Energizing America

Facts for Addressing Energy Policy

America's Oil and Natural Gas Industry

May 2016

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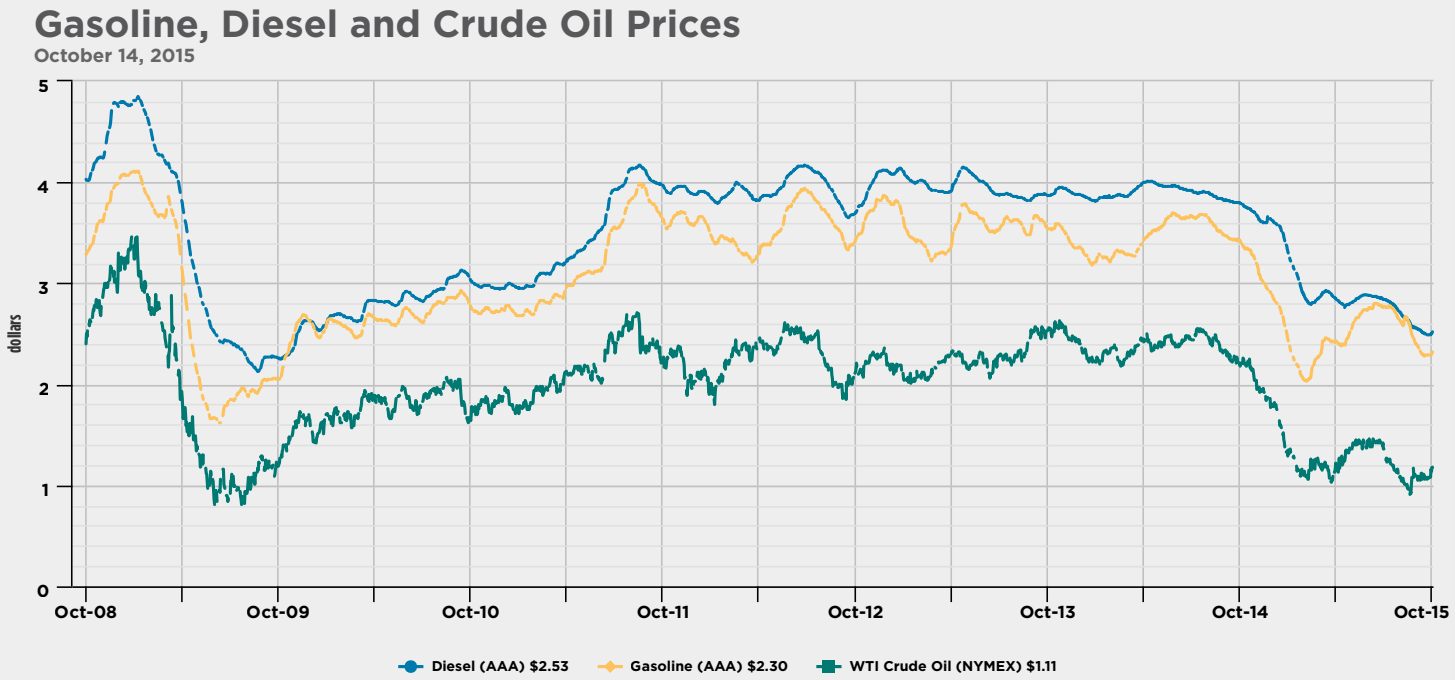
Table of Contents

The United States is at an historic turning point for the country and its energy policies. But many Americans lack a full understanding of the oil and natural gas industry. API has assembled this oil and gasoline primer to encourage a constructive public policy debate that leads to a new fact-based comprehensive energy policy.

Factors Affecting Price

Gasoline, Diesel and Crude Oil Prices

Changes in gasoline and diesel prices mirror changes in crude oil prices.



Source: NYMEX (WTI crude oil) and AAA (gasoline and diesel)

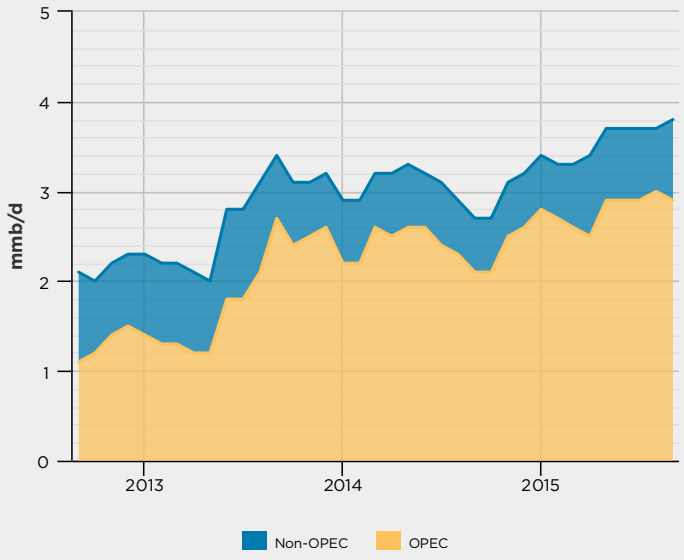
Changes in gasoline and diesel prices mirror changes in crude oil prices. Those changes are determined in the global crude oil market by the worldwide demand for and supply of crude oil. Weak economic conditions in the U.S. and around the world in 2008 and into 2009 led to less demand which helped push prices down.

With the worldwide economic recovery underway, demand is on the rise again but unrest in the Middle East and North Africa has put supplies at risk. This combination of rising demand and reduced supply helped to push prices higher over the last few years. However, the recent downturn in prices was the result of the growth in oil supplies, largely from the U.S., outpacing the growth in global demand.

Global Oil Supply Disruptions vs. U.S. Oil Growth

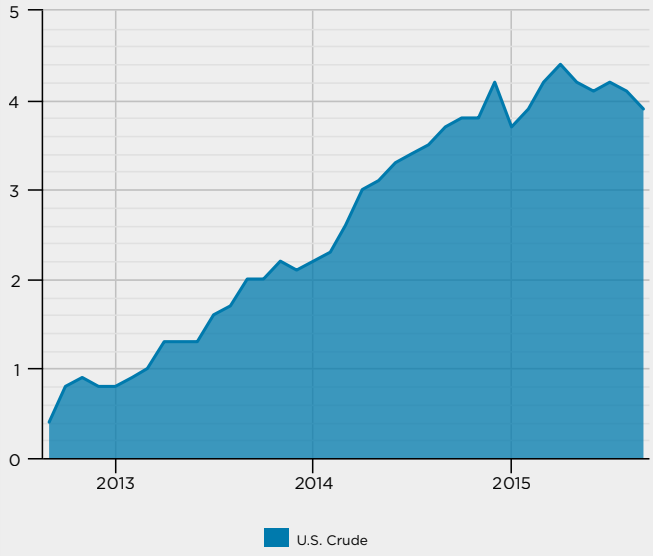
Growth in U.S. oil production has largely offset the growth in global oil supply disruptions since 2012.

Growth in Global Oil Supply Disruptions



Source: EIA.

Growth in U.S. Oil Production*



Unplanned supply disruptions in the global crude oil market have grown in recent years, peaking at 3.8 million barrels a day in May and September 2015. According to the EIA, this is the highest level of supply disruptions since the Iraq-Kuwait War (1990-91) when prices spiked to new highs.[1]

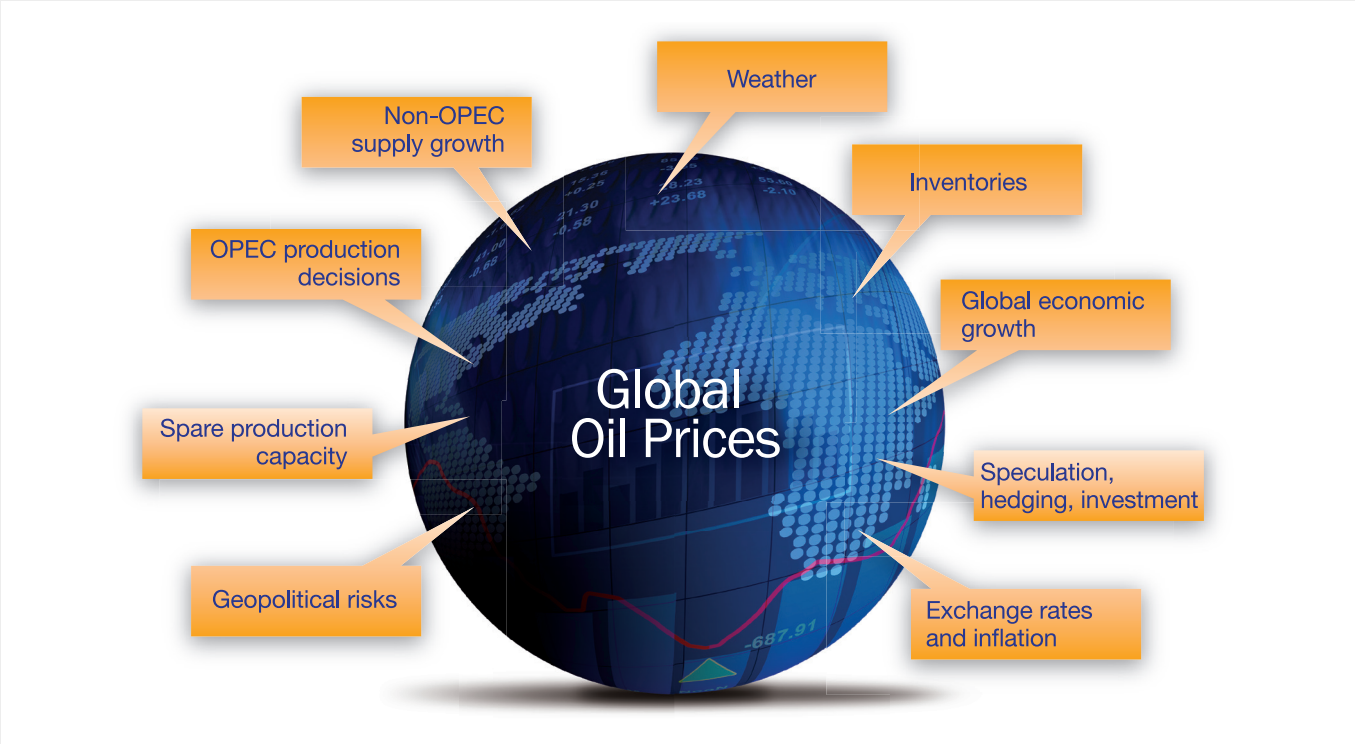
U.S. production growth has made all the difference. It has largely offset the loss from unplanned production outages around the world and put downward pressure on prices to the benefit of all consumers.

1. EIA, Today in Energy, August 27, 2014.

Oil Prices Relate to Many Uncertain Factors

A host of factors, many of them uncertain, affect the price of crude oil and the products made from it.

Oil Prices Relate to Many Uncertain Factors



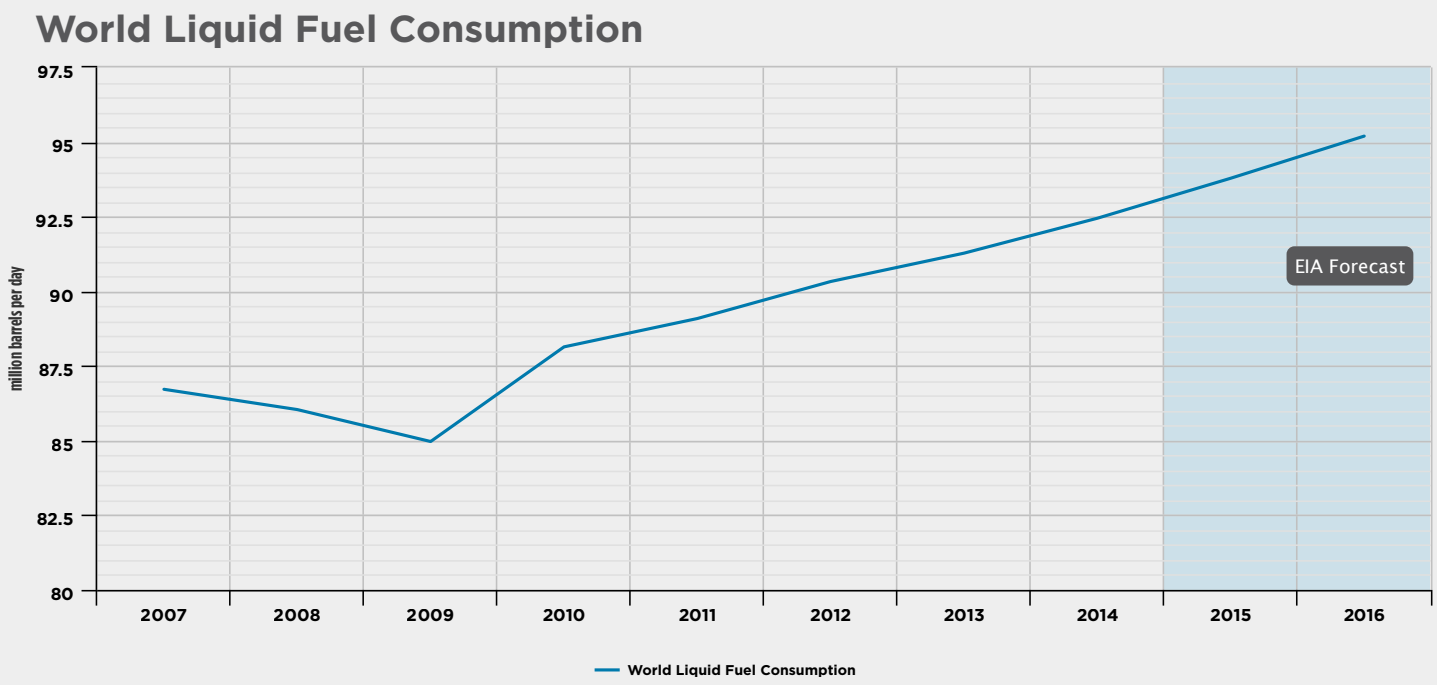
Source: EIA.

Crude oil prices are set globally through the daily interactions of thousands of buyers and sellers in both physical and futures markets, and reflect participants' knowledge and expectations of demand and supply.

In addition to economic growth and geopolitical risks, other factors, including weather events, inventories, exchange rates, investments, spare capacity, OPEC production decisions, and non-OPEC supply growth all figure into the price of crude oil.

World Liquid Fuel Consumption

World oil consumption is expected to grow as the global economy rebounds.

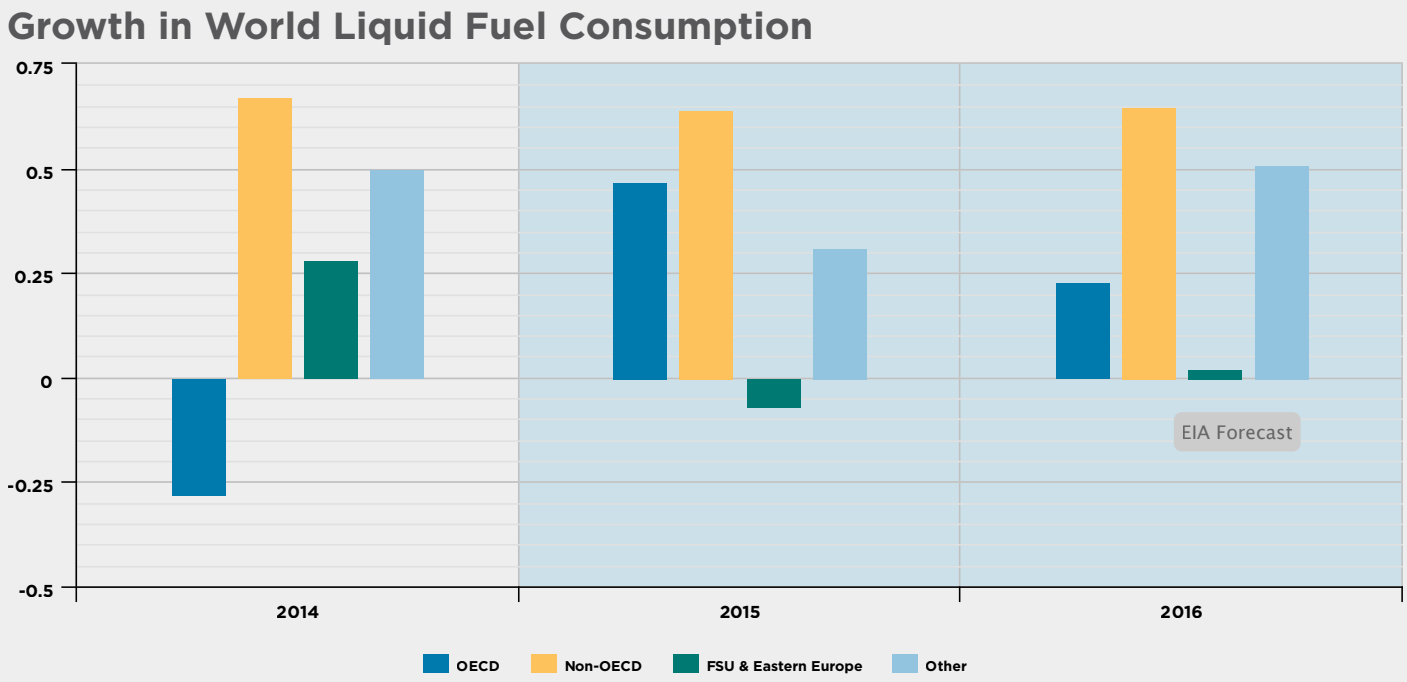


Source: EIA, Short-Term Energy Outlook, October 2015

The world's demand for oil increased sharply for several years, peaking at 87 million barrels per day in 2007. However, the global economic slowdown in recent years reversed this trend and demand fell for two consecutive years to just 85 million barrels per day in 2009, or nearly two million barrels per day less than at its peak before rebounding in 2010. The Energy Information Administration expects growth to continue over the next couple of years reaching 93.8 million barrels per day in 2015 and 95.2 million in 2016.

Growth in World Liquid Fuel Consumption

Growth in world oil consumption is expected to be concentrated in non-OECD countries.



Source: EIA, Short-Term Energy Outlook, October 2015

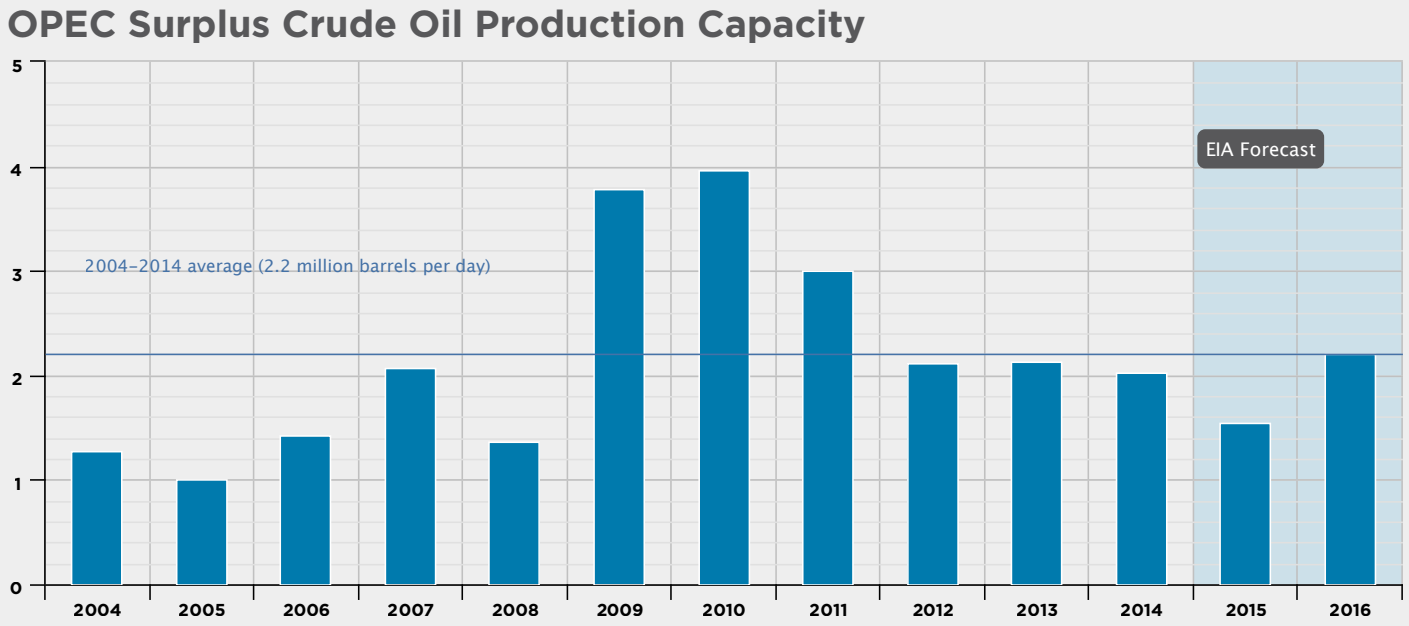
The EIA projects consumption in the Organization for Economic Cooperation and Development (OECD)[2] countries to increase slightly this year and next. Global growth is concentrated in the non-OECD countries including China and the Middle East with world gains of 1.34 million barrels per day in 2015 and 1.41 million barrels per day in 2016.

2. The 34 member countries of the OECD include:

Australia	Hungary	Poland
Austria	Iceland	Portugal
Belgium	Ireland	Slovakia
Canada	Israel	Slovenia
Chile	Italy	Spain
Czech Republic	Japan	Sweden
Denmark	Korea (South)	Switzerland
Estonia	Luxemburg	Turkey
Finland	Mexico	United Kingdom
France	Netherlands	United States
Germany	New Zealand	
Greece	Norway	

OPEC Surplus Production Capacity

Surplus crude oil capacity is expected to increase.



Source: EIA, Short-Term Energy Outlook, October 2015

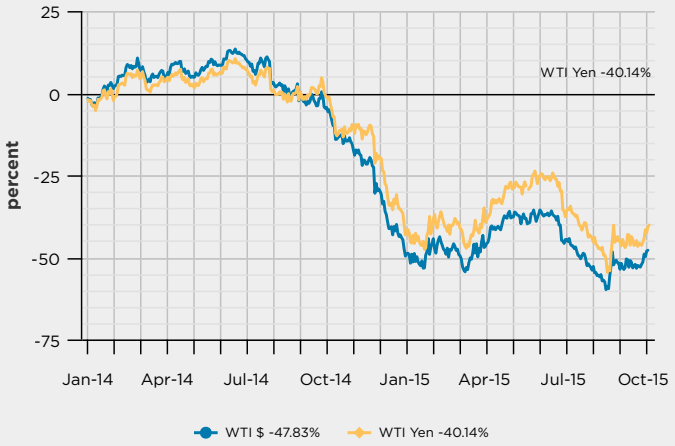
The amount of surplus crude oil capacity, which is the amount of oil available to meet surges in demand or disruptions in supply, remained near 2 million barrels per day over the last few years as demand for crude oil increased along with global economic growth, and supplies were put at risk by unrest in the Middle East and North Africa.

EIA expects OPEC surplus production capacity will average about 1.5 million barrels per day in 2015 and increase to 2.2 million barrels per day in 2016.

The Value of the Dollar Makes a Difference

Percent Change of West Texas Intermediate Crude (WTI) in Dollars and Yen

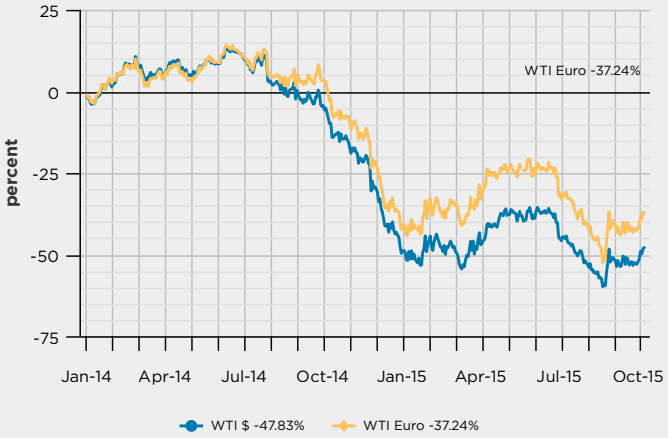
Jan 2, 2014 – October 9, 2015



Source: Board of Governors of the Federal Reserve Bank, EIA, NYMEX.

Percent Change of West Texas Intermediate Crude (WTI) in Dollars and Euros

Jan 2, 2014 – October 9, 2015



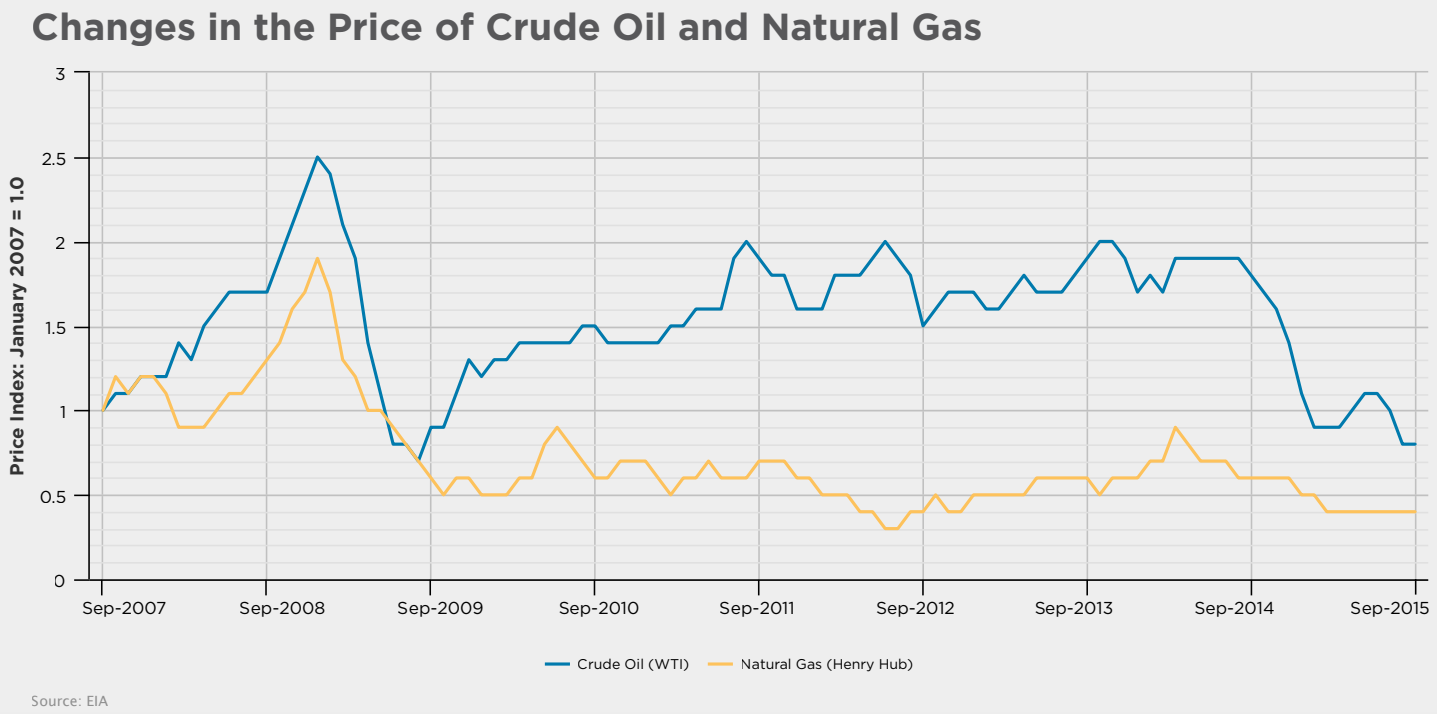
Source: Board of Governors of the Federal Reserve Bank, EIA, NYMEX.

The strength of the U.S. dollar against other currencies around the world has widened compared to the Yen and the Euro. For American consumers this means they are experiencing a greater fall in crude oil prices than the citizens of Japan and Europe.

As oil prices have fallen around the world, the price decline has been greater for countries that have a strong currency like the U.S., but less for those that don't.

Changes in the Price of Natural Gas and Crude Oil

The price of natural gas has fallen relative to crude oil.



These prices are driven by demand and supply. In recent years, technological innovations have allowed for the rapid expansion of domestic oil and natural gas supplies. This expansion has helped put downward pressure on fuel prices, especially the price of natural gas. This is due, in part, to the fact that the natural gas market is more regional in nature than the global crude oil market. Most of the natural gas consumed in the U.S. is produced domestically with a small amount imported. Large domestic production increases relative to domestic demand for natural gas has helped push prices downward relative to crude oil whose price is determined by global supply and demand.

EIA Price Forecast

Looking ahead: EIA's price forecast.

EIA Price Forecast	Year			
	2013	2014	2015 Projected	2016 Projected
WTI Crude[a] ($/barrel)	97.98	93.17	49.53	53.57
Brent Crude ($/barrel)	108.56	98.89	53.96	58.57
Gasoline[b] ($/gallon)	3.51	3.36	2.42	2.38
Diesel[c] ($/gallon)	3.92	3.83	2.72	2.77
Heating Oil[d] ($/gallon)	3.78	3.72	2.73	2.65
Natural Gas[d] ($/mcf)	10.29	10.94	10.35	10.28
Electricity[d] (¢/kwh)	12.12	12.50	12.55	12.69

[a] West Texas Intermediate [b] Average Regular Pump Price [c] On-Highway Retail [d] Residential Average

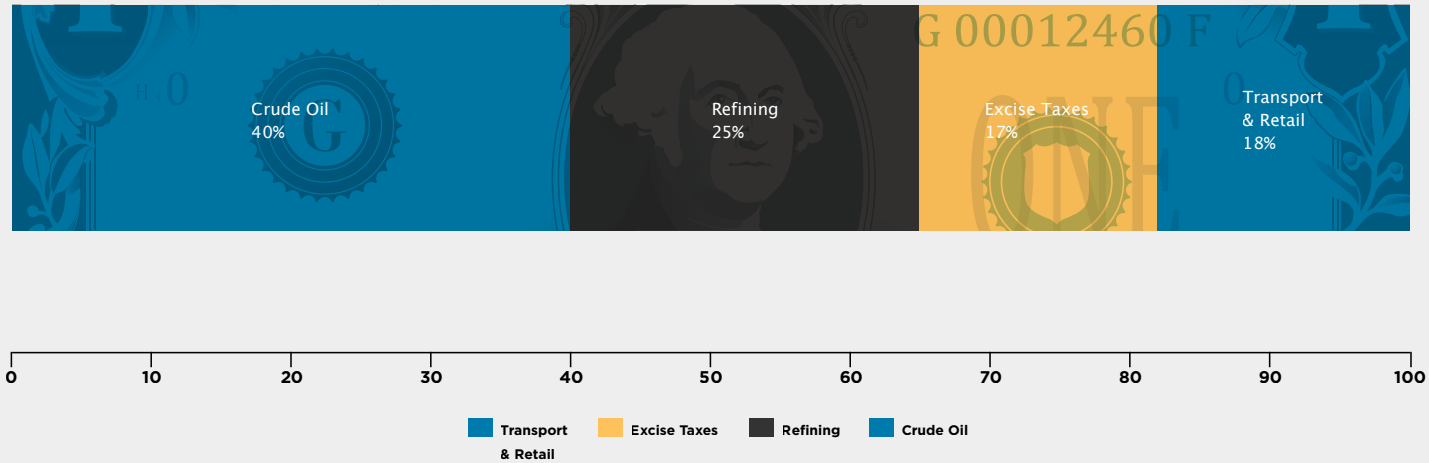
Source: EIA, Short-Term Energy Outlook, October 2015.

Looking ahead, the Energy Information Administration projects the annual price of WTI crude will fall by $43.64 per barrel in 2015 and increase by $4.04 per barrel in 2016. Brent crude oil prices are projected to follow a similar pattern of falling this year and increasing next year. EIA expects changes in crude oil prices will be reflected in prices for the products made from crude oil, such as gasoline, diesel, and heating oil.

Where the Money is Going

What Consumers Are Paying

Pump prices: A fractional story.



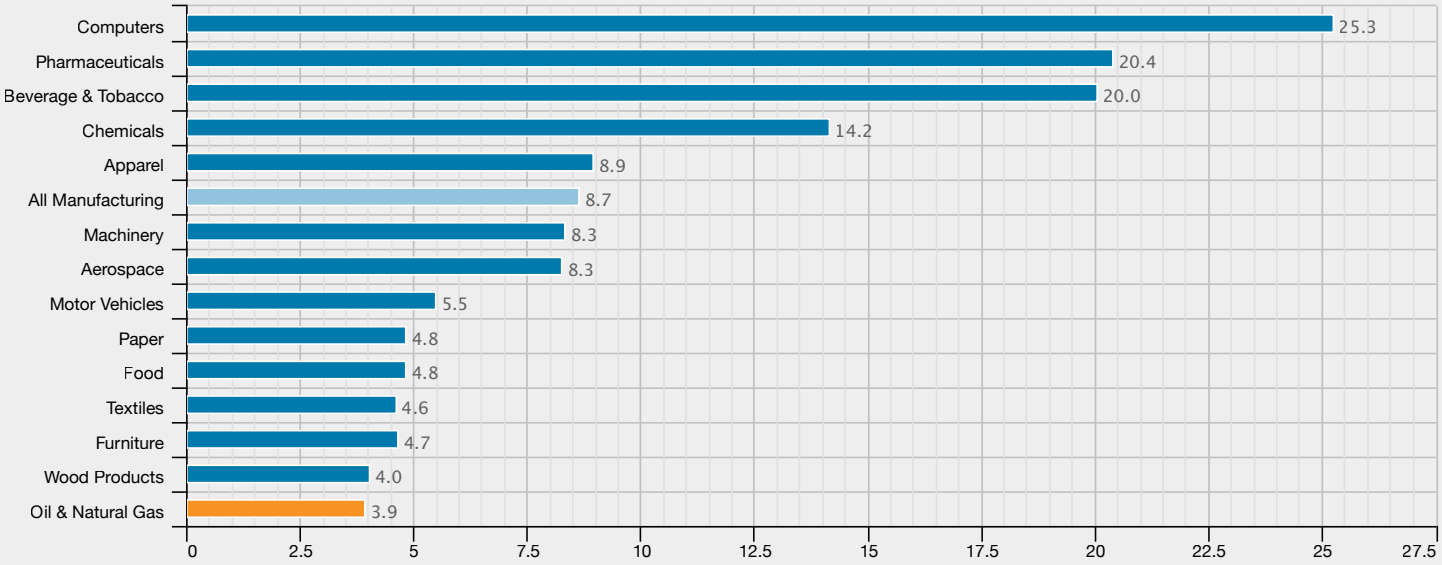
The biggest single component of retail gasoline prices is the cost of the raw material used to produce the gasoline – crude oil. Recently, that price has been between $44 and $49 a barrel, depending on the type of crude oil purchased. With crude oil at these prices a standard 42 gallon barrel translates to $1.05 to $1.17 a gallon at the pump. Excise taxes add another 49 cents a gallon on average nationwide. So the price for gasoline is already at $1.54 or more per gallon even before adding the cost of refining, transporting, and selling the gasoline at retail outlets. Crude oil costs account for about 40 percent of what people are paying at the pump. Excise taxes average 17 percent. That leaves just 43 percent for the refiners, distributors, and retailers.

Earnings by Industry

Profit margins provide one useful way to compare financial performance among industries of all sizes.

Earnings by Industry, 2011-2015 Average

(cents of net income per dollar of sales)



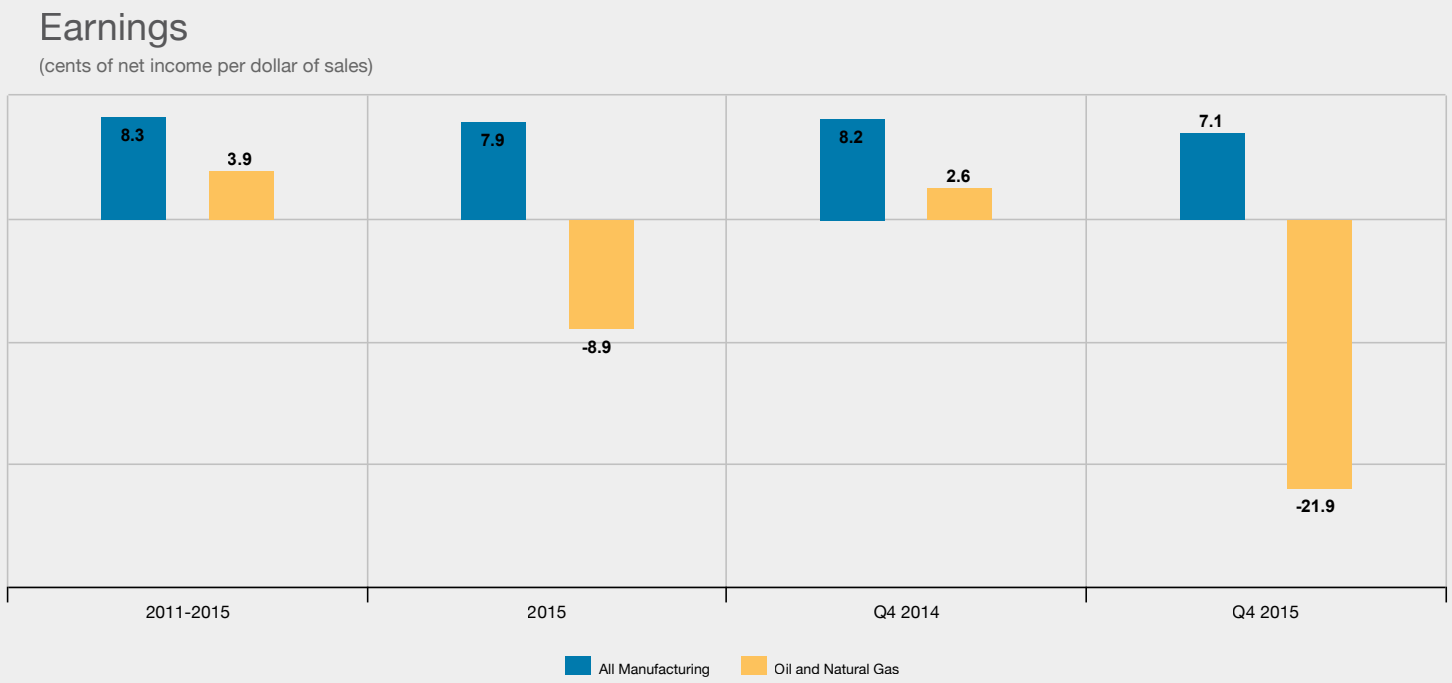
Sources: Based on company filings with the federal government as reported by U.S. Census Bureau for U.S. manufacturing industries and Standard & Poor's Research Insight for Oil and Natural Gas.

Oil and natural gas earnings are typically in line with the average of other major U.S. manufacturing industries, but not recently. Published data for 2011 to 2015 shows the oil and natural gas industry lost on average 3.9 cent for every dollar of sales in comparison with all manufacturing which earned on average 8.7 cents for every dollar of sales.

Growth in the world's supply of crude oil has outpaced the growth in global demand, which has led to sharply lower prices, and lower earnings.

Earnings Compared to Manufacturing

Earnings: Keeping America going strong.



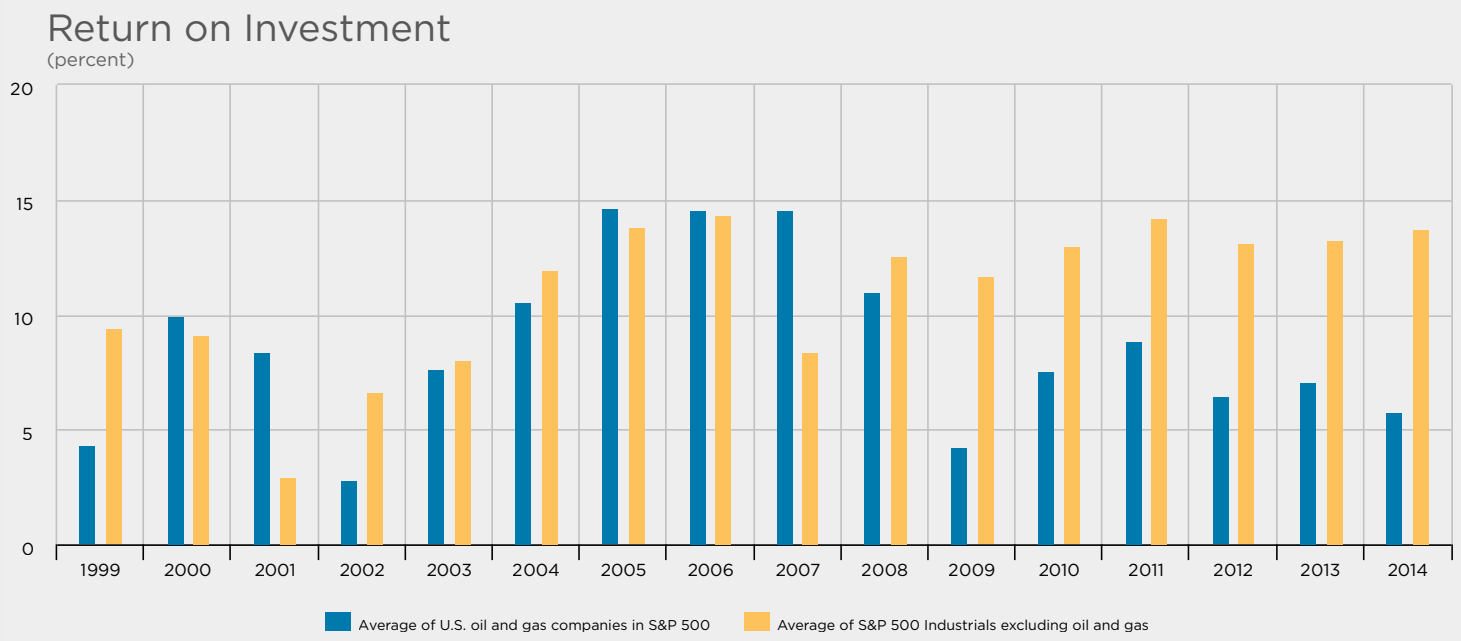
Source: U.S. Census Bureau for U.S. manufacturing, and Standard & Poor's Research Insight for oil and natural gas.

Over the last five years, average earnings for the oil and natural gas industry have been below the rest of the U.S. manufacturing industry, averaging about 4 cents for every dollar of sales compared to nearly 9 cents for manufacturing. By the second quarter of 2015, the average for the oil and gas industry fell to minus 21.9 cent on the dollar compared to 7.1 cents on the dollar for all U.S. manufacturing as the price collapse of crude oil took its toll on U.S. oil producers.

Like other industries, the oil and natural gas industry strives to maintain a healthy earnings capability. It does so to remain competitive and to benefit its millions of shareholders, across the country and in all walks of life. Healthy earnings also allow the industry to invest in innovative technologies that improve our environment and increase production to keep America going strong – even as it leads the search for newer technologies, and new sources of energy that will provide a more secure tomorrow.

Return on Investment

The return on investment for the industry turned sharply lower than the returns for the S&P Industrials during the recent downturn in the economy.



Source: S&P Research Insight, March 2015.

Return on Investment is Income Before Extraordinary Items – Available for Common, divided by Total Invested Capital, which is the sum of the following items: Total Long-Term Debt; Preferred Stock; Minority Interest; and Total Common Equity. This is then multiplied by 100.

Because the oil and natural gas industry is massive and requires huge investments, its earnings contribute greatly to the American economy and way of life. They allow companies to reinvest in the facilities, infrastructure and new technologies that keep America going strong well into the future while generating returns that meet shareholders' expectations.

The oil and natural gas industry is probably one of the world's largest industries. Its revenues are large, but so are its costs of providing consumers with the energy they need. Among those are the cost of finding and producing oil and natural gas and the costs of refining, distributing and marketing it.

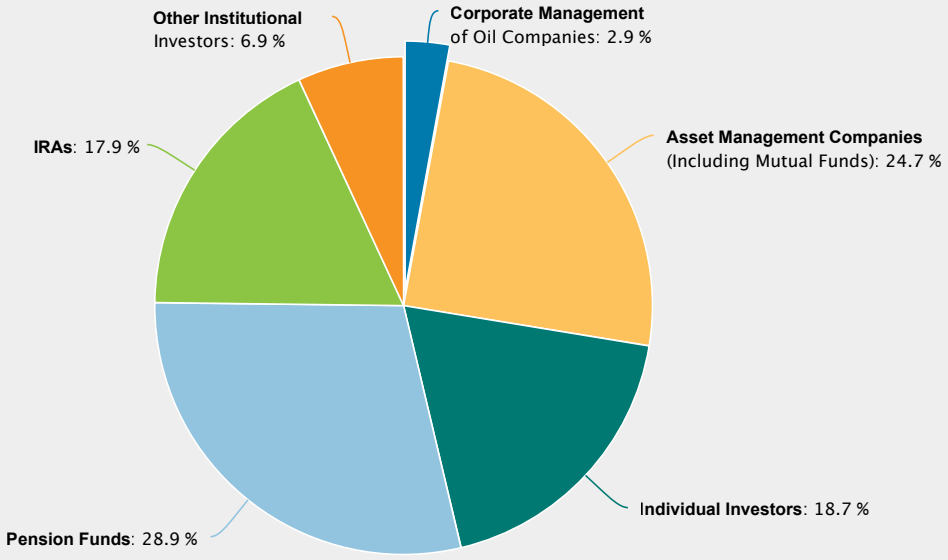
These costs remain huge, regardless of whether earnings are high or low – as was the case throughout most of the 1990s and during other industry downturns. The return on investment (net income/net investment in place) for the oil and natural gas industry has been lower than the returns for the S&P industrials.

Who Owns the Oil Companies

When politicians talk about taxing "Big Oil" or taking their "record profits," they should think about who they really would be hurting.

Who Owns "Big Oil?"

(holdings of oil stocks, 2014)



Source: Who Owns America's Oil and Natural Gas Companies, SONECON, October 2014.

If you're wondering who owns "Big Oil," chances are good the answer is "you." If you have a mutual fund account, and 57 million U.S. households do, there's a good chance it invests in oil and natural gas stocks. If you have an IRA or personal retirement account, and 46 million U.S. households do, there's a good chance it invests in energy stocks. If you have a pension plan, and 61 million U.S. households do, odds are it invests in oil and natural gas.

Contrary to popular belief, and what some politicians might say, America's oil companies aren't owned just by a small group of insiders. Only 2.9 percent of industry shares are owned by corporate management. The rest is owned by tens of millions of Americans, many of them middle class.

A strong oil and natural gas industry is a vital part of the retirement security for millions of Americans. State pension fund investments in oil and natural gas companies are providing strong returns for teachers, firefighters, police officers, and other public pension retirees, according to a Sonecon study.[3] Returns on oil and natural gas assets in the top two state funds in 17 states, which include more than half of all the people covered by state and local pension plans in the U.S., averaged $2.30 cents for each dollar invested compared to just $1.68 cents for other assets in these funds from 2005 through 2013.

The oil and natural gas industry is a major contributor to the health of these funds, many of which face huge future payout obligations. While oil and natural gas stocks made up 4 percent of public employee pension plan holdings, they accounted for 8 percent of the returns, outperforming other investment classes by two-to-one. During good economic times, or challenging ones, oil and natural gas investments far outperformed other public pension holdings.

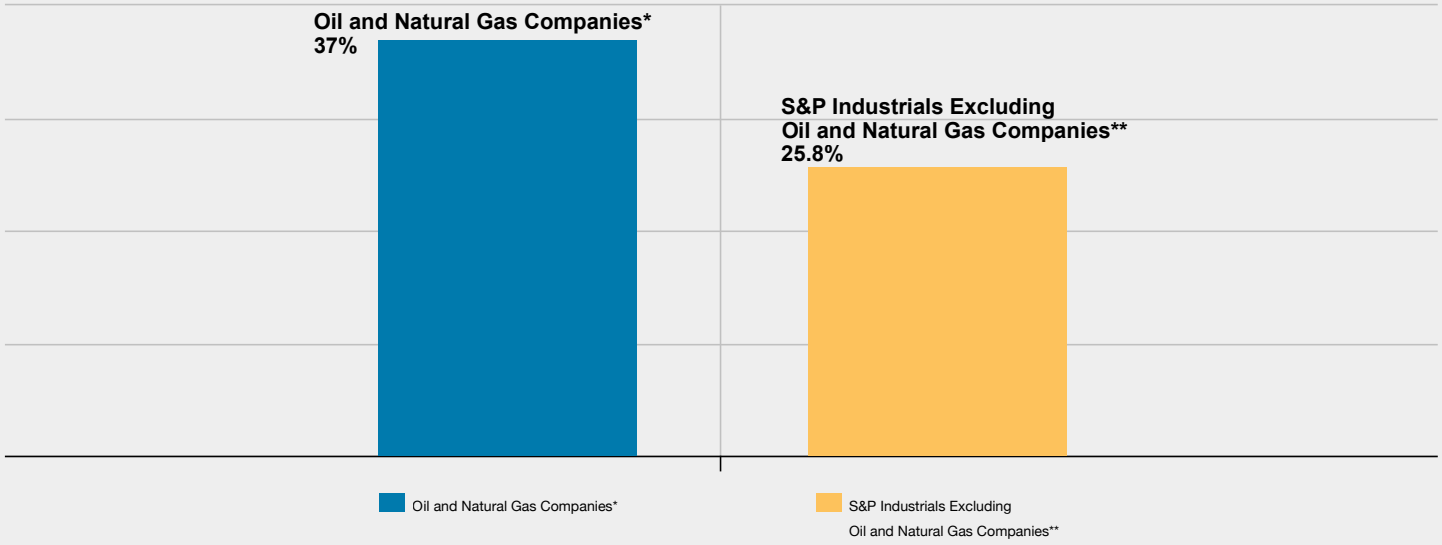
3. Robert J. Shapiro and Nam D. Pham, "The Financial Contribution of Oil and Natural Gas Investments to Public Employee Pension Plans in Seventeen States, Fiscal Years 2005-2013," SONECON, April 2015.

Taxes Paid by the Oil and Natural Gas Industry

U.S. oil and natural gas companies pay their fair share of taxes and are a tremendous source of public revenue.

Income Tax Expenses as Share of Net Income Before Income Taxes

(2011-2015)



Source: Compustat North America Database.

*Oil and Natural Gas Companies: GICS Industry Group Code 1010.

**S&P Industrials are extracted from the S&P 1500 by excluding companies in the Financials (GICS Sector = 40), Utilities (GICS Sector = 55), and Transportation (GICS Industry Group = 2030).

Over the past ten years U.S. oil and natural gas companies have paid considerably more in taxes than the average manufacturing company. From 2011 to 2015 income tax expenses (as a share of net income before income taxes) averaged 37 percent, compared to 25.8 percent for other S&P Industrial companies.

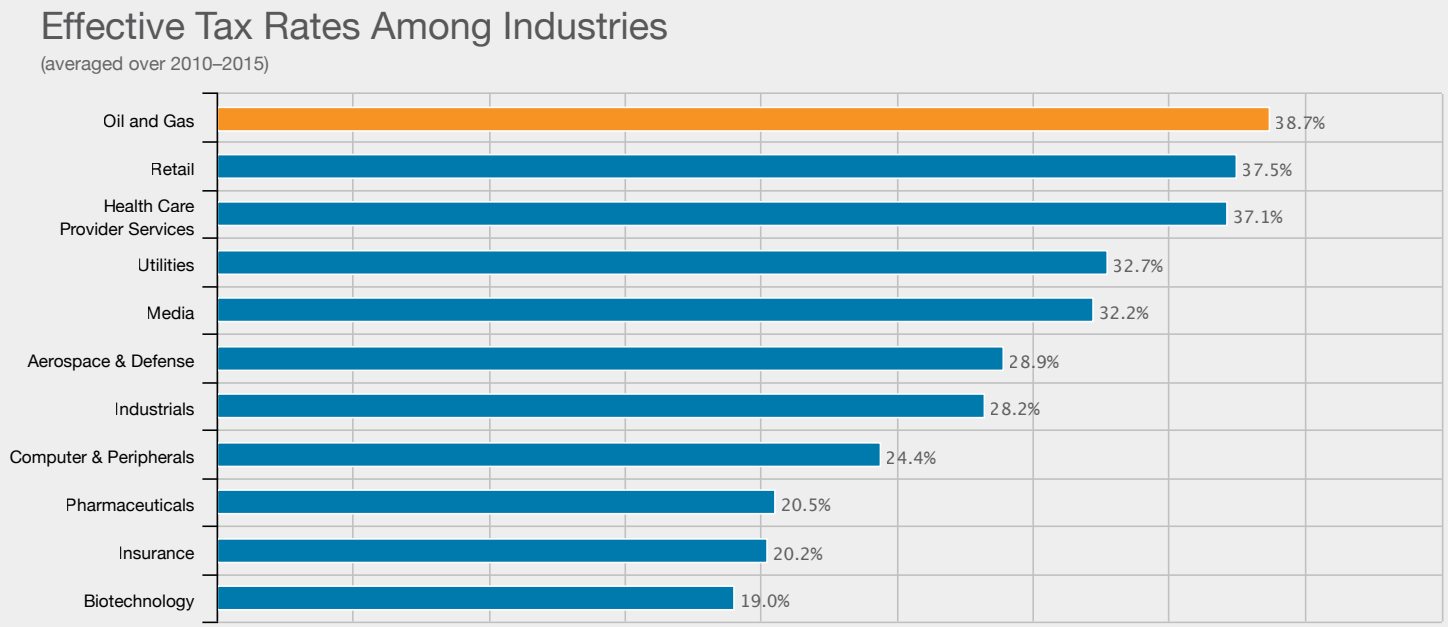
The U.S. oil and natural gas industry also pays the federal government significant rents, royalties and lease payments for production access – totaling more than $119 billion since 2000. In fact, U.S. oil and natural gas companies pay tens of millions of dollars to the federal government in both income taxes and production fees every single day.

4. GICS Industry Group Code 1010.

5. S&P Industrials are extracted from the S&P 1500 by excluding companies in the Financial (GICS Sector = 40), Utilities (GICS Sector = 55), and Transportation (GICS Industry Group = 2030).

Effective Tax Rates Among Industries

The high effective tax rates associated with the oil and gas industry are a function of the nature of the business.



Tax rate is total income taxes, which include income taxes imposed by federal, state, and foreign governments, divided by pretax income.
Source: S&P Research Insight; NB. Average rate for ONG was brought down by 25.6 percent in 2015

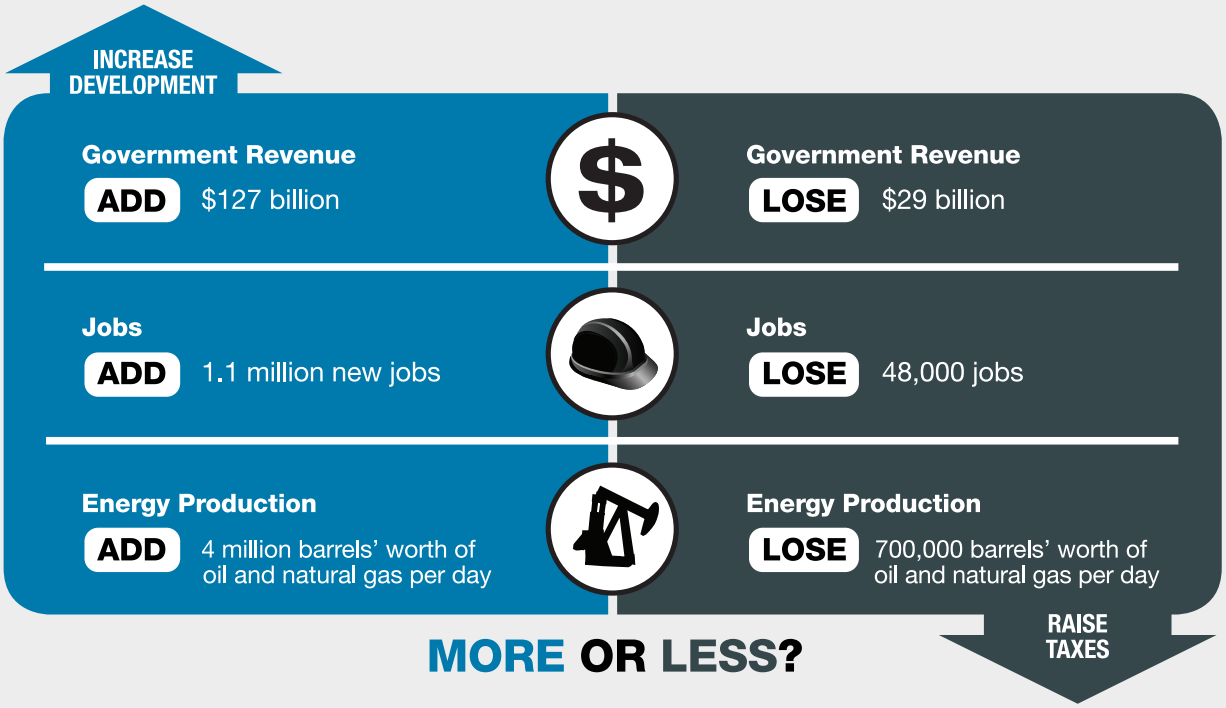
U.S.-based oil and gas companies must structure their operations and invest substantial capital where the resource is found rather than where the best tax regime is located. As a result, U.S.-based oil and gas companies' overseas income is often subject to very high effective tax rates. In addition, operations in the U.S. generate separate state and federal income tax obligations or payments, causing the industry to have an effective tax rate above the federal statutory rate of 35 percent.

Retailers are placed in a similar situation as they must naturally align their locations with customers, which can lead to higher effective tax rates. Other industries, however, may have greater flexibility on where they locate their physical capital or other operations to meet their customer needs. As a result, they may be able to establish activities in locations with lower effective tax rates.

Economic Consequences of Higher Taxes

Raising taxes on the oil and natural gas industry will not lower the price of fuel.

Economic Consequences of Higher Taxes



Source: Wood Mackenzie Energy Consulting, http://www.api.org/Newsroom/upload/API-US_Supply_Economic_Forecast.pdf; and http://www.api.org/policy/tax/recentstudiesandresearch/upload/SOAE_Wood_Mackenzie_Access_vs_Taxes.pdf.

The Administration has proposed over $90 billion in additional taxes and fees on the oil and natural gas industry over a 10-year period. According to the Congressional Research Service, the proposals "… would make oil and natural gas more expensive for U.S. consumers and likely increase foreign dependence."[6]

In the long run, the negative economic consequences of higher taxes more than offset any short-term tax revenue gains. An additional $5 billion in new, annual taxes – similar to what's been proposed by the Administration, or some in Congress – could actually decrease cumulative government revenue by $29 billion by 2020 according to an economic analysis by Wood Mackenzie.[7] And even worse, higher taxes could result in the loss of tens of thousands of jobs between now and 2020.

There is a better way than saddling a troubled economy with new taxes and fees that hurt consumers and workers. The oil and natural gas industry should be allowed to develop the vast energy resources that belong to the American people. If we open areas that are currently off-limits to development, and partner with Canada to develop resources, we could create more than one million jobs throughout the economy and generate an additional $127 billion in government revenue by 2020.[8]

We can either take momentum away from recovery or put it behind American prosperity.

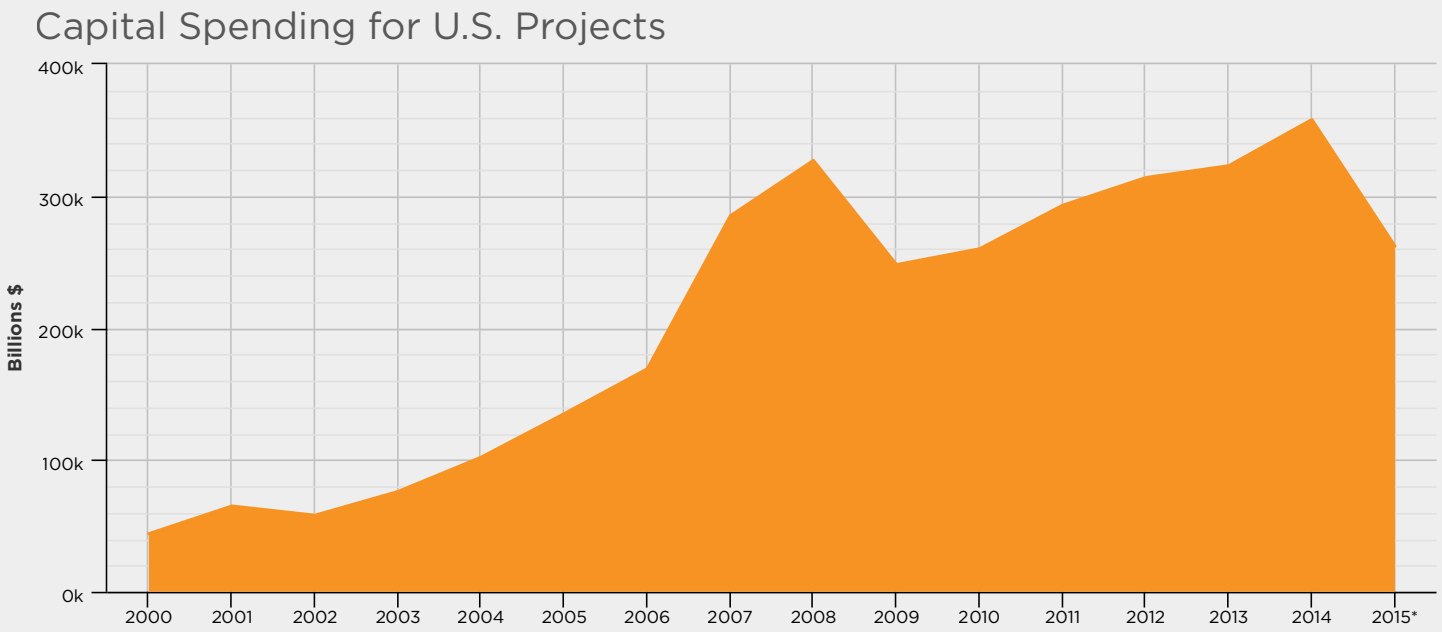
6. CRS Report to Congress, "Oil and Natural Gas Industry Tax Issues in the FY2012 Budget Proposal," March 3, 2011.

7. Wood Mackenzie, "Energy Policy at a Crossroads: An Assessment of the Impacts of Increased Access versus Higher Taxes on U.S. Oil and Natural Gas Production, Government Revenue, and Employment," January 2011.

8. Wood Mackenzie, "U.S. Supply Forecast and Potential, Jobs and Economic Impacts (2012-2030)," September 7, 2011

Capital Spending for U.S. Projects

To understand the oil and natural gas industry one must recognize it as an industry characterized by long lead times, huge capital requirements and returns realized only decades later in the face of very real investment risks.



*Planned

Source: Oil & Gas Journal, various issues

Significant oil and gas discoveries that are announced today often result from investments begun by companies as far back as a decade or more ago. Since the year 2000, our industry invested over $3 trillion dollars in U.S. capital projects to meet the growing demand for oil and natural gas. The worldwide economic downturn, along with lower oil and natural gas prices and tight credit markets, caused some oil and natural gas producers to cut their capital budget plans in 2009.

The Oil & Gas Journal estimates capital spending on U.S. projects will decline again in 2015 as the value of oil has fallen almost in half over the past year leaving many companies with less to invest.[9]

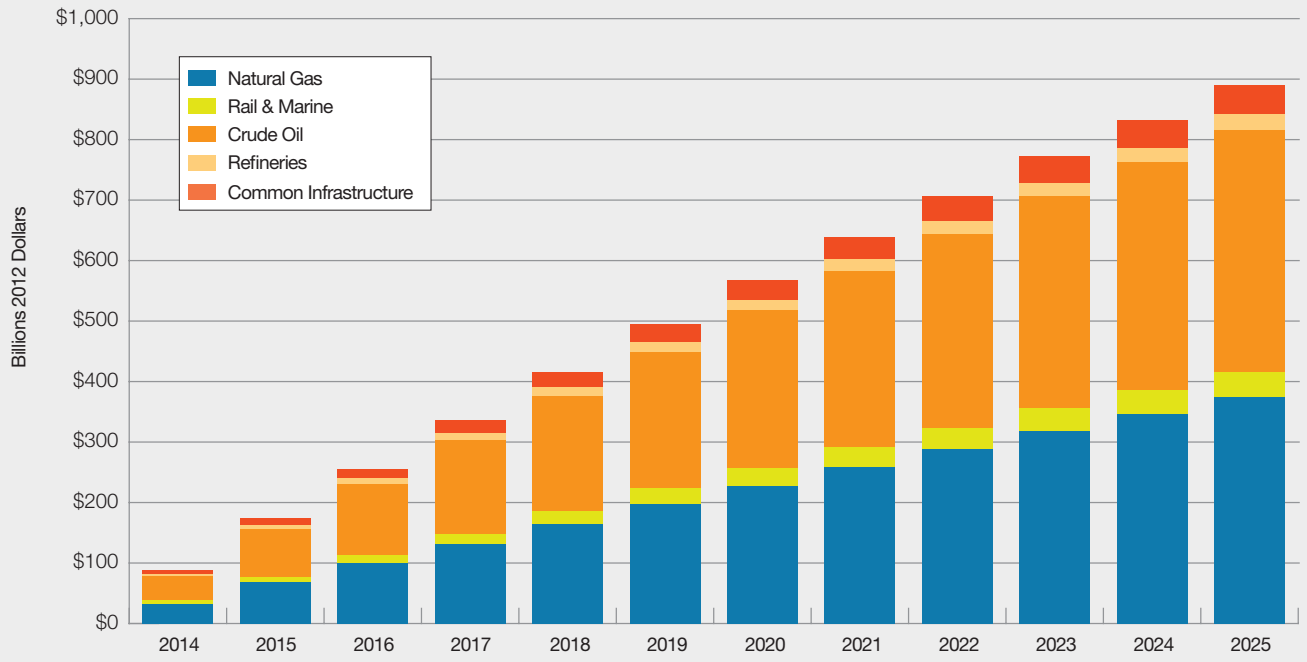
Planning and investment cannot be turned on and off like a spigot, without entailing huge, potentially non-recoverable costs and delaying urgently needed projects. Because the industry must plan and operate under these long lead times, it is hypersensitive to minimizing risk over the course of its investments. It is crucial for an industry that must manage such huge risks that government provide an energy policy and tax framework that encourages investment, rather than discourages it.

9. Oil & Gas Journal, "Companies slash capital budgets as oil price drop cuts cash flows," April 6, 2015.

Capital Spending on Infrastructure

Shale driven energy production is reshaping the U.S. oil and natural gas infrastructure landscape

Capital Spending on Infrastructure



Source: IHS Global Inc., "Oil & Natural Gas Transportation & Storage Infrastructure," December 2013.

Capital spending in oil and gas midstream and downstream infrastructure has increased by 60 percent between 2010 and 2013, from $56.3 billion to $89.6 billion, and is estimated to reach a cumulative total of $890 billion over the next 11 years according to a report by IHS Global Inc.[10] This increase in capital spending has provided both an economic stimulus and further proof of how shale driven oil and gas production is reshaping the U.S. oil and gas infrastructure landscape, according to the report.

Expanded investments in oil and natural gas infrastructure is forecast to support almost 900,000 jobs, contribute $94 billion to U.S. GDP, generate $59 billion in labor income, and provide government revenues in excess of $21 billion according to the IHS study.[11]

10. IHS Global Inc., "Oil & Natural Gas Transportation & Storage Infrastructure," December 2013.

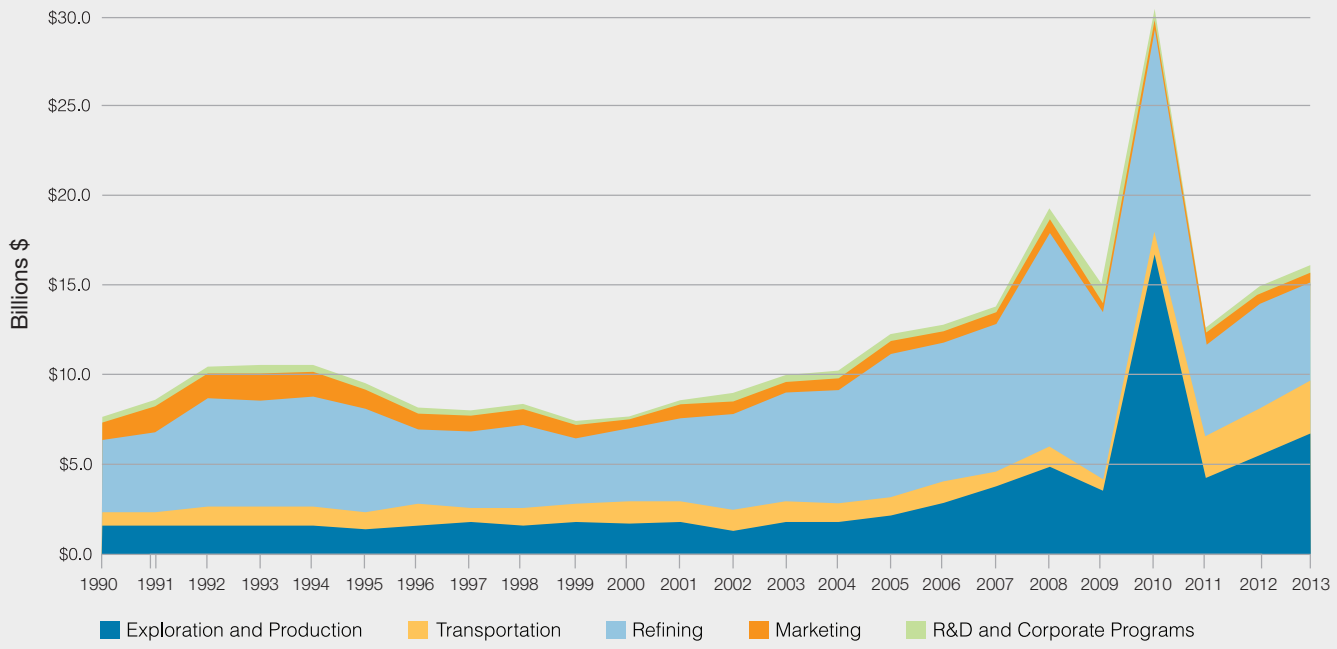
11. Ibid.

U.S. Environmental Expenditures

Decades of investments of hundreds of billions of dollars have been made by the oil and natural gas industry to protect the environment and improve the performance of its products, facilities and operations.

U.S. Environmental Expenditures since 1990

(by sector*)



* Remediation and spills expenditures are included in the sector numbers and are reported data only. 2010 data is unusually high due to an outlier event. The remaining sector expenditures are estimated for the entire industry.

Source: API Statistics, Environmental Expenditures by Oil and Gas Industry, December 2014.

The U.S. oil and natural gas industry has invested over $284 billion since 1990 toward improving the environmental performance of its products, facilities and operations; $899 for every man, woman and child in the United States.

In the year 2013 alone, $16.3 billion was spent on the environment; $14.6 billion was spent implementing new technologies, creating cleaner fuels and funding ongoing environmental initiatives. An additional $1.7 billion went toward research and development, corporate environmental programs and spill remediation efforts.

Carbon Mitigation

Climate Change Policy

We all have a role to play in addressing the risk of global climate change; that includes America's oil and natural gas companies.

Climate Policy Framework

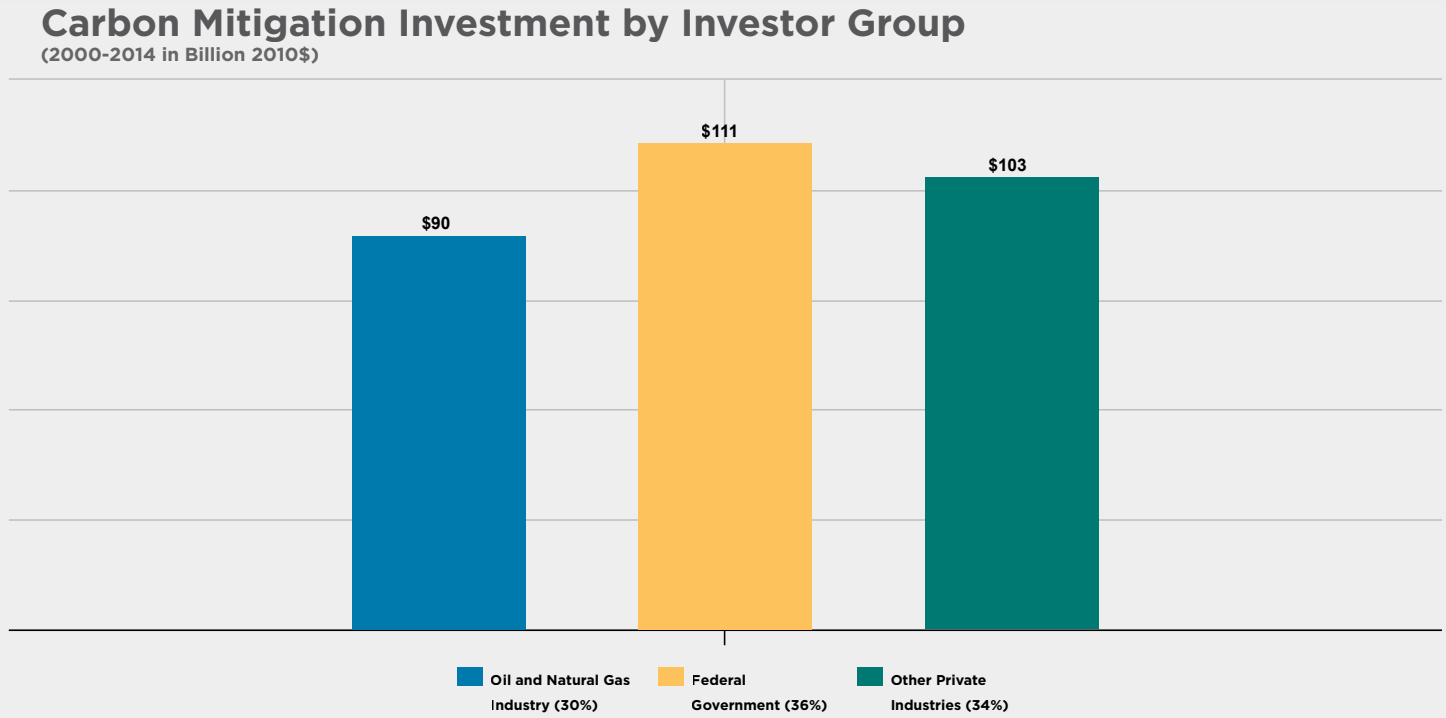
Climate change is an extraordinarily complex and challenging issue that impacts energy, the environment and the economy in profound ways.

It is crucial that our nation have a climate policy framework that not only heads us in the right direction, but enables us to move forward with workable policies and practical solutions. To be workable, climate change policy should have some essential components, as follows:

- Be environmentally effective;
- Be transparent and understandable to consumers;
- Identify the most cost efficient ways to reduce emissions;
- Avoid government selection of market"winners" and "losers;"
- Provide access to all domestic energy sources particularly natural gas, which has the lowest emissions per Btu of all fossil fuels;
- Keep U.S. energy production competitive in the global marketplace to avoid "outsourcing" business jobs and emissions overseas; and
- Avoid severe damage to the U.S. economy.

Investments to Reduce Emissions

The U.S. oil and natural gas industry is spending billions of dollars developing new advanced energy technologies to reduce greenhouse gas emissions and meet future energy needs.



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.

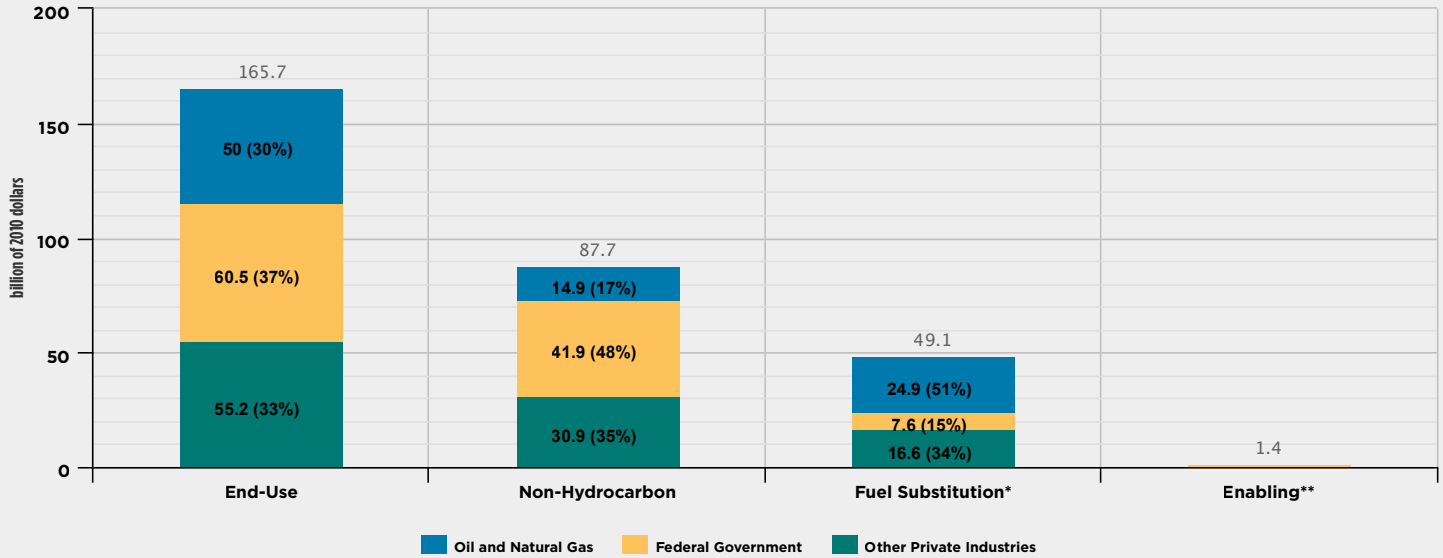
The oil and natural gas industry is hard at work meeting today's energy needs and developing next-generation forms of energy. Between 2000 and 2014, the industry invested $90 billion in new low and zero emissions technologies. This represents 30 percent of the $304 billion spent by all U.S. industries and the federal government combined. These large investments are critical to provide the low-carbon energy we will need in the years ahead.

U.S. oil and natural gas companies are pioneers in developing alternatives and expanding America's use of virtually every form of energy – from geothermal to wind, from solar to biofuels, from hydrogen power to the lithium ion battery for next-generation cars.

Investments by Technology and Investor Group

Oil and natural gas companies are taking action now to reduce greenhouse gas emissions and investing in the technologies and fuels that will reduce them even more in the future.

Carbon Mitigation Investments by Technology and Investor Group
(2000-2014)



Source: T2 & Associates, September 2015
*Excludes $127.6 billion invested in shale gas.
**Basic and applied research.

End-Use: America's oil and natural gas companies are investing in efficiency improvements and alternatives and are advising companies in other industrial sectors how to use energy more efficiently. Through such end-use technologies as combined heat and power – using excess heat from refinery processes to produce additional energy – refiners are becoming more energy efficient, reducing both energy use and emissions.

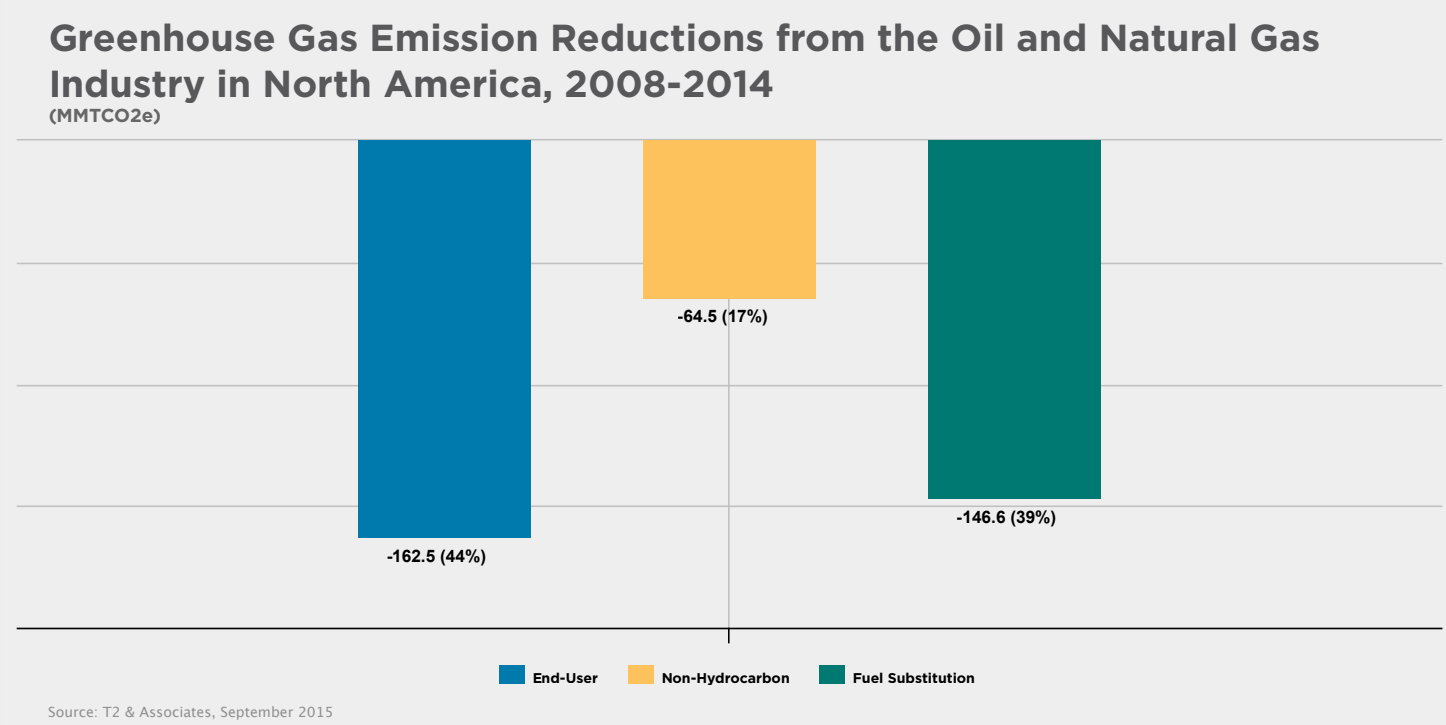
Between 2000 and 2014 the industry invested $50 billion in end-use technologies, including advanced technology vehicles, efficiency improvements, combined heat and power, gas flare reduction technologies and carbon capture and sequestration. This represents approximately 30 percent of all the investments made in these technologies in North America.

Non-Hydrocarbon: We are a major provider of the green jobs that are in the news today. The oil and natural gas industry accounts for about one out of every six dollars of all the investments made in non-hydrocarbon fuels since 2000. The industry's top investments are in wind and biofuels. Expenditures were also made in solar, geothermal, and landfill digester gas.

Fuel Substitution: The oil and natural gas industry has spent nearly $25 billion developing substitute and less carbon intensive fuels, such as liquefied natural gas and reducing fugitive gas emissions. This investment in fuel substitution technologies represents 51 percent of the total invested in this technology class.

Greenhouse Gas Emission Reductions

Carbon mitigation investments have helped reduce industry greenhouse emissions.



Greenhouse gas emissions from the U.S. oil and natural gas industry have declined by 374 million metric tons of carbon dioxide equivalent from 2008 through 2014[12]. Among the factors contributing to the reduction is more than $90 billion invested by the industry in low-carbon technologies from 2000-2014.

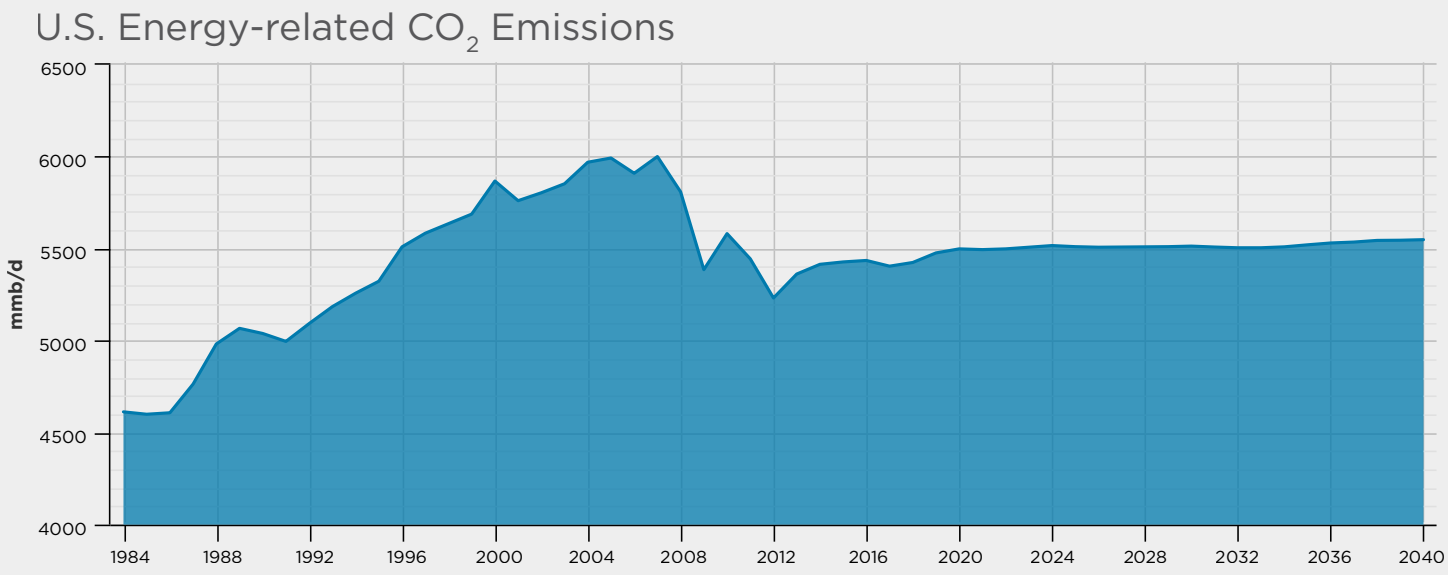
The study found that the emission reductions fell into three major categories:

- End-use efficiency improvements (44 percent of the total reduction, from investments in combined heat and power);
- Non-hydrocarbon fuels (17 percent of the total reduction, from investments in wind, solar, and biofuels produced at biorefineries); and
- Fuel substitution (which accounted for 39 percent of the total reduction, and which reflects enhanced management of methane in the natural gas supply and distribution network, and replacing more carbon intensive fuels).

12. 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.

Energy-related CO_2 Emissions

The EIA projects U.S. energy-related CO_2 emissions will be lower in 2040 than when they peaked in 2007



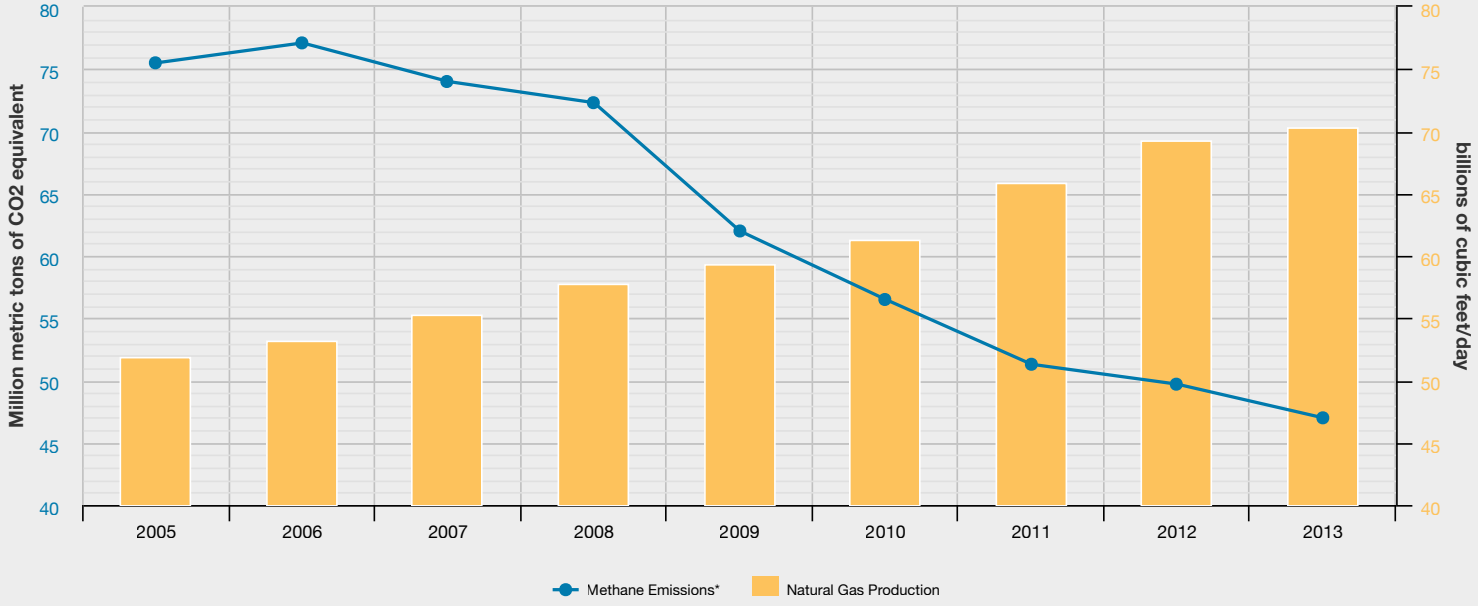
Source: EIA

U.S. energy-related CO2 emissions peaked in 2007 and have declined sharply since then. The EIA expects this trend to continue with energy-related carbon dioxide emissions forecast to be 7.5% below 2007 levels in 2040. According to EIA, the reduction reflects both market and policy factors, including the adoption of tighter economy fuel standards, the implementation of efficiency standards, and a continued shift to less carbon-intensive fuels like natural gas.

Methane Emissions

Methane emissions are falling even as natural gas production is increasing

Natural Gas Production and Methane Emissions from Production



*U.S. CH4 net emissions from natural gas systems field production

Source: EPA, Inventory of GHG and Sinks: 1990–2013, Table 3-45; and EIA, Marketed Natural Gas Production.

While natural gas production has risen, ethane emissions have fallen thanks to the oil and natural gas industry's investment in new technologies. The latest EPA Inventory of Greenhouse Gases[13] found that methane emissions from field production of natural gas systems fell 38 percent from 2005 through 2013, while natural gas production grew 36 percent during the same period.

EPA also reported that methane emissions from hydraulically fractured natural gas wells are down 79 percent since 2005. [14] Total methane emissions from natural gas systems are down 11 percent since 2005.

Thanks to these reductions, methane emissions from the oil and natural gas industry make up just 3 percent of U.S. greenhouse gas emissions from energy-related activities.[15]

13. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013, April 2015.

14. Ibid.

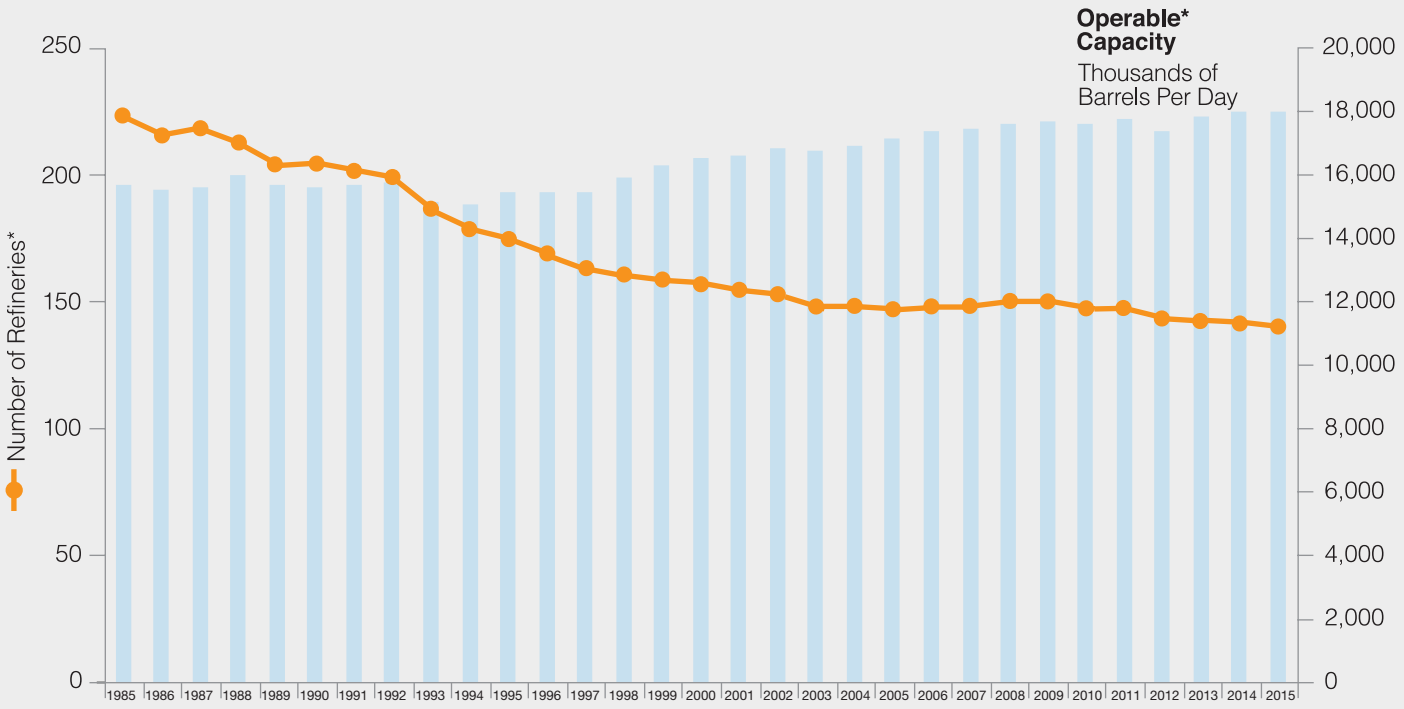
15. Ibid.

Refineries and Fuels

Refining Capacity Expands

U.S. refining capacity continues to expand even as the number of refineries contracts.

Number of Refineries Declines but Capacity Expands



*Operable as of January 1st of each year.
Source: EIA, Petroleum Supply Annual.

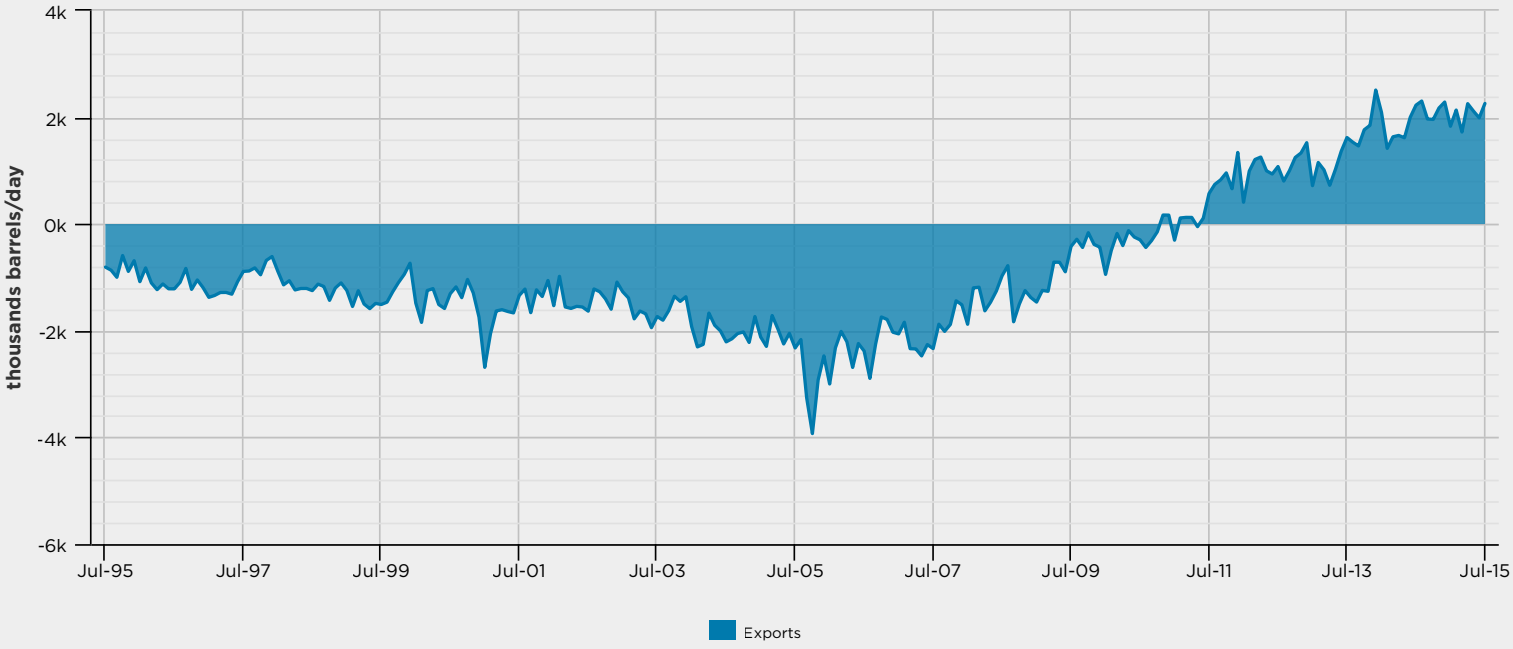
Since 1985, U.S. refining capacity has increased by 14.7 percent even though there are 83 fewer refineries. Because the infrastructure to bring crude in and get products out is in place, it is more cost effective to add on to a refinery than to build a new one. The elimination of subsidies under the government price and allocation controls in 1981 led to the closure of many smaller, less efficient refineries throughout the 1980s and 1990s.

Capacity has increased while at the same time, refineries invested $143 billion since 1990 to make the cleanest burning fuels in the world. Much of the investments were in technologies and investments to meet stringent clean air standards set by the Clean Air Act of 1990 for refineries and cleaner burning fuels.

Moreover, a number of refineries are expanding and upgrading equipment to handle increased processing of heavier crude oils, including oil derived from Canadian oil sands. This additional crude from Canada – a reliable, nearby source – would enhance our domestic energy security.

Net Exports of Total Petroleum Products

For the first time since 1949, the U.S. became a net exporter of petroleum products in 2011.



Source: EIA

Refiners continue to produce record or near record amounts of petroleum products even though U.S. demand has declined in recent years. This has resulted in U.S. refiners becoming net exporters of petroleum products.

In fact, rapid growth in the U.S. oil and natural gas industry has transformed our trade balance, both in terms of driving down imports and driving up exports. In 2014, the total U.S. trade deficit shrank by $35.6 billion, while exports rose by $8.1 billion among petroleum and petroleum products.[16] The U.S. is importing less oil than at any time in nearly 30 years. Growth in the U.S. oil and natural gas industry served as the central pillar of U.S. strength in the international market last year, helping to offset categories of trade where U.S. businesses lost ground.

Exports are good for the economy. They mean jobs for Americans, including well-paying U.S. refinery jobs, and a lower trade deficit.

16. U.S. Department of Commerce, Bureau of Economic Analysis, January 2015

Petroleum Products Traded by Region

The U.S. balance of petroleum products traded has shifted significantly.

Net Imports (+) and Exports (-) of Petroleum Products by Region

2008 (thousands of barrels per day)		2014 (thousands of barrels per day)	
Asia and Pacific	-92	-311	Asia and Pacific
Canada	301	25	Canada
Caribbean	341	-94	Caribbean
Central America	-115	-405	Central America
Europe	805	102	Europe
Mexico	-218	-494	Mexico
Middle East, North Africa	266	-58	Middle East, North Africa
South America	2	-682	South America
Sub-Sahara Africa	66	-36	Sub-Sahara Africa
WORLD	1,356	-1,953	
Non-OPEC	871	-1,935	
OPEC	485	-18	

Source: EIA

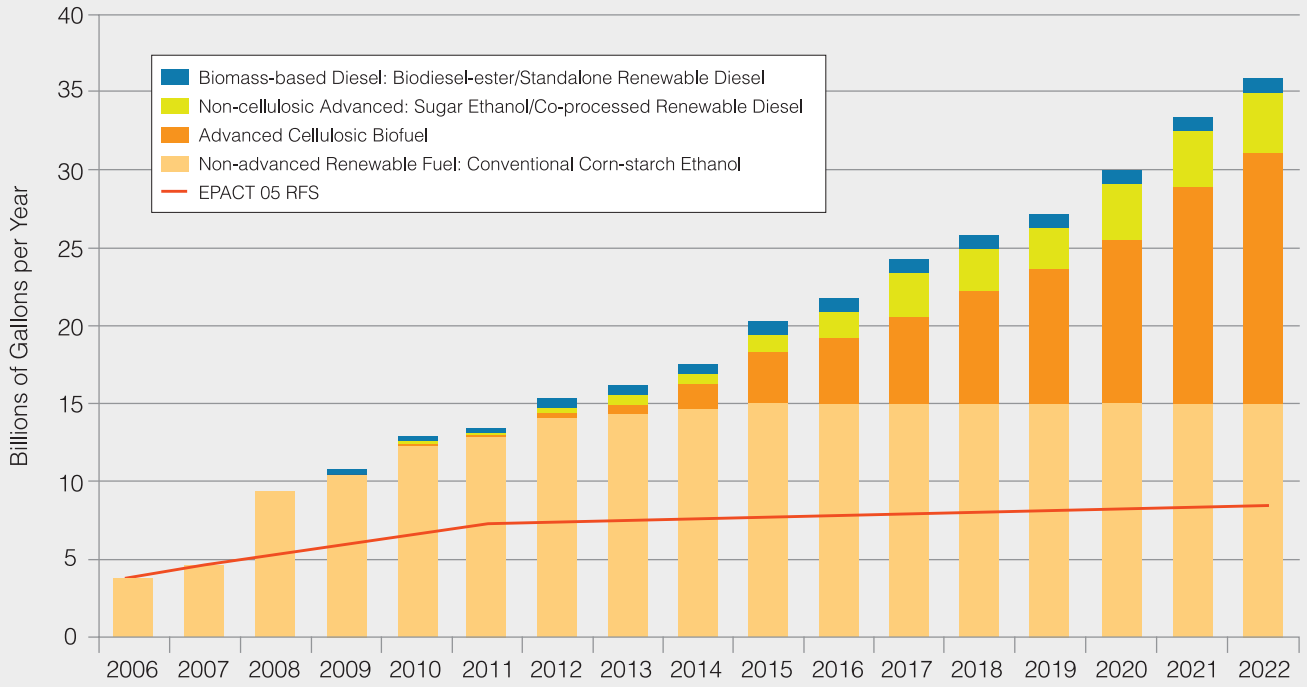
Petroleum products are traded globally, and the U.S. has a long history of exporting certain petroleum products and importing others to balance refinery outputs and global demand. For example, U.S. refiners have tended to export diesel to Europe (where diesel demand is stronger), while European refiners have tended to export gasoline to the U.S. (where gasoline demand is stronger).

Over the period from 2008 through 2014, the U.S. went from being a net importer of over one million barrels a day of petroleum products to being a net exporter of nearly two million barrels per day, resulting in significant shifts in the balance of petroleum products traded among regions of the world. For example, the U.S. has gone from being a net importer of petroleum products from South America to a net exporter to the region. The U.S. is also much less reliant on OPEC for petroleum products than we once were.

Expanding Alternative Fuels

Our industry is the nation's largest user of ethanol and is increasing the volume of renewable fuels in America's transportation fuel portfolio.

Expanding Alternative Fuels for Transportation: Current Laws



Source: EIA and Energy Independence Security Act of 2007.

The Energy Independence and Security Act of 2007 (EISA), containing four interrelated parts, creates a significantly increased Renewable Fuel Standard (RFS) from the Energy Policy Act of 2005 (EPACT 05 RFS).

The RFS requires annually increasing minimum volumes of renewable fuels to be included in transportation fuel sold or introduced into the United States. However, most cars on the road today were not designed to use more than 10 percent ethanol mixed with gasoline, and we are getting close to passing that threshold because of EPA's ever increasing ethanol mandates.

In 2014, 13.5 billion gallons of ethanol were consumed in the U.S. — much less than the 14.4 billion gallons required by EISA. In fact, the U.S. EPA has not finalized regulations for 2014 even though total renewable fuel consumption was far less than 18.15 billion gallons required by EISA.

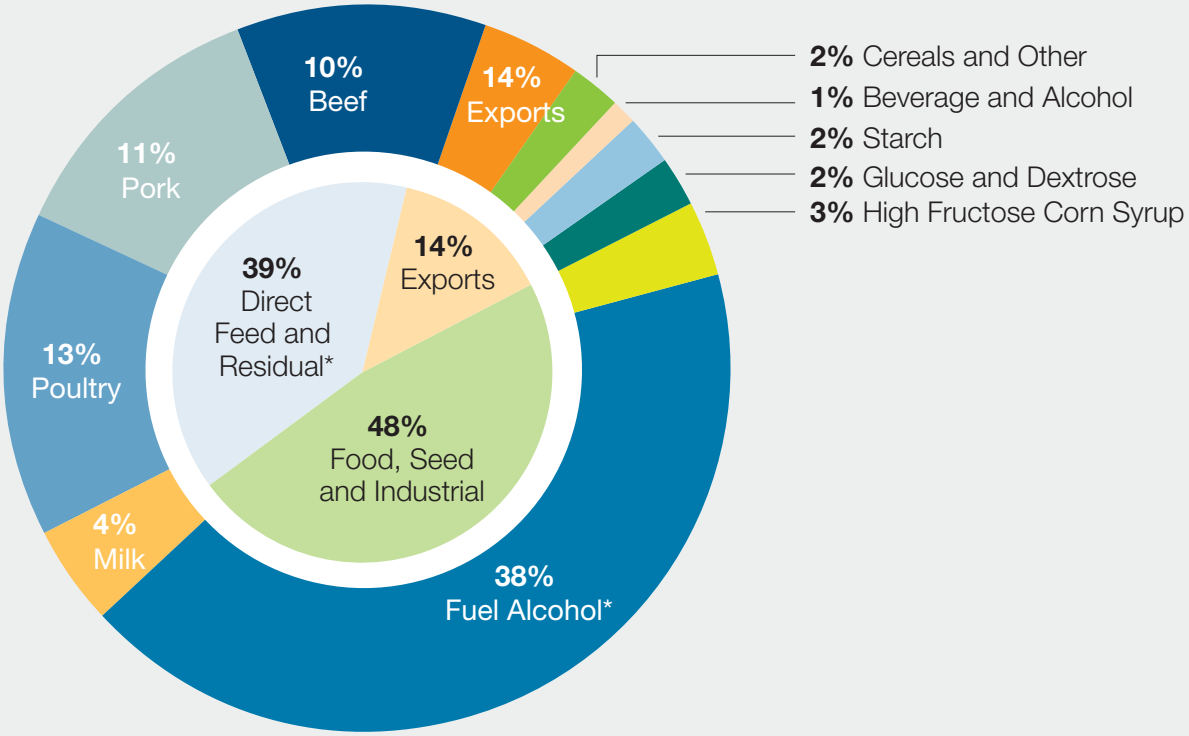
A report by the Congressional Budget Office[17] estimates that complying with the EISA volumes scenario would raise the price of petroleum-based diesel by 30 to 51 cents per gallon and the price of gasoline by 13 to 26 cents per gallon by 2017.

17. CBO, "The Renewable Fuel Standard: Issues for 2014 and Beyond," June 2014.

U.S. Corn Use

The percentage of the corn crop used for ethanol is growing.

U.S. Corn Use 2015/2016
(13.76 billion bushels)



*Distillers Grain is in addition to this figure.
Source: Based on USDA/GCAU Data.
% May not =100 due to rounding.

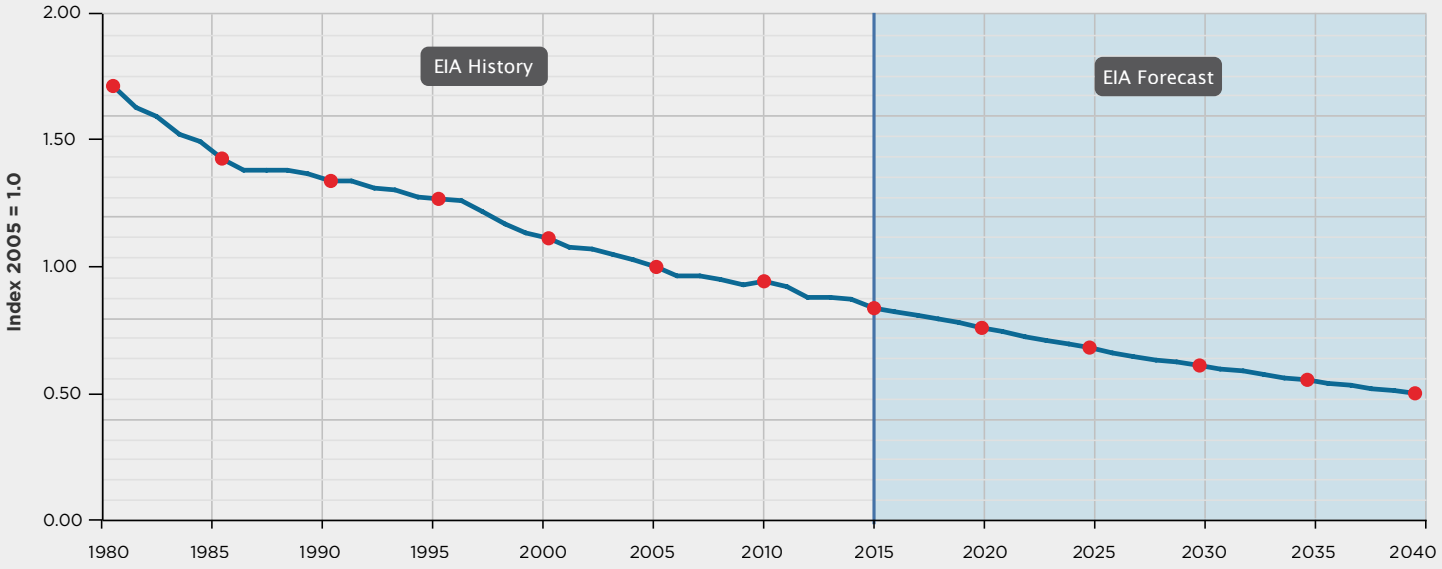
Ethanol production is now taking 38 percent of the U.S. corn crop. This percentage has increased over the last several years due to a significant ramp-up in the renewable fuels mandate included in the 2007 Energy Independence and Security Act enacted by Congress.

U.S. Energy Needs

Energy Efficiency

Energy efficiency is the cleanest, quickest and most cost-efficient way to extend today's energy supply in the future.

U.S. Energy Demand per Dollar of GDP – Growing Efficiency



Source: Source: EIA, Annual Energy Outlook 2015.

The greatest "new" source of energy comes from the reduced demand of greater efficiency and conservation. Significant progress has been made in the past and more is expected in the future. We use about half as much energy today for every dollar of Gross Domestic Product as we did back in 1980. And EIA projects we will use nearly 43 percent less in 2040 than we do today.

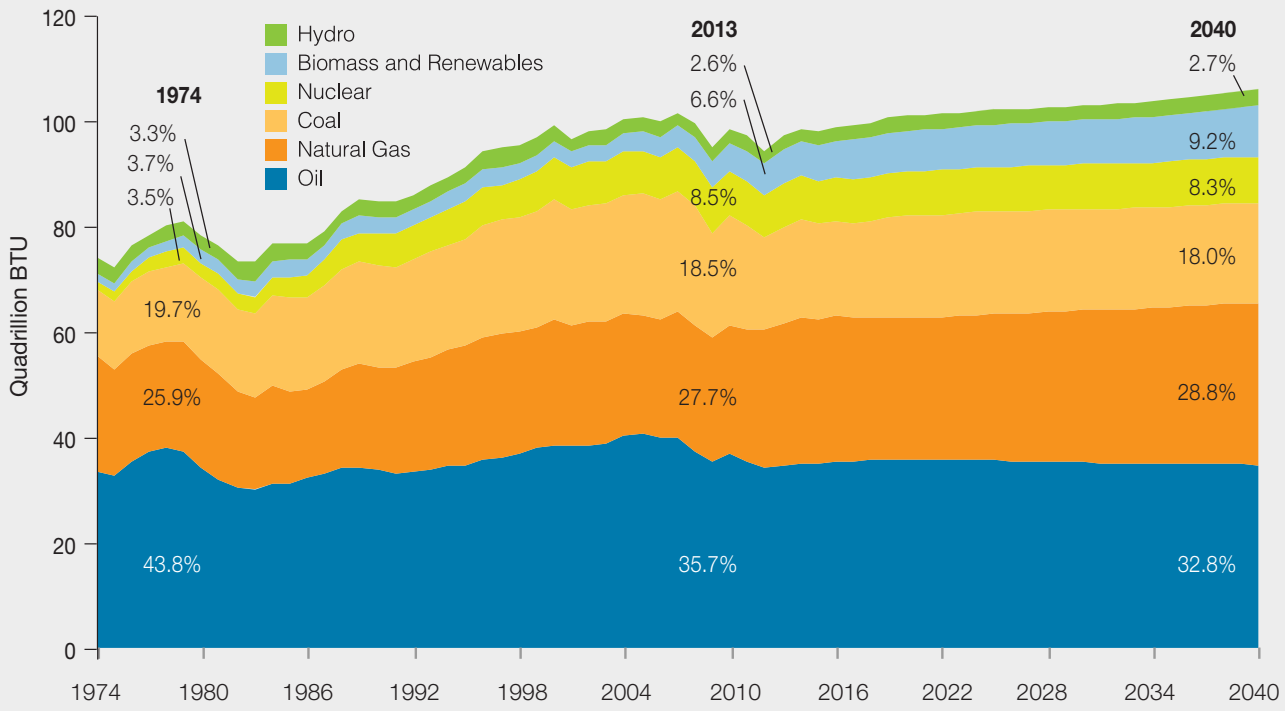
Looking forward, our nation must take energy efficiency more seriously. Our industry is doing its part. Energy efficiency is a core value and a daily practice in our industry. Through such technologies as combined heat and power, also known as cogeneration – the re-use of excess heat from refinery processes to produce additional energy – refiners are becoming more efficient, reducing both energy use and emissions.

Future U.S. Energy Demand

Although the share of non-fossil fuels is growing rapidly, fossil fuels – oil, natural gas and coal – will continue to play leading roles through 2040

Future U.S. Energy Demand

The U.S. will require 9 percent more energy in 2040 and more than 60 percent of it will be met by oil and natural gas.



Source: EIA.

Given expected global economic and population growth, energy efficiency improvements alone will not be enough in the future. More total energy will be needed both in the United States and globally. The U.S. Energy Information Administration (EIA) forecasts U.S. energy demand will grow by 9 percent between 2013 and 2040, with more than 60 percent of the energy demand expected to be met by oil and natural gas, as is the case today.

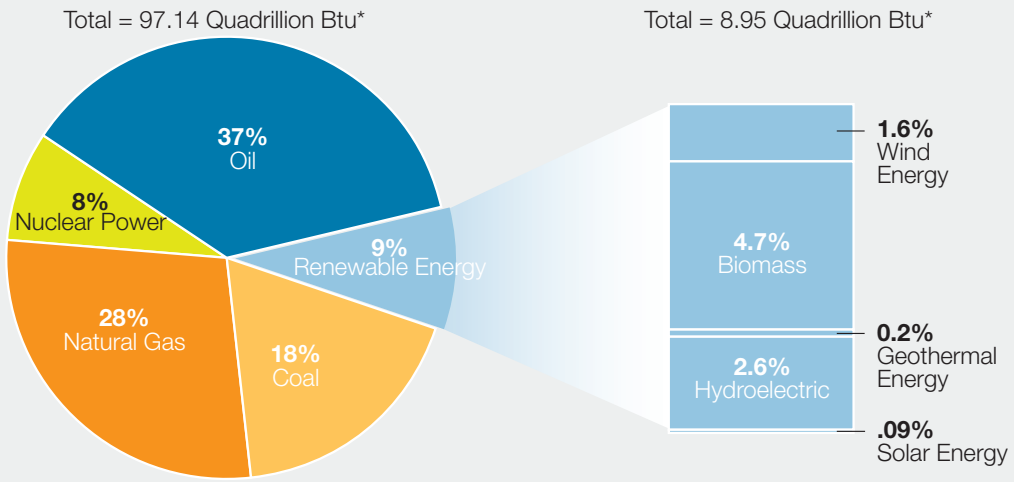
	2013		2040		
Consumption	**Quads**	**%Share**	**Quads**	**%Share**	**%Change**
Liquid Fuels and Other Petroleum	35.91	37.0%	36.21	34.2%	0.8%
Oil	34.65	35.7%	34.64	32.8%	0.0%
Ethanol, Biodiesel and Green Liquids	1.26	1.3%	1.57	1.5%	24.4%
Natural Gas	26.86	27.7%	30.50	28.8%	13.5%
Coal	18.01	18.5%	19.01	18.0%	5.5%
Nuclear Power	8.27	8.5%	8.73	8.3%	5.6%
Hydropower	2.54	2.6%	2.83	2.7%	11.2%
Biomass and Renewables	5.14	5.3%	8.12	7.7%	57.9%
Other**	0.40	0.4%	0.34	0.3%	-16.3%
Total	**97.14**	**100.0%**	**105.73**	**100.0%**	**8.8%**
Oil and Natural Gas	61.51	63.3%	65.13	61.6%	5.9%
Oil, Natural Gas and Coal	79.52	81.9%	84.14	79.6%	5.8%

**Other includes non-biogenic municipal solid waste and net electricity imports.

Renewable Energy Consumption

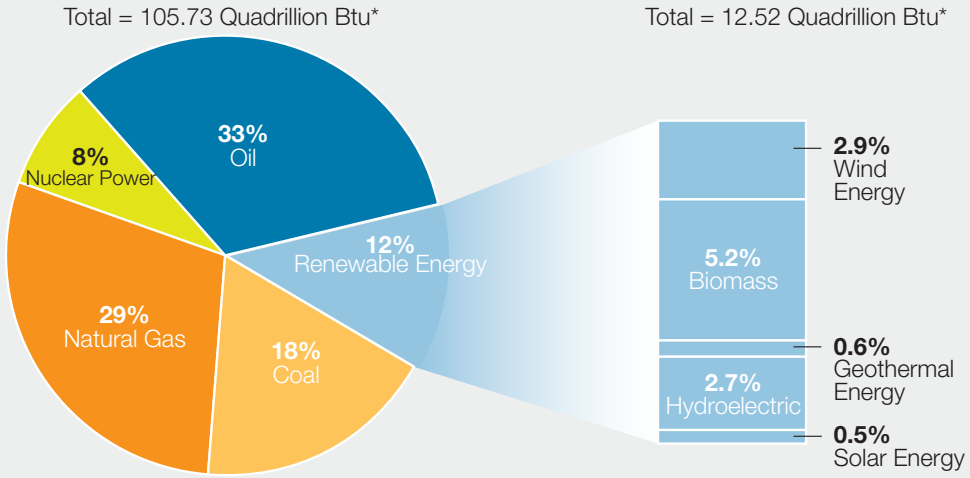
Just 9 percent of the nation's energy needs are supplied by renewables, which are expected to supply 12 percent by 2040.

The Role of Renewable Energy Consumption in the Nation's Energy Supply, 2013



Note: Sum of components may not add exactly to 100 percent due to rounding.
*Excludes non-biogenic municipal waste and net electricity imports.
Source: EIA, AEO 2015, Tables A1 and A17.

The Role of Renewable Energy Consumption in the Nation's Energy Supply, 2040



Note: Sum of components may not add exactly to 100 percent due to rounding.
*Excludes non-biogenic municipal waste and net electricity imports.
Source: EIA, AEO 2015, Tables A1 and A17.

Over four percent of renewables come from biomass, including wood, biofuels and waste. Hydroelectric power accounts for about three percent of the renewable energy consumed, with wind, geothermal and solar accounting for nearly two percent together.

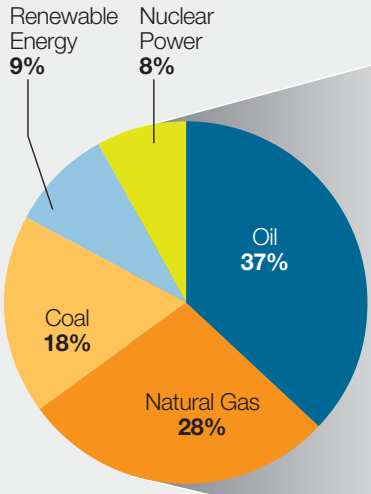
Renewables are expected to grow rapidly between now and 2040 with EIA forecasts showing biomass and other renewables increasing by 58 percent. Despite the rapid growth and because they are starting from such a small base, renewables are expected to supply just under 12 percent of the nation's energy needs by 2040.

Energy Consumption by Sector

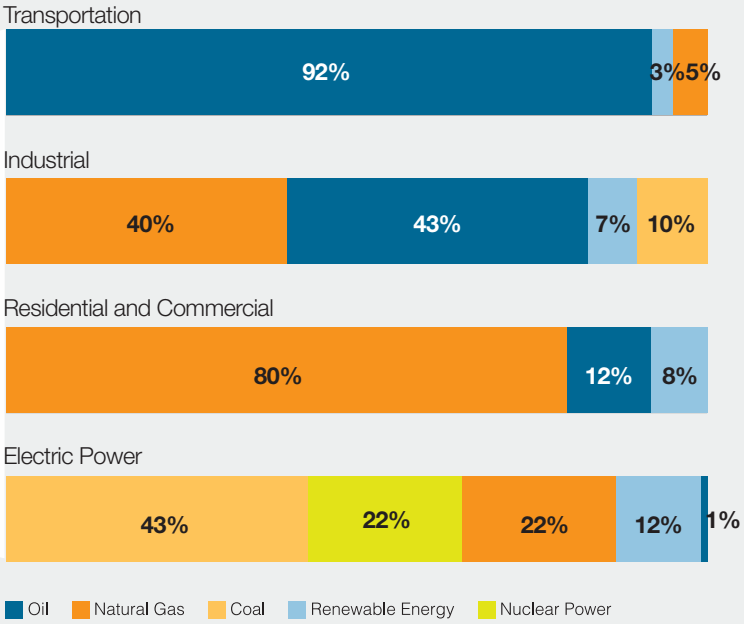
Oil is expected to remain the dominant fuel in our nation's energy mix for decades to come.

Energy Consumption by Sector, 2013

Total Energy Consumption by Fuel

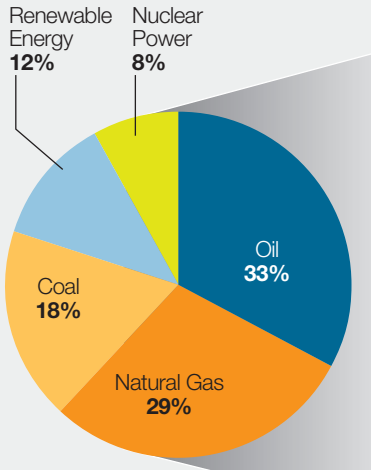


Sector Energy Consumption by Fuel Type

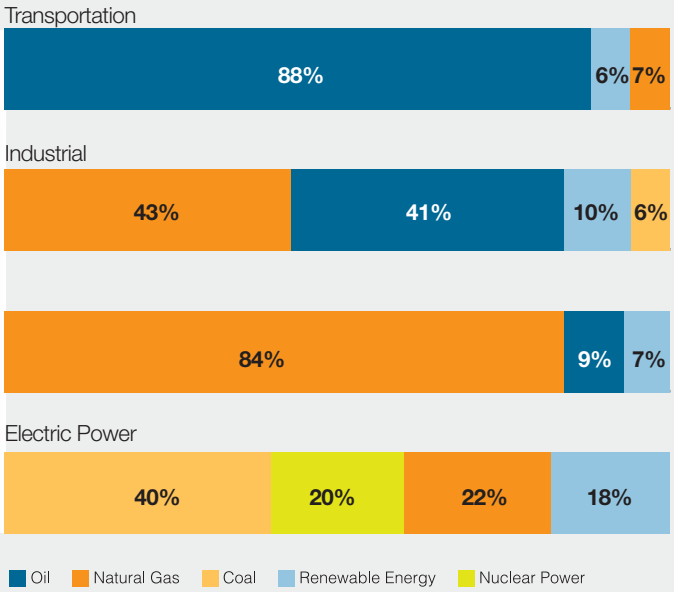


Energy Consumption by Sector, 2040

Total Energy Consumption by Fuel



Sector Energy Consumption by Fuel Type



Source: AEO 2015, Tables A1, A2 and A17.

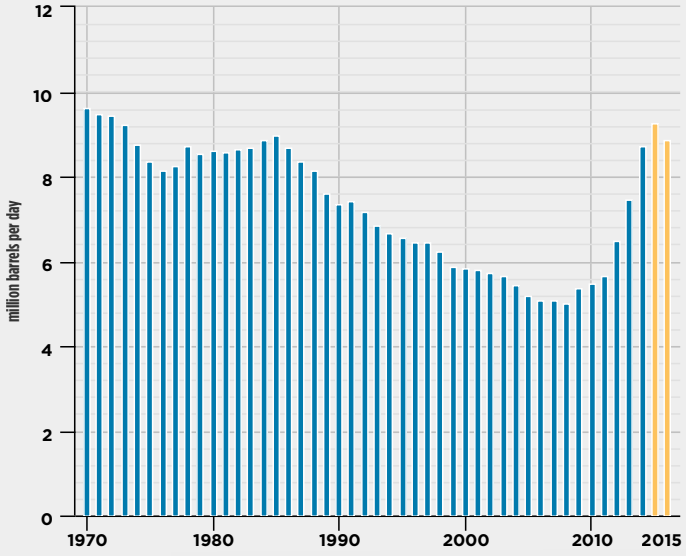
Today, oil accounts for 37 percent of our energy use with the lion's share of it fueling 92 percent of our transportation energy needs. Although ethanol and other biofuels are expected to grow rapidly in the future and steadily displace some oil use, EIA forecasts oil will continue to account for the largest share of our energy needs filling 33 percent of total energy demand and 88 percent of our transportation needs in 2040.

Potential of Domestic and Canadian Resources

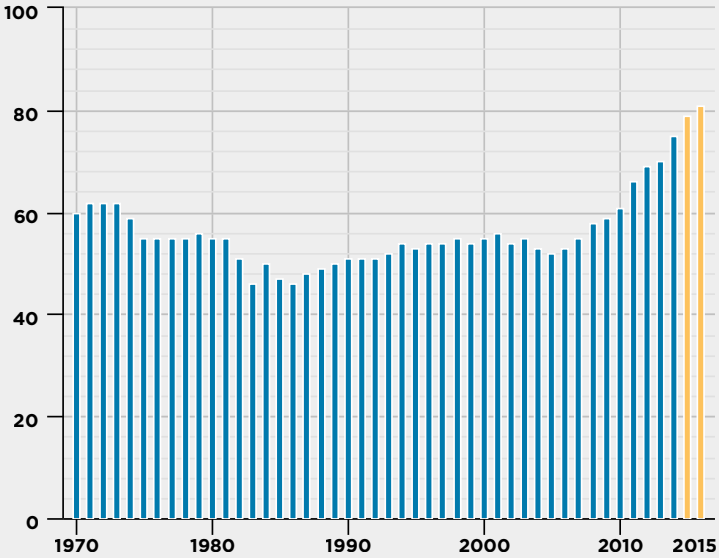
U.S. Crude Oil and Natural Gas Production

U.S. oil and natural gas production is increasing as a result of technological innovation

U.S. Crude Oil Production



U.S. Natural Gas Marketed Production



Note: Bars in orange show EIA's short-term energy outlook forecast.
Source: EIA

The U.S. is the world's leader in the technological innovations allowing for the rapid expansion of production of oil and natural gas from shale deposits. Since 2008 we have increased crude oil production by 3.7 million barrels per day, or by 74 percent. And since 2005 natural gas production has increased by 44 percent. These are accomplishments that most energy experts thought impossible a few years ago.

The U.S. is the largest global natural gas producer (overtaking Russia) and is forecast to become a net exporter next year.[18]

Surging domestic production is not only driving our energy security but also creating large benefits for consumers. According to ICF International, innovations in horizontal drilling and hydraulic fracturing are responsible for shaving up to $0.94 per gallon from fuel prices in 2013, saving consumers up to $248 billion in 2013.[19]

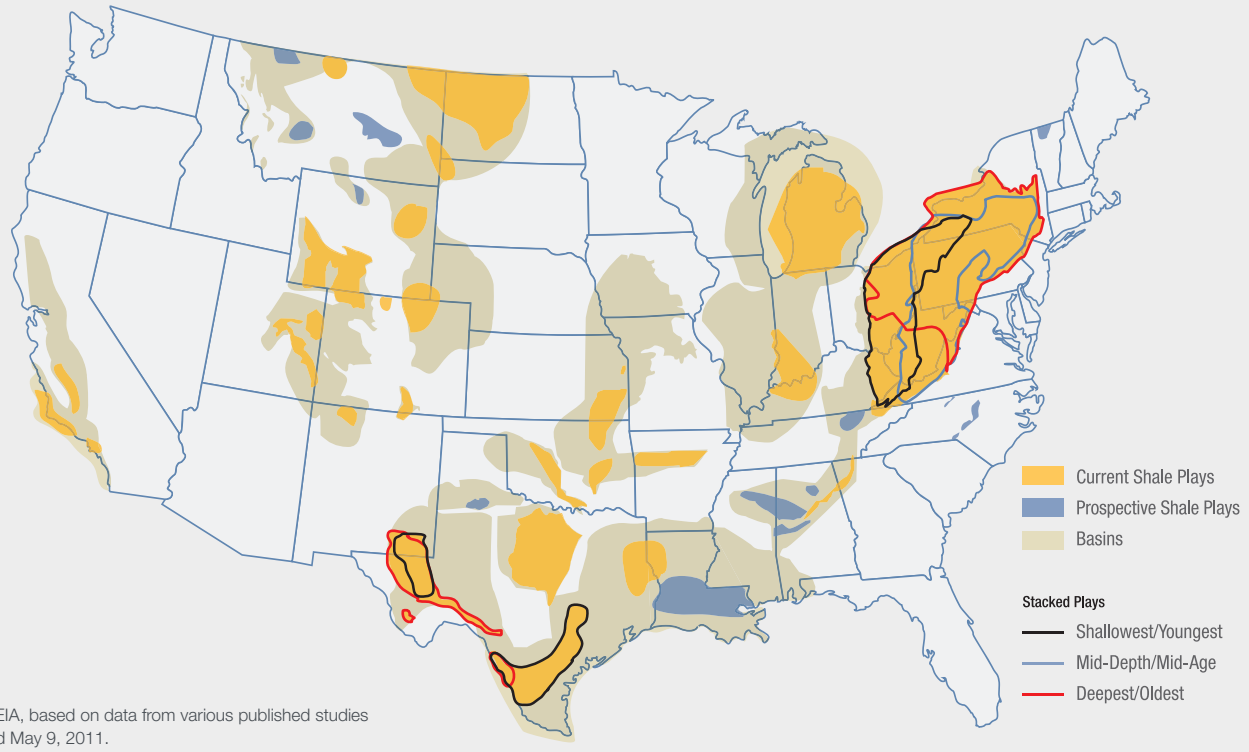
18. EIA, Annual Energy Outlook 2015.

19. ICF International, "U.S. Oil Impacts," October 2014.

Shale Plays, Lower 48 States

Shale plays are widely dispersed across the U.S.

Shale Plays, Lower 48 States



Source: EIA, based on data from various published studies - updated May 9, 2011.

The U.S. is the world's leader in the technological innovations allowing for the rapid expansion of production of oil and natural gas from shale deposits. Advancements in hydraulic fracturing and horizontal drilling technology make it commercially viable to recover natural gas and oil from shale rock formations deep below the earth's surface.

Without these advanced technologies, we would lose 45 percent of domestic natural gas production within 5 years.[20] But with them, the U.S. is expected to have plentiful supplies of affordable, low carbon emitting fuel for decades to come.[21]

A study by IHS Global Insight estimates that shale development increased disposable household income by $1,200 in 2012, rising to $3,500 in 2025.[22]

20. IHS Global Insight, Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing, 2009.

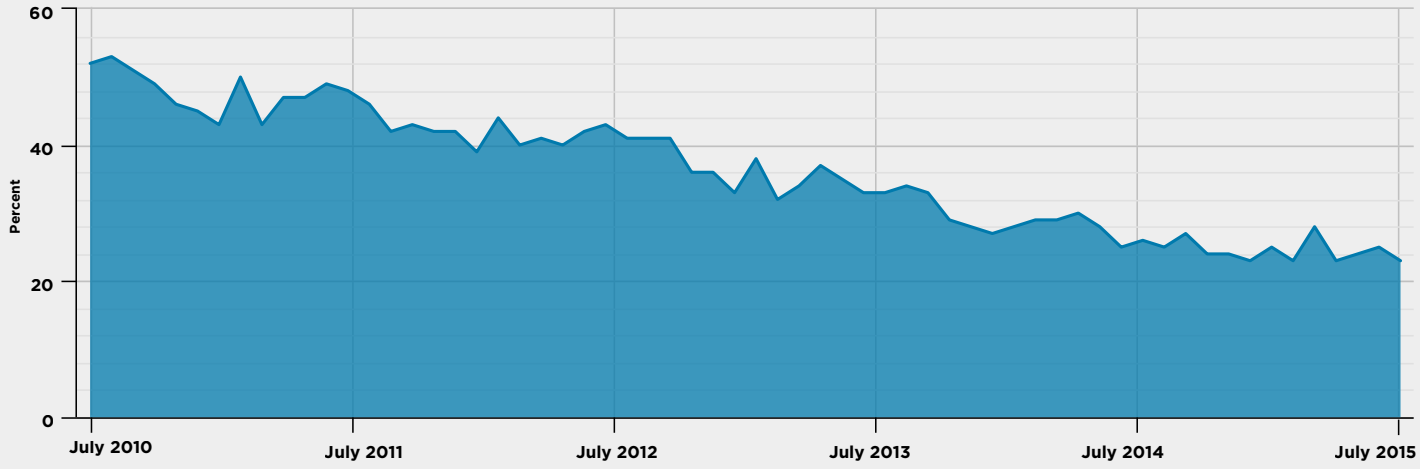
21. EIA, Annual Energy Outlook 2012 Early Release.

22. IHS Global Insight, "America's New Energy Future, Volume 3: A Manufacturing Renaissance," September 2013.

Net Imports of Crude Oil and Petroleum Products as a Share of Consumption

The U.S. is less dependent on others for our oil needs.

Net Import of Crude Oil and Petroleum Products as a Share of Consumption

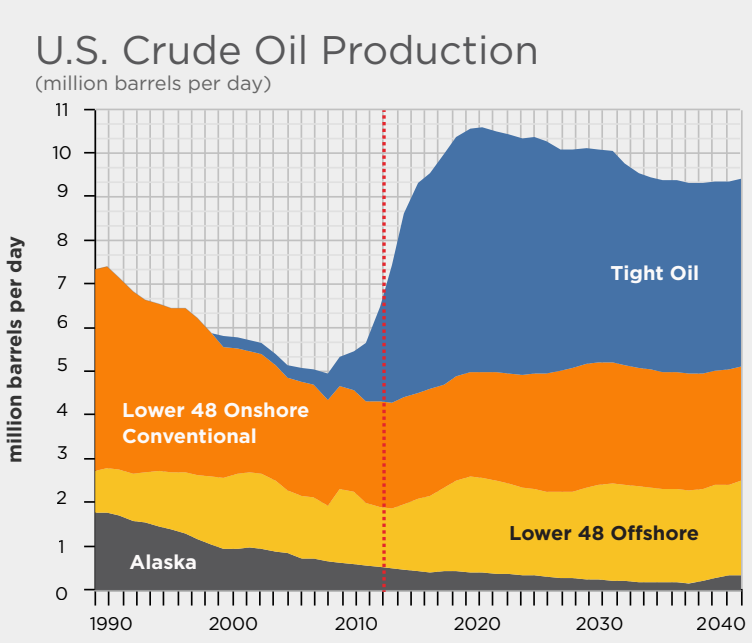


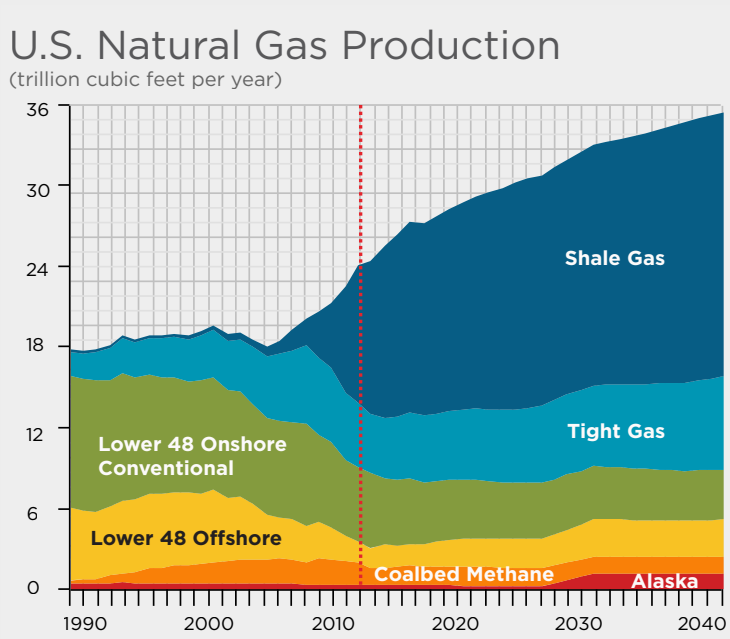
Source: EIA

In a few short years the U.S. has gone from being dependent on the rest of the world for 53 percent of our oil needs in July 2010 to 23 percent today. This reversal of fortune is due to technological innovations in the U.S. oil industry that have allowed for the rapid expansion of domestic oil production in recent years. According to the U.S. Energy Information Administration, U.S. oil production has increased by over 4.1 million barrels per day over the period from July 2010 through July 2015, while U.S. demand grew by 660 thousand barrels per day. The combination of increased crude oil production along with the expansion of U.S. refinery output has led to a rapid decline in U.S. dependence on others for our liquid fuel needs.

U.S. Crude Oil and Dry Gas Production by Source

Production of natural gas and oil from shale and other tight formations is offsetting declines in other U.S. natural gas and oil sources.





Source: EIA, Annual Energy Outlook 2015

Having an abundance of natural gas and oil from shale and other tight formations is changing the vision of our energy future, resulting in new opportunities to put more people to work, boost domestic production, grow government revenue, and save many billions annually in imported energy costs.

According to a report by IHS Global Insight, the development of shale resources supported more than 2.1 million jobs in 2012 and could grow to as much as 3.9 million by 2025.[23] In terms of tax revenue, the development of shale resources generated $74 billion in federal, state and local tax receipts in 2012 and is expected to nearly double by 2025, reaching $138 billion.[24]

23. IHS Global Insight, "America's New Energy Future, Volume 3: A Manufacturing Renaissance," September 2013.

24. Ibid.

Why Export Crude Oil?

Crude oil exports yield economic benefit across all 50 states

The U.S. is poised to become the world's largest oil producer, and access to foreign customers will create economic opportunities across the country. When it comes to crude oil, the rewards of free trade are not limited to energy-producing states. New jobs, higher investment, and greater energy security from exports could benefit workers and consumers from Illinois to New York, especially in areas where consumer spending and manufacturing drive growth.

According to a report conducted by ICF International and EnSys Energy,[25] lifting export restrictions on crude oil

- Could save consumers up to $5.8 billion per year in lower fuel costs
- Add 300,000 jobs to the U.S. economy in 2020
- Reduce America's trade deficit by $22 billion in 2020.

Depending on global price trends, nine states—Florida, Michigan, Indiana, California, New York, Pennsylvania, Ohio, Texas, and North Dakota—could see over $1 billion each in state economic gains in 2020.

Eight states—Illinois, Florida, New York, Pennsylvania, Ohio, California, North Dakota, and Texas—could gain over 10,000 jobs each in 2020.

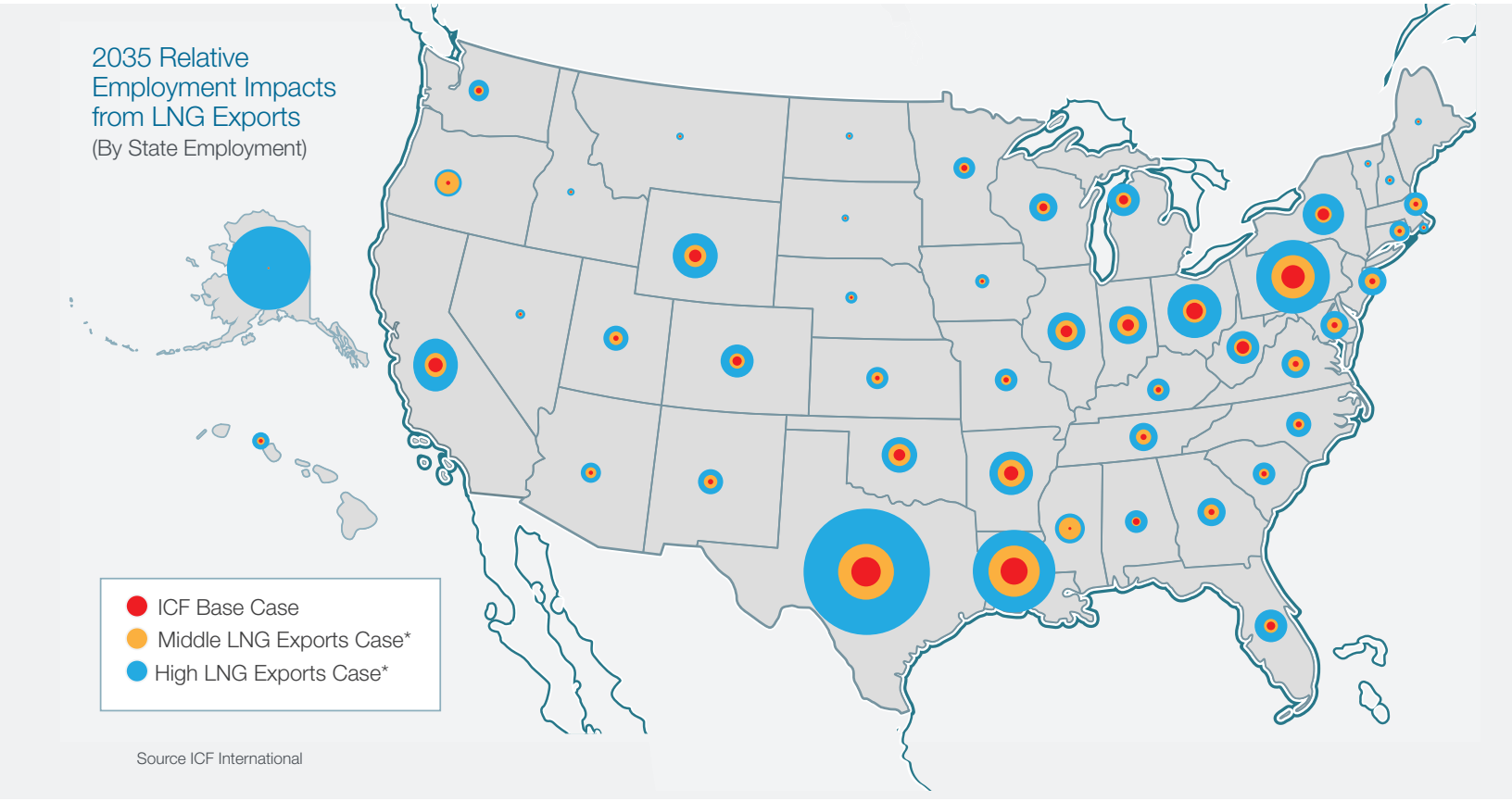
According to the U.S. Government Accountability Office, removing export barriers for U.S. crude oil could incentivize higher domestic production, create more jobs, lower the trade deficit, and put downward pressure on gasoline prices.[26] The economic benefits are well-established, and policymakers are right to reexamine 1970s-era trade restrictions that no longer make sense.

[25] ICF International and EnSys Energy, "The Impacts of U.S. Crude Oil Exports on Domestic Crude Production, GDP, Employment, Trade, and Consumer Costs," March 31, 2014 and "Supplement State-Level Economic and Employment Impacts," May 9, 2014.

[26] U.S. Government Accountability Office, "Changing Crude Oil Markets: Allowing Exports Could Reduce Consumer Fuel Prices, and the Size of the Strategic Reserves Should be Reexamined," September 2014.

Why Export Liquefied Natural Gas?

The export of LNG represents one of the most promising economic opportunities of the shale revolution.



America is in the midst of an energy revolution and for American workers, the best is yet to come. The export of liquefied natural gas — or LNG — will significantly reduce our trade deficit, increase government revenues, grow the economy, and support millions of U.S. jobs in engineering, manufacturing, construction, and facility operations.

The opportunities associated with LNG exports will extend beyond natural gas-producing states, and the economic impacts could be substantial in many areas. According to ICF, [26] by 2035:

- LNG exports could contribute as much as $10 to $31 billion per state to the economies of natural gas-producing states.
- Other states will also benefit, partly due to the boost in demand for steel, cement, equipment, and other goods. States with a large manufacturing base, such as Ohio, California, New York, and Illinois, will see economic gains as high as $2.6 to $5.0 billion per state.
- Natural gas-producing states could see employment gains as high as 60,000 to 155,000 jobs; and large manufacturing states, such as California and Ohio, could see employment gains of up to 30,000 to 38,000 jobs in 2035.
- There could also be significant job growth in states where LNG export terminals could be built. For example, in a high export scenario, in which an Alaska-based terminal is built, Alaska could see up to a $10 billion addition to state income and over 36,000 added jobs resulting from LNG exports.

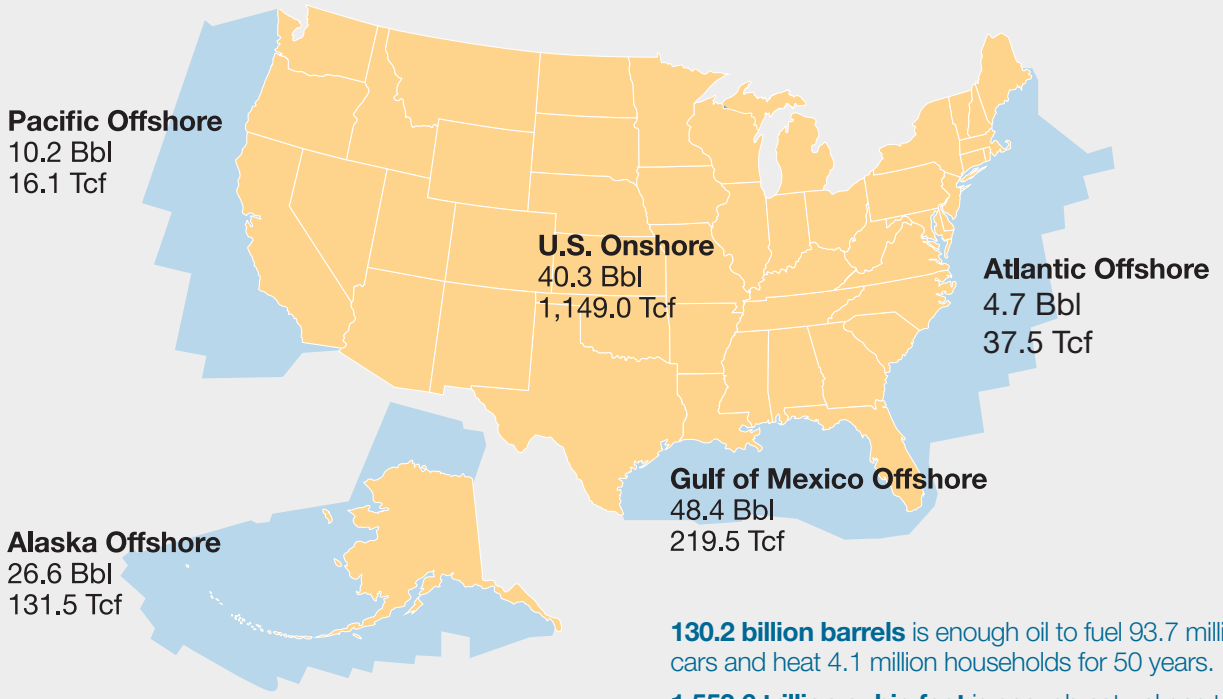
America is in a global race to build this infrastructure and secure a competitive position in the international market. More than 60 international LNG export projects are currently planned or under construction around the world, and those nations that act quickly to attract these investments will reap the economic rewards.

26. ICF International, "U.S. LNG Exports: State-Level Impact on Energy Markets and Economy," November 13, 2013.

U.S. Undiscovered Technically Recoverable Resources

Developing domestic sources of oil and natural gas will be an important bridge to our energy future.

U.S. Undiscovered Technically Recoverable Crude Oil and Natural Gas Resources
(billion barrels - Bbl and trillion cubic feet - Tcf)*



130.2 billion barrels is enough oil to fuel 93.7 million cars and heat 4.1 million households for 50 years.

1,553.6 trillion cubic feet is enough natural gas to heat all 66 million households that use natural gas heating for 314 years.

*Figures may not add exactly to total due to rounding.
Source: U.S. Geological Survey and BOEM.

At a time when we need all the energy we can find, increasing access to domestic sources of oil and natural gas would enhance our energy security. We have enough oil and natural gas resources to fuel 93.7 million cars for 50 years and heat 66 million households for more than three centuries.

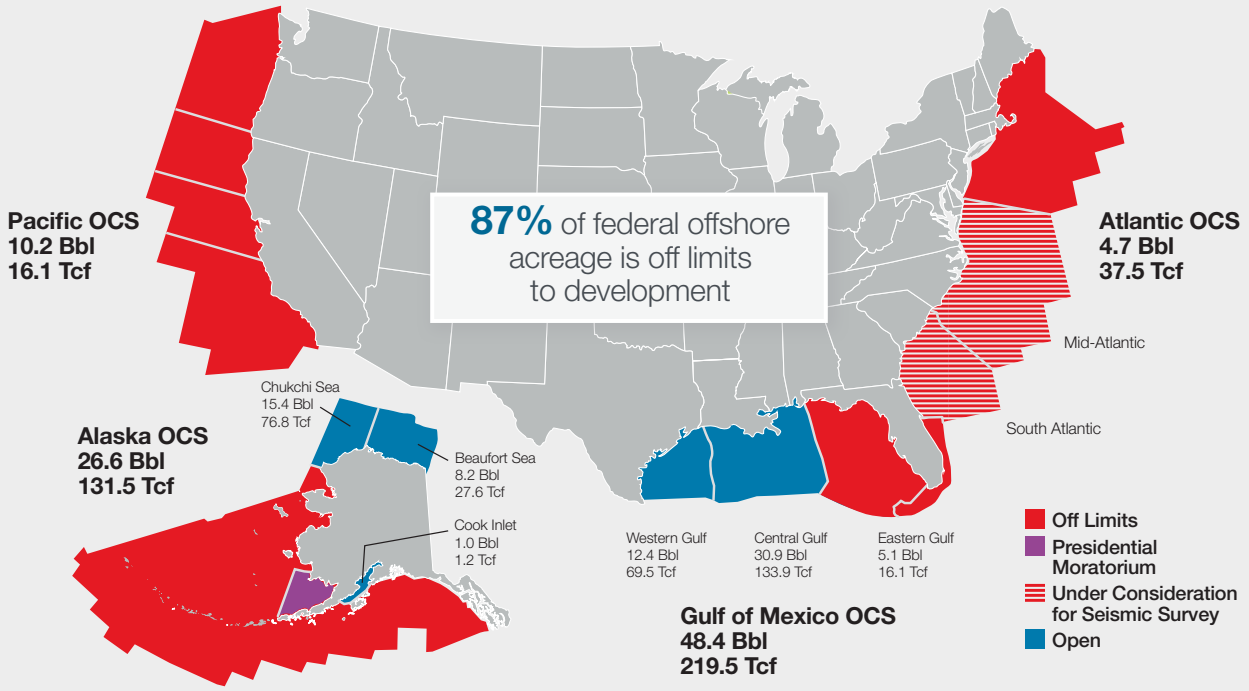
There could be much more oil and natural gas than previously known in areas where industry has been unable to fully explore, and new technologies allow us to access resources previously thought unreachable. There are many examples of how the government's initial estimates dramatically underestimated the amount of actual resources. For example:

- Alaska's North Slope oil field has produced more than 16 billion barrels of oil and natural gas liquids, and is still producing. Government agencies forecast the region would produce no more than 10 billion barrels, total.
- In the Bakken Formation of North Dakota and Montana, the U.S. Geological Survey now says 7.4 billion barrels of undiscovered oil are available – about 50 times more than the original estimate made in 1995.
- In 1987, the BOEM (then MMS) estimated that there were 9 billion barrels of oil in the Gulf of Mexico. By 2011, after major advances in seismic technology and deepwater drilling techniques, the MMS resource estimate for that area had ballooned to 48 billion barrels.

U.S. Offshore Undiscovered Technically Recoverable Federal Resources

America can become a global energy superpower – but only if our leaders pursue smart energy policy.

U.S. Offshore Undiscovered Technically Recoverable Federal Oil and Natural Gas Resources
(billion barrels — Bbl and trillion cubic feet — Tcf)



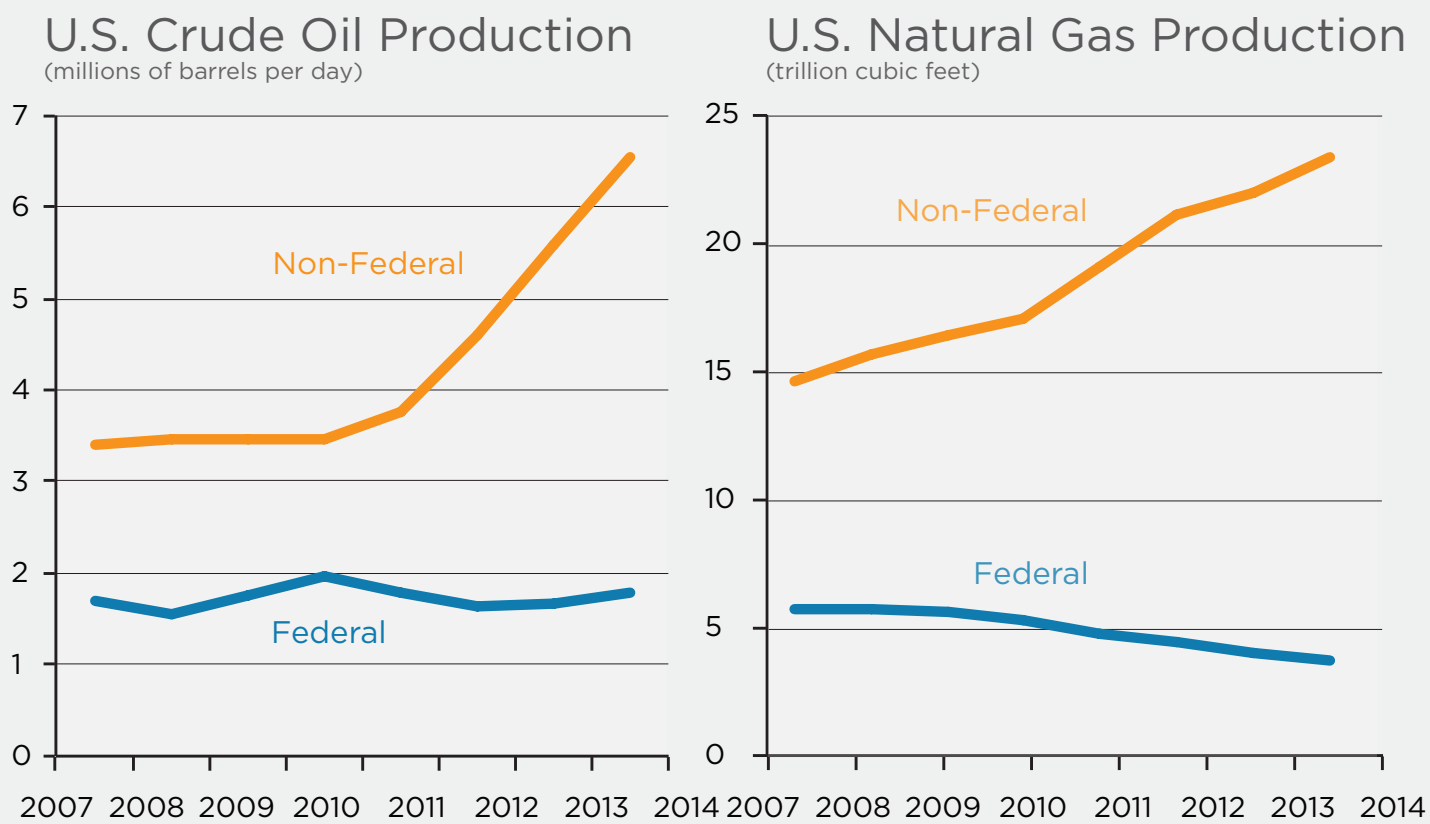
Source: The Bureau of Ocean Energy Management (BOEM).

The U.S. Outer Continental Shelf (OCS) is estimated to contain vast undiscovered oil and natural gas resources. Unfortunately, the federal government has placed most of the OCS off-limits to energy exploration and development.

- The Bureau of Ocean Exploration and Management (BOEM) estimates that 89.9 billion barrels of oil and 404.6 trillion cubic feet of gas have yet to be discovered on the U.S. OCS.
- Unfortunately, some of BOEM's estimates are 30 years old. If Congress permits the use of state-of-the-art seismic surveying technology in largely unexplored areas of the Atlantic OCS, we may discover an even greater abundance of oil and natural gas.
- Developing these oil and natural gas resources will be vital to achieving energy security, growing our economy, and reducing government deficits.
- The oil and natural gas industry has a strong safety record, despite a work environment that often involves heavy equipment, hazardous materials, high temperatures and high pressures. Safety is our top priority, and we are constantly improving the technologies, standards and best practices, and programs that protect our workers and our environment.

U.S. Oil and Natural Gas Production on Federal vs. Non-Federal Lands and Waters

Oil and natural gas production are down on federal lands and waters.



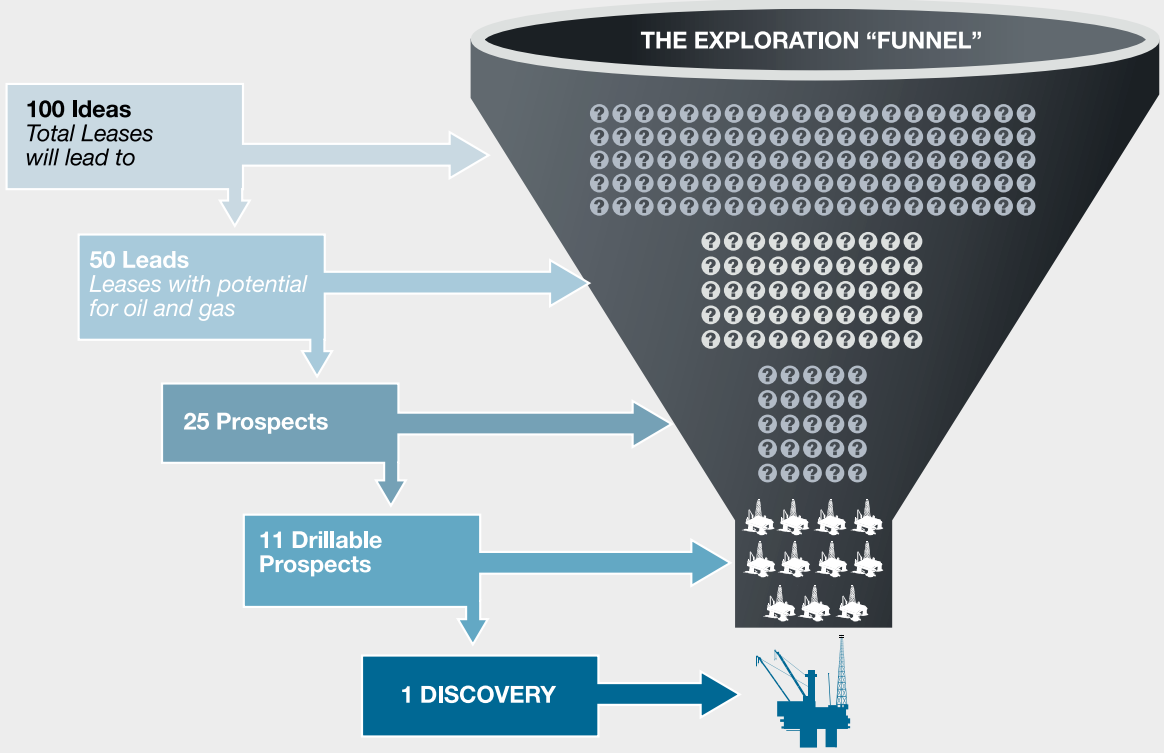
Source: CRS, "U.S. Crude Oil and Natural Gas Production in Federal and Non-Federal Areas," April 3, 2015 and February 28, 2013.

The increase in oil and natural gas production is occurring on state and private lands. Production has decreased in areas under federal government control. Opening more federal land and waters for development and improving the speed of the permitting process could improve this picture and result in higher levels of production on federal lands and waters.

The Myth of Idle Leases

The purchase of a lease is always a gamble. Exploration is not a risk-free proposition, but it is an essential part of the energy business. There is nothing idle about it.

The Myth of Idle Leases



Source: API, 2008.

Sometimes when a lease is not producing, critics claim it is "idle." Much more often than not, non-producing leases are not idle at all; they are under geological evaluation or in development and could become an important source of domestic supply.

Companies purchase leases hoping they will hold enough oil or natural gas to benefit consumers and become economically viable for production. Companies can spend millions of dollars to purchase a lease and then explore and develop it, only to find that it does not contain oil and natural gas in commercial quantities. The reason is that a company usually only has limited knowledge of resource potential when it buys a lease. Only after the lease is acquired will the company be in a position to evaluate it, usually with a very costly seismic survey followed by an exploration well.

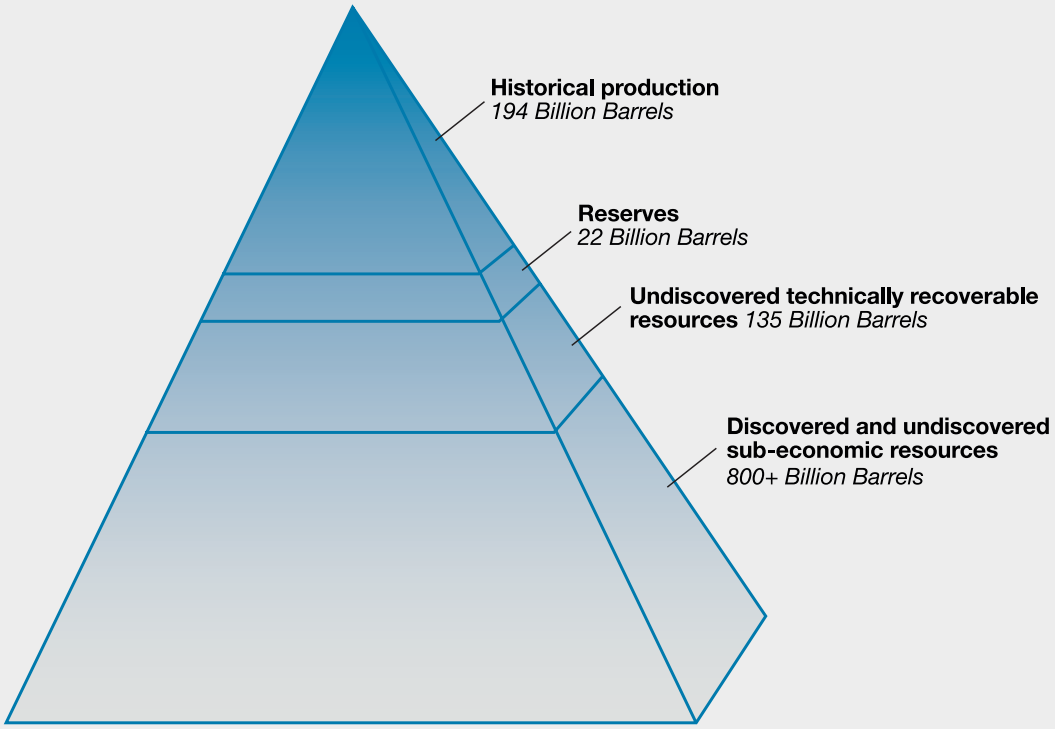
If a company does not find oil or natural gas in commercial quantities, the company hands the lease back to the government, incurs the loss of invested money and moves on to more promising leases.

If a company finds resources in commercial quantities, it will produce the lease. But there sometimes can be delays – often as long as ten years – for environmental and engineering studies, to acquire permits, to install production facilities (or platforms for offshore leases) and to build the necessary infrastructure to bring the resources to market. Litigation, landowner disputes and regulatory hurdles also can delay the process.

Ultimately Recoverable Oil Resources

Ultimately recoverable oil resources dwarf current proven reserves.

Ultimately Recoverable Oil Resources



Source: CRS. "U.S. Fossil Fuel Resources; Terminology, Reporting, and Summary," March 25, 2011.

Ultimately recoverable oil resources are many times greater than our current proven reserves. Although the U.S. has just 2 percent of the world's conventional oil reserves, it accounts for 18 percent of the world's undiscovered technically recoverable resources (UTRR).[27] And these estimates do not include the vast potential of currently sub-economic shale and heavy oil that may become economically available in the future as our technology progresses.

The distinction between "reserves" and "resources" is important to note because it can inform policy decisions. If you believe the amount of oil is small, then energy development strategies will differ than if you know it is large.

"Reserves" is a technical term that refers to oil and natural gas that has proven to be available typically through drilling and that is economically recoverable. Whereas "undiscovered technically recoverable resource" estimates are based on geological characteristics similar to producing areas with today's production practices.

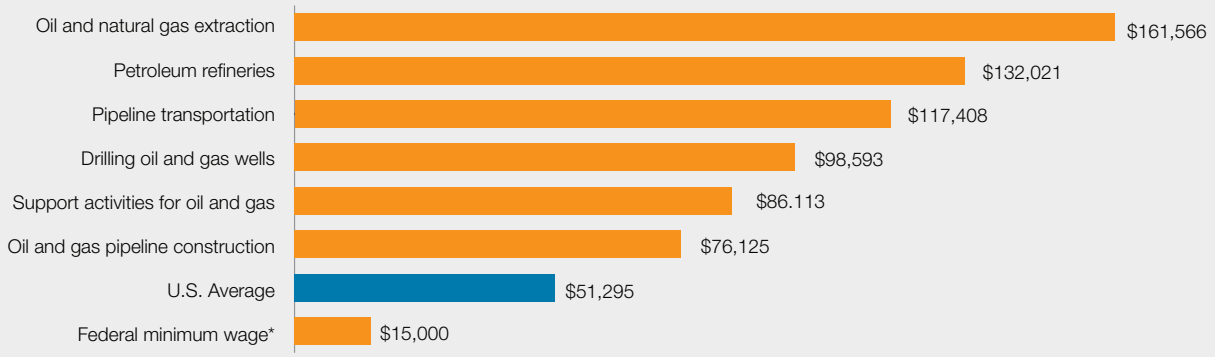
As U.S. government numbers show, the U.S. is an energy rich nation and is not helpless in a worldwide market for oil. U.S. oil companies believe in the long-term potential of U.S. oil development. That's why they are willing to invest many billions of dollars in new projects here at home.

27. CRS, "U.S. Fossil Fuel Resources: Terminology, Reporting, and Summary," March 25, 2011; USGS, "An Estimate of Undiscovered Conventional Oil and Gas Resources of the World, 2012; and BOEM, "Assessment of Undiscovered Technologically Oil and Gas Resources of the Nation's Outer Continental Shelf, 2011."

Benefits to Access to Domestic Sources

Increasing access to domestic sources of oil and natural gas would create new high paying jobs, bring billions of dollars to federal and state treasuries, reduce our balance of payments and enhance America's energy security.

Oil and natural gas jobs pay well
(average annual wages)



*Based on hourly wage of $7.25 times 40 hours per week. Starting in 2015 the federal minimum wage is mandated to increase to $10.10 per hour.
Source: U.S. Quarterly Census of Employment and Wages, 2014.

Increased federal leasing could bring additional high paying jobs to Americans. Nearly 10 million people depend on the oil and natural gas industry for their jobs.

- Oil and natural gas industry exploration and production wages are more than double the national average.
- New manufacturing jobs would be created to develop and install the infrastructure to bring new resources to market.
- Local employment also would benefit with the addition of construction jobs as well as service and support positions.
- Over the next decade, more than one million jobs could be created through increased federal leasing.[28] Production of oil and natural gas on federal lands has brought billions of dollars of revenue into federal and state treasuries. These royalties are one of the largest sources of income to the federal government.

According to the Department of the Interior, in fiscal year 2014, the agency distributed $13.4 billion to the federal government, states and American Indian tribes from onshore and offshore energy production.

Total collections on the year from oil and natural gas production were over $11 billion.

- A part of this revenue included $1.1 billion in bonus bids paid by companies to lease tracts for offshore energy exploration on the Outer Continental Shelf in the Gulf of Mexico and Alaska.
- A total of 36 states received more than $2.2 billion from bonus bids, royalties and rents.[29]

According to an ICF International study commissioned by API, developing America's vast domestic oil and natural gas resources that were kept off-limits by Congress for decades could generate $1.8 trillion in government revenue, including $1.3 trillion in revenues from offshore development alone. These revenues would be earned over the life of the resource.[30]

[28] Wood Mackenzie, "U.S. Supply Forecast and Potential Jobs and Economic Impacts (2012-2030)," September 7, 2011.

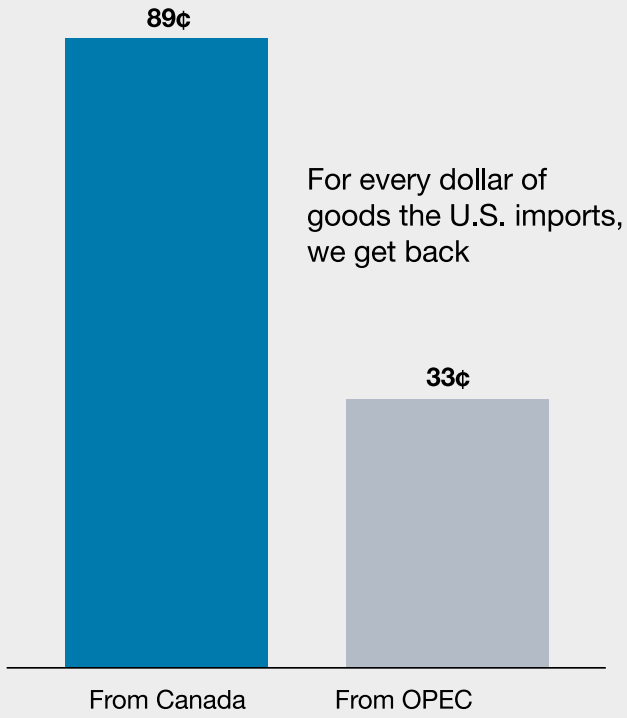
[29] DOI press release December 2, 2014.

[30] ICF International Study, "Strengthening Our Economy: The Untapped U.S. Oil and Gas Resources," December 2008.

Canadian Oil Sands

Development of Canadian oil sands would benefit the U.S. economy.

Trade in Goods*



*For the Year 2011.
Source: http://www.census.gov/foreign-trade/balance/.

The United States imports 4.8 million barrels of oil and petroleum products a day to help meet its energy needs. Canada is the largest supplier to the U.S., providing more than 2.5 million barrels a day – more than half of these imports. Canada has the third largest oil reserves in the world, with over 175 billion barrels of oil within its borders. Much of Canada's oil is located in geologic formations that are a mixture of sand, water, clay and heavy, thick oil called bitumen. These natural formations are called oil sands. Canada sends more than 99 percent of its oil exports to the United States, the bulk of which goes to Midwestern refineries for refining and processing. Increasing imports from Canada is good for our economic, national and energy security.

The planned 1,700 mile Keystone XL pipeline can transport up to 830,000 barrels of oil a day, or half of what we currently import from the Persian Gulf to U.S. refiners. The pipeline has been thoroughly reviewed for more than four years and has strong support from labor and a growing group of bipartisan members in Congress who see the benefits of getting more energy from Canada. It only awaits the President's approval.

Approving the pipeline will not only bring more oil from Canada, but will also pick up a significant amount of domestic production. Twenty-five percent of the pipeline's capacity will be dedicated to moving currently stranded oil from North Dakota and Montana to market.

Thousands of jobs will be created from construction of this pipeline. And the potential trade impact on jobs is even greater. That is because for every dollar spent on Canadian exports, such as crude oil, up to 89 cents is in fact spent on imports of U.S. goods and services to Canada. OPEC spends just 33 cents on U.S. imports. The potential trade impact of the pipeline equals 90,000 U.S. jobs every year.[31]

[31] http://www.census.gov/foreign-trade/balance

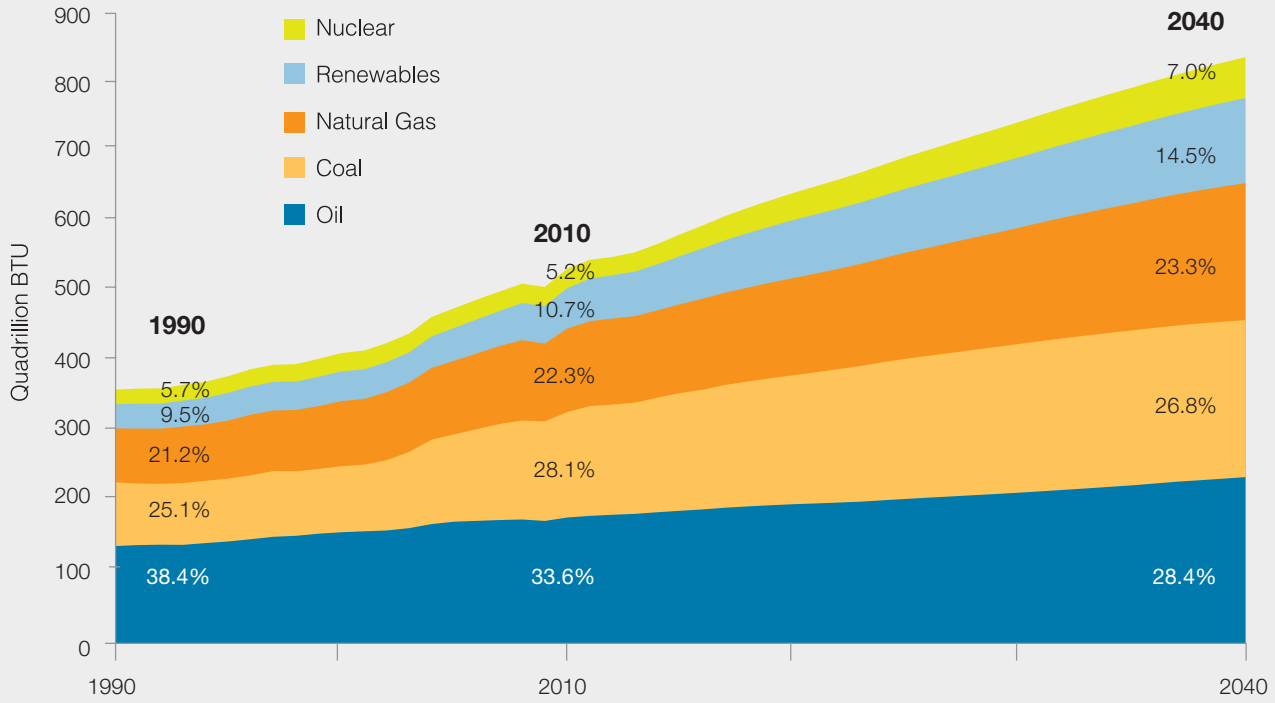
The Global Energy Framework

Future Global Energy Demand

Most energy analysts agree that sustaining even modest economic growth worldwide for the next several decades will require massive new investments in oil and natural gas.

Future Global Energy Demand

The world will require 56 percent more energy in 2040 than in 2010.



Source: EIA, International Energy Outlook 2013.

Recent forecasts by the U.S. Energy Information Administration (EIA) estimate that sustaining a 3.6 percent rate of annual growth in the global economy from 2010 to 2040 (measured in purchasing power parity) will require an expansion of about 28 million barrels per day in global oil supplies. That is an increase equivalent to more than doubling the current consumption of the U.S., Canada, Mexico, and Japan.

The growth in demand for natural gas worldwide is expected to be even larger, increasing by 64 percent from 2010 to 2040. Despite significant growth of renewable and improvements in energy efficiency, more than half of the world's energy demand will be met in 2040 by oil and natural gas, as is the case today.

	2010		2040		
Consumption	**Quad BTU**	**%Share**	**Quad BTU**	**%Share**	**%Change**
Liquid Fuels	176.1	33.6%	232.6	28.4%	32.1%
Coal	147.4	28.1%	219.5	26.8%	48.9%
Natural Gas	116.8	22.3%	191.3	23.3%	63.8%
Renewables	56.2	10.7%	119.1	14.5%	111.9%
Nuclear Power	27.3	5.2%	57.2	7.0%	109.5%
Total	**523.9**	**100.0%**	**819.6**	**100.0%**	**56.4%**
Oil and Natural Gas	292.9	55.9%	423.9	51.7%	44.7%
Oil, Natural Gas and Coal	440.4	84.1%	643.4	78.5%	46.1%

Source: EIA, International Energy Outlook 2013.

Accumulating Risks to the Development of Oil and Natural Gas

There are accumulating risks to the development of oil and natural gas.

Accumulating Risks to the Development of Oil and Natural Gas

Source: NPC.

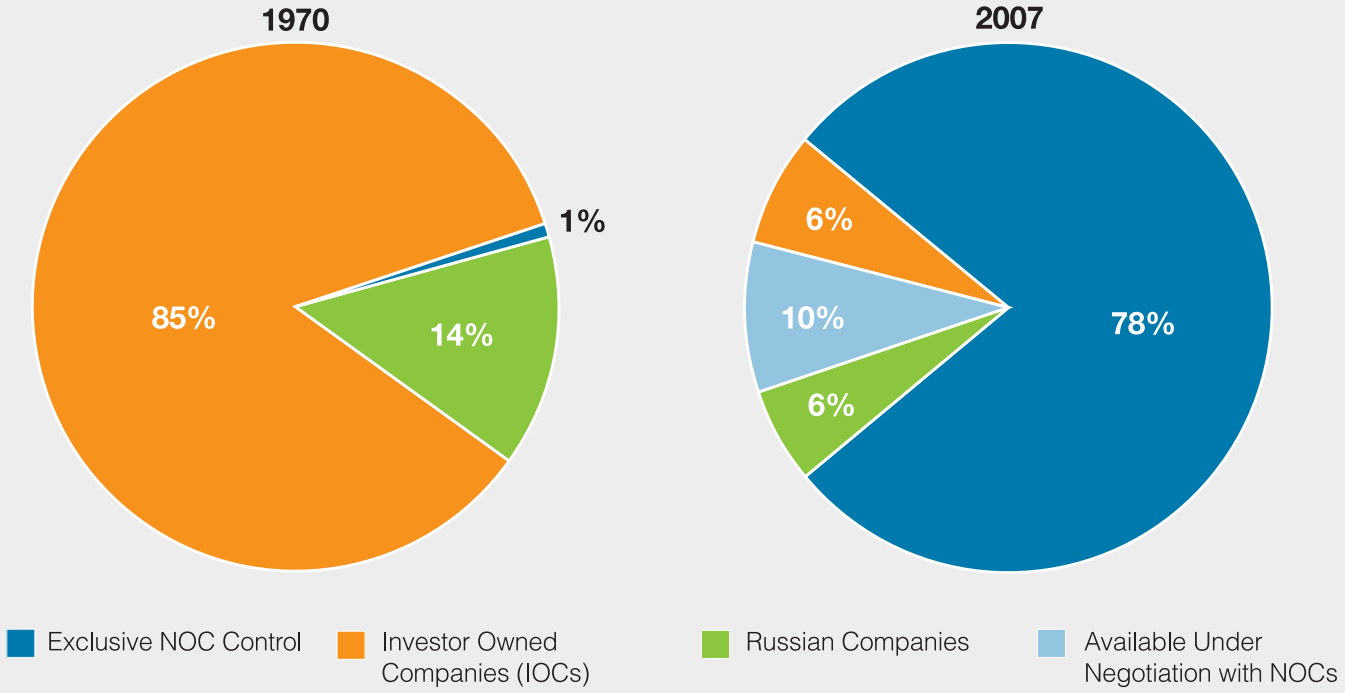
The National Petroleum Council (2008) examined a broad range of global energy supply, demand and technology projections through 2030 and concluded that "the world is not running out of energy resources, but there are accumulating risks to continuing expansion of oil and natural gas production from the conventional sources relied upon historically."

These risks include political instability in the Middle East and North Africa, the resurgence of resource nationalism in Latin America, civil unrest in Nigeria, piracy off the African coast, transit vulnerability in the Caspian, energy subsidies in Asia, extreme weather around the world, and restricted access to resources in the U.S. These risks create significant challenges to meeting projected energy demand.

The Myth of "Big Oil"

In terms of market power, investor-owned international oil companies (IOCs) own just 6 percent of the world's oil reserves.

The Myth of "Big Oil" (as a percent of proven reserves)
National Oil Companies (NOCs) Increasingly Control the World's Oil Reserves



Source: PFC Energy.

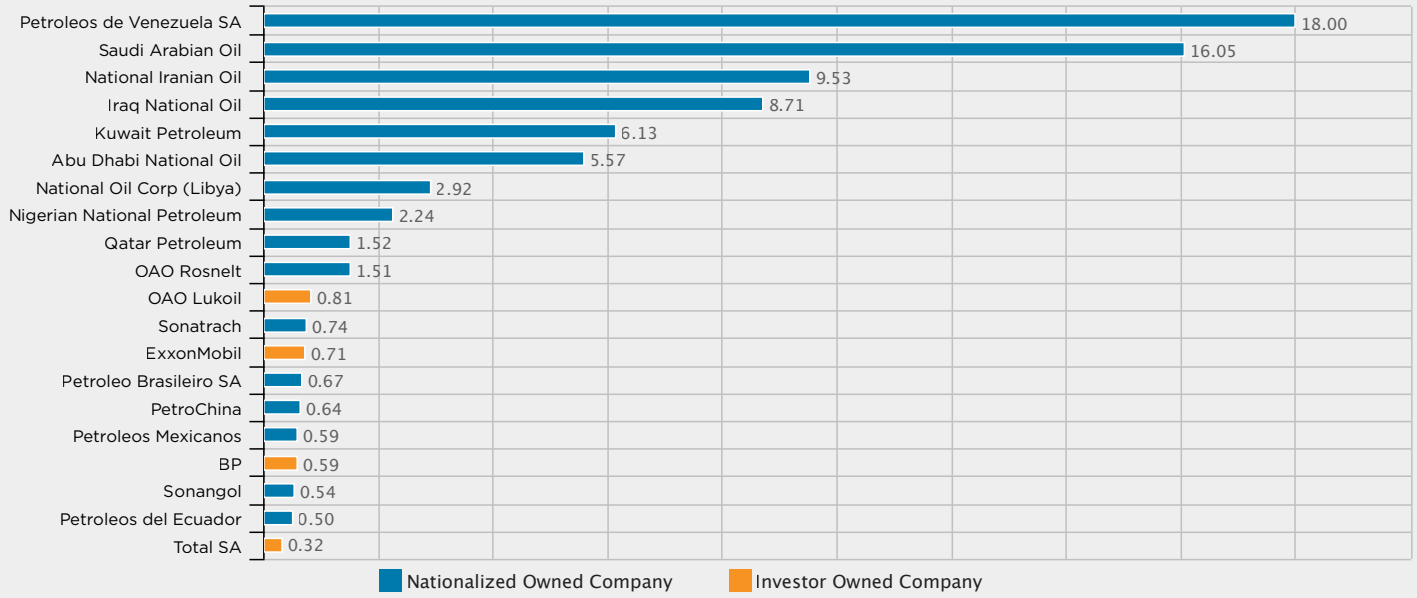
It is important to understand how the energy world has changed. Forty years ago, world oil reserves were largely the domain of the investor-owned, international oil companies (IOC), based principally in the United States. Most people today assume international oil companies are little changed from decades ago, still sitting astride the bulk of these world oil reserves. That is no longer the case. Today, world oil reserves are 80 percent owned by the national oil companies of foreign governments, many formed during the past 30 years. Only 6 percent of worldwide oil reserves are now held by investor-owned oil companies.

Faced with such competition, the investor-owned oil companies have scaled up within this new world – principally through mergers and acquisitions – by creating ever larger efficiencies, greater technological and project management prowess, and substantially broader competitive access to capital markets.

Largest Oil Companies

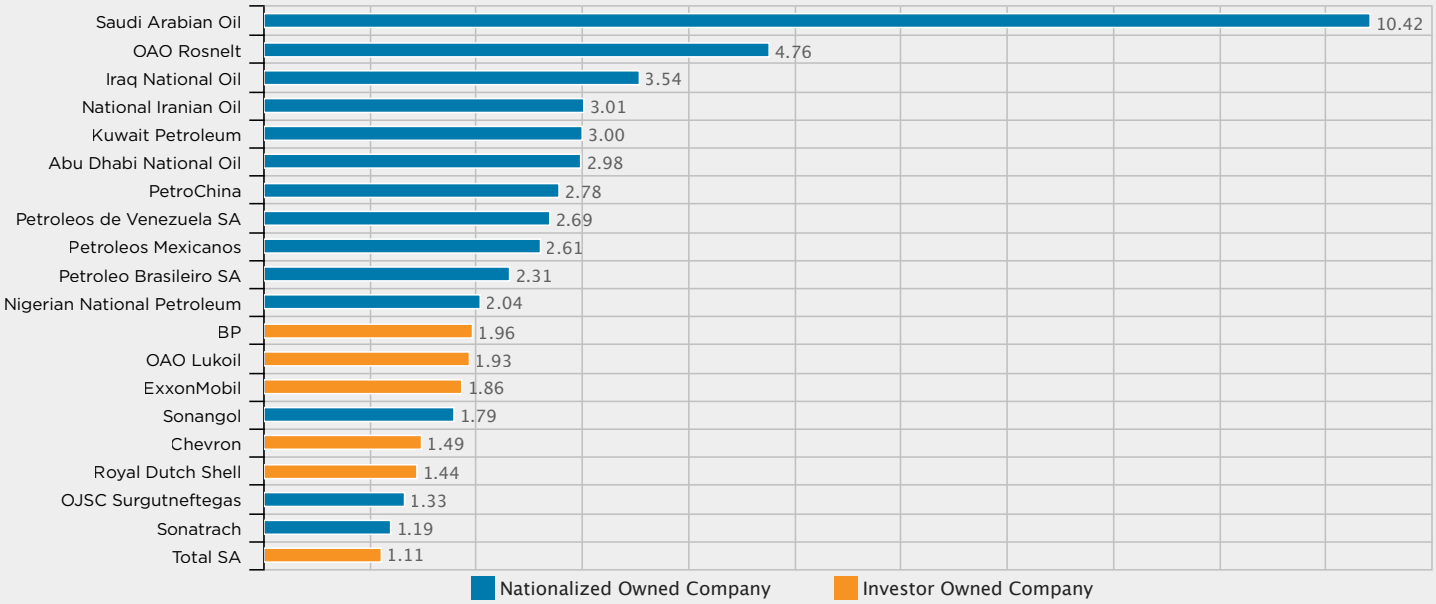
U.S. companies face stiff competition for market share.

2014 Largest Oil Companies (percent of worldwide proved reserves)



Source: Calculated from EIA estimated world total of 1.656 trillion barrels in 2014 and Oil & Gas Journal, September 7, 2015.

2014 Largest Oil Companies (percent of worldwide production)



Source: Calculated from EIA estimated world total of 93 million barrels/day and Oil & Gas Journal, September 7, 2015.

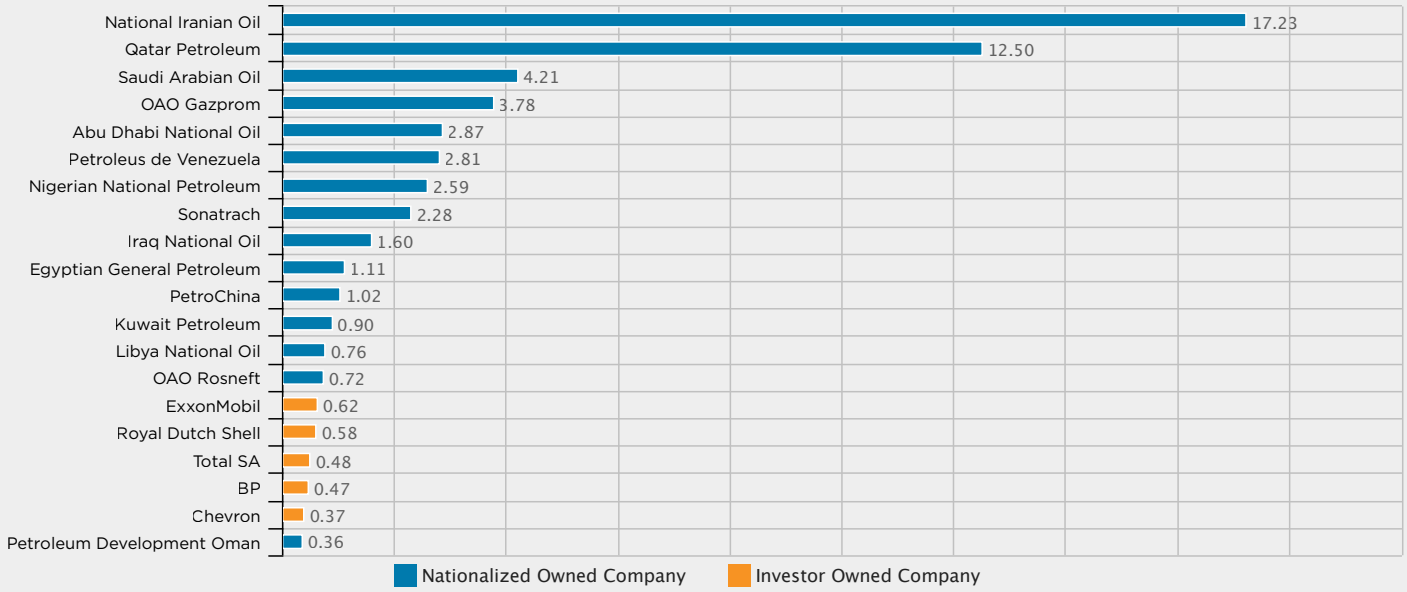
Even the largest U.S. based international investor owned company accounts for just a small fraction of the world's oil reserves and natural gas reserves.

This limits U.S. companies' influence on world crude oil and natural gas prices.

Largest Natural Gas Companies

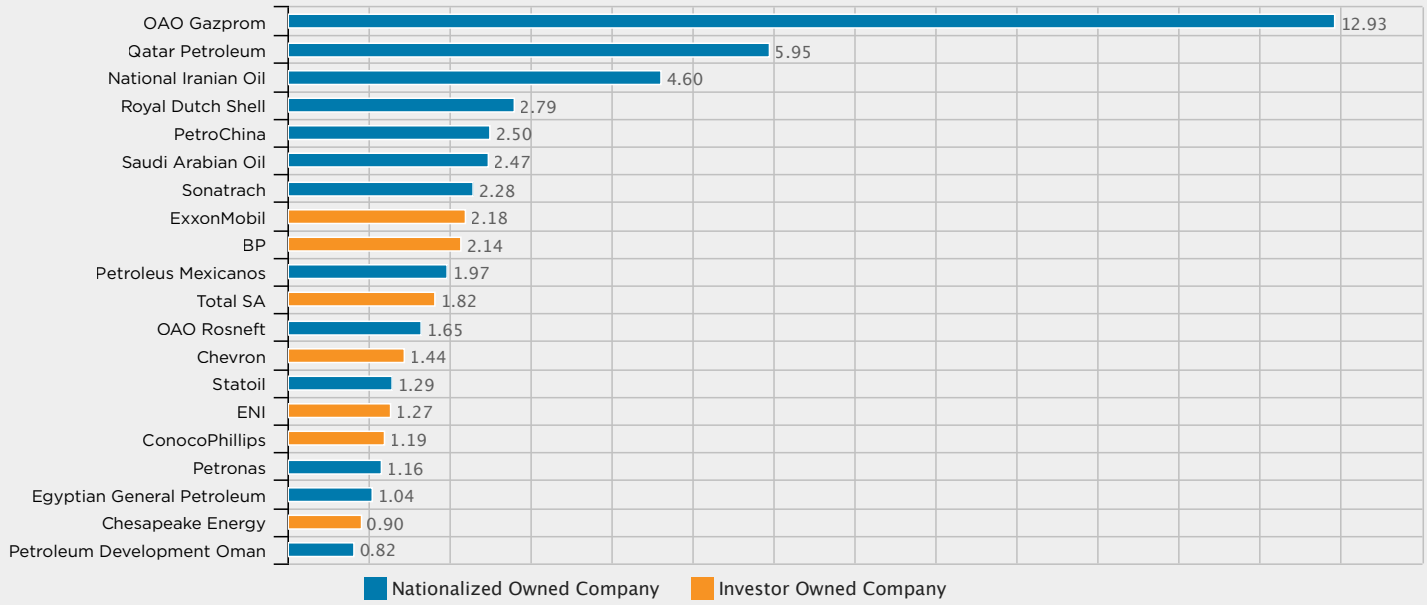
U.S. companies face stiff competition for market share.

2014 Largest Natural Gas Companies (percent of worldwide proved reserves)



Source: Calculated from EIA estimated world total of 6,973 trillion cubic feet in 2014 and Oil & Gas Journal, September 7, 2015.

2014 Largest Natural Gas Companies (percent of worldwide production)



Source: Calculated from EIA estimated world total of 121 trillion cubic feet in 2013 and Oil & Gas Journal, September 7, 2015.

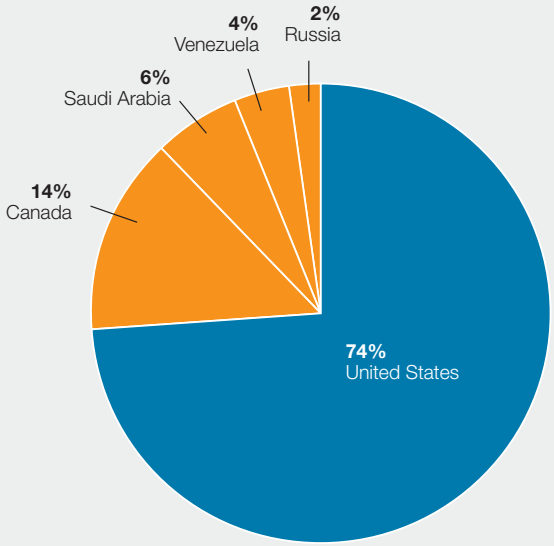
U.S. based international investor owned companies face stiff competition for the world's natural gas market share.

But this is tempered by the fact that the natural gas market is more regional in nature than the global crude oil market.

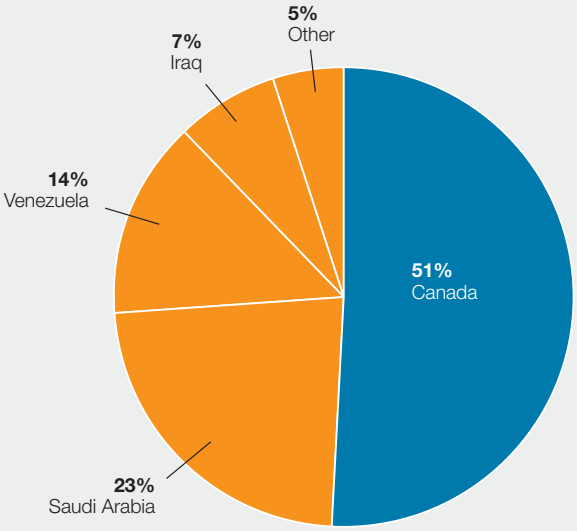
Sources of Supply

Diversifying sources of supply.

U.S. Supplies of Crude and Products 2014
(19,035 thousand barrels per day)

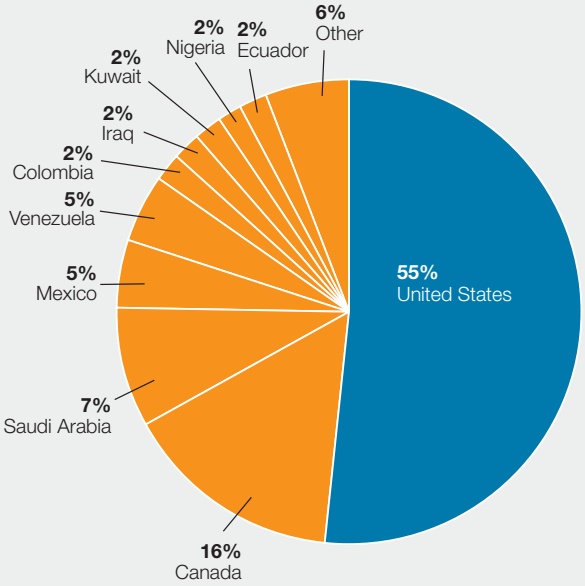


U.S. Net Imports of Crude and Products 2014
(5,041 thousand barrels per day)

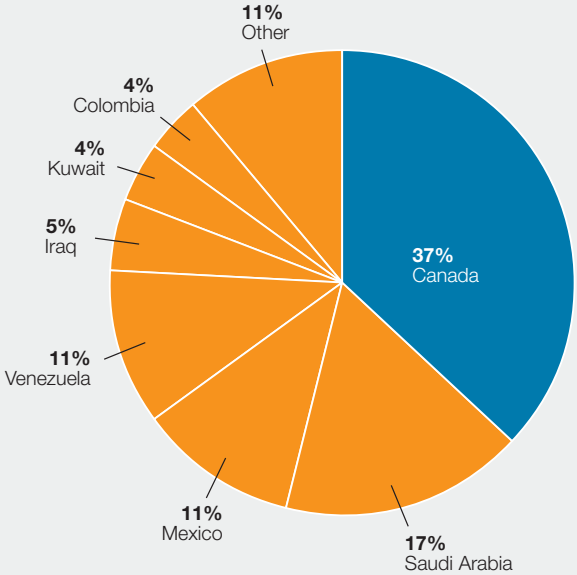


Source: EIA, Petroleum Supply Monthly, February 2015.

U.S. Supplies of Crude 2014
(15,644 thousand barrels per day)



U.S. Net Imports of Crude 2014
(6,991 thousand barrels per day)



Source: EIA, Petroleum Supply Monthly, February 2015.

We produce 74 percent of all the oil and petroleum products we consume. The rest is imported, with most of it coming from our neighbors in North America. In fact, Canada is the largest supplier to the U.S., accounting for 51 percent of our imports compared to 23 percent for Saudi Arabia. One way to enhance our nation's energy security is to continue to diversify our sources of supply.

Energy Policy

Energy Policy Choices and Consequences

Energy development hinges on energy policy

Potential reward of a pro-energy public policy path and the possible economic harm that can result from regulatory constraints and barriers to energy production and refining.

MORE

POTENTIAL IMPACT ON U.S.* (by 2035)	Pro-Energy Policies	Regulatory Constraints	Policy Difference
Oil Production Natural Gas Production	+5.7 mb/d (+52%) +11.6 bcf/d (+10%)	-1.0 mb/d (-9%) -11.3 bcf/d (-10%)	+6.7 mb/d (+61%) +22.9 bcf/d (+20%)
Average Household Energy Expense**	-$360/year	+$242/year	+$602/year
Household Income/ Year**	+118 billion	-$43 billion	+$161 billion
Jobs Supported	+2.3 million	-830 thousand	+3.1 million
GDP/Year**	+$443 billion	-$133 billion	+$576 billion
Government Revenue/Year**	+$122 billion	-$18 billion	+$140 billion
Cumulative Gov't Revenue from 2016**	+$1,078 billion	-$500 billion	+$1,578 billion

LESS

*Incremental impacts assessed versus a baseline scenario
** All dollar numbers are in 2015 real U.S. dollars.
Source: Wood Mackenzie, "A Comparison of U.S. Oil and Natural Gas Policies," July 22, 2015

There is a lot at stake for all Americans in choosing the right leadership for the country's energy future. A new WoodMackenzie study,[32] analyzed and compared the impacts in seven major areas of a future characterized by pro-development policies (green column)[33] and also one characterized by regulatory constraints (red column).[34]

The study results put into sharp contrast the tremendous difference between the benefits we could accrue from pro-energy policies and the negative effects of policy decisions that are anti-energy. The consequences of these policy choices add up over the next 20 years (blue column).

Here's the difference they can make:

- Increase oil production by **52%** or reduce it by **9%**
- Increase natural gas production by **10%** or reduce it by **10%**
- Save the average **household $360** in energy expenses or add **$242 to household** energy bills
- Increase total household income by **$118 billion** or reduce it by **$43 billion**
- Generate **2.3 million jobs** or lose **830 thousand**
- Add **$443 billion** in annual GDP to the U.S. economy or decrease **GDP by $133**
- Collect **$122 billion** in additional government revenue each year or **lose $18 billion a year**
- Collect **$1,078 billion** in government revenue over the next 20 years or **lose $500 billion**

32. WoodMackenzie, "A Comparison of U.S. Oil and Natural Gas Policies," June 22, 2015.

33. Pro-development policies would include more access to energy reserves, more efficient permitting of projects, timely approval of infrastructure, such as the Keystone XL pipeline, a free-market approach to the export of liquid natural gas (LNG) and lifting the decades-old ban on domestic crude oil exports.

34. The regulatory constraints scenario includes more restrictive ozone standards, new fracking rules, new rules on refinery emissions, a new definition of "Waters of the U.S." under the Clean Air Act, the Renewable Fuel Standard and other regulatory constraints. For a full list of policies see the WoodMackenzie study at API.org.

Energy Policy Framework

There are no silver bullets or magic formulas on energy. We need a comprehensive approach to energy shaped by reason, common sense and experience – an approach based on competition in the market-place and state-of-the-art technology.

Policy Choices Needed to Ensure Future Energy Security

- Increase, not decrease energy production by promoting all sources.
- Encourage energy efficiency.
- Encourage investment in advanced technologies and long-term energy initiatives.
- Allow market forces to allocate products and adjust to changing conditions.
- Refrain from new taxes that make it more expensive to develop our domestic supplies.
- Support the need to participate actively in global energy markets.

What is needed today are policy choices to increase, not decrease, energy production. Barriers to oil and natural gas production only contribute to volatile energy prices, slower economic growth, and lost American jobs.

Our nation's past history is replete with short-term energy "fixes" and searches for "silver bullets" to solve our nation's energy problems. Price controls, allocation schemes, limitations on natural gas, picking winners and losers among fuels, and increasing taxes have all been tried by government – and none have worked to benefit the consumer.

We should learn from the past – and take some positive steps to ensure we meet America's energy needs in the decades ahead. As a society, we cannot remain passive to energy, nor to the environment, nor to economic growth. Each will fall short of its fullest promise, absent constructive industry/government partnerships committed to providing our nation with a workable energy security policy.

What we need is a public policy framework to ensure future energy security for our nation. We need elected and appointed officials who understand the energy challenges we face. We need a greater commitment to increased energy efficiency. We need to diversify our energy resources, drawing upon the full range of energy sources, including alternatives. We also need to increase and diversify our oil and natural gas supplies, both within this country and abroad. And, we need to enhance energy technologies, remaining on the cutting edge of advanced technology. We need to get it right on energy. Too much is at stake for our nation to do otherwise.

For more information, please visit
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