CONSUMER **ENERGY** ALLIANCE

THE VOICE OF THE ENERGY CONSUMER

Recommendations for a Balanced Energy Policy

A Briefing Book Presented to the 114th Congress

Outline of Chapters

Letter to the 114th U.S. Congress

In the two years since Consumer Energy Alliance (CEA) issued its *Recommendations for a Balanced Energy Policy: A Briefing Book Presented to the 113th Congress*, North America's energy landscape has changed dramatically.

Consumer Energy Alliance (CEA) presents to Congress these recommendations with the fundamental belief that a sensible energy policy underpins a healthy economy. CEA brings together consumers, producers and manufacturers to engage in a meaningful dialogue about America's energy future. CEA's almost 260 corporate members represent nearly every sector of the U.S. economy and understand well how energy affects every business, family and driver.

Since CEA's inception in 2006, CEA and its membership have strongly advocated for expanded U.S. energy development and increased energy efficiency as a means to moderate energy prices and further energy self-sufficiency. For our nation's oil and natural gas consumers, hope has turned to reality. Expanded North American oil and natural gas production has increased global supplies and suppressed prices, including driving gasoline and diesel prices to their lowest point in years. Abundant energy resources and greater efficiencies in production technologies will allow these gains to continue well into the future, unless misguided and misinformed polices curtail America's energy revolution.

Conversely, U.S. electricity consumers face an uncertain, less affordable future. Nuclear, coal, natural gas and renewable power each face new realities due to a variety of economic and regulatory factors that in many cases will transform how utilities produce power.

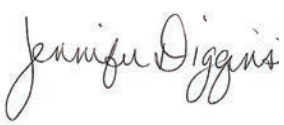
Despite these new realities, the United States continues to a lack a defined national energy policy. Inactivity at the congressional level has allowed, and in some cases emboldened, federal agencies to take action absent public will. This situation is not only undesirable; it imperils the short- and long-term availability of dependable, affordable energy for consumers.

In this briefing book, CEA identifies policy recommendations that, if enacted, would establish a balanced energy policy that supports thoughtful increases in U.S. energy production, improvements in energy transportation and utilization and advances in energy efficiency. Ultimately, the recommendations provide a blueprint for a sound energy future defined by greater economic opportunity, more resilient energy security and affordable, abundant energy.

CEA encourages the 114th Congress to work together with one another and with the Obama Administration in a bipartisan manner to act on these recommendations in the next two years. CEA also urges federal leaders to engage state policy makers and regulators on decisions affecting their states.

As the "Voice of the Energy Consumer," CEA looks forward to working with elected officials in Washington and in state houses across the country to advance a balanced energy policy for American consumers.

Sincerely,



David Holt
CEA President

Jennifer Diggins
CEA Chair
Nucor

Chapter 1

Importance of a Balanced Energy Policy

A balanced energy policy must ensure that every sector of the U.S. economy has access to affordable, reliable energy. American energy has the power to transform the U.S. economy – empowering consumers while creating jobs, revenue and additional economic opportunity – as well as to improve U.S. energy security.

Yet, in order to realize these benefits, sound policy must promote safe energy production and use and minimize political impediments to development. Onerous regulations, restricted access to supplies of domestic resources and excessive taxation are only a few of the many examples of artificial barriers that can paralyze energy development and limit America's energy future.

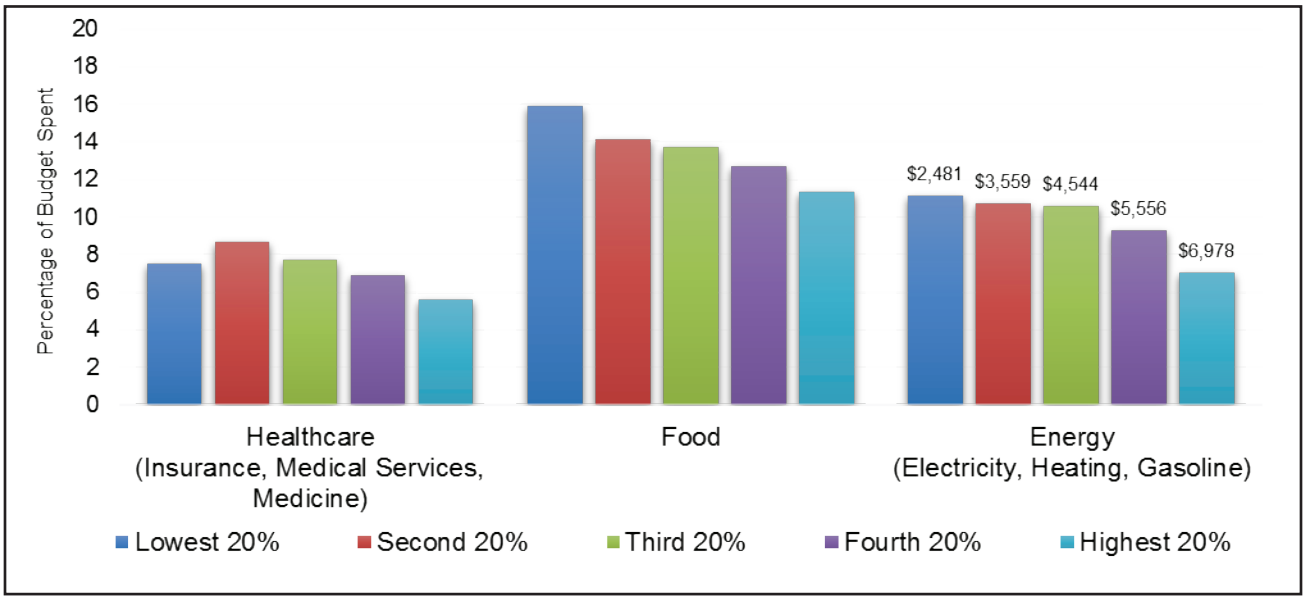
The recommendations included in this report are designed to help policy makers resolve many of the political hurdles that threaten the short-term and long-term viability of America's energy future. Before examining these policies, it is important to review how energy policy affects consumers.

How Energy Prices Affect Consumers

The U.S. economy depends on access to reliable and affordable energy. Nearly every sector of the U.S. economy relies on energy to transport its goods and services, power its facilities and manufacture numerous consumer goods. Policy makers would be remiss to believe that the energy industry and environmental groups are the only stakeholders in this discussion. Decisions about energy development and use affect all energy consumers, and Consumer Energy Alliance and its consumer membership are proud to represent and speak to consumer concerns.

When evaluating the impact of energy policies on consumers, policy makers must first consider how prices affect the most vulnerable amongst us: low-income and fixed-income families for whom price increases result in difficult decisions. Not surprisingly, low-income families spend a larger percentage of their disposable income on electricity, heating costs and transportation fuels than other income brackets. Unlike other necessities like housing, food and healthcare, energy consumers oftentimes cannot shop around for cheaper resources nor do federal and state governments have sufficient resources allocated to fully assist with energy bills.

Percentage of Budget Spent on Expenditures By Quintiles of Income Earners



(Data from Bureau of Labor Statistics, Consumer Expenditure Survey, 3Q 2012-2Q 2013)

In each of the recessions in the last forty years, high oil prices precipitated contraction of the U.S. economy.[1] Even slight increases in the price of fuel translate to higher costs for goods and services as transporters and manufacturers are forced to pass along those fuel costs that cannot be absorbed.

Slight increases in fuel costs can have a significant impact on the profitability of transportation companies. The trucking industry alone consumes more than 37 billion gallons of diesel fuel annually. For the industry, a one-cent increase in the average price of diesel costs an additional $350 to $370 million a year in fuel expenses.[2] Similarly, for every dollar-per-barrel increase in the cost of oil, the airline industry's fuel bill increases by $420 million, according to Airlines for America.[3]

According to IHS Global Insight, a 10 percent increase in gasoline prices lowers consumer confidence by about 1.5 percent.[4] Conversely, lower than expected fuel costs can lead to significant savings for families. For the average household, lower transportation fuel costs have increased purchasing power. Beginning in fall 2014, gasoline costs have declined dramatically, decreasing by over 40 percent to just over $2.00 per gallon of gasoline in January 2015.[5] In 2014, the cost of gasoline averaged $3.43 a gallon, down $0.25 in two years.[6] The average family household will save $750 in 2015 due to lower gasoline prices.[7]

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1 *Bloomberg*, "How High Oil Prices Will Permanently Cap Economic Growth." September 23, 2012. http://www.bloomberg.com/news/2012-09-23/how-high-oil-prices-will-permanently-cap-economic-growth.html

2 *Real Clear Policy*, "High Fuel Costs Not Just a Drag on Commuters." March 27, 2012. http://www.realclearpolicy.com/articles/2012/03/27/high_fuel_costs_not_just_a_drag_on_commuters_97.html.

3 Ibid.

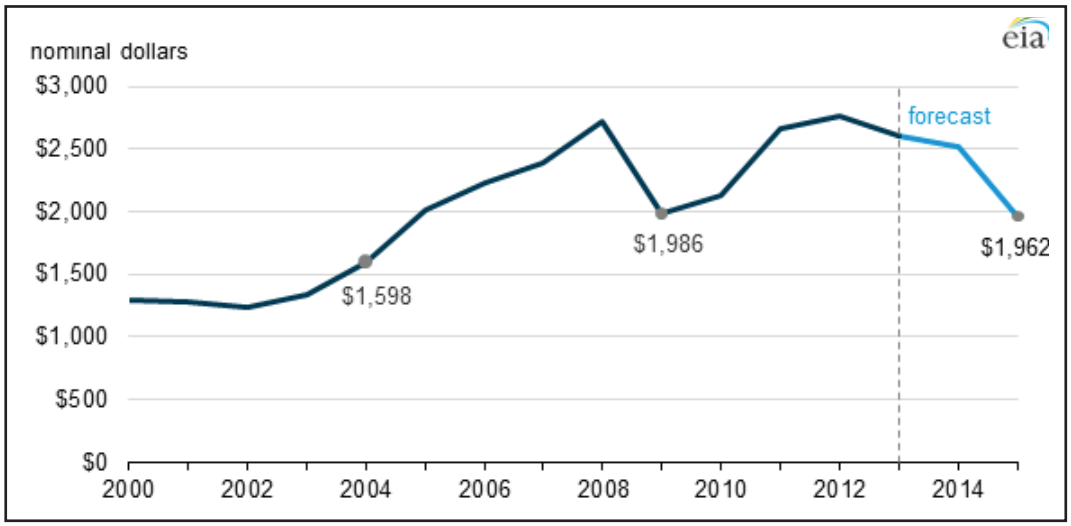
4 *U.S. News & World Report*, " 5 Things That Can Change When Gas Prices Spike." March 16, 2012. http://www.usnews.com/news/blogs/rick-newman/2012/03/16/5-things-that-change-when-gas-prices-spike.

5 Energy Information Administration, "Weekly Retail Gasoline and Diesel Prices," January 12, 2015. http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_a.htm

6 U.S. Department of Energy, Energy Information Administration, "Gasoline and Diesel Fuel Update." http://www.eia.gov/petroleum/gasdiesel/.

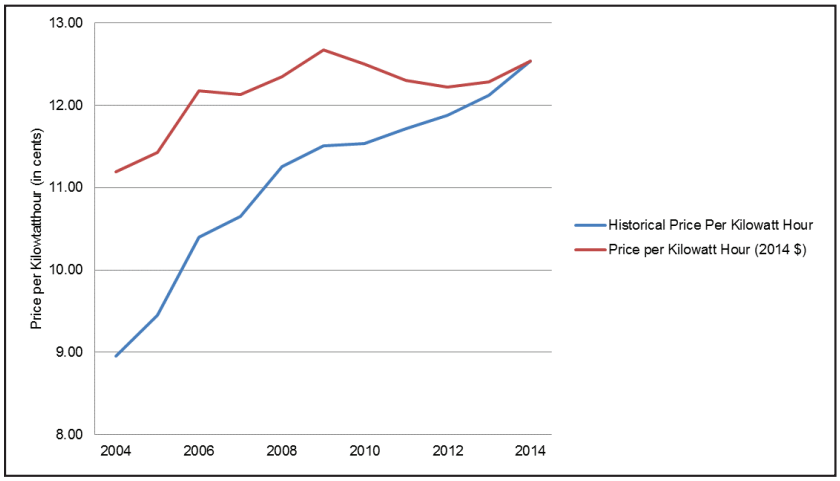
7 Diane Cardwell and Nelson D. Schwartz, "Lower Oil Prices Provide Benefit to U.S. Workers," *New York Times*, January 17, 2015. http://www.nytimes.com/2015/01/18/business/economy/lower-oil-prices-offer-a-bonanza-to-us-workers.html?_r=0.

Average annual household expenditures on gasoline and motor oil (2000-2015)



In addition to transportation fuels, electricity, heating and cooling costs affect all sectors of the economy. For electricity consumers, particularly large consumers like hospitals, universities and manufacturers, reliability and cost directly influence bottom-lines and the ability to plan for the future. While individual retail prices vary greatly depending on provider, regulation, demand and type of fuel utilized, the average U.S. price per kilowatt hour (kWh) has risen by approximately 7.5 percent since 2004 after adjusting for inflation. For residential consumers, the chart below shows that homeowners are now paying 12 percent more for electricity than a decade ago.

Average Retail Price of Electricity to Residential Customers (2004 - 2014)



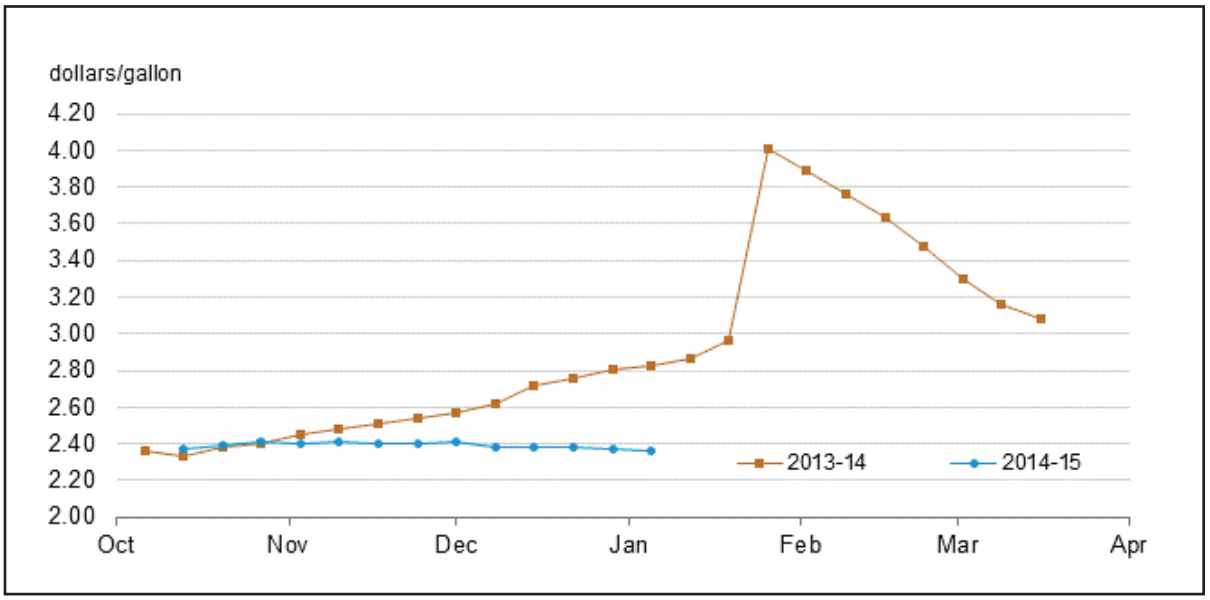
* Data on kWh prices from the U.S. Energy Information Administration (http://www.eia.gov/electricity/data.cfm#sales).
**Data on inflation-adjusted prices from the U.S. Bureau of Labor Statistics

For heating, a majority of U.S. consumers utilize natural gas, heating oil, propane or electricity. Although it is not the most cost-effective option, the proportion of residences utilizing electricity for heat generation has increased dramatically as populations migrate to the south and west where electricity is the common source of space heating.[8]

For those consumers who rely on propane for home heating, the winter of 2014 proved to be a harsh lesson in how sudden shifts in supply and demand and overtaxed infrastructure can affect consumers. A confluence of factors – a surge in demand from the agricultural sector, a draw down in supplies and constraints on transportation – clashed with an unseasonably cold "polar vortex." As a result, consumer prices for propane skyrocketed. Going into winter 2015, prices have moderated as storage hubs have regained supplies and pipeline projects have increased capacity.

[8] Energy Information Administration, "Everywhere but Northeast, fewer homes choose natural gas as heating fuel," September 25, 2014. http://www.eia.gov/todayinenergy/detail.cfm?id=18131.

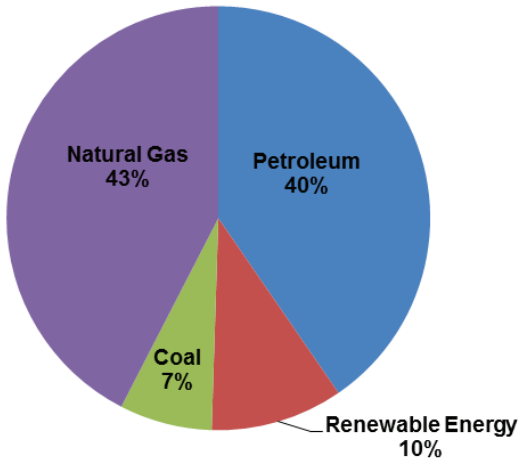
U.S. Average Residential Propane Prices



Source: U.S. Energy Information Administration

Finally, several energy-intensive manufacturers utilize oil, natural gas, and coal as a direct feedstock in order to make a multitude of consumer products, including steel, fertilizer, plastics, medicine, and hundreds of other goods. In 2013, industrial energy usage accounted for 22 percent of total energy consumption.[9] Of this amount that was used as inputs to manufacturing processes, petroleum accounted for 40 percent of what was consumed and natural gas accounted for 43 percent.[10] Consequently, increases in the price of oil and natural gas not only affect transportation and electricity costs, but also the cost of many manufactured goods. Ensuring a transparent regulatory regime that provides for consistent and sustained energy production remains in the nation's best interest.

Industrial Fuel Consumption



Source: U.S. Energy Information Administration

9 U.S. Department of Energy, Energy Information Administration, "Energy in Brief." http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm.
10 Ibid.

Energy as an Economic Driver

Energy touches every aspect of the economy: whether it's powering a factory or a hospital, farming food and fiber or fueling the daily commute, the U.S. economy and the daily lives of every citizen depend on access to affordable energy. Millions of American workers also depend on energy for their livelihood, and all American taxpayers enjoy services paid for by federal and state revenues from energy production.

The U.S. oil and natural gas industry alone supports more than 9.8 million American jobs. [11] The nation's electric utilities furthermore employ more than 500,000 people and contribute 2.4 percent to the gross domestic product.[12] Jobs in the energy sector are often well-paying, high-tech positions.

Expanded North American energy production, particularly oil and natural gas development, would help create millions of jobs and billions in tax revenue. The continuation of the shale revolution in the United States could generate another 1.8 million jobs by 2025, including more than 500,000 manufacturing jobs that benefit from low-cost energy.[13] These jobs would span from Alaska to Florida and nearly every state in between – even those that do not host traditional energy development and production. Increased energy development indirectly benefits several sectors, including manufacturing, pipefitting, trucking, catering, lodging and other oilfield service providers.

Finally, as Chapter 8 discusses, energy production is one of the nation's largest sources of revenue generation, sending billions annually to federal, state, American Indian tribal and local coffers.

Bolstering U.S. Energy Security

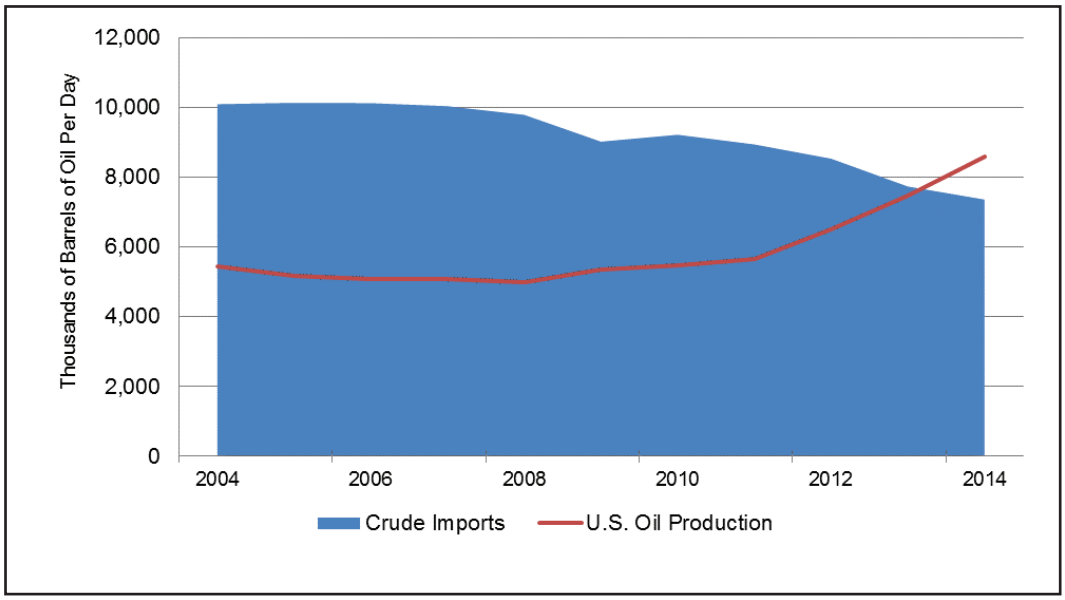
Energy security can be defined as the relationship between a country's ability to meet its energy needs and a country's access to affordable supplies of energy. Access to energy depends on the availability of supply on the global market, the ability to transport energy safely to its import destination and the ability of the importer to receive and distribute the energy to consumers safety and efficiently. Depending on a variety of factors, such as geopolitical relationships, internal politics and technological factors, the landscape of energy security is constantly in flux.

Many of America's energy security concerns stem from geopolitical relationships. For example, the long history of enmity between Iran and Iraq and internal instability in many of the Persian Gulf and West African states can and have all affected the global supply of oil. When instability inevitably disrupts supply, huge spikes in the price of oil have and will result, compromising America's energy security and threatening the health of the economy.

Recognizing the effect of supply and demand on America's energy and economic security, Congress commissioned a study by the Department of Commerce in 1989 called "The Effect on the National Security of Imports of Crude Oil and Refined Petroleum Products." The Department found that reliance on petroleum imports is a threat to national security and recommended a plan to reduce U.S. dependence on foreign oil. This plan urged improving the efficiency of America's national energy system and further recommended preventing disruptions of global energy supplies, following the study's observation that energy security depends on free access to oil at "reasonable and

11 American Petroleum Institute, "Energy Tomorrow: The State of American Energy 2015," January 2015. http://www.api.org/~/media/files/policy/soae-2015/api-2015-soae-report.pdf.
12 Edison Electric Institute, "Electricity & the Economy," http://www.eei.org/electricity101/pages/value.aspx.
13 Ibid.

Crude Oil Imports Fall As U.S. Production Grows



Source: U.S. Energy Information Administration

predictable prices."[14] Specifically, the report recommended that the United States expand domestic production of oil, particularly offshore energy development, maintain a tax policy that encouraged oil production and increase bilateral energy trade between Canada and the United States.[15] In total, the Department believed these efforts would help better protect the U.S. economy by bolstering U.S. energy security in the short and long term.

While some of the dynamics of global energy have changed since the 1989 study, the fundamental issue – access to a resource that is central to the U.S. economy – remains the same. Dependence on unstable nations leaves the United States vulnerable to supply disruptions. The difference now, thanks to increased production of domestic oil and better efficiency of its use, is that the United States appears to have the wherewithal to substantially lessen its dependence on these unstable sources of oil.

The conditions that make a nation energy secure are not static. Even in the current climate of low-cost oil and natural gas – due primarily to higher U.S. production, the United States must remain vigilant in developing and implementing a long-term approach to meeting its energy needs. Steps to implement long-term programs to develop all resources, including fossil fuels, nuclear power and renewable energy, bolster long-term energy security and militate against unforeseen disruptions.

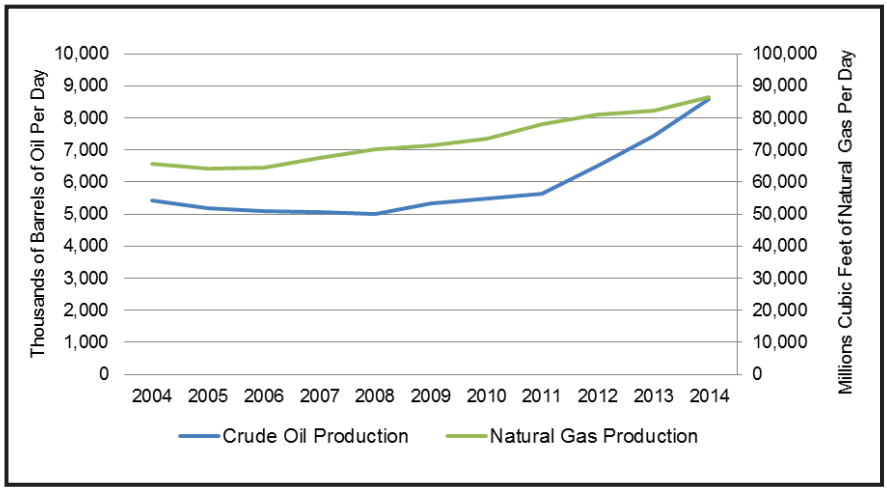
14 U.S. Department of Commerce, "The Effect on the National Security of Imports of Crude Oil and Refined Petroleum Products." 1989. http://beta-www.bis.doc.gov/index.php/licensing/forms-documents/doc_view/78-crude-oil-and-petroleum-products-1989.
15 Ibid.

Chapter 2

Onshore Oil and Natural Gas

The expanded application of hydraulic fracturing and horizontal drilling has transformed the world of energy and allowed producers to develop oil and natural gas resources once considered technically and economically unviable. Increasingly, these prodigious tight oil and shale gas reserves have contributed significantly to overall U.S. energy security and been a driving economic force in areas hosting production across the country.

U.S. Crude Oil and Natural Gas



Source: U.S. Energy Information Administration

In October 2014, the United States produced 9.0 million barrels of oil per day – 80 percent of which came from onshore reserves – up from 5.7 million barrels per day in 2011.[16] According to the Energy Information Administration (EIA), nearly all of this growth in crude oil production consisted of light, sweet crude, mostly from Texas and North Dakota. Experts had estimated that U.S. oil production would grow by one million barrels per day in 2015, but due to low oil prices some estimate that oil production will instead grow by 500,000 to 800,000 barrels per day in 2015.

Similarly, booming shale gas production has increased natural gas development by 25 percent within a decade.[17] In just six years, natural gas prices have fallen dramatically – from $12.69 per million btu in June 2008 to $3.48 at the end of 2014.[18] Production is expected to increase in 2015 by 2 to 3 percent.

For consumers, increased supplies of oil and natural gas have helped lower energy prices, and experts predict that prices will remain at these lower levels through the coming years. The energy research firm IHS Energy estimated that fracking added $1,200 to household incomes due to lower prices and greater economic activity.[19] For energy-intensive manufacturers like fertilizer, steel and petrochemical producers, access to lower cost natural gas has spurred sizeable expansion in America's manufacturing sector.

16 Energy Information Administration, "Petroleum and Other Liquids: Crude Oil Production," http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbblpd_m.htm.
17 Energy Information Administration, "Natural Gas Gross Withdrawals and Production," http://www.eia.gov/dnav/ng/ng_prod_sum_dcu_NUS_m.htm.
18 Energy Information Administration, "Henry Hub Natural Gas Spot Price," http://www.eia.gov/dnav/ng/hist/rngwhhdA.htm.
19 Jim Efstathiou, Jr., "Fracking Boom Seen Raising Household Incomes by $1,200," *Bloomberg*, September 4, 2013. http://www.bloomberg.com/news/2013-09-04/fracking-boom-seen-raising-household-incomes-by-1-200.html.

Natural gas, which is mostly utilized for electricity generation, home heating and manufacturing, as well as for limited use in the transportation sector, emits significantly lower levels of greenhouse gases, notably carbon dioxide and sulfur dioxide, than other sources of energy. Increased utilization of natural gas, particularly for electricity generation, has influenced a twenty-year low in U.S. carbon emissions and established the United States as the global leader in carbon dioxide reductions since 2006.[20]

To ensure that the shale revolution continues, policy makers must permit access to abundant domestic natural resources. At the same time, industry should work with the government to ensure viable markets, while preventing cost disruptions, as this is in the public's interest and could provide benefits to consumers everywhere.

For all onshore oil and natural gas producers, a number of policy obstacles can limit development of these resources, including: access to acreage; legal challenges and other delays to permits, plans and environmental reviews; lack of clarity and coordination amongst a host of federal and state agencies with jurisdiction; critical habitat and wilderness designations; public opposition; and other regulatory matters. Of note, shale development has raised fears about potential impacts to drinking water quality, water volume levels, induced seismicity and air quality, particularly methane emissions. While multiple independent and government studies have affirmed the safety of shale production when best practices are effectively followed, opponents continue to advocate for stringent regulations and drilling moratoria at the state and local level.

At the executive level, a few key developments merit greater attention and oversight by Congress. First, the U.S. Environmental Protection Agency is seeking to regulate shale development via two initiatives. The Department of the Interior, Environment and Related Agencies Appropriations Act of 2010 (Public Law 111-88) directed the EPA to carry out a study on the relationship between hydraulic fracturing and drinking water. While the study remains ongoing with a final report expected in 2016, many questions have been raised about EPA's intentions to utilize the study to regulate fracking from the federal level. Previous EPA reports that aquifers near Pavillion, Wyoming and Dimock, Pennsylvania had been contaminated by hydraulic fracturing have since been reversed, and questions remain about whether EPA is seeking to federalize regulation of hydraulic fracturing under the Safe Drinking Water Act and the Clean Water Act.

Second, the EPA announced in January 2015 its plans for new and expanded regulations to limit methane emissions from the oil and natural gas sector as part of the White House's 2014 "Strategy to Reduce Methane Emissions." While further investigation based

Recommendation:

Recognize the vast economic and energy security potential that U.S. oil and natural gas resources have for U.S. consumers and ensure both increased access and expanded markets for energy resources to help maintain reasonable energy supplies and stable prices for consumers.

[20] *New York Times*, "A 20-Year Low in U.S. Carbon Emissions." August 17, 2012. http://green.blogs.nytimes.com/2012/08/17/a-20-year-low-in-u-s-carbon-emissions/.

on sound science to identify and curtail methane leaks is needed, the EPA and other federal agencies should defer regulation to state agencies, many of which have moved forward with aggressive regimes to limit emissions and build new transmission and pipelines to move methane to markets.

The Department of the Interior also has significant purview over oil and natural gas production through federal land leasing and regulation and Endangered Species Act (ESA) designations. Access to federal acreage particularly in Western states and thoughtful regulation over hydraulic fracturing, air emissions and associated practices will ensure that federal production of oil and natural gas increases. Moreover, the Interior Department should work with industry and state governments to evaluate reasonable measures to protect wildlife and their habitats without needing to close large areas to commercial activity.

Congress and the Administration can improve the clarity and efficiency of the regulatory system for operators on federal lands. Yet, production on state and private land should continue to be promulgated at the state level. Federal agencies, however, should be encouraged to engage in dialogue with state regulators on best practices and information-sharing.

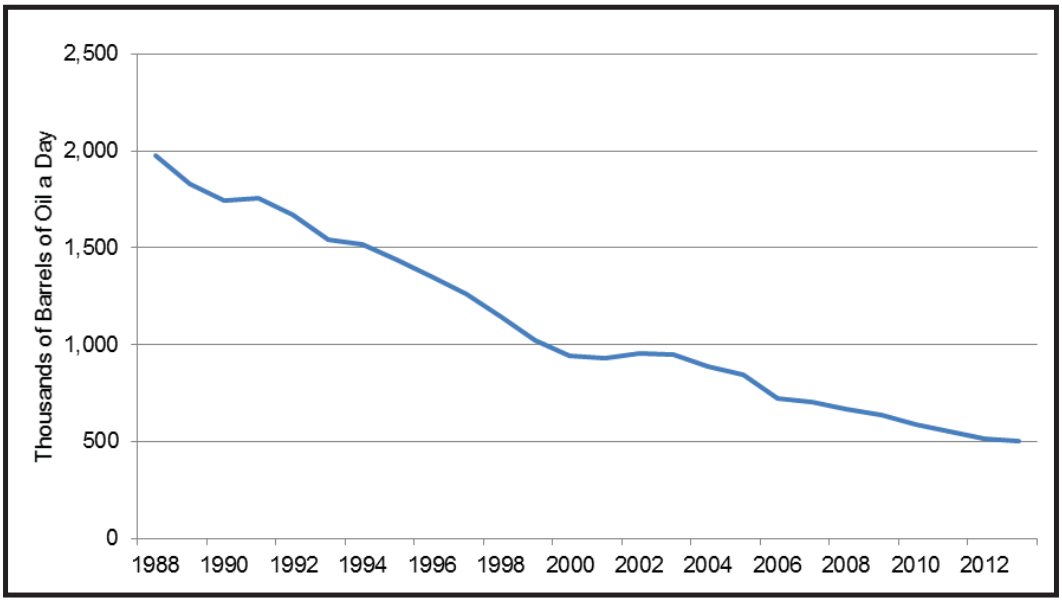
For onshore oil and natural gas production in Alaska, the principle challenge remains access to acreage, specifically in the designated oil-and-gas reserves of the National Petroleum Reserve-Alaska (NPR-A) and the designated area within the Arctic National Wildlife Refuge (ANWR). Limited leasing opportunities in the 23-million-acre NPR-A have produced significant revenues for the State of Alaska and local governments, but ongoing permitting delays and a new integrated land management plan for the petroleum reserve continue to delay production. The Integrated Activity Plan for the NPR-A restricts oil and gas leasing on approximately 30 percent of the reserve and expands designated areas for conservation, which may complicate efforts to develop necessary infrastructure for oil and natural gas development in and in the vicinity of the NPR-A.[21] Increased restrictions could limit the viability of current lessees to develop their tracks and dissuade future investors from developing the petroleum reserve and nearby areas. With regard to ANWR, the 1.5 million acre part of the refuge known as the

Recommendation:

Ensure the Environmental Protection Agency's study on the potential impacts of hydraulic fracturing on drinking water proceeds in a transparent, independent and scientifically driven manner and ensure that the EPA adequately recognizes the safety and performance record of the U.S. oil and gas industry in its over 60-year history using hydraulic fracturing.

[21] U.S. Department of the Interior, "Secretary Salazar Announces Plan for Additional Development, Wildlife Protection in 23 Million Acre National Petroleum Reserve-Alaska." December 19, 2012. http://www.doi.gov/news/pressreleases/secretary-salazar-announces-plan-for-additional-development-wildlife-protection-in-23-million-acre-national-petroleum-reserve-alaska.cfm

Alaska North Slope Crude Production



"10-02 area" that was designated by the U.S. Congress for oil and natural gas exploration has not been made available for leasing. Furthermore, the Obama Administration announced in January 2015 that it would manage the full reserve as wilderness, prohibiting any opportunities for commercial development.

While the Alaskan residents have consistently and overwhelming supported expanded energy production in ANWR and the NPR-A, the federal government has greatly restricted access to federal areas designated for resource development.[22] If the federal government fails to provide greater access to these resources, the Alaska state government and the broader economy could suffer significant hardship. Due to natural declines in crude production on Alaska's North Slope, output now equals about one quarter of 1988 peak levels of 2 million barrels a day.[23] As production declines, the volume of oil transported via the Trans-Alaska Pipeline System also declines. Unfortunately, this warm-oil pipeline cannot operate easily at low volumes in part because of the cold climate. With lower volumes, oil idles or debris freezes in the pipeline, causing costly shutdowns. These consequences, which can cause havoc for the pipeline, global oil markets, and the environment, could occur unless oil production in the North Slope and in the Alaskan Outer Continental Shelf increases.

Recommendation:

Expand leasing of federal land in Alaska to protect the longevity of the Trans-Alaska Pipeline System, to ensure the financial solvency of the State of Alaska and to provide U.S. consumers with a domestic source of fuel, particularly those on the West Coast who rely on Alaska energy resources.

22 Arctic Power, "Top ten reasons to support ANWR development," http://www.anwr.org/ANWR-Basics/Top-ten-reasons-to-support-ANWR-development.php.

23 U.S. Department of Energy, Energy Information Administration, "Alaska North Slope Crude Oil Production." http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MANFPAK2&f=A

Chapter 3

Offshore Oil & Natural Gas

For decades, the U.S. Gulf of Mexico has provided significant oil and natural gas resources for American consumers, today accounting for approximately 21 percent of domestic oil production and 5 percent of domestic natural gas production.[24]

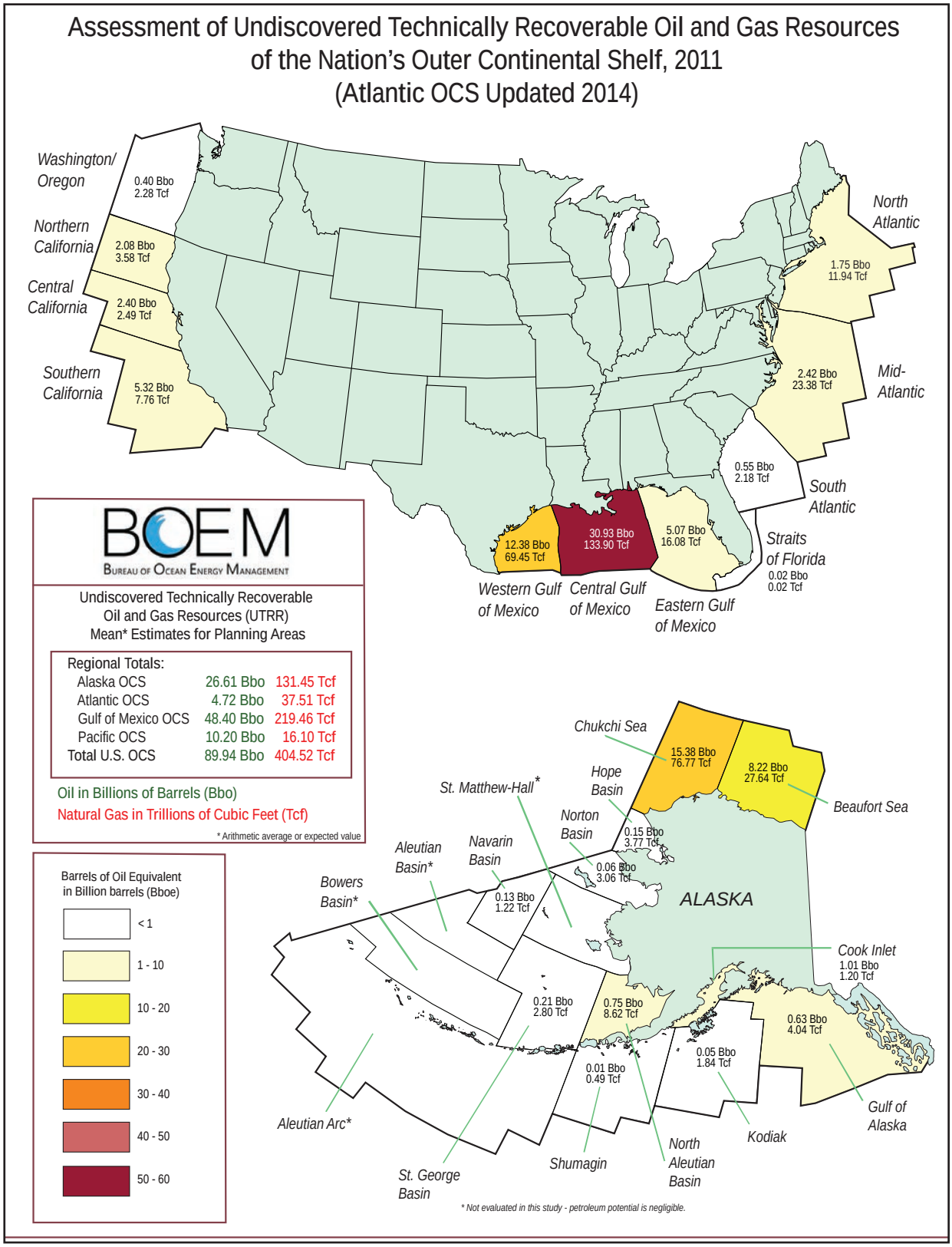
Following the 2010 Deepwater Horizon spill and the ensuing temporary moratorium on deepwater drilling, industry and regulators have advanced significant measures to bolster safety. After more than two years of declines in oil production, activity is up and offshore operators in the Gulf of Mexico are approaching previous levels of production. The number of rigs operating in the region has more than doubled since February 2011, and investment and activity in the U.S. Gulf of Mexico is robust. Amongst the offshore oil and natural gas fields internationally, the U.S. Gulf of Mexico offers greater predictability, and new technologies allow producers to explore in deeper waters. Experts project that due to the increasing rig count during the past year, production in 2015 will rise to more than 1.7 million barrels of oil per day.[25]

At the same time, the federal government continues to keep potentially prolific areas of the U.S. Outer Continental Shelf (OCS) off-limits to oil and natural gas development. In 2014, the U.S. Bureau of Ocean Energy Management (BOEM) estimated that the federal OCS is home to a mean of 89.9 billion barrels of undiscovered technically recoverable resources (UTRR) oil and 404.5 trillion cubic feet of UTRR natural gas.[26] As the BOEM image demonstrates, significant reserves of oil and natural gas lie in areas outside the Western and Central Gulf of Mexico.

24 U.S. Department of the Interior, Bureau of Ocean Energy Management, "Oil and Gas Program." http://www.boem.gov/Oil-and-Gas-Energy-Program/index.aspx.

25 Securing America's Future Energy, "Energy Security Fact Pack Q3 2014." http://www.secureenergy.org/sites/default/files/Q3_ESFP_final_for_website.pdf.

26 U.S. Department of the Interior, Bureau of Ocean Energy Management, "Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2011 (Atlantic OCS Updated 2014)." http://www.boem.gov/2011-National-Assessment-Map-ATL/.



Source: Bureau of Ocean Energy Mangement

Even though roughly half of OCS resources exist outside the Western and Central Gulf of Mexico, abundant resources outside this region are not available for new leasing. Under the Interior Department's current Five-Year Plan for Offshore Oil and Gas Leasing, access to any new areas such as the vast majority of the Eastern Gulf of Mexico and the entire Mid- and South Atlantic region is prohibited through 2017. With development of the next Five-Year Plan for Oil and Gas Leasing for 2017-2022 underway, and with broad public and bipartisan support for expanded offshore access,[27] the Interior Department has an opportunity to ensure long-term energy self-sufficiency by opening access to these significant resources that are currently off limits to leasing and development. As any areas excluded at the outset cannot later be added back in (absent congressional action or the development of a new Five-Year Plan), Interior Department decisions that will be made in 2015 regarding which areas it proposes to keep open for leasing consideration under the 2017-2022 Five-Year Plan are likely to have lasting impacts well into the next decade.

In addition to leasing opportunities, operators need greater confidence in the permitting process. Lessees must contend with a labyrinth of regulations, as well as uncertainty regarding possible changes to financial liability requirements, safety requirements, and other matters. Due to the nature of offshore drilling – including the technical, environmental, and regulatory demands, the offshore production timeline from pre-planning and seismic studies to first production can easily take up to ten years.

As to seismic exploration, the Interior Department's decision in 2014 to issue the framework for receiving and processing permit applications to conduct seismic surveys in the Mid- and South Atlantic marked an important step toward updating decades-old data on offshore oil and gas resources in the region.[28] Such data will provide valuable information that will help facilitate more economically and environmentally effective activities should leasing and development ultimately take place in this area. For seismic activity to take place, however, companies must first receive various permits from federal agencies.

Recommendation:

Conduct vigilant congressional oversight to help secure a 2017-2022 Five Year OCS Oil & Gas Leasing Plan that includes annual lease sales in the Mid-Atlantic and South Atlantic regions, off Alaska, and in the Eastern Gulf of Mexico.

[27] Consumer Energy Alliance, "Poll Finds Strong Support for Offshore Energy." October 10, 2014. http://consumerenergyalliance.org/offshore-energy-poll/; Energy Tomorrow, "A Bipartisan Call for Offshore Energy." August 4, 2014. http://energytomorrow.org/blog/2014/aug/a-bipartisan-call-for-offshore-energy.

[28] U.S. Interior Department, "Record of Decision, Atlantic OCS Proposed Geological and Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement." July 18, 2014. http://www.boem.gov/Record-of-Decision-Atlantic-G-G/.

Recommendation:

Thoughtfully and diligently review and process permits necessary to conduct seismic surveys in the Mid and South Atlantic in a manner that will provide industry and policy makers with the data necessary to make well-informed decisions about where to develop offshore energy resources.

In addition to permitting concerns, implementation of coastal and marine spatial planning and other components of the Administration's National Policy for the Oceans, Our Coasts, and the Great Lakes issued by President Obama through an Executive Order in 2010 -- as well as related activities such as the Administration's Integrated Arctic Management initiative[29] -- continues to cause significant uncertainty about future access to offshore energy exploration, production, and associated activities. Many who have concerns about the policy note that the initiative does not give sufficient oversight and participatory roles for Congress and fails to provide adequate opportunities for public engagement.

Concerns about new potential access restrictions are compounded by President Obama's September 2014 decision to take executive action under the Antiquities Act to significantly expand the size of the Pacific Marine National Monument in a manner that created the largest marine area in the world that is closed to resource extraction.[30] In December 2014, President Obama exercised his executive authority under the OCS Lands Act to indefinitely remove the North Aleutian Planning Area, including Bristol Bay, from consideration for oil and natural gas leasing.[31] Future utilization of the Antiquities Act or other mechanisms to administratively create new non-extraction marine protected areas in U.S. waters could significantly set back efforts to explore for and develop domestic energy resources.

Recommendation:

Ensure that any further development and implementation of the National Ocean Policy and related activities such as the Administration's Integrated Arctic Management initiative proceeds in a sensible and transparent manner that does not create new hurdles for access to offshore energy development and allows for effective Congressional oversight of all activities and sufficient participation by local and state elected officials, user groups, and the public.

29 U.S. Interior Department, "New National Arctic Strategy Adopts Integrated Arctic Management." May 10, 2013. http://www.doi.gov/news/doinews/new-national-arctic-strategy-adopts-integrated-arctic-management.cfm.

30 The White House, "President Obama to Designate Largest Marine Monument in the World Off-Limits to Development." September 24, 2014. http://www.whitehouse.gov/the-press-office/2014/09/24/fact-sheet-president-obama-designate-largest-marine-monument-world-limit.

31 The White House, "President Obama Protects Alaska's Bristol Bay from Future Oil and Gas Drilling." December 16, 2014. http://www.whitehouse.gov/the-press-office/2014/12/16/president-obama-protects-alaska-s-bristol-bay-future-oil-and-gas-drillin.

Recommendation:

In order to ensure that any future decisions regarding the possible designation of marine protected areas fully account for all potential impacts – including those related to U.S. energy security – and are sufficiently informed by potentially affected stakeholders, Congress, and state and local officials, refrain from using the Antiquities Act or other mechanisms as administrative tools to establish non-extraction marine protected areas through executive action.

Furthermore, the Department of the Interior continues to lack sufficient resources to efficiently regulate an evolving offshore industry. While the reorganization of the former Minerals Management Service has begun to address some of the problems related to insufficient staffing, much more can be done to ensure regulators have adequate resources to properly enforce environmental regulations and carry out leasing and permitting duties.

Recommendation:

Ensure regulatory agencies receive sufficient resources to hire skilled professionals to conduct environmental surveys, regulatory enforcement, and leasing and permitting activities, and provide direct funding from existing oil and gas revenues to federal regulatory agencies.

These regulatory challenges are amplified for operators on the Alaska OCS, a source of one of the country's most abundant, untapped energy reserves. The Alaska OCS is not only a ripe opportunity for energy development; it also holds significant geopolitical importance for the United States as an Arctic nation and is a necessary lifeline for the Trans-Alaska Pipeline System. The pipeline's future remains highly uncertain due to declining oil throughput, which has been falling in tandem with declines in onshore oil production in northern Alaska.

Recommendation:

Recognize the strategic importance of the Trans-Alaska Pipeline System to the entire nation and the continued need to develop Alaskan energy resources.

While other nations move forward with aggressive Arctic offshore development projects, producers in the United States have been stalled by a series of litigation, new regulations, technical challenges, and failed coordination amongst a host of regulatory agencies overseeing exploration. Relatedly, the Interior Department is expected to make decisions in spring 2015 regarding whether to affirm Chukchi Lease Sale 193 (held in 2008) and issue related permits necessary to allow exploration to proceed in time for the 2015 summer drilling season. It is also anticipated that the Interior Department will issue proposed regulations in 2015 that are specific to offshore oil and gas activity in the Alaskan Arctic.

The Administration's decision in 2012 to move from an areawide to targeted leasing approach in the Chukchi and Beaufort Seas raises additional questions about the extent to which opportunities will be available to develop energy in this resource-rich region.[32] Under this new leasing approach, rather than offer the full area with certain exclusions, the BOEM will determine in advance of any potential lease sale which specific areas within the region "offer the greatest resource potential while minimizing potential conflicts with environmental and subsistence considerations."[33] BOEM has begun the process of implementing this new approach in advance of proposed Chukchi Lease Sale 237 (currently scheduled for 2016) and proposed Beaufort Lease Sale 242 (currently scheduled for 2017).[34]

Recommendation:

Expeditiously conclude the supplemental environmental review of Chukchi Lease Sale 193, affirm the lease sale, and issue the permits necessary for exploration to commence in time for the summer 2015 drilling season.

32 U.S. Interior Department, "Proposed Final Outer Continental Shelf Oil & Gas Leasing Program, 2012-2017." June 2012. http://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Leasing/Five_Year_Program/2012-2017_Five_Year_Program/PFP%2012-17.pdf.

33 Ibid.

34 U.S. Bureau of Ocean Energy Management, "BOEM Issues Call for Information and Nominations for Potential 2016 Oil and Gas Lease Sale Offshore Alaska." September 26, 2013. http://www.boem.gov/press09262013/; and U.S. Bureau of Ocean Energy Management, "BOEM Issues Call for Information and Nominations for Potential 2017 Oil and Gas Lease Sale Offshore Alaska." July 25, 2014. http://www.boem.gov/BOEM-Newsroom/Press-Releases/2014/press07252014.aspx

Recommendation:

Ensure that any proposed Arctic-specific offshore oil and gas regulations and leasing strategies are reasonable, necessary, based on sound science, and not duplicative of existing requirements.

Recommendation:

As part of the agenda for the U.S. Chairmanship of the Arctic Council, ensure that promotion of jobs, economic growth, and security, including those associated with Arctic offshore energy development, receives appropriate priority.

Lastly, the upcoming 2015-2017 U.S. chairmanship of the eight-member Arctic Council will mark the beginning of a new opportunity for the United States to exercise its leadership in the Arctic for the benefit of this and future generations. The Arctic Council was established in 1996 as a high-level intergovernmental forum to provide a means for promoting cooperation, coordination, and interaction among the Arctic States on common Arctic issues (with the involvement of Arctic Indigenous communities and other Arctic inhabitants). Proposed thematic areas for the U.S. chairmanship focus on climate change, Arctic Ocean stewardship, and improving economic and living conditions.[35]

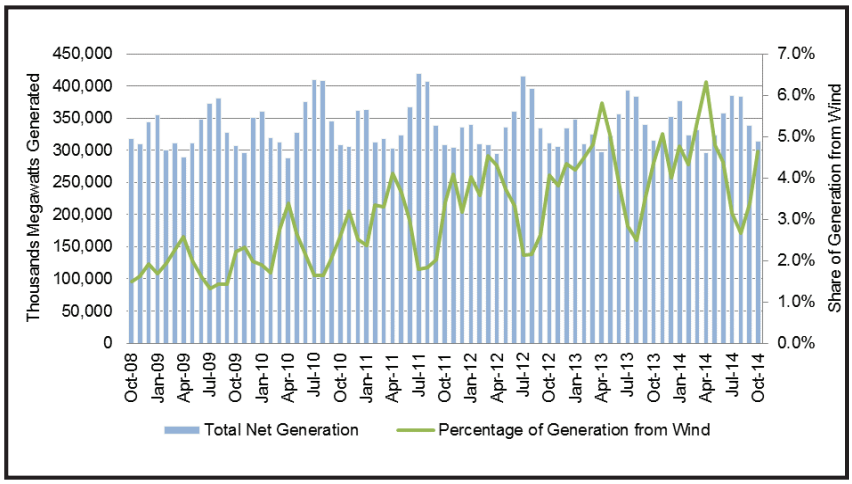
[35] U.S. State Department, "Virtual Stakeholder Outreach Forum on the US Chairmanship of the Arctic Council." December 2, 2014. http://arctic.gov/publications/presentations/Arctic_Council/US_Chairmanship_for_stakeholders.pdf.

Chapter 4

Renewable Energy

Renewable energy resources – including wind, solar, geothermal, biomass, biofuels and hydroelectric power – increasingly play a strong role in the nation's energy mix and demonstrate potential to increase the use of low-carbon energy in America. This chapter will review the main sources of renewable energy in use today, the opportunities and challenges facing these resources and policy recommendations that will ensure increased utilization of these resources benefits energy consumers, national security and the environment.

Share of Electricity from Wind Rising



Wind

Due in part to a mix of federal and state incentives and production standards, as well as significant decreases in production costs, onshore wind installations continue to increase and offshore wind installations are in the initial stages of commercialization in the United States. While wind energy still accounts for less than five percent of net electricity generation, in just the past few years wind energy has nearly doubled its share of electricity generation.[36] Lower costs and regulatory standards have influenced electricity providers to increase the utilization of wind in their portfolios. In 2013, electric utilities signed purchase power agreements for 8,000 megawatts of wind energy.[37]

diversify sources of electricity generation, but the expansion of this resource and its ability to compete with more popular fuels for electricity face a few challenges. First, the areas of greatest potential – the windier plains of the Mid-Continent – exist far away from the populous coastal centers where electricity demand is highest. Better capitalization of these resources will require significant transmission infrastructure to efficiently transport supplies to centers of demand and the construction of large, battery-like storage systems. The development of offshore wind farms, particularly in the North- and Mid-Atlantic and the Pacific Northwest, could alleviate some of the transmission limitations. Public opposition has exacerbated these technical challenges. The wind industry increasingly faces opposition from communities unwilling to site wind farms and permit right-of-ways for large transmission lines that traverse their local areas.

36 Energy Information Administration, "Electricity Data Browser," http://www.eia.gov/electricity/data.cfm

37 American Wind Energy Association, "The Attributes of Wind Energy are Adding Up," State of American Energy. January 2015. http://www.api.org/~/media/files/policy/soae-2015/api-2015-soae-report.pdf.

Second, the intermittency of wind energy will require utilities and grid operators to prepare for and manage the variability of wind power on the grid. This will be particularly critical as grid managers and regulators prepare for the reliability challenges that may come as coal-fired and nuclear power plants retire prematurely and intermittent resources expand.

The wind industry also faces long-term uncertainty about federal financial incentives, particularly the federal Production Tax Credit, which has been extended retroactively through 2014. Many lawmakers question the efficacy of a long-term tax credit, yet the annual extensions also create uncertainty for the growing industry. Wind producers and manufacturers could benefit from greater certainty and avoid a boom-bust cycle if policy makers instituted a long-term plan for wind energy support that evaluates current and future incentives and standards (including federal air emission regulations) at the state and federal levels and balances this against the industry's needs for greater commercialization. Ultimately, consumers and taxpayers could benefit from a more competitive, cost-effective renewable electricity resource.

Solar

According to data from the Energy Information Administration (EIA), solar power only accounted for 3.3 percent of renewable energy consumption in 2013 and similarly contributed a small percentage of utility-scale electricity generation in the United States.[38,39]

Given the steadily declining costs per kilowatt hour of solar photovoltaic systems, which converts solar energy to electricity, and the expansion of solar panel leasing programs, distributed solar systems (e.g. rooftop solar panels) could contribute a more sizable portion of renewable electricity generation in the coming years. The Solar Energy Industries Association reports that the solar industry installed 7.4 gigawatts of solar in 2014, up 42 percent over the previous year. Furthermore, the residential market for rooftop solar has grown by at least 50 percent in each of the past few years.[40]

As adoption of distributed generation grows, many states are examining how this growth affects the grid and the resources needed to support this critical infrastructure. State-level public utility commissioners are grappling with two particular challenges. First, most states have adopted net metering programs that incentivize distributed generation systems by allowing owners to sell unused electricity back to the grid, resulting in a credit on their utility bill. In some states, the utility is paying a higher cost for this excess energy and these higher costs can be redistributed to non-rooftop solar owners in the form of higher rates. Second, the two-way flow of power on and off the grid has increased the maintenance needed to ensure the grid remains reliable.

Recommendation:

Enable stronger coordination amongst federal and state agencies involved in permitting wind installations and transmission lines to limit the potential for delays.

38 Energy Information Administration, "Renewable Energy Production and Consumption by Primary Energy Source," http://www.eia.gov/totalenergy/data/annual/index.cfm#renewable.
39 U.S. Department of Energy, Energy Information Administration, "Energy in Brief." http://www.eia.gov/energy_in_brief/article/renewable_electricity.cfm.
40 Solar Energy Industries Association, "Solar Energy in America Shines Bright," State of American Energy. January 2015. http://www.api.org/~/media/files/policy/soae-2015/api-2015-soae-report.pdf.

While much of this policy making occurs at the state and local level, federal lawmakers should be aware of how these opportunities and challenges affect the future growth of solar power and engage in a dialogue with local leaders about how to ensure an equitable system for all consumers.

Biomass & Biofuels

Biomass – mostly wood, landfill gas, municipal solid waste and other organic waste – accounted for approximately 1.5 percent of electricity generation in 2013.[41] For industrial consumers, biomass offers an alternative source of readily accessible electricity or heating for facilities with large operations proximate to sufficient biomass supplies. In particular, paper, chemical and food processing industries can utilize the biomass waste produced during operations to generate electricity, heat and steam for on-site facilities.

Biofuels account for a sizable portion of the transportation fuel pool, due primarily to the federal Renewable Fuel Standard (RFS), which is examined in Chapter 7. Ethanol derived from renewable, organic matter accounts for nearly 10 percent of U.S. gasoline consumption and biodiesel accounts for nearly 2 percent of distillate consumption.[42] In 2014, ethanol production averaged 935,000 barrels per day, and EIA projected very modest growth in production in the coming years.[43] Biodiesel production similarly will grow: EIA estimated that biodiesel production will average 84,000 barrels per day in 2015, up from 81,000 barrels per day in 2014.[44]

Current biofuel production remains mostly limited to ethanol and biomass-based biodiesel. Advanced cellulosic ethanol – transportation liquids derived from non-food feedstocks such as agricultural waste and switchgrass – has not been available in significant commercial quantities, even though the federal RFS requires utilization

Recommendation:

Support polices that foster the growth of advanced biofuels through more targeted research, development and demonstration programs that would lead to more effective and cost-competitive advanced biofuel production.

Recommendation:

Federal policy makers should ensure that continued growth in distributed energy is balanced against the need to maintain resources for the electric grid and to maintain reasonable prices for all consumers.

41 U.S. Department of Energy, Energy Information Administration, "Energy in Brief." http://www.eia.gov/energy_in_brief/article/renewable_electricity.cfm.
42 U.S. Department of Energy, Energy Information Administration, "Biofuels Issues and Trends," October 2012. http://www.eia.gov/biofuels/issuestrends/pdf/bit.pdf.
43 Energy Information Administration, "Short-Term Energy Outlook: Renewables and CO2 Emissions," January 2015. http://www.eia.gov/forecasts/steo/report/renew_co2.cfm?src=Environment-b1.
44 Ibid.
45 Institute for Energy Research, "What Will EPA's Final Decision Be on the RFS?" September 24, 2014. http://instituteforenergyresearch.org/analysis/will-epas-final-decision-rfs/.

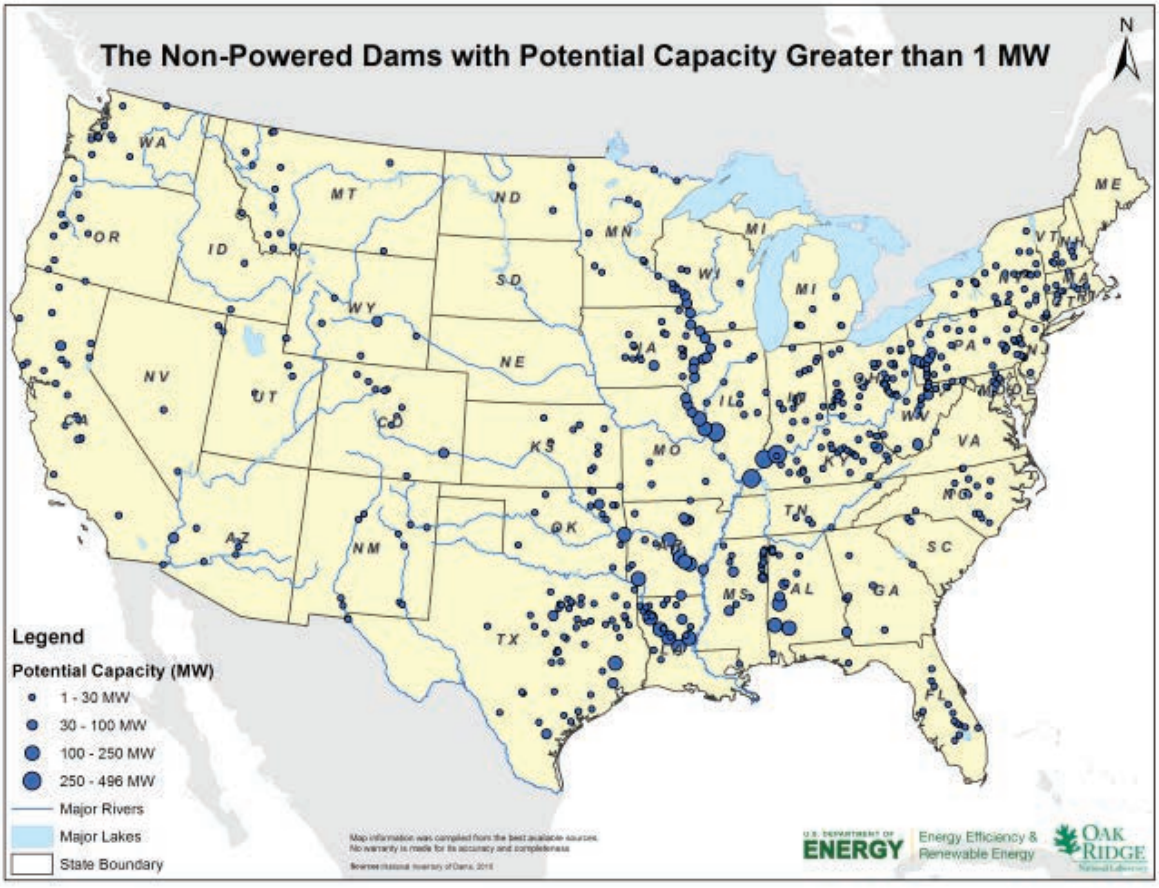
of cellulosic ethanol. The Environmental Protection Agency (EPA) estimated that as of July 2014, the cellulosic biomass industry produced year to date only 50,000 gallons of cellulosic ethanol.[45]

In order to boost production of cellulosic fuels as required by the RFS, the federal government should realign funding support mechanisms to focus more on the research, development and demonstration phase in order to ensure that biofuels can be produced commercially in the quantities necessary and at a competitive price.

Hydroelectric

Hydroelectric power constitutes the largest source of renewable electricity, representing 6.7 percent of total U.S. electricity generation in 2013.[46] Hydropower's greatest advantages are its consistency as a baseload source of power and its affordability for current consumers, as many of the best sites have been dammed.

Despite the advantages of hydroelectric power, the United States is not fully utilizing its hydropower resources. More than 82,000 dams exist in the United States, yet only 3 percent of dams (approximately 2,500) currently produce electricity.[47] According to the Department of Energy (DOE), since many of the monetary costs and environmental impacts of dam construction have already occurred at these non-powered dams, adding power to these existing dam structures could be achieved at a lower cost, with less risk and in a shorter timeframe than development requiring new dam construction.[48]



Source: Oak Ridge National Laboratory

46 U.S. Department of Energy, Energy Information Administration, "Energy in Brief." http://www.eia.gov/energy_in_brief/article/renewable_electricity.cfm.

47 U.S. Department of Energy, Energy Efficiency and Renewable Energy, "An Assessment of Energy Potential at Non-Powered Dams in the United States." April 2012. http://www1.eere.energy.gov/water/pdfs/npd_report.pdf

48 Ibid.

Transforming qualified non-producing dams into power generators could add 12 gigawatts of new generating capacity.[49]

One of the main hurdles to expanding hydropower at existing facilities is the lengthy permitting process, which is overseen by the Federal Energy Regulatory Commission (FERC). The 113th Congress acted in a bipartisan manner to pass the Hydropower Regulatory Efficiency Act of 2013 (Public Law 133-23), which includes charges to streamline the permitting process for converting existing dams into electricity generators. Since converting existing dams into power generators is a low-cost, low-risk way to increase electricity generation, it is in the best interest of consumers to ensure a streamlined permitting procedure that takes into account that much of the environmental impacts associated with damming the waterway have already occurred.

Recommendation:

Ensure the Federal Energy Regulatory Commission, the Department of Energy and other federal agencies continue to implement legislation that seeks to expand the development of new hydroelectric power from small hydropower projects and from existing dams.

[49] Ibid.

Chapter 5

Nuclear Energy

Nuclear Power

There are currently 99 operable commercial nuclear reactors at 61 nuclear power plants across the United States.[50] Advances in the average capacity factor for nuclear plants have enabled nuclear power to keep pace with demand in the absence of new construction. The last time a new reactor entered commercial service was in 1996. The Tennessee Valley Authority estimates that its Watts Bar 2 unit will begin commercial operation in late 2015, while Southern Nuclear's Vogtle Units 3 and 4, as well as SCE&G's VC Summer Units 2 and 3, are expected to come online in 2017 and 2018.[51]

While nuclear energy expands in the Southeast, other parts of the country have experienced the premature closure of nuclear facilities due mostly to poor market conditions and onerous regulations. In recent years facilities in Vermont, California and Wisconsin have closed before the end of their operating life expectancy. These shutdowns require regulators and utilities to quickly replace the supply, oftentimes with more costly interim solutions that have raised prices for consumers.[52] In order to extend the longevity of these resources, federal and state policy makers must better account for the contributions of nuclear power to zero-carbon electricity generation and work to prevent unnecessary plant closures.

Existing nuclear facilities also faces challenges regarding the management and disposal of nuclear waste. As stipulated by the Nuclear Waste Policy Act of 1982, the federal government is responsible for providing a place for the permanent disposal of high

Recommendation:

Revise the EPA Clean Power Plan to ensure existing nuclear facilities receive full credit for the emissions-free power they currently produce and to encourage expansion of nuclear power as a means of low-carbon, base-load power.

50 U.S. Department of Energy, Energy Information Administration, "How many nuclear power plants are in the U.S. and where are they located?" http://www.eia.gov/tools/faqs/faq.cfm?id=207&t=21.

51 U.S. Department of Energy, Office of Nuclear Energy, "Quarterly Nuclear Deployment Scorecard – October 2014." http://www.energy.gov/ne/downloads/quarterly-nuclear-deployment-scorecard-october-2014.

52 Energy Information Administration, "Vermont Yankee nuclear plant closure in 2014 will challenge New England energy markets," September 6, 2013. http://www.eia.gov/todayinenergy/detail.cfm?id=12851.

level radioactive waste and spent nuclear fuel. Also included in the law, nuclear utilities were required to pay 1/10th of a cent per kilowatt hour of electricity generated at nuclear power plants plus interest into the Nuclear Waste Fund to expense disposal. Amendments to the law provided for the DOE to investigate a possible permanent disposal site at Yucca Mountain, Nevada. For years, opposition to the site kept Yucca from moving forward. In 2009 the Obama Administration announced that it would not proceed with construction and operation of the Yucca Mountain as a used fuel repository project.

In May 2014, following a lawsuit filed by the nuclear industry, and with no long-term plan for nuclear waste repository, the DOE ceased collecting fees for the Nuclear Waste Fund. The current balance of the Nuclear Waste Fund exceeds $30 billion and remains unspent to date.[53] At this time, nearly all commercial used fuels are in temporary storage at individual reactor sites.

In response to the final recommendations issued by the Administration's 2012 Blue Ribbon Commission on America's Nuclear Future, the DOE recently released its "Assessment of Disposal Options for DOE-Managed High-Level Radioactive Waste and Spent Nuclear Fuel." The report recommends that DOE "begin implementation of a phased, adaptive, and consent-based strategy" to develop a separate repository for nuclear waste.[54]

The obstacles to construction of new nuclear facilities remain substantial: cost estimates for a new nuclear plant range from $6 billion to $8 billion, an extremely high price tag for most of the relatively small U.S. electric companies, and the regulatory process for approval can take years.[55] Programs intended to reduce the financial risk of new construction, including federal loan guarantees and state-based construction work in progress (CWIP) laws, have not been effectively applied in all cases and isolated incidents have increased the public scrutiny of these financial tools. Compounding financing concerns, new facilities increasingly face litigation from opposition groups.

Since financing and construction of new reactors remains uncertain, nuclear producers are examining the potential to expand nuclear power with small modular reactors (SMR). An SMR is smaller in size than current nuclear power facilities, provides less than

Recommendation:

Develop and implement a viable program for the long-term management and disposal of nuclear waste as recommended by the Department of Energy in its "Assessment of Disposal Options for DOE-Managed High-Level Radioactive Waste and Spent Nuclear Fuel."

53 Nuclear Energy Institute, "Nuclear Waste Fund Fee Suspended." http://www.nei.org/Master-Document-Folder/Multimedia/Infographics-Database/Nuclear-Waste-Fund-Fee-Suspended.

54 U.S. Department of Energy, "Assessment of Disposal Options for DOE-Managed High-Level Radioactive Waste and Spent Nuclear Fuel," October 2014. http://energy.gov/sites/prod/files/2014/10/f18/DOE_Options_Assessment.pdf.

55 Nuclear Energy Institute. "FAQ About Nuclear Energy: New Reactor Cost." http://www.nei.org/Knowledge-Center/FAQ-About-Nuclear-Energy.

Recommendation:

Ensure continued support for the Department of Energy's SMR Licensing Technical Support Program to assist the commercialization and deployment of small modular reactors.

300 megawatts of power and requires substantially less capital investment.[56] One of the biggest advantages of an SMR is that manufacturers can build them at a central location before shipping the reactor via rail or barge for on-site assembly. Additionally, the SMR design includes an underground radiation-containment structure, which is meant to be safer and less expensive than containment structures at larger facilities. The Department of Energy (DOE) has placed a high priority on accelerating the timelines for commercialization and deployment of SMR technologies through its SMR Licensing Technical Support Program. This program aims to advance the certification and licensing of domestic SMR technologies that are relatively mature and will be ready for deployment within the next decade.[57]

56 U.S. Department of Energy, Office of Nuclear Energy, "Small Modular Nuclear Reactors." http://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors.
57 Ibid.

Chapter 6

Electricity Generation & Distribution

The United States produces electricity from a diversity of sources, with coal, natural gas, nuclear and hydroelectric power accounting for a vast majority of electricity generation.[58] Diversification reduces some of the price and supply vulnerabilities that can result with over-reliance on one form of energy for electricity generation. Much of the diversification in U.S. generation, however, is simply a consequence of geography and local market conditions, and as a result has been taken for granted.

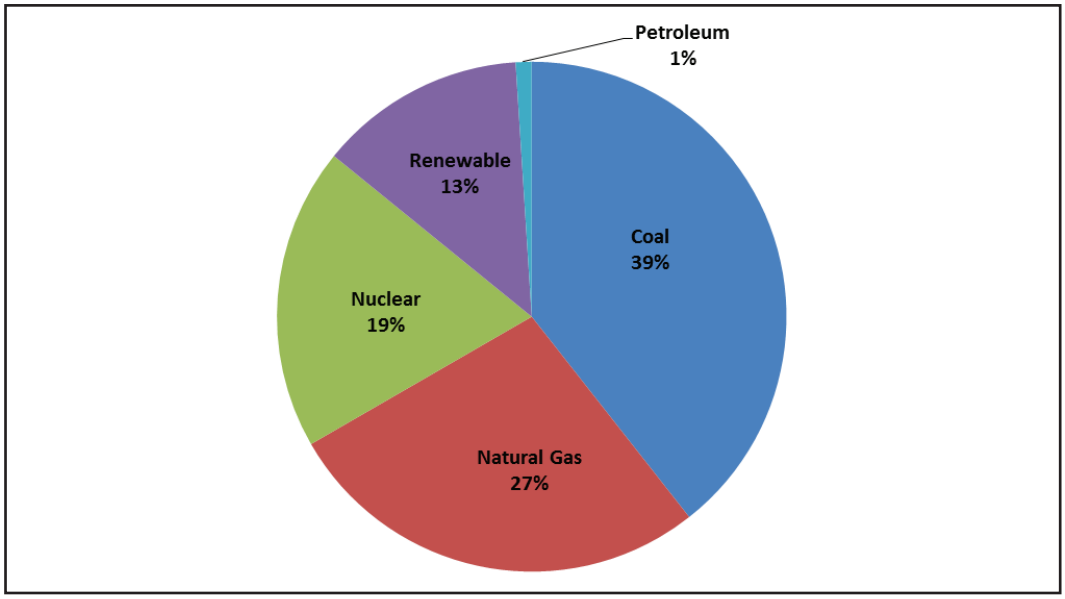
This chapter specifically focuses on coal-fired power and electricity distribution. For information and policy recommendations on natural-gas fired power generation, renewable electricity or nuclear energy, visit Chapters 2, 4, and 5, respectively.

Coal-Fired Electricity Generation

Coal is one of the most abundant domestic resources available to produce electricity cost-effectively and its utilization continues to account for a significant part of U.S. electricity generation. However, concerns have been expressed about the impacts of coal use to public health and the environment. While alternative energy and natural gas have begun to play an increasing role in electricity generation, the United States should continue to thoughtfully utilize coal, striving to ensure its development and use occur in the most responsible manner available.

For decades the U.S. Environmental Protection Agency (EPA) has successfully enforced a

Sources of U.S. Electricity Generation, 2013



[58] U.S. Department of Energy, Energy Information Administration, "Electricity in the United States." http://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states.

suite of regulations to mitigate emissions, including mercury, sulfur dioxide and other pollutants, from coal-fired power plants. The agency has implemented the Cross State Air Pollution Rule and the Mercury and Air Toxics Standards for Power Plants to limit emissions of air pollutants as well as increase facilities' requirements for monitoring, record keeping and reporting. These rules have had sweeping impacts for coal-fired power generators, which must undergo extensive retrofits or retire in order to comply.

In September 2013, the EPA released its Proposed Carbon Pollution Standard for New Power Plants to establish emission limits for new coal-fired units. Subsequently, in June 2014 the EPA published the draft Clean Power Plan (CPP) to require existing coal-fired power generators to cut carbon emissions by 30 percent from 2005 levels. These proposed rules will significantly reduce the use of coal-fired electricity based on its greenhouse gas emissions and pose serious consequences for American consumers, particularly as it relates to affordable electricity and grid reliability.

In order to comply with proposed regulatory requirements in the CPP, utilities and electric cooperatives could spend anywhere from $366 billion to $479 billion over a 15-year time period. These increased costs translate into double digit electricity price hikes for consumers in 43 states, with consumers in 14 states potentially seeing peak rates increase by 20 percent or more.[59] (For elaboration regarding the CPP's impacts on grid reliability, visit the Electricity Distribution section later in this chapter.)

Recommendation:

Ensure a proper balance between emission standards and coal-fired electricity using objective, peer-reviewed, scientific evidence that takes into consideration environmental and economic sustainability.

Recommendation:

Prioritize our nation's electricity consumers by ensuring the Clean Power Plan does not impair the affordability and reliability of electricity and expand the compliance period for the proposed rule in order to allow states and electricity providers enough time to ensure that new generation capacity from low- and no-carbon fuel sources can be brought online in an orderly and cost-effective manner.

59 Ibid.

Electricity Distribution

The nation's electrical transmission grid, or "grid," is the interconnected group of power lines and associated equipment that transports electric energy at high voltage between points of supply and points at which it is delivered to other electric systems or transformed to a lower voltage for delivery to customers.[60] Beginning in the 1960s, the nation's electric system transformed from isolated generators to an interregional grid, which helped to dramatically improve reliability. Investor-owned utilities own nearly 80 percent of transmission and public-owned utilities own the remaining 20 percent.[61] To ensure the efficient operation of the grid, independent system operators and regional transmission organizations monitor system loads, operate transmission facilities and direct generation, and oversee other critical functions while reliability coordinators also help develop and enforce safety and reliability standards.

Given the interconnectedness of North America's electricity system, multiple layers of reliability safeguards must be enforced to prevent widespread outages. In 2003, the Midwest and Northeast, as well as parts of Ontario, Canada, experienced one of the largest blackouts in history, affecting 50 million customers and costing an estimated $4 billion to $10 billion.[62] The task force that evaluated the causes of the 2003 blackout concluded that various entities involved failed to develop, implement, and enforce necessary practices and technologies that would ensure safe, consistent flow of electricity to consumers.

The Federal Energy Regulatory Commission's (FERC) Office of Electric Reliability (OER) was formed in response to the 2003 blackout and continues to play a significant role in ensuring electric grid reliability. Under the Energy Policy Act of 2005, the OER is charged with protecting and improving the reliability and security of the nation's bulk power system via regulatory oversight. One of the OER's major responsibilities is to "coordinate with the applicable Federal agencies…to facilitate energy reliability and security."[63] In December 2014, FERC Chairman Cheryl A. LaFleur stated, "The Commission clearly has a role to play in ensuring that the nation's energy markets and infrastructure adapt to support compliance with the proposed Clean Power Plan."[64] In order to further assess the CPP's impact on reliability and power system operations, FERC announced a series of technical conferences to be held at various locations across the U.S. in 2015.

In the Regulatory Impact Assessment for the CPP, the EPA notes that generation capacity from coal-fired units could be reduced by 45 gigawatts in 2030. Coal-fired units have historically provided the nation's "base-load" of electricity, the portion of the electricity

Recommendation:

Support FERC's efforts to assess stakeholders' concerns and coordinate with EPA in order to maintain electric grid reliability under the Clean Power Plan.

60 U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, "Information Center." http://energy.gov/oe/information-center/educational-resources/electricity-101#sys3.
61 Ibid.
62 U.S. Department of Energy, U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations," April 2004. http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/BlackoutFinal-Web.pdf.
63 Federal Energy Regulatory Commission, "Office of Electric Reliability (OER)." http://www.ferc.gov/about/offices/oer.asp.
64 Federal Energy Regulatory Commission, "FERC Plans Technical Conferences Focused on EPA's Clean Power Plan," December 9, 2014. http://www.ferc.gov/media/news-releases/2014/2014-4/12-09-14.asp#.VK3TaCvF8jo.

load that is continually present on the grid. A potential base-load reduction of this magnitude will result in an unprecedented restructuring of electricity markets and will require extensive capital investment as well numerous hurdles related to permitting and infrastructure. Additionally, removal of coal-fired units from the grid increases the chance for power disruptions during extreme conditions.

To ensure reliability practices align with the realities of the current electricity market, the Department of Energy's Office of Electricity Delivery and Energy Reliability (OE) oversees a range of initiatives that develop and recommend electricity policy that could better provide consumers with reliable electricity now and in the future. Some of the current and future challenges that the OE examines include emergency planning and response, cybersecurity threats and coordination of federal and state policy.

Recommendation:

Provide adequate resources to federal agencies, including the Office of Electricity Delivery and Energy Reliability, to continue to identify threats to electricity reliability and to research technologies and behaviors that could improve the reliability of the nation's electrical system.

Chapter 7

Fuels

Refining

The U.S. transportation sector – cars, trucks, planes, ships and trains – consume nearly 71 percent of U.S. oil demand.[65] U.S. refineries have an operating capacity of more than 17.8 million barrels of oil per day and supply nearly 93 percent of domestic gasoline demand for 246 million vehicles.[66] In addition to fuels, refineries utilize oil and natural gas to manufacture petrochemical products, which form the building blocks for countless consumer products, including, but not limited to plastics, fertilizer, food preservatives, candles, paint, cosmetics and laundry detergent. America's refineries also manufacture home heating oil, asphalt and a variety of lubricants that keep mechanical devices running smoothly.

In 2014, the U.S. Environmental Protection Agency (EPA) proposed a rulemaking that will increase hazardous air emission control requirements for petroleum refineries. The EPA could also move to enact greenhouse gas emission standards for refineries, similar to the rules proposed on existing power plants. New and expanded regulations will affect the ability of refiners to manufacture fuels and petrochemical products affordably. Refiners have invested significantly to minimize the environmental impact of their operations. However, with a slate of more stringent environmental regulations proposed by federal regulators, the U.S. refining industry may be required to further increase investments in emission control technologies or shutter its facilities, either of which could lead to significant added costs for consumers.

Recommendation:

Ensure the U.S. Environmental Protection Agency conducts objective, cost-benefit analyses to determine whether proposed changes to existing regulation and proposed new regulations affecting domestic refineries will produce significant health and environmental benefits.

65 U.S. Department of Energy, Energy Information Administration, "Oil: Crude and Petroleum Products Explained." http://www.eia.gov/energyexplained/index.cfm?page=oil_home#tab2.

66 U.S. Department of Energy, Energy Information Administration, "Refinery Utilization and Capacity." http://www.eia.gov/dnav/pet/pet_pnp_unc_dcu_nus_m.htm; American Petroleum Institute, "The State of American Energy: America's Energy, America's Choice." 2014. http://www.api.org/~/media/files/policy/soae-2014/api-2014-state-of-american-energy-report.pdf.

Alternative Fuels

Other sources of energy, in addition to crude oil and biomass, can be transformed into transportation fuels. State-of-the-art technology exists for developing synthetic fuels from coal and natural gas to produce a liquid for use primarily as diesel or jet fuel. These synthetic fuels can utilize current infrastructure, and conventional vehicle and jet engines will not require retrofitting.

Specifically, gas-to-liquids (GTL) products include GTL diesel, naphtha, liquefied petroleum gas (LPG), jet fuel and chemical feedstocks. The GTL production process is based on Fischer-Tropsh technology, which has been in commercial use for nearly 70 years. In 2012, Sasol, a South African company with existing GTL operations in South Africa and Qatar, proposed to build the first GTL facility in the United States and is expected to render its final decision to proceed with construction by 2016.[67] The Louisiana-based plant would take advantage of bountiful supplies of lower cost shale gas produced in nearby Texas and Louisiana to manufacture GTL products.[68]

Since these synthetic fuels work with existing infrastructure and vehicles, the commercial viability of these fuels in the United States remains promising. However, the construction and operation of new facilities in the United States will likely face economic and regulatory barriers similar to those experienced by oil refiners.

Renewable Fuel Standard

Fuel standards can also affect the availability and affordability of fuel. One such federal standard is the Renewable Fuel Standard (RFS), which seeks to increase the volume of renewable fuels – such as corn ethanol and advanced cellulosic ethanol – blended into the nation's fuel pool. In 2007, Congress passed the Energy Independence and Security Act of 2007 (EISA). The law dramatically increased the RFS, first enacted in 2005, from 7.5 billion gallons to 36 billion gallons of renewable fuel by 2022. In order to implement this expanded standard, the EPA finalized the RFS2 regulations in 2009. The EPA remains responsible for revising and annually promulgating the volumetric blending requirements in accordance with the law and its views on the projected market availability of various renewable fuels.

As Americans continue to reduce their fuel use, due in part to greater vehicle efficiency standards, the RFS's increasingly higher renewable blending requirements has posed a challenge for U.S. refiners, motorists and fuel retailers. First, in order to accommodate future RFS mandates, gasoline must be blended with higher ethanol content. In 2014, the nation reached the 10 percent ethanol (E10) blend-wall as a result of the RFS's increased blending requirements. Maintaining a higher target for the RFS would require a move to 15 percent ethanol blended gasoline (E15). Unfortunately for consumers, 90 percent of vehicles on the road today (including most 2001 to 2013 models) cannot

Recommendation:

Ensure federal regulators apply sound, objective regulations on new alternative fuel facilities and support environmentally sound manufacturing of synthetic fuels.

[67] *Independent Online*, "Sasol to decide on US GTL plant in 2016," October 28, 2014. http://www.iol.co.za/business/companies/sasol-to-decide-on-us-gtl-plant-in-2016-1.1771597#.VJj9JsAAA.
[68] iBid.

handle higher ethanol blends without risking significant mechanical problems. Additionally, the nation's fueling infrastructure is incompatible with higher ethanol blends.[69]

Second, the current and projected levels of commercially available cellulosic ethanol have not been nor will be sufficient to meet the standard. As of July 2014, the cellulosic biomass industry produced only 50,000 gallons of cellulosic ethanol year to date – far below the 1.75 billion gallon mandate established by the EISA.[70] Due to this significant shortfall, the EPA revised its definition of what qualifies as cellulosic biofuel. In its rulemaking, the agency identified "advanced fuel pathways" eligible for qualification under the RFS including compressed and liquefied natural gas produced from biogas from landfills.[71] According to the EPA, since this new classification, nearly 24.2 million gallons of cellulosic biofuels have been produced by these feedstocks.[72]

The EPA recently announced it would delay finalizing its November 2013 rule proposal mandating U.S. refiners add 15.2 billion gallons of renewable fuel to the nation's fuel supply in 2014.[73] The agency is evaluating the intent of the RFS under EISA in light of concerns regarding the viability of future blend requirements and lower gasoline consumption.

The long-term RFS volumetric blending requirements will, unless modified, result in unintended consequences for energy consumers. The U.S. Congress should undertake reasonable reform measures now to protect American fuel consumers without damaging America's renewable fuel industry. A successful reform effort should amend the program to account for the realities of renewable fuel markets, existing vehicle technologies, fuel demand, and issues arising from the use of gasoline containing more than 10 percent ethanol in order to ensure that the RFS properly incentivizes renewable transportation fuels. Specifically, any RFS reform effort must take into account the reality that neither the American vehicle fleet nor its fueling infrastructure are currently capable of handling fuels with more than 10 percent ethanol without risking vehicle damage or voiding vehicle warranties. Moreover, the federal government should focus efforts on supporting research, development and demonstration of advanced biofuels to ensure their commercial viability.

Recommendation:

Pursue reform efforts to amend the federal Renewable Fuel Standard to account for the realities of renewable fuel markets, vehicle technologies, fuel demand, and issues encountered with the use of fuels containing more than 10 percent ethanol.

69 Institute for Energy Research, "What Will EPA's Final Decision Be on the RFS?" September 24, 2014. http://instituteforenergyresearch.org/analysis/will-epas-final-decision-rfs/.
70 Ibid.
71 U.S. Environmental Protection Agency, "EPA Issues Final Rule for Renewable Fuel Standard (RFS) Pathways II and Modifications to the RFS Program, Ultra Low Sulfur Diesel Requirements, and E15 Misfueling Mitigation Requirements," July 2014. http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f14045.pdf.
72 U.S. Environmental Protection Agency, "2014 RFS2 Data," December 8, 2014. http://www.epa.gov/otaq/fuels/rfsdata/2014emts.htm.
73 Bloomberg BNA, "EPA Won't Finalize Renewable Fuel Standard in 2014, Cites Lengthy Delays," November 21, 2014. http://www.bna.com/epa-wont-finalize-n17179912489/.

Low Carbon Fuel Standard

A low carbon fuel standard (LCFS) is designed as a cap-and-trade program for transportation fuels that seeks to reduce the carbon intensity of the nation's fuel pool through an aggressive program to force fuel switching from traditional fuels such as gasoline and diesel to "low carbon" fuels such as cellulosic ethanol and electric vehicles. The standard is under implementation in California and Oregon and is under development or consideration in Washington State and 11 states in the Northeast/Mid-Atlantic region.[74] The EPA has also stated it has the authority to pursue a national LCFS.

The LCFS program in California and those proposed by other states differentiate between crude oil sources by establishing a life-cycle carbon evaluation for the fuels, which effectively discriminates against high carbon intensity crudes such as Canadian oil sands and some forms of domestically produced crude.

Although proponents of an LCFS claim that it is a cost-effective way to reduce carbon emissions from the transportation sector, several economic studies have concluded that an LCFS – regardless of whether it is implemented at the national, regional or state level – will substantially raise transportation fuel prices without meeting its intended purpose of reducing greenhouse gas (GHG) emissions. According to a 2010 study by Charles River Associates, a national LCFS could raise gasoline, diesel, and home heating oil prices by as much as 170 percent over 10 years and eliminate as many as 4.3 million jobs over 10 years.[75] Furthermore, a 2010 study by Barr Engineering concluded that the rerouting of crude transports as a result of an LCFS could increase GHG emissions by 7.1 to 19.0 million metric tons annually.[76]

Recommendation:

Support polices that foster the growth of advanced biofuels through more targeted research, development, and demonstration programs that would lead to more effective, cost-competitive, advanced biofuel production.

Recommendation:

Prevent the enactment of a federal-, regional-, or state-level low carbon fuel standard and avoid other GHG-reduction strategies that discriminate against North American resources, such as Canadian crude.

74 Center for Climate and Energy Solutions, "Transportation Sector: Low Carbon Fuel Standard," January 5, 2015. http://www.c2es.org/us-states-regions/policy-maps/low-carbon-fuel-standard.

75 Charles River Associates, "Economic and Energy Impacts Resulting from a National Low Carbon Fuel Standard," June 2010. http://www.secureourfuels.org/wp-content/uploads/2010/06/CRA-LCFS-Final-Report-June-14-2010.pdf.

76 Barr Engineering, "Low Carbon Fuel Standard 'Crude Shuffle' Greenhouse Gas Impacts Analysis," June 2010. http://www.secureourfuels.org/wp-content/uploads/2011/04/Crude_Shuffle_Report_0616101.pdf.

Chapter 8

Energy Taxes and Revenue

Energy resource development contributes significantly to the U.S. economy. As Chapter 1 highlights, not only does every sector of the U.S. economy rely on energy to power its operations, the economy also benefits directly from the significant amount of jobs and revenue energy production generates. The oil and natural gas sector alone annually contributes more than $1.2 trillion to the U.S. economy.

Federal tax and budget policy greatly influences nearly every step in the process of energy development and consumption, affecting the cost of energy, the types of energy available, and how industry produces and delivers energy. For the purposes of simplicity, this chapter separately examines those policies that affect the taxation of energy and those policies that utilize a series of financial tools to promote domestic energy development.

Natural resource development provides substantial federal revenues from royalties, rents and lease payments from resource extraction on federal land as well as from corporate, income and other taxes. The Office of Natural Resources Revenue in the U.S. Department of the Interior oversees the collection of federal and Native American royalties and other monies owed for the utilization of public resources in the production of conventional and renewable energy and mineral resources. In Fiscal Year 2014, the Office disbursed over $13.4 billion in revenues to the U.S. Treasury, federal agencies, 36 states, 34 Indian Tribes and more than 34,000 individual Native American mineral owners. Of the revenues collected, royalties for oil, natural gas and coal production accounted for nearly $11 billion. In addition to these revenues, energy producers and providers pay corporate taxes, employ millions of people who pay federal income taxes, produce products such as gasoline that are federally taxed and pay a series of other federal, state and local taxes.

Recommendation:

Recognize the strong economic contributions of domestic energy production and avoid changes to the existing tax code that could result in higher energy prices and lower energy output for consumers.

77 American Petroleum Institute, "Oil and Natural Gas Stimulate American Economic and Job Growth." http://www.api.org/policy-and-issues/policy-items/jobs/oil-and-natural-gas-stimulate-american-economic-and-job-growth.

78 U.S. Department of the Interior, Office of Natural Resources Revenue, "Who We Are." http://www.onrr.gov/About/default.htm. U.S. Department of the Interior, "Interior Disburses $13.4 Billion in FY14 Energy Revenues to Benefit Federal, State, Local and Tribal Governments." http://www.onrr.gov/about/pdfdocs/20141202b.pdf.

Reported Revenues to the Office of Natural Resources Revenue

Fiscal Year	Federal Revenue
2014	$13,179,995.664.65
2013	$14,387,309,770.99
2012	$11,976,472,570.58
2011	$11,216,781,058.70
2010	$9,484,611,015.21
Five-Year Period (2010-2014)	**$60,245,170,080.13**

Source: Office of Natural Resources Revenue[79]

The federal government utilizes some of the monies generated from resource development to fund regulation of production; research, development, and demonstration of various energy resources; infrastructure development and maintenance; and programs to further environmental objectives. One such program is the sharing of revenues generated from federal Outer Continental Shelf (OCS) development.

In 2006, the U.S. Congress passed the Gulf of Mexico Energy Security Act (GOMESA) directing that the states of Texas, Louisiana, Mississippi and Alabama receive 37.5 percent of all royalties from new oil and natural gas development in adjacent federal waters.[80] The intent of GOMESA is to ensure states have adequate resources to fund coastal restoration, conservation initiatives and hurricane protection projects. As such, on top of the 37.5 percent of revenues distributed to the GOMESA states, 12.5 percent of revenues are allocated to the federal Land and Water Conservation Fund. Currently, federal OCS revenue-sharing as provided under GOMESA only extends to the four states included in the original legislation. States such as Alaska, Virginia, North Carolina, South Carolina, Georgia and Florida that are either developing offshore resources or are exploring the potential to do so will not be eligible for revenue-sharing under current law.

In terms of encouraging energy development through federal budget and tax policy, tax credits and deductions, loan guarantees

Recommendation:

Enact federal legislation that allows all participating states and coastal communities to receive an appropriate share of the royalty revenues generated by energy production in their adjacent waters.

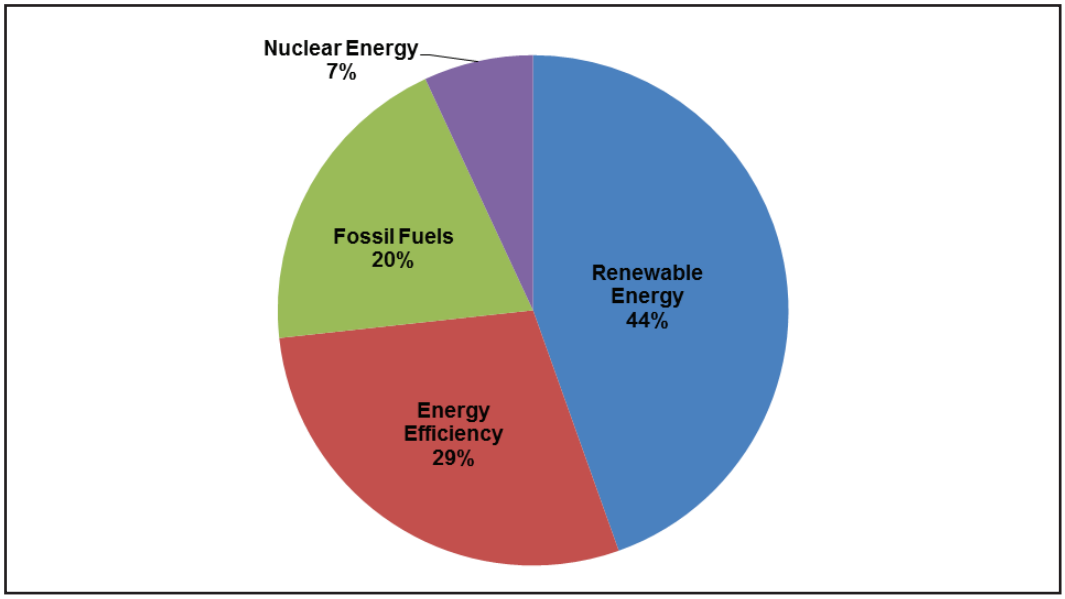
79 U.S. Department of the Interior, Office of Natural Resources Revenue, "Statistical Information." http://statistics.onrr.gov/ReportTool.aspx.
80 U.S. Department of the Interior, Bureau of Ocean Energy Management, "Gulf of Mexico Security Act (GOMESA)." http://www.boem.gov/Revenue-Sharing/.

and federal grants can be useful financial tools to stimulate development of energy resources and technology, provide greater certainty to all energy producers and stabilize prices for consumers. Nearly every source of energy benefits from some type of federal support – whether it is a tax credit to promote production or a grant to research technologies to mitigate environmental impacts or increase cost competitiveness. However, the proportion of federal support allotted varies greatly on the energy source or technology as well as the point of assistance, such as direct expenditures to producers or consumers or grants to academic institutions to research and develop various technologies.

As researchers from the Brookings Institute, Breakthrough Institute and World Resources Institute referenced in a 2012 analysis examining federal policies and programs supporting the "clean tech" sector, optimal annual clean energy research, development and demonstration funding levels recommended by business leaders, researchers and national science advisors range from $12 billion to as much as $30 billion.[81]

A recent Government Accountability Office (GAO) report identified ~$153.07 billion in federal spending between fiscal years 2000 and 2013 on tax expenditures ($119.36 billion), outlays ($19.95 billion), royalty relief (~$12 billion from 2000-2012) and estimated loan guarantee costs ($1.76 billion) in support of fossil, nuclear and renewable energy. Total identified dollars spent were allocated as follows: $84.25 billion to renewables, $60.92 billion to fossil energy and $7.9 billion to nuclear. As to federal spending not targeted specifically at fossil, nuclear or renewable energy production and consumption but that may have influenced energy production and consumption between fiscal years 2000 and 2013, GAO identified ~$117.26 billion in spending on tax expenditures ($65.44 billion), outlays ($50.82 billion) and estimated loan guarantee costs ($~1 billion).

Allocation of Energy Related Tax Preferences in Fiscal Year 2013, by Type of Fuel or Technology[82]



[81] Jesse Jenkins, "Beyond Boom & Bust: Putting Clean Tech on a Path to Subsidy Independence." April 2012. http://www.brookings.edu/~/media/Research/Files/Papers/2012/4/18%20clean%20investments%20muro/0418_clean_investments_final%20paper_PDF.PDF.

[82] Terry Dinan, "Testimony: Federal Financial Support for Fuels and Energy Technologies: Before the Subcommittee on Energy, Committee on Science, Space, and Technology, U.S. House of Representatives." March 13, 2013. https://www.cbo.gov/sites/default/files/03-12-EnergyTechnologies.pdf.

At the same time, the GAO report identified $22.22 billion in federal research and development spending related to fossil, nuclear and renewable energy over the same time period, of which $8.65 billion was allocated to fossil energy, $7.86 billion to renewables and $5.71 billion to nuclear (some outlays associated with these programs may not be related to R&D).[83] Essentially, 15 percent of expenditures were allocated to research and development. While this is slightly higher than the U.S. government average of 12 percent allocation of non-defense discretionary spending for R&D, current R&D funding is far below what experts believe is necessary to spur significant innovations in the energy sector.[84]

While all reasonable measures should be taken to promote domestic energy development and efficiency, greater proportions of government support should be allocated at the research, development and demonstration phase to help determine the viability and commercialization potential of energy resources and technologies and to possibly discover new resources or technology that can meet our nation's energy needs affordably and sustainably.

Recommendation:

Support development of a diverse energy portfolio, including expanded development and use of alternative and renewable energy resources, by ensuring greater proportions of reasonable federal support are allocated at the research, development and demonstration phase.

83 Government Accountability Report to the Ranking Member, Committee on Energy and Natural Resources, U.S. Senate, "Information on Federal and Other Factors Influencing U.S. Energy Production and Consumption from 2000 through 2013." September 2014. http://www.gao.gov/assets/670/666270.pdf.

84 American Association for the Advancement of Science, "Historical Trends in Federal R&D," http://www.aaas.org/page/historical-trends-federal-rd; Jesse Jenkins, "Beyond Boom & Bust: Putting Clean Tech on a Path to Subsidy Independence." April 2012. http://www.brookings.edu/~/media/Research/Files/Papers/2012/4/18%20clean%20investments%20muro/0418_clean_investments_final%20paper_PDF.PDF.

Chapter 9

Energy Transport Infrastructure

Energy – whether it is electricity, transportation fuels or heating fuels – oftentimes must travel great distances to reach the ultimate consumer. This chapter pertains to the system of barges, rail, pipelines and trucks that transport crude, refined petroleum products, natural gas and other liquids to market. For information about electricity distribution, visit Chapter 6.

Transportation fuels must be transported from the well-pad to the refinery and then from the refinery to the retail station. This complex process requires a network of ports and barges, pipelines, trains and trucks, with pipelines remaining the predominant method of transportation for crude and natural gas products. More than 2.6 million miles of pipeline deliver trillions of cubic feet of natural gas and hundreds of billions of ton/miles of liquid petroleum products every year in the United States.[85] Given the efficiency and safety record of pipelines, the U.S. Pipeline and Hazardous Materials Safety Administration has affirmed that, "Pipeline systems are the safest means to move [oil and natural gas] products."[86]

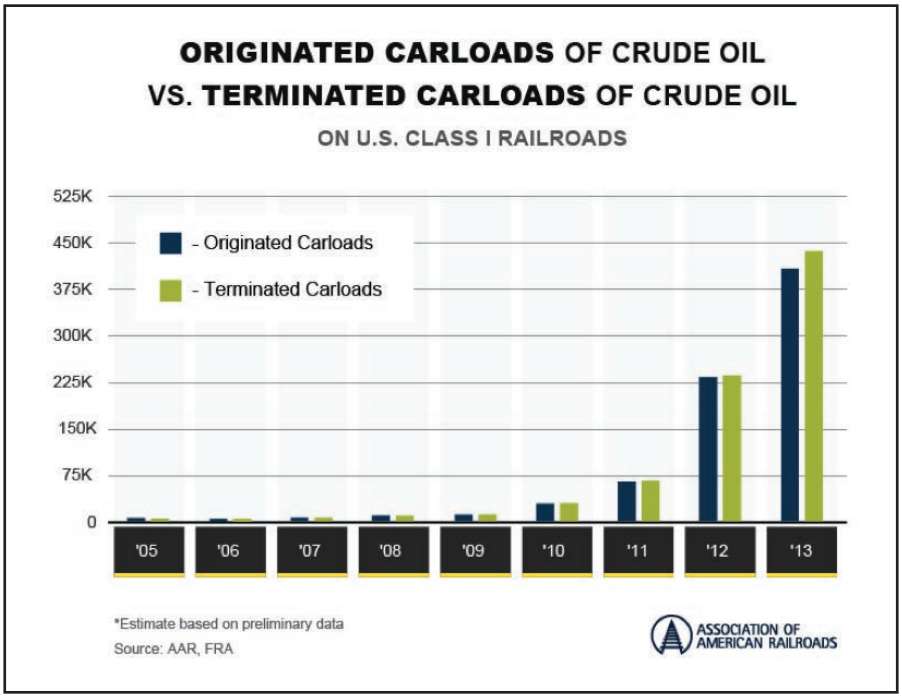
The cost of transporting fuels affects nearly every fuel consumer in the nation. Any disruption or inefficiency in the network can add costs to the final product for the consumer. In recent years, the expansion of the nation's fuel transportation network has not kept pace with the increase in U.S. oil and natural gas production, and limited pipeline capacity has forced distributors to seek alternative ways to get their products to market.

Notably, growing oil production, particularly in the Bakken Shale in North Dakota, has influenced a surge in crude-by-rail shipments. Rail shipments of oil have increased exponentially in just the past few years. As more of the nation's petroleum resources move via rail, industry and regulators have moved to improve safety standards and emergency preparedness. Continued collaboration with state and local officials is critical to ensuring the continued safe use of rail to move oil.

To alleviate congestion on U.S. railways, expansion of existing and new pipeline infrastructure is needed. A March 2014 Interstate Natural Gas Association of America (INGAA) Foundation report estimated that the United States and Canada will need at least $30 billion per year of investments in natural gas, crude oil and natural gas liquids midstream infrastructure to keep pace with the increased production expected through 2035. The study estimated that roughly half of that investment ($14.2 billion) will be needed for mainlines, laterals, processing, storage, compression and gathering lines for new shale gas plays. Crude oil infrastructure, including gathering pipelines, equipment, mainline pipeline and pumping, storage laterals and storage tanks, will make up roughly $12.4 billion per year, and natural gas liquids (NGLs) will comprise $2.5 billion per year for transmission pipelines, pumping and fractionation and export facilities.

85 U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, "General Pipelines FAQs." http://p.gov/portal/site/PHMSA/

86 Ibid.



Source: Association of American Railroads, https://www.aar.org/Pages/Crude-Oil-Rail-Traffic.aspx

Despite the clear need for pipelines, and the vital role they will play in the continued success of U.S. energy development, pipeline siting and construction has become increasingly difficult. The saga of Keystone XL is a prime – if not extreme – example of the political challenges to approving pipelines. The project first applied in 2008 for a federal permit to traverse the Canadian border and transport crude oil from Alberta to Texas. Opposition campaigns against the project have led to a more than six-year delay. Unfortunately, opposition groups are increasingly utilizing these same tactics to create political obstacles to other infrastructure projects, including natural gas pipelines, rail terminals and LNG export facilities.

In order to protect and grow the nation's transport infrastructure, companies must be afforded a predictable and encouraging regulatory climate in order to attract investment and expand capacity. Policymakers should resist efforts to further delay and complicate federal permitting regimes, and Congress should encourage the Obama Administration to grant permits for vital infrastructure projects, such as the Keystone XL pipeline. Finally, the federal government must also ensure that the tariff rates charged on pipeline shipments of liquid fuel are transparent and reasonable for the consumer.

Recommendation:

Promote the expansion of energy infrastructure to ensure efficient, safe movement of energy supplies across the country.

Chapter 10

Efficient Energy Use

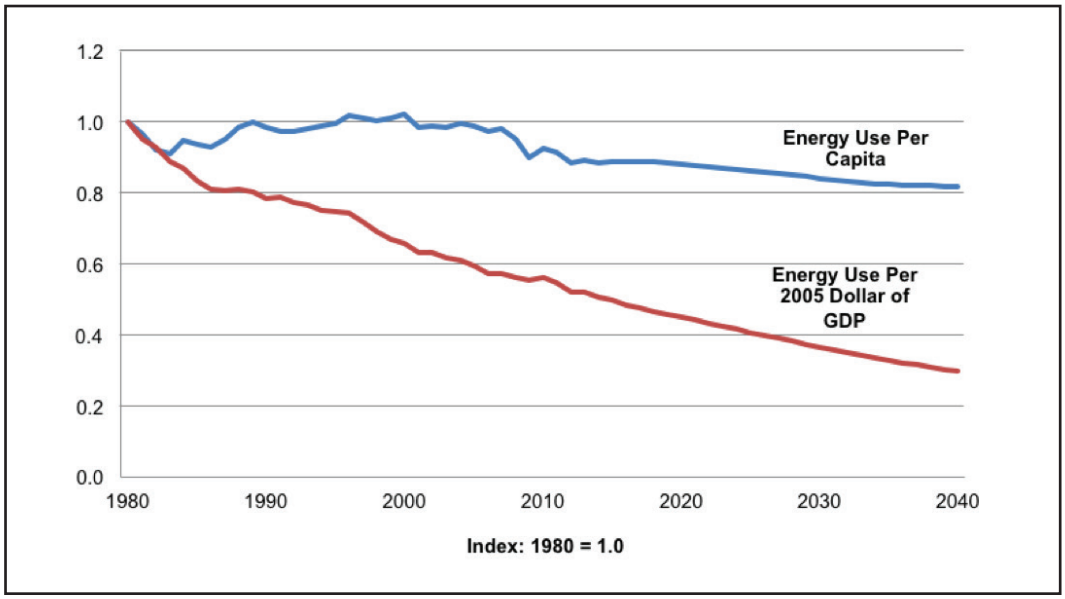
As the United States seeks to stabilize energy prices and enhance energy security, energy efficiency, conservation and sustainable practices remain effective tools in helping to meet society's expanding energy needs. Sustainable practices extend beyond environmental stewardship. Energy efficiency and conservation produce significant cost savings for consumers and make American businesses more competitive globally.

Although the Energy Information Administration (EIA) projects that total energy consumption will increase by 0.4 percent per year from 2012 to 2040, energy use per capita will decrease due to advancements in energy-efficient technologies, efficiency practices by the electric power sector, expanded use of fuel-efficient vehicles and additional changes in consuming behavior.[87] Furthermore, energy use per dollar of gross domestic product will decline significantly over the same time period.

Efficiencies in Electricity Generation & Distribution:

Increased efficiencies in electricity generation and improvements to the grid can conserve substantial quantities of energy. For electricity generation, one of the more promising

Energy Use Per Capita and Per Dollar of GDP (1980-2040)



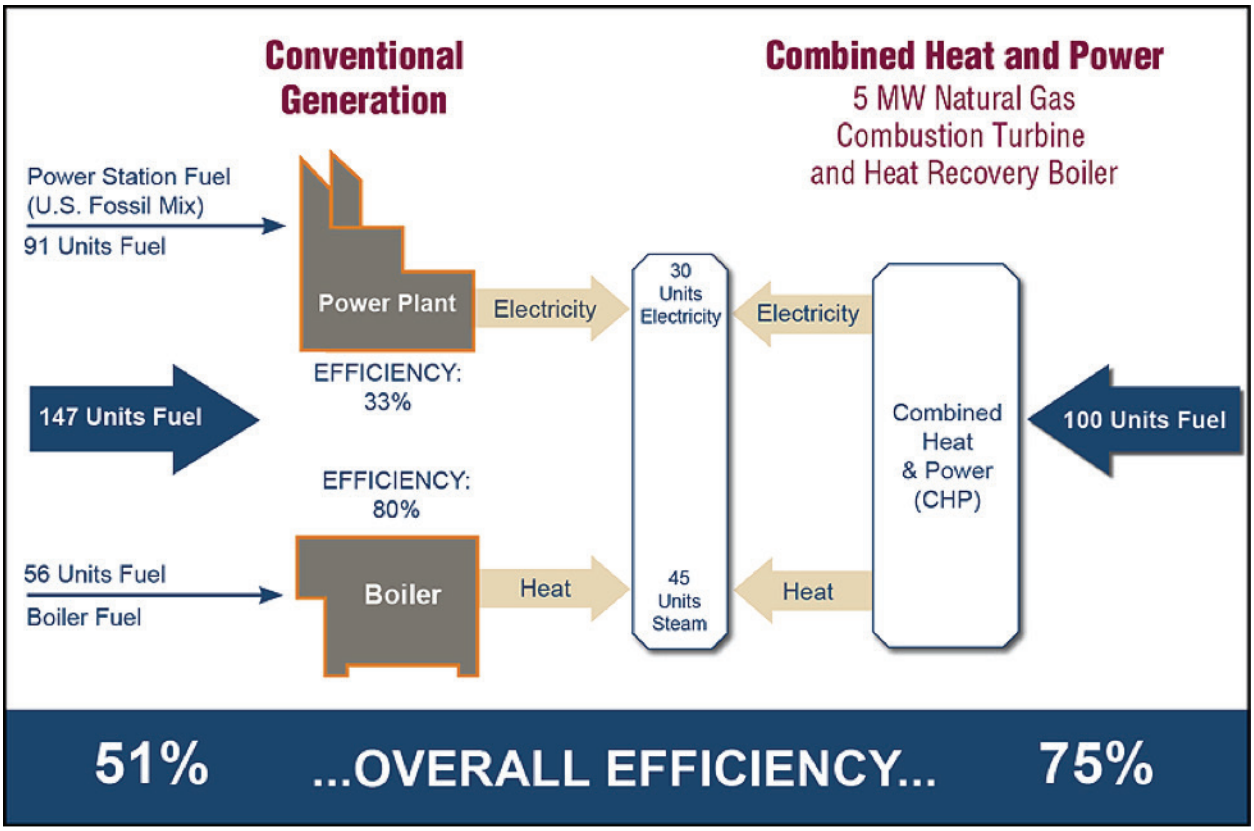
Source: From the Annual Energy Outlook 2014: http://www.eia.gov/forecasts/aeo/MT_energydemand.cfm#declines

87 U.S. Energy Information Administration, "Annual Energy Outlook 2014," http://www.eia.gov/forecasts/aeo/MT_energydemand.cfm#declines.

technologies is combined heat and power (CHP) systems, oftentimes referred to as cogeneration systems. CHP systems generate electricity and thermal energy in a single, integrated system. Rather than a single technology, CHP systems use a variety of fuels to provide reliable electricity, thermal power and mechanical power for factories, hospitals, universities and commercial buildings. Because they are utilized as on-site power sources, CHP systems may lower demand on the electrical grid, reduce reliance on traditional energy supplies and lower business costs.

By recovering and utilizing heat that is typically wasted in traditional electricity generation, CHP systems are more energy efficient than separate electricity generation and thermal production. CHP systems also produce energy savings by eliminating the electricity losses that normally occur in the transmission and distribution of electricity from a power plant to a user because the systems are located at or near the point of use. In 2012, CHP accounted for about 12 percent of U.S. generating capacity, saving consumers over $5 billion a year.[88]

In addition, there are steps that can be taken to improve the efficiency in the transmission and distribution of electricity. According to the EIA, annual electricity and distribution losses average about 6 percent of the electricity that is transmitted in the United States.[89] Monitoring and automation technologies could help reduce the amount of transmission



Soure: U.S. Environmental Protection Agency

88 Combined Heat and Power Association, "Uses of CHP." http://chpassociation.org/uses-of-chp/ .
89 U.S. Energy Information Administration, "How much electricity is lost in transmission and distribution in the United States?" http://www.eia.gov/tools/faqs/faq.cfm?id=105&t=3.

Recommendation:

Facilitate interconnection of CHP systems and ensure CHP can be utilized as a tool to meet forthcoming carbon emission standards for power plants.

and distribution losses across the grid. As authorized by the Energy Independence and Security Act of 2007, Section 1303 established the Smart Grid Advisory Committee and the Federal Smart Grid Task Force. One of the objectives of these initiatives is to coordinate with state and regional officials as well as with the private sector on matters affecting the effectiveness and the efficiency of electricity transmission and distribution, regionally and nationally. Continued federal support for these initiatives and general support for the Department of Energy offices tasked with improving electricity efficiency and reliability is necessary to continue improvements in grid efficiency. Efforts by these offices to coordinate with state governments and regional grid operators will be increasingly important as federal regulations require states to devise and implement plans to meet the Environmental Protection Agency's (EPA) proposed Clean Power Plan for existing power plants.

Efficiencies in Electricity Consumption:

For individual consumers, new energy-efficient appliances, building materials and practices and electricity-consumption monitoring technologies can enable consumers to decrease their electricity consumption. Increased utilization of energy-efficient appliances and practices is an effective and practical way for individual consumers to reduce utility expenses.

Buildings in particular continue to consume energy inefficiently, despite the proliferation of state and federal programs to boost smarter building practices and to retrofit inefficient buildings. Commercial buildings consume 20 percent of U.S. energy, yet government estimates show that commercial

Recommendation:

Provide resources to the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability and the Office of Energy Efficiency and Renewable Energy to continue research, development and deployment efforts for technologies that can help improve grid efficiency.

buildings waste 30 percent of their energy use.[90] Landlords and buildings owners should recognize the cumulative value of small, incremental improvements – such as programmable lights and thermostats – that cost little but can easily save 10 percent or more in electricity costs.

One of the most well-known energy-efficiency programs, ENERGY STAR, is a successful voluntary, public-private partnership to identify and brand energy-efficient appliances, building materials and homes. According to ENERGY STAR, the program saved consumers nearly $30 billion in 2013.[91] The EPA has certified more than 45,000 individual products and more than 1.5 million homes, and the program continues to work with manufacturers and contractors to increase the marketability of energy-efficient technologies.[92]

Efficiencies in Transportation Fuel Consumption:

The transportation sector accounted for 28 percent of primary energy consumption in 2013. As gasoline and diesel prices in 2014 reached their lowest levels in four years, consumer demand for fuel-efficient vehicles tapered off slightly.[93] Long-term, however,

Recommendation:

Provide support to establish and expand voluntary, public-private partnerships to make energy efficiency and conservation more accessible and affordable for consumers and more attractive for homebuilders, manufacturers and building owners.

Recommendation:

Ensure all products, homes, or retrofits labeled by ENERGY STAR undergo regular audits to guarantee consumers are receiving maximum value for their investment in energy-efficient technologies.

90 Energy Star, "Improve energy use in commercial buildings," http://www.energystar.gov/buildings/about-us/how-can-we-help-you/improve-building-and-plant-performance/improve-energy-use-commercial.

91 U.S. Environmental Protection Agency, "ENERGY STAR and Other Climate Protection Partnerships: 2013 Annual Report." http://www.energystar.gov/sites/default/uploads/about/old/files/EnergyStar_POY_4page_040414_PrintReady_508compliant.pdf.

92 Ibid.

93 Angelo Young, "As Gas Prices Fall, So Does Fuel Economy: Consumers Flock to Trucks When They See Low Prices at the Pump," *International Business Times*, January 6, 2015. http://www.ibtimes.com/gas-prices-fall-so-does-fuel-economy-consumers-flock-trucks-when-they-see-low-prices-1775096.

the trend towards more fuel-efficient vehicles continues to be influenced by consumer demand and government policy.

Federal corporate average fuel economy (CAFE) standards, periodically revised and promulgated by the Department of Transportation (DOT) and the EPA, seek to increase the number of miles that a vehicle can travel while consuming one gallon of gasoline. In 2012, the Obama Administration finalized the most substantial increase in CAFE standards for cars and light-duty trucks, requiring a fuel economy equivalent of 54.5 miles per gallon for cars and light-duty trucks by Model Year 2025.[94] DOT estimates that the new standards will result in an average fuel savings of more than $8,000 by 2025 over the lifetime of the vehicle.[95] Yet, DOT and EPA also estimate that the incremental, first-year cost of a new vehicle will increase by $2,000 to account for the development of new fuel-saving technology.[96] DOT and EPA expect to issue a proposed rulemaking for medium- and heavy-duty vehicles by March 2015 with a final rule by 2016. The EPA reported in 2014 that new cars and trucks averaged 24.1 miles per gallon, the highest average ever recorded and an increase of five miles per gallon since 2004.[97]

The Obama Administration has not expressed an interest in revisiting the standards in the context of lower oil prices and continues to underscore the long-term benefits of the standards for energy security and environmental protection.

Alternative vehicles – including compressed natural gas, plug-in electric, flex fuel, hydrogen, propane, liquefied natural gas and gasoline- or diesel-powered hybrids – have faced impediments to successful commercialization. For many of these vehicle types, cost differentials between internal-combustion-engine vehicles and accessibility and costs of refueling infrastructure remain significant hurdles for some consumers. Notwithstanding, a suite of state and federal incentives and policies, including CAFE standards, and consumer education has led to a steady increase in the use of alternative vehicles. In 2014, the Department of Energy estimated that approximately 17 million (6.7 percent) of the estimated 253 million registered vehicles on the road were alternative fuel, advanced efficiency and hybrid vehicles. Hybrid vehicles in particular have grown in popularity and now account for over 3 percent of new purchases.[98] In order to increase the commercial viability of alternatively fueled vehicles, the federal

Recommendation:

As automakers work to comply with the standards, Congress and the Administration should actively monitor the cost impacts of these CAFE standards on consumers and seek remedies if compelling evidence suggests that the new standard is unachievable without economic harm to consumers.

94 National Highway Traffics Safety Administration, "Obama Administration Finalized Historic 54.5 mpg Fuel Efficiency Standards," http://www.nhtsa.gov/About+NHTSA/Press+Releases/2012/Obama+Administration+Finalizes+Historic+54.5+mpg+Fuel+Efficiency+Standards.
95 Ibid.
96 Federal Register. Volume 77, No. 199. Book 2 of 2 Books. October 15, 2012.
97 Tom Krisher, "Average New Vehicle Fuel Economy Hits Record 24.1 Miles Per Gallon, Says EPA," *Associated Press*, October 8, 2014. http://www.huffingtonpost.com/2014/10/08/average-fuel-economy-record_n_5953968.html.
98 Green Car Congress, "Experian: US hybrid vehicle market share grew by 41% in 2012 to 3.1%," April 23, 2013. http://www.greencarcongress.com/2013/04/experian-20130423.html.

government should focus support at the research, development and demonstration phase to help overcome common barriers to these new technologies, namely cost-differentials in manufacturing, costs and accessibility of refueling infrastructure and depreciation of vehicle value.

In aviation, commercial airlines and other aviation entities, including the U.S. military, have advanced new technologies and behaviors in an effort to conserve fuel and increase the efficiency of operations. Since jet fuel remains the greatest and most volatile cost for many operators, commercial airlines have invested significant resources to increase fuel efficiency and reduce fuel costs. Despite a 17 percent increase in the volume of passengers and cargo transported, the Bureau of Transportation Statistics found that U.S. airlines in 2013 consumed 8 percent less fuel than in 2000.[99]

These efficiency gains will continue to increase with additional efforts by the federal government to improve the nation's air traffic control system. The U.S. Federal Aviation Administration (FAA) has begun implementing the Next Generation Air Transportation System (NextGen), which will transform the nation's air traffic control system from a ground-based system to a satellite-based system. Implementation of new air traffic control technologies could reduce traffic delays, shorten routes and encourage other efficient behaviors that can help reduce fuel usage.

Recommendation:

Focus federal support at the research, development and demonstration phase to help overcome common barriers to commercialization for alternatively fueled and electric-vehicle technologies, namely cost-differentials in manufacturing, costs and accessibility of refueling infrastructure and depreciation of vehicle value, in order to address the viability of large-scale commercialization of electric vehicles.

Recommendation:

Ensure the Federal Aviation Administration remains accountable for effective, timely and sound implementation of the NextGen program and ensure the NextGen program provides flexibility for operators to participate in the program cost-effectively.

99 Airlines for America, "Reducing Our Environmental Footprint," http://airlines.org/industry/#section-accordian?industry_section=greener.

Chapter 11

Energy Education

A capable and innovative workforce is an often overlooked attribute of the nation's economic and energy security. In order to sustain the benefits of today's energy revolution and to grow new technologies for the future, the United States must work to expand and improve the nation's educational and research infrastructure for energy professionals.

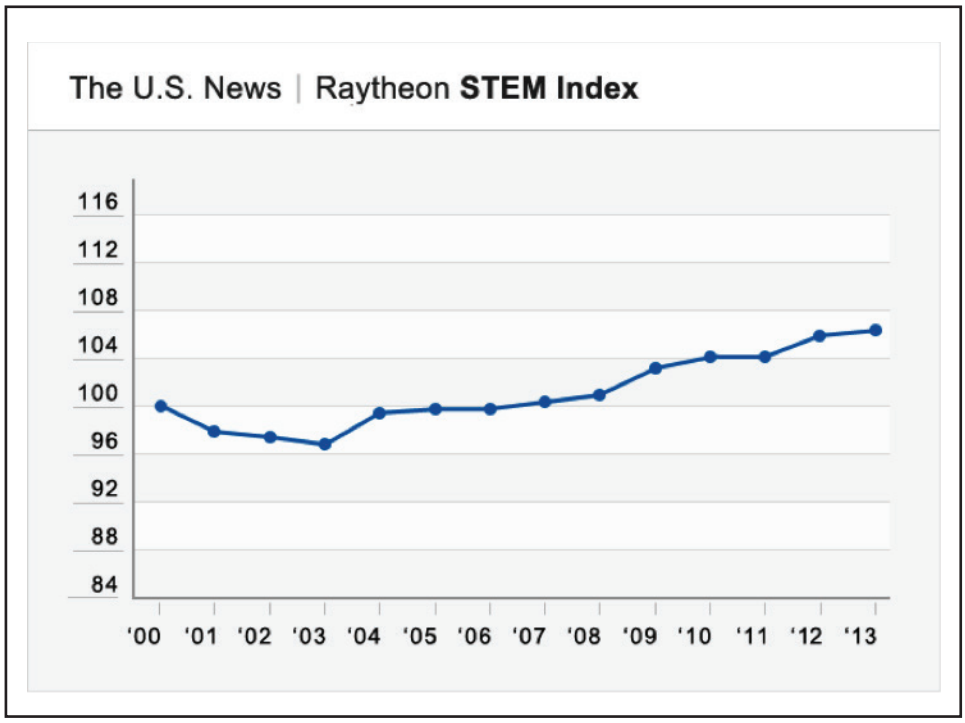
Over the coming years, many baby boomers will become eligible for retirement, leaving vacancies for engineers, electricians, geologists, computer scientists and other positions at utilities, energy companies and research laboratories. For example, according to the Center for Energy Workforce Development 62 percent of utility workers could retire over the next decade, including 110,000 engineers, technicians, line workers and plant operators.[100] Moreover, the Bureau of Labor Statistics reports that employment in science and engineering professions will increase by 18.7 percent from 2010-2020, compared to 14.3 percent for all occupations.[101]

Despite the high demand for STEM (Science, Technology, Mathematics and Engineering) graduates, U.S. universities are not graduating sufficient numbers of students to fill these positions. A 2014 report by Burning Glass found that for every STEM graduate with a Bachelor's degree, there are 2.5 entry-level positions open, compared to just 1.1 openings for non-STEM students.[102] Not only are positions available; entry-level STEM-related careers pay an average of 26 percent more than non-STEM related professions.[103]

Experts point to two primary causes for the dearth in qualified STEM graduates. First, many students lack access to sufficient training and education opportunities at all levels, including deficiencies in STEM education and shortages in vocational training programs. Second, students continue to lack interest in pursuing STEM opportunities. A U.S. News/Raytheon STEM Index in 2014 quantified student interest and aptitude for STEM and found that despite some modest gains since 2010, pursuit of STEM education has remained mostly flat. The report noted that the data demonstrated that "the education pipeline to fill the current and future jobs that will require STEM skills still isn't producing enough talent."[104]

In order to increase the amount of competent, motivated STEM graduates, the United States must improve science and math curriculum in primary, secondary and post-secondary schools. Improvements in STEM education can be achieved by increasing the number of qualified math and science teachers and allocating additional resources – such as

100 Center for Energy Workforce Development, "GI Jobs," December 2014. http://www.gijobs.com/wp-content/uploads/2014/12/Energy.LR_.pdf.
101 National Science Foundation, "What does the S&E job market look like for U.S. graduates?" http://www.nsf.gov/nsb/sei/edTool/data/workforce-03.html.
102 Burning Glass, "Real-Time Insight into the Market for Energy-Level STEM Jobs," February 2014. http://www.burning-glass.com/media/3326/Real-Time%20Insight%20Into%20The%20Market%20For%20Entry-Level%20STEM%20Jobs.pdf.
103 Ibid.
104 U.S. News & World Report, "New STEM Index Finds America's STEM Talent Pool Still Too Shallow to Meet Demand," April 23, 2014. http://www.usnews.com/news/stem-index/articles/2014/04/23/new-stem-index-finds-americas-stem-talent-pool-still-too-shallow-to-meet-demand.



internships, competitions and fellowships such as those provided by the U.S. Department of Energy - to ensure educators have the tools necessary to keep students engaged in the STEM subjects. Outside of the classroom, mentors, parents and other educators should have access to afterschool activities that can help augment the curriculum of STEM students.

For those students not seeking a university degree in a STEM field, there remain significant opportunities to pursue training and vocational programs that can lead to careers in the energy sector. In fact, more than one-fourth of current science and engineering workers do not have a bachelor's degree.[105] On-the-job training combined with continuing education at a community college, a four-year university or a dedicated training facility allows students graduating high school to begin pursuing a career in specialized fields while furthering their education. Companies, trade associations and labor groups increasingly collaborate with local educational institutions to ensure targeted training, ultimately increasing the efficiency of an employee's time in the classroom. Oftentimes qualified workers can

Recommendation:

Provide schools the resources to improve STEM instruction in order to graduate higher numbers of STEM degrees and support federal programs, such as the U.S. Department of Energy's Office of Economic Impact and Diversity, which seek to expand the number of qualified STEM graduates.

[105] National Science Foundation, "What level of education do U.S. S&E workers have?" http://www.nsf.gov/nsb/sei/edTool/data/workforce-04.html.

find tuition assistance or free classes from their employers or a local trade union. In order to promote these seemingly "non-traditional" educational opportunities, educators, parents and businesses must work proactively to demystify employment straight out of high school and post-secondary vocational training.

The importance of human capital cannot be underestimated. The United States possesses a wealth of human resources, but its educational and training institutions must adapt to the needs of the energy and manufacturing sectors of the 21st century.

Recommendation:

Support private-sector initiatives by private businesses, trade associations and labor unions that work with local universities and community colleges to produce new employees for the energy and manufacturing sectors.

Consumer Energy Alliance (CEA) brings together consumers, producers and manufacturers to engage in a meaningful dialogue about America's energy future. As the Voice of the Energy Consumer, our mission is to help ensure stable prices for consumers and energy security. We believe energy development is something that touches everyone in our nation, and thus it is necessary for all consumers to actively engage in the conversation about how we develop and diversify our energy resources. CEA promotes a thoughtful dialogue to help produce our abundant energy supply, and balance our energy needs with our nation's environmental and conservation goals. Our corporate affiliates comprise a range of sectors from the energy industry, academia, small businesses, and conservation groups to travel-related industries.

CEA Affiliates

Consumers, Business, Agriculture, Industry, End-Users

1. Agriculture Energy Alliance
2. Air Conditioning Contractors of America
3. Airlines for America
4. Alaska State Chamber of Commerce
5. Alaska Trucking Association
6. American Bus Association
7. American Chemistry Council
8. American Forest & Paper Association
9. American Highway Users Alliance
10. American Iron & Steel Institute
11. American Rental Association
12. American Trucking Associations
13. Anchorage Chamber of Commerce
14. Associated General Contractors of Alaska
15. Associated Industries of Florida
16. Association of Corporate Travel Executives
17. Association of Equipment Manufacturers
18. Axistrade, Inc.
19. Babcock & Wilcox Company
20. Baylor College of Medicine
21. Beaver County Chamber of Commerce
22. Better Roads, Inc.
23. British-American Business Council
24. C & H Printing
25. Canadian American Business Council
26. Casis
27. Caterpillar, Inc.
28. CF Industries, Inc.
29. Chamber of Shipping of America
30. Chemical Industry Council of Illinois
31. Cleveland Brothers Equipment Co., Inc.
32. Colorado Energy Coalition
33. Colorado Farm Bureau
34. Colorado Motor Carriers Association
35. Comanco
36. Commonwealth North
37. Corpus Christi Hispanic Chamber of Commerce
38. Credence Corp.
39. DcR Engineering Services, Inc.
40. Elite Parking Services of America, Inc.
41. Energy Industries of Ohio
42. Energy People Connect
43. Florida Chamber of Commerce
44. Florida Fertilizer and Agrichemical Association
45. Florida Handling Systems, Inc.
46. Florida Restaurant and Lodging Association
47. Florida Taxpayers Union
48. Florida Transportation Builders Association
49. Fueling California
50. Gallagher Benefit Services, Inc.
51. Georgia Agribusiness Council
52. Georgia Chamber of Commerce
53. Grand Junction Area Chamber of Commerce
54. Greater Fairbanks Chamber of Commerce
55. Greater Houston Partnership
56. Greater Houston Restaurant Association
57. Greater Pittsburgh Chamber of Commerce
58. Grocery Manufacturers Association
59. Hispanic Leadership Fund
60. Houston Technology Center
61. Illinois Chamber of Commerce
62. Illinois Trucking Association
63. International Brotherhood of Electrical Workers - Local Union 111
64. International Union of Operating Engineers Local 66
65. Iowa Motor Truck Association

66. Iron Workers International
67. J. B. Coxwell Contracting, Inc.
68. Jacksonville Chamber of Commerce
69. John L. Wortham & Son, L.P.
70. Kentucky Motor Transport Association
71. Kenworth Alaska
72. Lynden
73. Maine Motor Transport Association
74. Maritime Exchange for the Greater Delaware River and Bay
75. MatSu Business Alliance
76. McDonald Construction Corporation
77. Methanex Corporation
78. Midland Chamber of Commerce
79. Mississippi Energy Institute
80. Mississippi Manufacturers Association
81. Missouri Chamber of Commerce and Industry
82. Mobile Area Chamber of Commerce
83. Monarch Corporation
84. Montana Chamber of Commerce
85. Mosaic Company
86. Move Texas Forward
87. Muscle Wall, LLC
88. MWH Global
89. Myrtle Beach Area Chamber of Commerce
90. My Town, My Job, My Voice
91. National Association of Convenience Stores
92. National Association of Home Builders
93. National Association of Manufacturers
94. National Association of Neighborhoods
95. National Association of Truck Stop Operators
96. National Small Business Association
97. National Tank Truck Carriers
98. Nebraska Chamber of Commerce & Industry
99. Nebraskans for Jobs and Energy Independence
100. Nevada Trucking Association
101. New Mexico Business Coalition
102. New Mexico Trucking Association
103. North Carolina Chamber of Commerce
104. North Carolina Farm Bureau
105. North Florida Clean Cities Coalition
106. Northeast Pennsylvania Manufacturers and Employers Association
107. Northrim Bank
108. Nucor Corporation
109. Odessa Chamber of Commerce
110. Offshore Marine Services Association
111. Ohio Cast Metals Association
112. Ohio Chamber of Commerce
113. On Deck Seafood
114. Palmetto Agribusiness Council
115. Pennsylvania Motor Truck Association
116. Port of Corpus Christi
117. Port of Houston Authority
118. Ports-to-Plains Trade Corridor Coalition
119. Prosperity Alaska
120. Ragin' Cajun
121. Research Partnership to Secure Energy for America
122. Resource Development Council for Alaska
123. Rifle Area Chamber of Commerce
124. Rigzone
125. Ring Power Corporation
126. Rivere Foods
127. Safety on Demand, LLC
128. Santa Barbara County Energy Coalition
129. 60 Plus Association
130. Slover Consulting
131. Smiths Group, PLC
132. Softway Solutions
133. South Carolina Chamber of Commerce
134. South Carolina Farm Bureau Federation
135. South Carolina Trucking Association
136. Southeastern Fisheries Association
137. Southpointe Chamber of Commerce
138. St. Louis Chamber of Commerce
139. Steel Manufacturers Association
140. Straits Lighting Company
141. Tennessee Chamber of Commerce & Industry
142. Tennessee Farm Bureau
143. Texas Association of Manufacturers
144. Texas Trucking Association
145. The Fertilizer Institute
146. The Peace and Prosperity Project
147. The Plaza Group
148. Third Coast International
149. Torch Energy Solutions
150. U. S. Chamber of Commerce
151. Union Contractors and Subcontractors Association, Inc.
152. Virginia Chamber of Commerce
153. Virginia Manufacturers Association
154. Vital for Colorado
155. W. W. Gay Mechanical Contractor, Inc.
156. Washington County Chamber of Commerce

157. Wisconsin Manufacturers and Commerce
158. Wisconsin Motor Carriers Association
159. Wyoming County Chamber of Commerce

Academic Groups:

1. CSTEM Teacher & Student Support Services
2. Houston Museum of Natural Science
3. National Energy Education Development Project
4. Offshore Energy Center
5. Science & Engineering Fair of Houston
6. University of Texas, Center for Energy Economics

Energy Providers & Suppliers:

1. Alaska Energy Authority
2. Alaska Miners Association
3. Alaska Oil and Gas Association
4. The Alaska Support Industry Alliance
5. Alpha Natural Resources
6. American Association of Petroleum Geologists
7. American Coalition for Clean Coal Electricity
8. American Exploration & Production Council
9. American Fuel & Petrochemical Manufacturers
10. American Gas Association
11. American Public Gas Association
12. American Public Power Association
13. America's Natural Gas Alliance
14. Anchorage Municipal Light & Power
15. Apache Corporation
16. Arctic Power
17. Arkansas Independent Producers and Royalty Owners
18. Association of Electric Companies of Texas, Inc.
19. Association of Oil Pipe Lines
20. BP
21. Cabot Oil & Gas Corporation
22. Centrus
23. Cheniere Energy
24. Chevron
25. Clean Line Energy Partners
26. Colorado Mining Association
27. ConocoPhillips
28. CONSOL Energy
29. Delaware Valley Marcellus Association
30. Devon Energy Corporation
31. Direct Energy
32. Dominion Transmission Inc.
33. Energy Equipment and Infrastructure Alliance
34. Entergy
35. Environmentally Conscious Consumers for Oil Shale
36. Environmentally Friendly Drilling Systems
37. EOG Resources
38. ExxonMobil
39. Florida Power & Light Co.
40. Freedom Solar
41. GATE Petroleum Company
42. Georgia Electric Membership Corporation
43. Georgia Transmission Corporation
44. Green Earth Fuels
45. Gulf Economic Survival Team
46. Hess Corporation
47. Houston Renewable Energy Network
48. Independent Petroleum Association of America
49. International Association of Drilling Contractors
50. Interstate Oil & Gas Compact Commission
51. JEA
52. Kentucky Oil & Gas Association
53. Lime Instruments
54. Marathon Corporation
55. Marcellus Shale Chamber of Commerce
56. National Algae Association
57. National Ocean Industries Association

58. National Ocean Policy Coalition
59. National Propane Gas Association
60. National Solar Power
61. Natural Gas Supply Association
62. New England Fuel Institute
63. New Mexico Oil & Gas Association
64. Noble Energy, Inc.
65. North Carolina Association of Electric Cooperatives
66. Nuclear Energy Institute
67. Oglethorpe Power Corporation
68. Ohio Oil & Gas Association
69. Partnership for Affordable Clean Energy (PACE)
70. Peabody
71. PennHills Resources
72. Pennsylvania Coal Alliance
73. Piedmont Natural Gas
74. Pioneer Natural Resources
75. Range Resources
76. Sasol
77. SCANA Corp.
78. Shell Oil
79. Shell WindEnergy
80. Society for Mining, Metallurgy & Exploration
81. Southeastern Coastal Wind Coalition
82. Spectrum ASA
83. Spitzer Industries, Inc.
84. Stuart Petroleum Testers
85. Tennessee Mining Association
86. Tennessee Oil & Gas Association
87. Texas Alliance of Energy Producers
88. Texas Oil & Gas Association
89. U.S. DOE Gulf Coast Clean Energy Application Center
90. U.S. Oil & Gas Association
91. Wisconsin Industrial Energy Group, Inc.

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Consumer Energy Alliance
2211 Norfolk
Suite 410
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713.337.8800
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