

100 DAYS of ENERGY

AMERICAN PETROLEUM INSTITUTE ENERGY FOUNDATION

OIL AND NATURAL GAS

Think about energy. It's all around us – in fuels and products that make life better, more comfortable. Yet energy's value goes even deeper: What do you want to do? Where do you want to go? What do you want to become? Energy is integrally involved in the answers to all three. It's absolutely fundamental to both prosperity and opportunity.

Today, electricity is available virtually everywhere in the U.S., and conveniences are broadly affordable. Energy plays its part. Conversely, even in a 21st century world, more than 1 billion people around the globe lack access to electricity and more than 2 billion are without clean cooking facilities – and their lives are a struggle. Energy is foundational to broad, societal progress – but also to individual prosperity.

Oil and natural gas touch our lives in countless ways, every day. They are key components in lifesaving medical equipment and technologies, from artificial limbs to implantable devices such as heart valves. The nation's largest 3,460 hospitals use more than 5 percent of the energy consumed by the entire U.S. commercial sector. Oil and natural gas are the raw materials used in many pharmaceuticals, such as antiseptics, antibiotics and coated pills that work on a time-release basis.

At home, everything from lip balm and lipstick to paints and cleaning supplies include components derived from petroleum, and we can save leftovers for the next meal – thanks to plastic containers and plastic wrap. Speaking of food, it is worth noting that anything that's planted, grown and harvested is produced using equipment that runs on fuels made from petroleum. Natural gas is a primary feedstock for more than 95 percent of ammonia production in the U.S., a key ingredient in fertilizers. Outside of the home the advanced polymers and plastics that go into bicycle helmets, moisture-resistant clothing and fitness equipment are made from oil and natural gas.

They are just a few examples to illustrate the point that energy from oil and natural gas is all around us in ways well beyond gasoline and diesel fuel. The continued safe and responsible production and refining of oil and natural gas is essential for the modern lifestyles we enjoy, and this hinges on energy policies that determine whether America's energy renaissance goes forward.

KEY POINTS

- **International experts estimate that more than 1.2 billion people around the world lack access to electricity and 2.7 billion live without clean cooking facilities. American oil and natural gas could significantly increase the number of people who have access to the cleaner, affordable energy they need to live healthier and more productive lives.**
- **Oil and natural gas are key components in modern healthcare, from lifesaving medical equipment in hospitals to artificial limbs and implantable devices such as heart valves.**
- **Oil and natural gas are key raw materials in many pharmaceutical products such as antiseptics, antibiotics and over-the-counter medications.**
- **Oil and natural gas are key components in plastic wrap and other food storage products that allow summer vegetables to be available in the winter and frozen goods to be available in the summer.**
- **Oil and natural gas are key components in a variety of everyday products, from lip balm and lipstick, to house paints and household cleaning supplies.**
- **Oil and natural gas are key raw materials in fertilizers and agricultural products.**
- **Oil and natural gas are key components in advanced polymers and plastics that go into bicycle helmets, lightweight clothing and fitness equipment.**

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AMERICAN PETROLEUM INSTITUTE ENERGY AND THE ECONOMY

CONSUMERS AND WORKERS

You don't have to look very far to see the American energy renaissance at work for U.S. consumers. In 2016 U.S. retail gasoline prices were at their lowest level since 2004. Falling prices at the pump reflect reduced crude oil prices worldwide – in part, because of rising U.S. crude output over the same period.

Increased global supply puts downward pressure on crude prices. The result for consumers is significant savings when they fill up. AAA estimates Americans saved, on average, more than \$550 per licensed driver in 2015 relative to 2014. That's a year over year savings of \$115 billion, which translates into increased disposable household income for individuals and families, as well as cost savings to manufacturers and other businesses for transportation of raw materials and finished goods. Consumers ultimately benefit from those savings, too.

And the benefits of abundant American energy extend beyond our fuel tanks. According to one study, plentiful natural gas from shale put an extra \$1,337 back in the pocket of the average U.S. family through lower home energy costs and lower costs of goods and services. Here's another data point: Since 2008, roughly the start of America's production surge, average annual energy costs per U.S. household have dropped 14 percent, lowering Americans' overall cost of living.

American energy is providing savings benefits to consumers but also energy – the energy to travel, build, create and manufacture. U.S. industrial electricity costs are 30 to 50 percent lower than those of overseas competitors, which is helping increase business investment here at home. The American Chemistry Council says U.S. chemical production grew 1.6 percent in 2016 and is projected to increase through 2020 with more than \$164 billion in investments expected to come online.

This broad economic support provided by America's oil and natural gas companies benefits individuals and families. We have a once-in-a-generation opportunity to

find solutions for many of today's most pressing issues, including creating middle class jobs, tackling income inequality, ensuring sustained affordable energy for consumers and enhancing our national security. And for all of these goals, and others, the 21st century American energy renaissance offers a solution.

KEY POINTS

- **American families saved on an average, \$1,337 in 2015 through lower home energy costs as well as lower costs of goods and services as a result of the abundant supply of North American natural gas.**
- **Among the 1.9 million job opportunities projected for the oil and natural gas industry, over 55 percent are projected to be in blue-collar occupations – indicating great opportunity for workers with high school diplomas and some post-secondary training.**
- **A recent report projects that oil, natural gas and petrochemical job opportunities will include over 700,000 positions to be held by African American and Hispanic workers, and more than 290,000 jobs filled by women by 2035.**
- **Lower oil and natural gas prices give U.S. industries a crucial competitive edge and are attracting more business investment back into the U.S.**
- **Since 2008, roughly the start of the energy renaissance, the average annual energy costs per household in the United States have dropped by 14 percent.**
- **For the American consumer, the nation's energy renaissance has meant lower energy costs, an average of \$550 savings in 2015 on transportation fuel costs, according to the AAA.**
- **According to the American Chemistry Council, U.S. chemical production grew 1.6 percent in 2016 and is projected to continue to increase through 2020 as new capacity from 264 announced projects and over \$164 billion in investment comes online.**

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HYDRAULIC FRACTURING

The link between hydraulic fracturing and U.S. global leadership in oil and natural gas production is direct: Without fracking, there would be no American energy renaissance – or the array of benefits it is providing to our economy, to individual households, U.S. manufacturers and other businesses.

Modern hydraulic fracturing – fracking has been used commercially for decades – is the technological engine behind surging U.S. oil and natural gas output. According to the U.S. Energy Department, up to 95 percent of new wells drilled today are hydraulically fractured, accounting for two-thirds of total U.S. marketed natural gas production and about half of U.S. crude oil production.

Modern hydraulic fracturing and horizontal drilling allow multiple wells to be drilled from one spot, reducing the size of the drilling area above ground by as much as 90 percent. Fracking is the key to unlocking vast U.S. shale resources, freeing up oil and natural gas that previously was inaccessible, while protecting groundwater supplies and the environment. America's shale energy revolution is privately financed and technologically driven. It's also an economic dynamo; shale natural gas and oil projects in just one region, the Marcellus shale, were responsible for more than 72 million man hours of direct and indirect labor construction hours from 2008 through the first half of 2014. By helping to lower power and materials costs, as well as stimulating economic activity for a variety of businesses, like service and supply companies, fracking has supported growth across an economy that has struggled in recent years.

Hydraulic fracturing is modern technology, safely and responsibly developing vast reserves of oil and natural gas from shale and other tight-rock formations. It's the backbone of an energy renaissance that's making the U.S. more prosperous and safer in the world today.

The combination of industry standards, best practices and effective state and federal regulation is protecting communities and the environment – while making available increasing volumes of cleaner-burning natural gas that is allowing the U.S. to lead the world in reducing carbon emissions from electricity generation.

KEY POINTS

- **America is powered every day by oil and natural gas, which supplies 66 percent of the energy Americans use, according to the U.S. Energy Information Administration.**
- **Through private investment, technological innovation and American grit, U.S. oil and natural gas producers launched a domestic energy renaissance that has seen oil production surge 78 percent and natural gas output rise 31 percent since 2008.**
- **Modern horizontal and directional drilling techniques allow multiple wells to be drilled from one spot, reducing the footprint of the site by as much as 90 percent. When the well is complete, the production site can be approximately the size of a two-car garage that will yield oil or natural gas for decades.**
- **Oil and natural gas are projected to supply 67 percent of the country's energy needs in 2040.**
- **Advanced horizontal drilling and modern hydraulic fracturing have safely unlocked vast deposits of shale, and have made the U.S. the world's leading oil and natural gas producer.**
- **Studies from government and universities have shown that hydraulic fracturing is safe and does not threaten groundwater.**
- **Oil and natural gas projects related to one shale region in the U.S. were responsible for more than 72 million direct and indirect labor construction hours.**

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EXPORTS

“I believe that a focus on energy security can and must be a critical new element in the American strategic partnership in Central and Eastern Europe, and will benefit Poland, Europe as a whole, and the United States.”

General James L. Jones, Former National Security Advisor to President Obama

One benefit of the renaissance in U.S. energy production is the new capability to export American oil and natural gas – the mere discussion of which reflects the recent sea change in the U.S. energy outlook. Today, thanks to surging domestic output, exporting oil and gas is not only possible, it’s happening, with clear benefits for the economy, domestic production and America’s allies abroad.

The United States started freely trading crude oil in December 2015, following congressional legislation to end a 1970’s-era ban on exports. The early results are promising. The U.S. Energy Information Administration (EIA) reported that the number of countries buying American crude in 2016 had increased sharply over 2015 and 2014 (when major restrictions on exports were in effect). Further, significant domestic fuel cost increases predicted by some opponents of lifting the export ban haven’t materialized – which is what most major studies projected.

Unlike crude exports, the situation with LNG exports is different, because there wasn’t a ban. Rather, declining domestic production of previous decades was pushing the U.S. toward importing large volumes of natural gas to meet needs here at home. The shale energy revolution changed that; now there’s an LNG export opportunity, one that an ICF study projects could contribute up to 452,000 jobs nationwide, while adding up to \$73.6 billion annually to GDP through 2035. Beyond the job and economic benefits, exporting U.S. LNG will help allies overseas – especially those seeking more options in terms of LNG supply – in particular, countries in Central and Eastern Europe.

With new crude exports and growing capacity to export LNG, the United States is just now discovering its potential as a global energy supplier. It’s time to complete the equation by expediting federal approvals for LNG export facilities so that the U.S. can be fully competitive with other suppliers around the world.

“Like shale gas was a game changer in the U.S., American gas exports could be a game changer for Europe.” Maros Sefcovic,

The European Union’s energy chief

KEY POINTS

- In the first year after export restrictions were lifted, the number of nations buying American crude oil increased to 26, further diversifying global supply options, boosting the U.S. economy through increased trade activity with Europe and providing an outlet for U.S. producers.
- Fuel cost increases predicted by those who opposed lifting the oil export ban did not materialize.
- Exporting natural gas to U.S. allies could contribute up to 452,000 American jobs between 2016 and 2035, and add up to \$73.6 billion annually to the U.S. economy.
- As of December 2016, more than 20 U.S. facilities still awaited approval, and more than half of those applications were sent to the Department of Energy in 2014 or earlier. Meanwhile, dozens of LNG export projects are currently planned or under construction in other nations.
- Access to U.S. natural gas will help improve energy security for our allies in Europe that are vulnerable to supply disruptions from other countries.
- The mayor of a Lithuanian town that just opened a natural gas import terminal to break reliance on Russian natural gas explained the geopolitical implications succinctly, commenting: “U.S. LNG is more than just about gas. It’s about freedom.”
- A 2014 DOE study found that exporting U.S. LNG will reduce global GHG emissions because U.S. natural gas consumed in Europe or Asia has lower life cycle GHG emissions than power generation from locally sourced fossil fuels.

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RENEWABLE FUEL STANDARD (RFS)

There might not be a sharper contrast with the innovation and market-driven success of the U.S. energy renaissance than the broken federal Renewable Fuel Standard (RFS) – a program rooted in the era of U.S. energy scarcity that has been made obsolete by the ongoing surge in domestic oil and natural gas production.

The RFS was significantly expanded nearly a decade ago to help counter rising U.S. crude oil imports. The idea was to support an industry that would supply the country with renewable fuels – ethanol, advanced and cellulosic biofuel and biodiesel – that could be blended into the nation’s gasoline and diesel supply. But advanced and cellulosic biofuels haven’t taken off commercially and are dwarfed in the RFS mix by conventional ethanol. At the same time, the purpose of the RFS has been overtaken by events – chiefly a U.S. energy revolution that has seen domestic crude production increase nearly 70 percent since 2009 and a lowering of crude and product net imports to levels not seen since the mid 1980’s.

U.S. gasoline demand has fallen below levels projected by the Energy Information Administration (EIA), even as mandates to blend more ethanol into the fuel supply continue to grow. Lower gasoline demand and rising RFS mandates are pushing the RFS against the ethanol blend wall, where more ethanol is required than can be safely blended into E10 gasoline that’s standard across the country. This could put consumers and the economy at risk. About 85 percent of the vehicles on the roads today weren’t designed to use higher ethanol blends like E15, and studies have shown E15 can damage engines and fuel systems in those vehicles, and could even void manufacturers’ warranties. Beyond those potential impacts, those pushing for greater use of higher ethanol blend fuels are ignoring the marketplace and consumers where demand for E15 and E85 has shown EPA’s aspirations for those fuels are unrealistic.

BOTTOM LINE: The RFS is an outdated, flawed program that should be repealed or significantly reformed. Its original objective, to reduce crude imports, is being achieved instead by rising domestic production. The risks of ever-increasing ethanol volumes in the fuel supply are too great.

KEY POINTS

- **RFS volumes exceed E10 blended fuel capabilities. Mandating additional levels of ethanol will push against the blend wall, and require more ethanol than can be safely blended as E10 fuel.**
- **About 85 percent of vehicles on the road today weren’t designed to use higher ethanol blends like E15, which studies show could cause engine damage. In fact, use of higher ethanol blends could void warranties of some vehicles.**
- **RFS mandates for ever-increasing use of ethanol in the fuel supply could result in driving up the price of gasoline by 26 cents per gallon, according to a study by the nonpartisan Congressional Budget Office.**
- **Demand for ethanol-free gasoline (E0), which many consumers seek for boats, lawnmowers, vintage cars, motorcycles and power equipment, is significant. The Energy Information Administration reported that in 2015 Americans consumed 5.3 billion gallons of ethanol-free gasoline, but the EPA’s 2017 volume requirements incorporate only 200 million gallons.**
- **USA Today calls the ethanol mandate a “folly” that “forces consumers to buy billions of gallons of ethanol, a costly and inferior fuel produced mostly from corn.”**
- **According to the EIA, ethanol and biodiesel are both more expensive than petroleum fuels.**
- **Even with government supported research and development since the 1970’s, the Government Accountability Office reported that advanced biofuel production has not kept pace with RFS volume requirements.**

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TAXES

The U.S. oil and natural gas industry invests \$232 billion in domestic capital investments every year. That's steel in the ground, paychecks for families and American production helping to grow our economy. This type of investment is a main driver of economic growth, technological advancement and jobs and should be considered wisely when making any changes to the tax code.

The U.S. tax system can impact the cost of capital in important ways. In particular, how those costs are recovered and depreciated is directly tied to a business's cost of capital analysis. Furthermore, even if coupled with a corporate tax rate reduction to lessen the impact of depreciation repeal or timing increases, most studies show that the long-term effects would result in slower economic growth.

The oil and natural gas industry is very capital intensive – from well equipment to pipelines to refiner towers. The ability to continue to make substantial investments would be directly impacted by slower capital cost recovery provisions

As tax policy is debated and reform is considered, it must be remembered that proposals increasing the cost of capital will have long-term, negative economic consequences as businesses adjust to the new tax regime. The goal of any well-structured tax system should be to raise revenue in a way that does the least amount of economic harm, while encouraging domestic investment and job creation, and allowing taxpayers to compete internationally for new opportunities.

KEY POINTS

- Subsidies are cash outlays from the U.S. Treasury, and the oil and natural gas industry doesn't get them. There are no targeted tax credits currently being used by industry.
- Legitimate tax treatments used by oil and natural gas companies – similar to those used by other business sectors – regularly come under attack by those pushing for higher taxes on energy companies.
- Tax rules should be non-discriminatory among industries and should provide a level playing field for taxpayers engaged in similar activities.
- Any pro-growth tax system should recognize the cost of capital and move toward a model of immediate expensing or decreasing depreciation lives to as short as possible.
- Any tax reform should be based on sound, transparent policies, and tax rates should be lowered to support a tax structure that promotes investment and is competitive with other major trading partners.
- Rules ensuring that foreign source operating income of U.S.-based companies is not subject to double taxation are essential for supporting the competitiveness of U.S. companies internationally.
- Any new tax regime will be difficult for businesses to immediately adopt. Fair and equitable transition rules must be developed and implemented.

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TRADE

The United States is the world's leading producer of oil and natural gas. Free trade allows the U.S. to maximize the benefits of our status as the world's largest producer of oil, natural gas and refined products.

Oil and natural gas production from shale resources, made available by hydraulic fracturing and horizontal drilling, has led to a U.S. revolution.

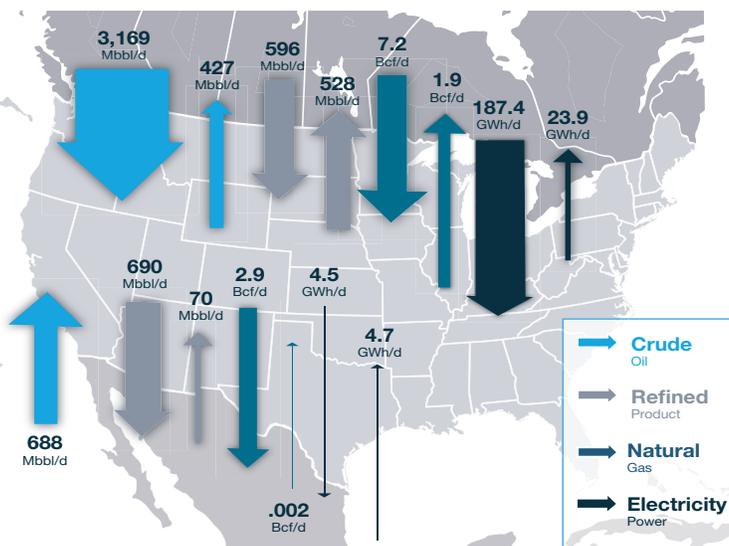
As a result, imports of crude oil by the U.S. have decreased in recent years. At the same time, falling gasoline prices at the pump in the U.S. reflect reduced crude oil prices worldwide – in part because of rising U.S. crude output over the same period. In addition, natural gas prices are at their lowest annual average price since 1999.

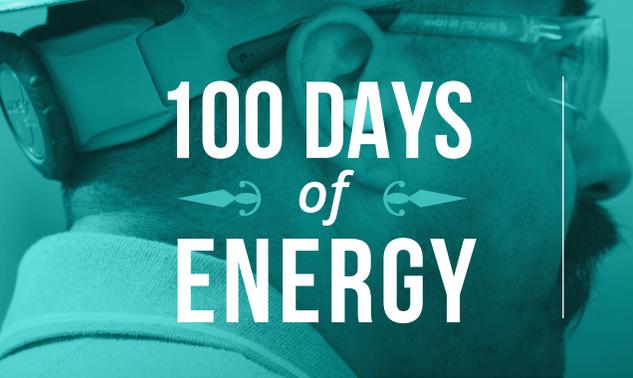
The combination of low prices and rising production of crude oil, natural gas and refined products makes it possible for the U.S. to enjoy lower energy prices at home and to increase our exports.

For example, free trade has helped make North American energy markets integrated and interdependent. Energy infrastructure crosses the borders of the U.S., Canada and Mexico. The trade in crude oil, natural gas, refined products, such as gasoline and petrochemicals, and electricity between the three countries is multi-directional.

KEY POINTS

- Oil and natural gas markets are global. API members support free trade because it supports jobs, keeps energy more affordable and strengthens U.S. foreign policy.
- Without tariffs, the energy we consume is more affordable, allowing oil and natural gas products and services – and those of our integrated supply chains – to flow efficiently.
- Free trade across U.S. borders allows U.S. energy companies and refineries, which lead the world in efficiency and environmental stewardship, to provide jobs here in the U.S. that support exports of oil, natural gas and refined products to consumers around the world.
- Free trade allows the U.S., as the world's largest producer of oil and natural gas and refined products, to provide energy to our allies and enhance their energy security.
- Trade and investment agreements level the playing field outside the U.S., allowing market access to our oil and natural gas companies to make competitive investments abroad.
- Strong investment protections, including Investor-State Dispute Settlement (ISDS), protect U.S. oil and natural gas foreign investments against egregious actions such as expropriation; these do not allow for companies to challenge regulations in the U.S. or abroad.





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AMERICAN PETROLEUM INSTITUTE ENERGY AND SECURITY

ACCESS

One of the important conversations in Washington this year should center on strategies to secure and extend an American energy renaissance that has made the U.S. the world's leading oil and natural gas producer. Increased output here at home has made the U.S. stronger economically and increased America's security in the world. It also is a key factor in reducing U.S. carbon emissions to their lowest level since 1992.

A number of policies and actions would support America's recent energy progress – none more important than increasing access to oil and natural gas reserves in federally controlled areas, onshore and offshore, where production has declined in recent years.

According to a report by the Congressional Research Service, between 2010 and 2015 the percentage of the nation's crude oil produced on federal lands has decreased from 35.7 percent to 21 percent. Why? Access – defined in part by offshore areas available for leasing and development and onshore activity, such as drilling permits granted. According to the Bureau of Land Management, the number of issued federal onshore drilling permits fell 47 percent from 2008 to 2015. Offshore, the Obama administration's move to withdraw tens of millions of acres from development in the Atlantic and Arctic oceans means that 94 percent of federally controlled offshore acreage is off limits to energy development.

This isn't just a bad national energy policy, it's also bad fiscal policy for the U.S. treasury. API calculates that if production in federal areas had grown at the same rate as overall U.S. production from 2010 through 2015, total royalties would have been 63 percent higher, with an additional \$28.8 billion in royalties collected by the federal government.

Increasing access to onshore and offshore energy reserves is essential to extend the benefits of America's energy renaissance, helping consumers, manufacturers and the environment – all while ensuring a secure, stable supply of the energy we depend on every day.

KEY POINTS

- **The numbers are clear. Between 2010 and 2015, the percentage of the nation's crude oil produced on federal land decreased from 35.7 percent to 21 percent.**
- **According to the Bureau of Land Management, the number of federal onshore drilling permits dropped 47 percent from 2008 to 2015.**
- **Federal data shows crude oil production remained flat between 2010 and 2015 on federally controlled land while natural gas production declined 27 percent. In contrast, on private and state lands, where drilling typically does not require federal approval, production increased 113 percent for crude oil and 55 percent for natural gas from 2010 to 2015.**
- **If production on federal lands had grown at the same rate as overall U.S. production, from 2010 through 2015, total royalties would have been 63 percent higher, with an additional \$28.8 billion in royalties collected by the federal government.**
- **Current government policies keep 94 percent of federally controlled offshore acreage off limits to energy development.**
- **Opening areas in the Atlantic, Pacific and Eastern Gulf of Mexico to oil and natural gas development could lead to production of more than 3.5 million barrels of oil equivalent per day.**
- **Allowing more offshore oil and natural gas production could create over 800,000 new American jobs, grow our economy by up to \$70 billion per year and raise over \$200 billion in cumulative revenue for the government treasury.**

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REFINING

Our nation's refineries provide us with high-quality fuels used for transportation, energy for heat and light and petrochemicals needed to manufacture the products we use every day – they are essential to our economy.

U.S. refiners contribute approximately 1.8 percent to the U.S. GDP. And with an annual salary that is generally more than twice the national average, U.S. refiners support \$98 billion in wages and benefits annually and support more than 1.2 million jobs all along the skills continuum.

Our nation's world-class refineries provide fuels and petrochemical feedstocks needed to manufacture thousands of everyday products, such as plastics, pharmaceuticals, fertilizers and more. Today, U.S. refining capacity exceeds 18 million barrels per day, its highest level in 35 years, and domestic refiners are upgrading their operations to produce cleaner fuels and meet the needs of the American consumer. In fact, they spent more than \$160 billion between 1990 and 2015 on producing cleaner-burning fuels.

The combination of cleaner gasoline and diesel fuels, modernized equipment and facilities and more fuel-efficient vehicles has helped reduce U.S. air pollutants by 70 percent between 1970 and 2015, even as vehicle miles traveled increased by more than 184 percent, according to the U.S. Environmental Protection Agency. Refiners have dramatically changed fuel formulations across the country and continue to enable significant reductions in vehicle tailpipe emissions. Gasoline produced today has reduced levels of sulfur, toxics and summer vapor pressure, improving air quality.

Further reductions in sulfur will continue to build on these improvements through 2020 and beyond as Tier 3 fuels and vehicles are phased in and the vehicle fleet turns over. Ultra-low sulfur diesel fuel has 99.5 percent less sulfur – and is now produced for all highway and non-road uses, allowing for dramatically reduced nitrogen oxide emissions from newer diesel engines.

The progress we've made is undeniable; national average peak ozone concentrations have dropped by 17 percent since 2000. A strong U.S. refining sector is essential to our nation's economic growth – and must not be hampered by duplicative and unnecessary regulation.

KEY POINTS

- **The U.S. refining industry supports more than 1.2 million jobs for high-skilled American workers across the country, with an average annual pay that's generally more than twice the national average.**
- **The U.S. refining industry supports \$98 billion in wages and benefits annually, contributing approximately 1.8 percent of the U.S. economy.**
- **U.S. refiners spent more than \$160 billion between 1990 and 2015 on environmental improvements and have developed cleaner fuels for American consumers.**
- **Today's advanced gasoline and diesel motor fuels are helping cars and trucks run cleaner, more efficiently and longer.**
- **Advanced fuels make modern travel possible, everything from long-range intercontinental flights to space exploration.**
- **U.S. refining capacity, now at nearly 18 million barrels per day, is at its highest levels in 35 years. America's refining industry supplies 132 billion gallons of gasoline and 56 billion gallons of ultra-low sulfur diesel in 2015.**
- **More than half – approximately 9.4 million of the 17.6 million barrels of domestic crude oil per day – of refining capacity is integrated with petrochemical manufacturing.**



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INFRASTRUCTURE

American consumers' growing energy appetite means greater demands on our nation's energy infrastructure, including pipelines, railroads, highways, waterways and ports. A robust infrastructure system that is safe, efficient and properly maintained can help lower the costs of supplying oil and natural gas and its products for consumers, by reducing congestion, maximizing efficiency and preventing accidents.

The country's energy infrastructure system was originally built to move oil and gas from the coasts, where it was delivered by ship, to the refining centers and populations inland. Today, the U.S. energy renaissance is driven by the enormous amount of energy resources found in inland formations. Pipelines are a modern, safe and efficient way to move oil and natural gas from where it is produced to where it is refined and processed to where it is used. In 2014, 500,000 miles of liquid and natural gas transmission pipelines transported 16.2 billion barrels of crude oil and petroleum products and 27.3 trillion cubic feet of natural gas throughout the country at a safety rate greater than 99.99 percent. The U.S. will need more pipelines to keep pace with growing production and consumer demand. The current lack of energy infrastructure negatively affects consumers. For example, because of infrastructure bottlenecks in the Northeast, New England's energy prices are among the highest in the lower 48 – with all six states ranking in the top 10 for highest costs of energy in 2015.

As impressive as our nation's energy infrastructure is, it needs to be expanded to keep pace with a growing population, demand for goods and services and energy needs. Investing in our nation's infrastructure will allow the oil and natural gas industry to keep pace with energy demand. It also will help keep energy affordable for the consumer, create well-paying jobs, give U.S. manufacturers a competitive advantage through lower energy and raw material costs and provide revenue to local, state and federal governments.

To sustain our nation's positive energy trajectory and position as a global energy leader, the new administration and Congress should work with the private sector to enable the expansion of our nation's energy infrastructure through consistent regulation and efficient permitting processes.

KEY POINTS

- **To reach America's full energy potential we need to maintain our existing infrastructure and invest in new infrastructure projects. The private sector is investing millions of dollars in infrastructure, with capital spending for the infrastructure that moves and transforms oil and natural gas into everyday products increasing 60 percent between 2010 and 2013.**
- **According to a 2013 study, updating America's energy infrastructure could generate up to \$1.15 trillion in new private capital investment, support 1.1 million new jobs and add \$120 billion per year to our nation's economy by 2025.**
- **Increased investment in the country's energy infrastructure will increase demand for industries such as steel, machinery and engineering services, and could trigger an estimated \$45 billion per year of economic activity throughout the supply chain.**
- **Pipelines are a modern, safe and efficient way to move oil and natural gas. This pipeline network transports oil, petroleum products and natural gas throughout the country at a safety rate greater than 99.99 percent.**
- **Railroads help transport oil to regions of the country where it is needed, and accomplish this at a safety rate greater than of 99.99 percent.**
- **The current lack of energy infrastructure has negatively affected consumers. In the Northeast, for example, infrastructure bottlenecks and/or the lack of infrastructure are part of the reason that seven of the region's nine states had the highest energy costs in the country in 2015.**
- **Except for Maine and Pennsylvania, consumers in the Northeast paid between 34 percent to 70 percent more for their energy than the national average in 2015.**

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ARCTIC

Alaska is home to some of the largest oil and natural gas reserves in the United States, with the state's North Slope at one time supplying about a quarter of total U.S. crude output. An estimated 30 percent of the nation's undiscovered recoverable offshore energy reserves are in Alaskan waters, but these are largely off limits to development. The federal government controls 61 percent of Alaska's land, yet Washington has erected one obstacle after another to energy development. Even the vast National Petroleum Reserve-Alaska, originally established by Congress for the future development of its oil and gas resources, remains mostly off limits due to federal policy.

Decades of experience operating in Arctic environments – most notably at Prudhoe Bay and across Alaska's North Slope – demonstrate the oil and natural gas industry has the technology and expertise to safely develop Arctic offshore resources. To boost American energy security in the coming decades, development in the Arctic must begin right away. According to a report from the National Petroleum Council, "Given the resource potential, and long timelines required to bring Arctic resources to market, Arctic exploration today may provide a material impact to U.S. oil production in the future, potentially averting decline, improving U.S. energy security, and benefitting the local and overall U.S. economy."

Russia, Canada and Norway are already active in Arctic offshore exploration. There is overwhelming support among Alaskans for increased development of oil and natural gas resources, and more than 40 wells have already been drilled offshore in Alaska going back to the 1980s. A consistent, forward-thinking regulatory framework that prioritizes regularly scheduled lease sales is necessary to enhance U.S. energy security and maintain America's position as a global energy superpower.

KEY POINTS

- The Arctic National Wildlife Refuge is roughly the size of the state of South Carolina, and within the refuge is an area the size of a metropolitan airport that was set aside for oil and natural gas production. That area is estimated to hold between 4.3 billion and 11.8 billion barrels of oil, but development is all but prohibited.
- Alaska's North Slope accounted for 24 percent of U.S. domestic oil and natural gas production in 1988, but production has plummeted because the U.S. government has largely prevented exploration for new resources in the state. Total North Slope production fell to approximately 465,000 barrels per day in 2015, a 76 percent decrease from 1988.
- The U.S. Geological Survey (USGS) estimates that the National Petroleum Reserve-Alaska, which encompasses about 23 million acres and is the largest single block of federally managed land in the U.S., holds an estimated 896 million barrels of oil and 53 trillion cubic feet of natural gas.
- Strong majorities of Alaska voters support more domestic oil and natural gas development, regardless of party affiliation.
- The USGS estimates that the Arctic holds some of the world's largest conventional, undiscovered oil and natural gas reserves – 16 percent of recoverable oil and 30 percent of recoverable natural gas resources. The Beaufort and Chukchi seas off the coast of Alaska contain more technically recoverable oil and natural gas than the Atlantic and Pacific coasts combined, according to government estimates.
- National military experts have urged energy exploration in the Arctic to ensure the U.S. is able to meet its own long-term energy needs – even as other countries start to ramp up production there as well.
- Military leaders have pointed out that: "Arctic offshore energy development will occur, whether or not the U.S. participates, as other countries pursue the Arctic's large energy resources to meet long-term energy needs."

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SAFETY

“The oil and natural gas industry has shown the world how entrepreneurial spirit, innovations in energy production techniques, a core commitment to safety – pioneered and reaffirmed every day by the millions of women and men of the oil and natural gas industry – and smart, effective regulations have transformed the United States from a passive consumer on the world energy stage to a leader in only a decade’s time.” Jack Gerard, API President and CEO

Safety is a core value for the oil and natural gas industry, which works tirelessly to improve safety in the workplace through ongoing research, standards development, training, sharing of recommended practices and advocacy. These efforts are paying off. Even as the industry provides the foundation for our economy and quality of life, the injury and illness rate for the U.S. oil and natural gas industry remains well below the national average for all private sectors. **The industry remains committed to continuous improvement with a keen focus on zero incidents.**

Since 1924, API has been the leader in developing industry standards that promote reliability and safety worldwide. The API Standards Program is accredited by the American National Standards Institute (ANSI), the same body that accredits programs at several national laboratories. These standards are developed by the best and brightest technical experts from government regulators, academia and industry.

The oil and natural gas industry is committed not only to the safety and health of its employees and contractors, but also to the people of the communities in which we operate. Careful review of the science shows that current, robust industry standards and stringent state and federal regulations are protecting public health. America is in the middle of an energy renaissance built upon the safe and responsible development of oil and gas reserves in a manner that protects of human health and the environment.

KEY POINTS

- Safety is the number one priority for the petroleum and natural gas industry.
- The oil and natural gas industry develops standards through an open, third-party accredited process that involves experts from a wide range of disciplines, including academia, government regulators and industry.
- The oil and natural gas industry maintains almost 700 standards covering all segments of operations.
- The oil and natural gas industry has the goal of safely delivering the energy our nation and the world needs.
- The Bureau of Safety and Environmental Enforcement (BSEE) references 95 API standards in its offshore regulations.
- Overall, more than 130 API standards are referenced in more than 430 citations by government agencies, including the Coast Guard, the Environmental Protection Agency, the Federal Trade Commission, the Department of Transportation’s Pipeline and Hazardous Materials Safety Administration and the Occupational Safety and Health Administration, in addition to BSEE.
- Additionally, API’s standards are the most widely referenced petroleum industry standards used by state regulators, with over 240 of them cited more than 4,130 times in state regulations.

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CLIMATE

“A lower natural gas price forecast...has a greater effect on emissions levels, the retirement of fossil steam resources and new entry of natural gas combined cycle resources than even the most stringent of the studied compliance pathways...Because of accelerated retirements, there would be no cost to achieve compliance, and the resulting emissions would be below the final Clean Power Plan targets, even without the Clean Power Plan.” PJM Interconnection

America's energy revolution has disproved the long-held assumption that increased energy production must be accompanied by higher emissions. The fact is that even while production has significantly increased, total criteria air pollutants and **greenhouse gas emissions have fallen**, in large part due to expanded use of abundant, affordable natural gas in electricity generation.

A study by Independent System Operator New England illustrates how the increased use of natural gas in power generation, transportation and other areas is reducing emissions. According to the study, regional emissions dropped 56 percent for nitrogen oxide, 91 percent for sulfur dioxide and 22 percent for carbon dioxide between 2006 and 2015. “The decline in emissions during this period reflects shifts in the regional fuel mix,” the report states, “with increasing natural gas generation offsetting decreases in coal- and oil-fired generation.”

The plentiful, affordable and dependable supply of U.S. natural gas, coupled with the fuel's environmental advantages, makes it a logical alternative because it achieves what were once thought to be mutually exclusive goals: providing more energy with a smaller impact on our environment.

CO₂ emissions from power generation in the U.S. have fallen 21 percent since 2000. Even without an emissions reduction requirement in place, API modeling projects natural gas will continue to drive emissions reductions in the power sector, due to fuel switching.

KEY POINTS

- Even while the economy has grown and domestic energy production has increased, total general criteria air pollutants and greenhouse gas emissions have fallen as a direct result of the oil and natural gas industry's investments in a cleaner environment.
- According to the EIA, greenhouse gas emissions from electricity generation are at their lowest point in nearly 30 years thanks to increased use of North American natural gas.
- According to EIA data, 61.3 percent of the decrease in power generation-related carbon emissions since 2005 was due to fuel switching to natural gas.
- A government study found that using U.S. Liquefied Natural Gas (LNG) for power generation in Asia and Europe could emit fewer greenhouse gas emissions from a life cycle perspective than electricity generated by regional coal.
- The oil and natural gas industry has directly invested approximately \$90 billion in zero- and low-emissions technologies since 2000, nearly as much as the federal government and more than twice that of the next largest industry sector.
- As a result, our nation's environment continues to improve. The United States is over 40 percent of the way to the emissions reductions target sought by the Paris Climate agreement.
- According to EPA's 2017 Draft Greenhouse Gas Inventory (1990-2015), U.S. carbon emissions were nearly 12 percent below 2005 levels, even as the United States economy has continued to grow.
- Based on the estimates in ICF International's power model, which uses API assumptions, emissions from power generation are projected to decrease by up to 30 percent from 2005 levels by 2030, based on continued increases in the use of natural gas as a generating fuel. The ICF power model is used by EPA for its electric market analysis.



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NATURAL GAS

“The constant stress of fluctuating commodity prices and unpredictable weather is softened a bit with additional income from leasing, royalties and pipeline right of way. Over the long term, I believe natural gas development will actually preserve our precious open space. Successful farmers will farm the land rather than subdivide it.” Jackie Root, Pennsylvania farmer and president of the National Association of Royalty Owners

The U.S. depends on energy being available at the flip of a switch, 24 hours a day, seven days a week. The supply and demand of electricity must always be in balance – meaning the energy going into the power grid must equal the amount being used. That’s why all our nation’s energy systems require constant power generation that also can fluctuate with our needs. Natural gas fuels that kind of generation. It reliably and efficiently provides affordable, flexible power that can quickly ramp up to keep the lights on when intermittent resources like wind and solar are not available.

American natural gas is a solution that has forever altered the world’s energy equation by: generating the power we need for our homes and businesses; providing the building blocks for our manufacturing renaissance; making our nation and our allies more secure; and fueling natural gas-powered transportation on our roads, oceans and waterways.

In 2015, natural gas generated nearly one-third of U.S. electricity, and clean-burning natural gas is lowering greenhouse gas emissions and reducing air pollution. Companies that provide the electricity to light, heat and cool your home have turned to natural gas. Power providers, manufacturing companies, surface and marine fleet operators and millions of small business and home-owners have turned to natural gas. Natural gas is America’s largest growing source of electricity generation, offering a clean, reliable and affordable way to create the energy people need, when and where they need it.

KEY POINTS

- As the world leader in both emissions reduction and production of oil and natural gas, the United States has a proven model for achieving environmental progress without sacrificing jobs, economic growth, energy security or consumer affordability.
- More than 65 percent of the CO₂ reductions in the electric power sector since 2005 have come from fuel switching to natural gas.
- In 2016, natural gas became the leading fuel for generating electricity in the U.S. for the first time ever.
- Natural gas generation is capable of providing on-demand “dispatchable” power, ramping up quickly and following real-time changes in demand for electricity.
- A New England study illustrates how the increased use of natural gas benefits the environment. The study found that as the fuel mix shifted toward natural gas, regional emissions dropped 56 percent for nitrogen oxide, 91 percent for sulfur dioxide and 22 percent for carbon dioxide between 2006 and 2015.
- 77 percent of 2016 voters supported natural gas’ role in reducing U.S. greenhouse gas emissions.

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ENVIRONMENTAL PROGRESS

“By 2015, the combined emissions of the six common pollutants (PM2.5 and PM10, SO₂, NOx, VOCs, CO and Pb) dropped 71 percent since 1970. This progress occurred while the U.S. economy continued to grow, Americans drove more miles and population and energy use increased.” Environmental Protection Agency (Air Trends Report)

America’s oil and natural gas industry has a long-standing commitment to protect the environment. The industry’s environmental investments represent a crucial aspect of today’s energy exploration and production process. **Between 1990 and 2015, industry has invested more than \$321 billion toward improving the environmental performance of its products, facilities and operations – \$996 for every man, woman and child in the United States.**

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 \$303 billion spent by all U.S. industries and the federal government combined.

Large investments are critical to provide the energy we will need in the years ahead. Additionally, through new seismic exploration and extended reach drilling technologies, our geologists can survey underground oil and natural gas deposits more effectively than in years past. This improves exploration success rates while also reducing environmental impact.

Electronic navigation and physical oceanographic systems also help safeguard our environment and are a large part of the reason why more than 99.99 percent of oil delivered by tankers during the last decade has reached its U.S. destination without incident.

The powerful combination of continually improving industry practices, advancing state programs and federal environmental statutes all work together to provide an effective structure that allows for the essential development of the nation’s oil and natural gas resources while protecting the environment.

KEY POINTS

- **The combination of cleaner gasoline and diesel fuels, modernized facilities and more fuel-efficient vehicles has helped reduce U.S. air pollutants by 70 percent since 1970, even as vehicle miles traveled have increased by more than 184 percent.**
- **Between 1990 and 2015, the industry invested over \$321 billion toward improving the environmental performance of its products, facilities and operations.**
- **Thanks in part to the increased use of domestic natural gas, ozone concentrations in the air have dropped by 17 percent since 2000.**
- **The oil and natural gas industry is investing in cutting-edge technologies that reduce leaks, capture emissions and improve energy efficiency.**
- **According to EPA data, methane emissions from natural gas systems have fallen even as production and use have increased.**
- **Greater natural gas production and use lowers emissions of air pollutants such as mercury, sulfur dioxide, nitrogen oxide and particulate matter.**
- **The American Petroleum Institute establishes standards and best practices for oil and natural gas production that lead the world in becoming more efficient, safer, cleaner and more productive.**