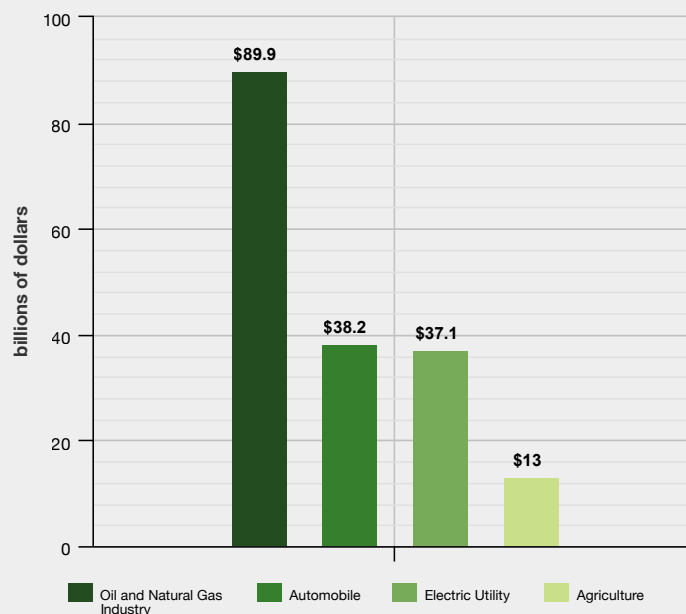
Thanks to America's energy revolution, the broad availability of natural gas and its increasing use in the power-generation sector also is playing a significant role, helping to reduce power generation-related emissions of carbon dioxide (CO₂) to nearly 30-year lows.

More indicators that industry is leading in terms of investments in emissions reduction:

- Since 2000, industry has spent **nearly \$25 billion developing substitute and less carbon intensive fuels**, such as liquefied natural gas, while also reducing fugitive gas emissions. Industry's investment in fuel substitution technologies represents 51 percent of the total invested by private industries and the federal government in this technology class.¹⁸
- The oil and gas industry has invested **nearly \$15 billion in non-hydrocarbon technologies** – including, wind, solar, biofuels, geothermal and landfill digester gas – since 2000, accounting for one out of every six dollars spent on non-hydrocarbon technologies since 2000.¹⁹
- The oil and gas industry has invested **\$50 billion for advanced end-use technologies** – efficiency improvements, carbon capture and storage and advanced technology vehicles – representing 30 percent of the total industry and federal government investment in this technology class.²⁰
- Since 2000, industry has invested **more than \$3 trillion in U.S. capital projects** to advance all forms of energy, including alternatives, while reducing the industry's environmental footprint.²¹
- Oil and natural gas industry expenditures on GHG mitigation more than doubled – to **\$217.5 billion** – with the addition of shale investments.²²

Spending to Reduce GHG Emissions

Leading Private Investors 2000-2014



Source: T² & Associates, "Key Investments in Greenhouse Gas Mitigation Technologies from 2000 Through 2014 by Oil and Gas Firms, Other Industry and the Federal Government," September 2015.

The industry is taking a variety of actions and investing in technologies across the value chain that reduce greenhouse gas (GHG) emissions. The oil and natural gas industry will continue to be an integral part of the effort to address the issue of climate change. Therefore, policies must support the development and use of our abundant oil and natural gas resources and encourage innovation.

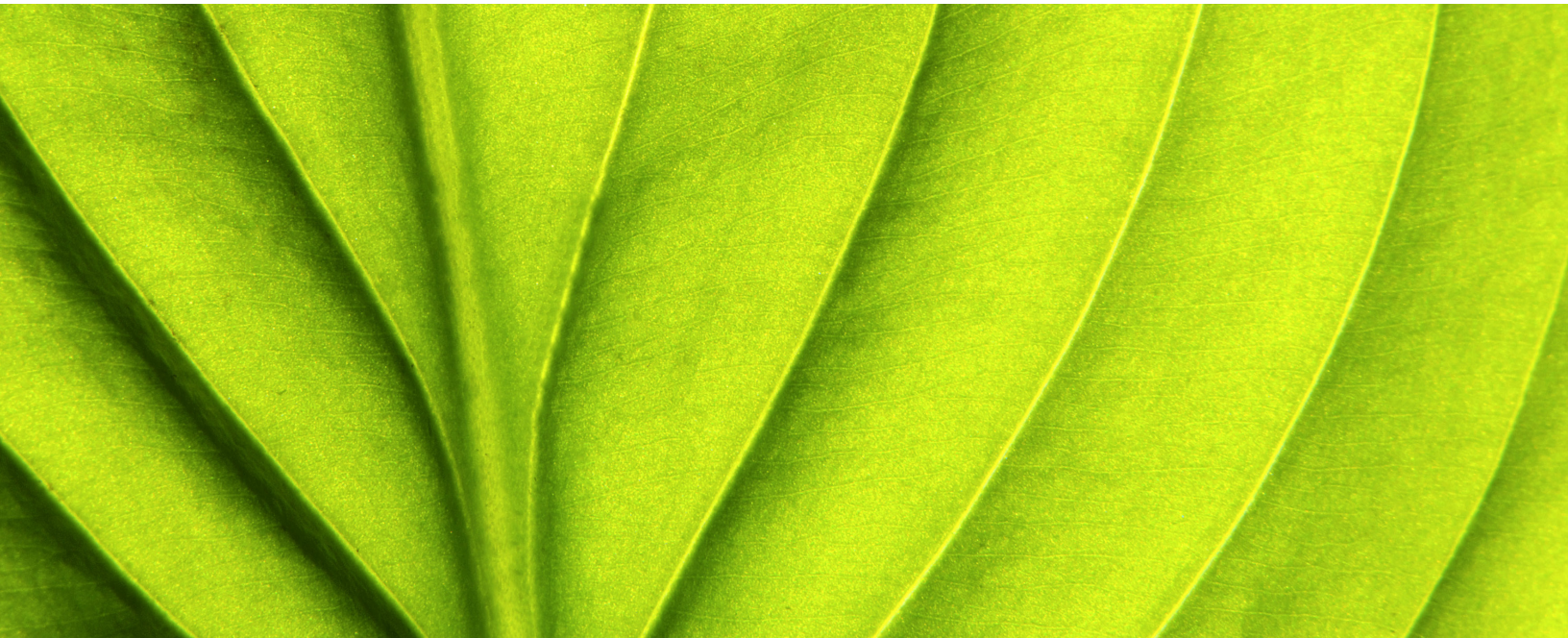
18. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.

19. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.

20. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.

21. API, Putting Earnings into Perspective, July 2016, <http://www.api.org/~media/Files/Statistics/Earnings-Perspective/putting-earnings-perspectives-high-res.pdf?la=en>

22. T² and Associates, Key Investments in Greenhouse Gas Mitigation Technologies from 2000 through 2014 by Oil and Gas Firms, Other Industry and the Federal Government, September 2015, <http://www.api.org/~media/Files/EHS/climate-change/2015-T2-Key-Investments-in-ghg-mitigation.pdf>.



- 1 EPA – Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2015 – <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015>
- 2 Our World In Data – <https://ourworldindata.org/>
- 3 IEA – Energy Poverty – <http://www.iea.org/topics/energypoverty/>
- 4 Energy Tomorrow – <http://www.energytomorrow.org/blog>
- 5 EIA – <http://www.eia.gov/>
- 6 T² and Associates – Key Investments in Greenhouse Gas Mitigation Technologies from 2000 Through 2014 by Oil and Gas Firms, Other Industry and the Federal Government – <http://bit.ly/1HVeiuW>
- 7 Who Owns Big Oil? – <http://www.whoownsbigoil.com/>
- 8 EPA – Profile of Petroleum and Natural Gas Systems – https://www.epa.gov/sites/production/files/2015-10/documents/subpart_w_2014_data_summary_10-05-2015_final.pdf
- 9 Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector – <http://pubs.acs.org/doi/full/10.1021/es5060258#showFigures>

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