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AMERICA'S ENERGY INFRASTRUCTURE NEEDS: OPPORTUNITIES AND OBSTACLES

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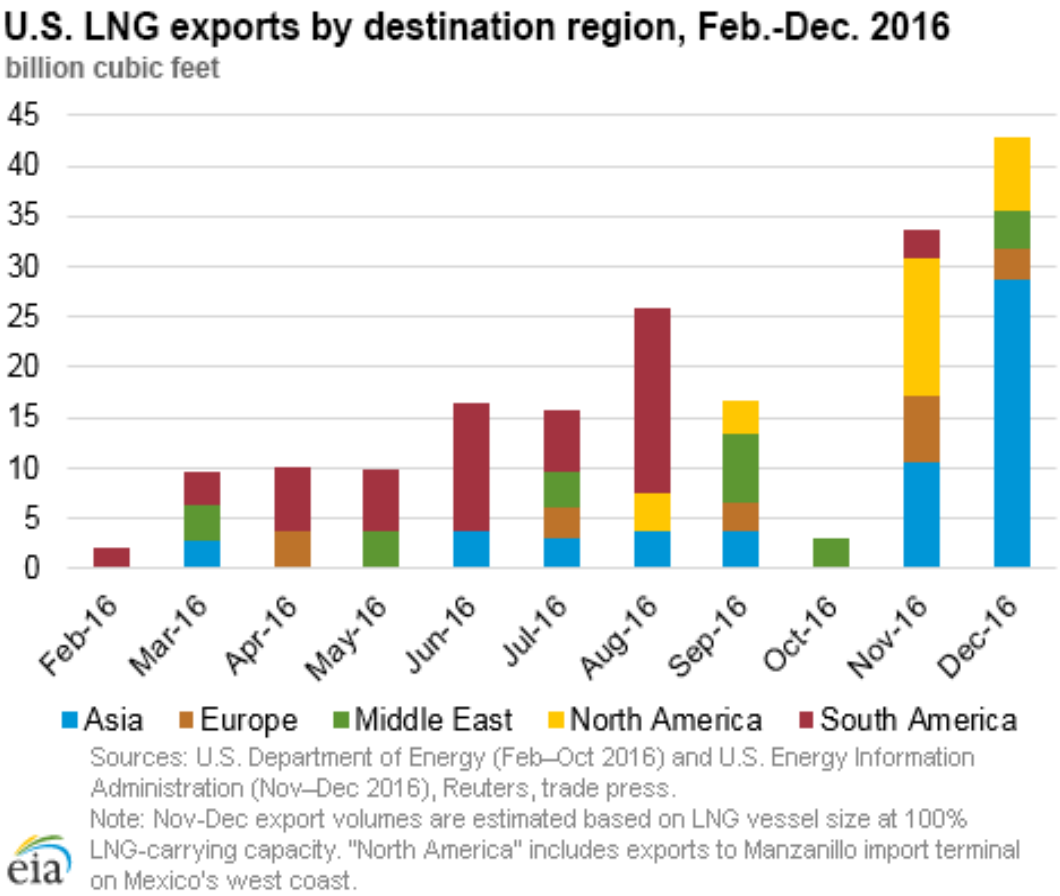
Introduction

America's energy prospects have improved markedly since the beginning of the 21st century. In 2000, the conventional wisdom was we were literally running out of reserves of oil and natural gas. At the time, we were importing more than half our oil needs and building terminals to receive imported liquefied natural gas (LNG).

According to the Energy Information Administration (EIA), seventeen years later, thanks to the shale revolution, imported oil accounts for less than a quarter of our consumption while domestic production reached an all-time high of nearly 9.9 million barrels per day (b/d) in 2017 and is expected to exceed 10 million in 2018. Though negligible, a few years ago, by the end of 2017 crude oil exports had reached 1.8 million barrels per day and gasoline exports were above 1.2 million b/d. Some of those facilities built to import natural gas have been converted to export terminals, as the U.S. has become a fast-growing supplier of LNG to customers around the world (see Figure 1). What's more, the EIA expects the U.S. to become a net exporter of natural gas in 2018.

FIGURE 1



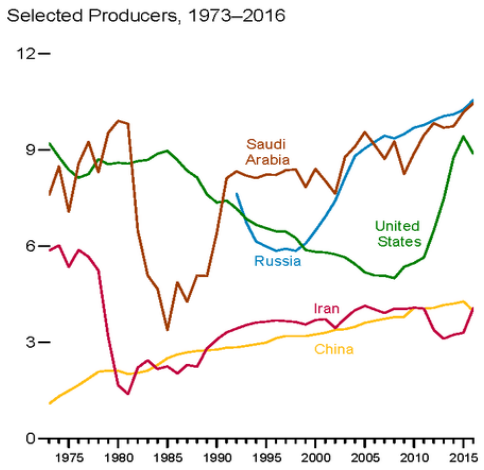
In short, the U.S. has once again become an energy superpower, and the old mantra of "energy independence" has been superseded by a new mantra of "energy dominance."

What do we mean by energy dominance?

At present, America ranks third in the world in oil production after Saudi Arabia and Russia (see Figure 2). But if natural gas liquids are included (e.g. propane, ethane, butane, etc.), we're actually number one. What's more, oil output is rising faster in the U.S. than either Saudi Arabia or Russia.

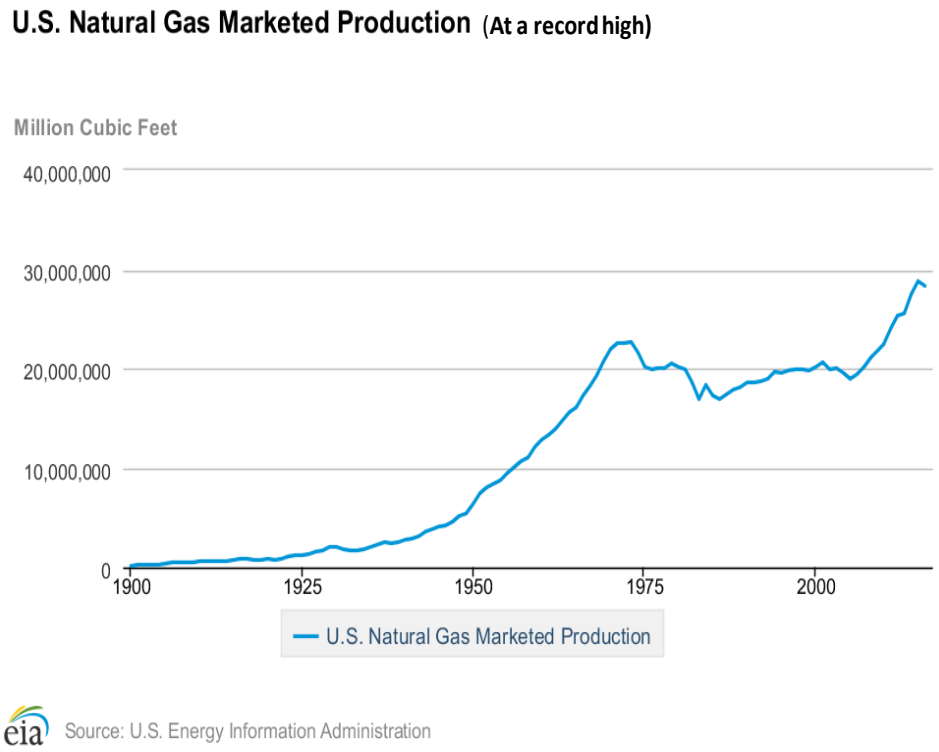
FIGURE 2

World's Largest Oil Producers



For years America has been the world's leading producer of natural gas and, since the shale revolution began, production has jumped by more than 50 percent (see Figure 3). Though at one time we led the world in coal production, we're now number three as coal use for power generation has been overtaken by natural gas.

FIGURE 3



Despite some recent plant closures, our 100 operating nuclear reactors—far more than any other country—still provide nearly 20 percent of America's electricity. And the U.S. also leads the world in renewable energy investment—wind, solar, biomass, and hydro.

As dominant as we've become, the U.S. has the potential to become a literal energy colossus. For example, at the end of 2015 the EIA estimated America's proven reserves of crude oil at 35 billion barrels and proven reserves of natural gas at 324 trillion cubic feet (Tcf). Technically recoverable reserves of oil are estimated at 134 billion barrels onshore with another 115 billion barrels on the Outer Continental Shelf (OCS). As for natural gas, the EIA estimates technically recoverable reserves at 2,355 Tcf for natural gas, enough to last 86 years at current levels of domestic consumption and export.

According to the latest forecast by the Paris-based International Energy Agency (IEA), the United States is set to enjoy the largest expansion of oil and gas production the world has ever seen over the

next few years, accounting for 80 percent of the increase in global oil supply between now and 2025. What's more, the agency expects America to become a net oil exporter within a decade.

The administration of President Donald Trump has taken some initial steps to turn this potential into reality. In October, the U.S. Department of the Interior proposed that nearly 77 million acres in the Gulf of Mexico be offered for drilling leases with the first sales occurring next March. The sale will include all un-leased areas on the Gulf's outer continental shelf (OCS), which includes offshore Texas, Louisiana, Mississippi, Alabama and Florida.

Offshore production currently accounts for more than one million barrels a day, but that's only a fraction of its potential. According to reputable estimates, 90 billion barrels of oil and 327 trillion cubic feet of natural gas are recoverable from the Gulf of Mexico and Atlantic OCS.

In addition to offshore lease sales, the Interior Department announced it will hold an auction for 900 tracts on federal land in northern Alaska in December 2017. Known as the National Petroleum Reserve-Alaska (NPR-A), the reserve is estimated to hold about 900 million barrels of oil and large amounts of natural gas.

Finally, in conjunction with pending tax reform legislation, the Trump Administration is pushing to open up a portion of the 19-million acre Arctic National Wildlife Refuge (ANWR) to oil and gas drillers. When Congress established the ANWR in 1980, it designated 1.5 million acres of coastal plain along the Beaufort Sea for possible energy exploration due to its proximity to Prudhoe Bay and other parts of the North Slope where large oil fields have been producing since the 1960s. The U.S. Geological Survey estimates the area to contain up to 12 billion barrels of recoverable crude. Importantly, this "non-wilderness" section of the ANWR does not include any critical habitat for wildlife such as caribou, polar bears, and migratory birds.

Growing opposition to energy infrastructure investments

In order to fulfill America's energy potential, huge investments will be required to get our oil and natural gas to customers in both in the U.S. and abroad, including pipelines, LNG facilities, and export terminals. Unfortunately, many environmental organizations and other groups opposed to fossil fuels are pushing back against these investments, especially in the case of pipelines. Lawsuits against new pipelines and LNG terminals have become commonplace (see discussion below) and the anti-carbon crowd is also pressuring pension funds, university endowments, and foundations to "divest" their portfolios of companies engaged in the production or transportation of fossil fuels. What's more, these same organizations are pressuring financial institutions to limit or revoke their lines of credit to energy companies.

Here are some examples of the obstacles facing oil, gas and transportation companies as they attempt to enhance America's energy development potential:

1. The poster child: Keystone XL

The most famous and prolonged example of pipeline opposition is the saga of the TransCanada Keystone XL pipeline. Originally approved by the Canadian National Energy Board in March 2010, Keystone XL is a planned 1,179-mile pipeline that would run from the oil sands of Alberta, Canada to Steele City, Nebraska, where it would join an existing pipe. The pipeline could transport 830,000 barrels of oil each day from production sites in the U.S. and Canada to U.S. refineries and ports along the Gulf Coast.

Because Keystone XL would cross an international boundary, TransCanada had to secure a U.S. Presidential Permit before construction could begin. The U.S. President issues a Presidential Permit only after the Department of State deems a project safe and beneficial to the U.S. national interest. Before

Keystone XL, companies found the Presidential Permit process to be relatively painless, straightforward, predictable, and most importantly, unbiased. However, environmental activists seized the opportunity to use the permitting process as a way to block Keystone XL and, more importantly, crusade against the development of fossil fuels in the U.S.

For years, the U.S. Department of State conducted environmental assessments to determine whether the proposed pipeline was safe and "in the national interest." After first saying the pipeline would not have significant adverse effects on the environment, the State Department advised TransCanada to explore alternative routes in Nebraska to avoid upsetting the fragile ecosystem of the Sandhills region. Even after TransCanada rerouted the pipeline, leading the Corps of Engineers to deem the pipeline "safe", President Obama, under pressure from the anti-carbon movement, refused to issue the Presidential Permit during his time in office.

Finally, after seven years of postponed revenue recognition, expensive court battles, and public advocacy in the U.S., TransCanada received a Presidential Permit from President Donald Trump in March 2017. Nonetheless, activists continue to protest the project, urging banks like Wells Fargo to avoid lending to TransCanada. In November 2017, a federal judge ruled that a lawsuit challenging the issuance of the Presidential Permit could proceed. The lawsuit, brought by the Indigenous Environmental Network, the North Coast River Alliance, and others, demands new environmental assessments which would once again add to the regulatory cost of the project. Also in November, a Nebraska regulatory commission issued a permit allowing construction of the pipeline in the state. Like the decision to grant the Presidential Permit, that decision is subject to legal challenges moving forward.

Even if TransCanada ultimately completes Keystone XL, environmental activists can cite tactical opposition to the project as a blueprint for how to substantially raise the costs of fossil fuel development and generate public outrage against the construction of fossil fuel infrastructure.

2. Dakota Access Pipeline

If the Keystone XL Pipeline is the poster child for activist opposition to fossil fuel infrastructure, then the Dakota Access Pipeline (DAPL) is "Exhibit B." Energy Transfer Partners' (ETP) $3.8 billion, 1,170-mile pipeline travels from North Dakota to Illinois, with the most controversial segment running beneath a dammed section of the Missouri River just north of the reservation of the Standing Rock Sioux Tribe in North Dakota. The tribe says the pipeline threatens its water supply and sacred sites, and it has been fighting the project tooth and nail with lawsuits and protests since its inception. In 2016, activists, indigenous groups, and even celebrities joined the tribe for over six months of on-the-ground protests that resulted in 761 arrests. Some of the demonstrations even turned violent, and one estimate puts the damage caused to construction equipment by protesters at $10 million. Around the world, Facebook users were "checking-in" to North Dakota with the hashtag "#NODAPL" to show solidarity with the activist coalition.

In response to the protests, the Obama Administration halted construction of the pipeline. However, in February 2017, President Trump instructed the U.S. Army Corps of Engineers to issue an easement allowing the DAPL to cross under the Missouri River. This easement cleared the way for construction of the final 1.5 miles of the pipeline. The DAPL began operation in June 2017, but protests and lawsuits will likely linger for years to come. Despite the fact that the pipeline is safely moving product, the Standing Rock and Cheyenne River Sioux tribes recently filed court documents urging a federal judge to force ETP to include additional protections and develop an emergency spill response plan that "incorporates tribal input." The judge is now requiring the Corps to further review the pipeline's impact on tribal interests, setting the stage for a prolonged, costly, burdensome, redundant, and unnecessary legal battle between the tribe and ETP.

3. More pipeline pushback

The cases above offer just a glimpse of the growing pushback against pipeline projects. Inspired by the media attention given to the Keystone and DAPL protests, environmentalists, indigenous groups,

landowners, and government officials have formed coalitions, including well-funded state and national networks, to oppose nearly every proposed pipeline project in the U.S. What is more, protesters have become tactical, moving from camp to camp across the country.

In 2016, a coalition of environmentalists and landowners convinced the Georgia and South Carolina legislatures to deny Kinder Morgan eminent domain for its Palmetto Products Pipeline. After that pipeline was proposed, the two states also issued moratoriums on all new petroleum pipelines, although the Georgia moratorium has since been lifted. Based on the success of their efforts in Georgia and South Carolina, environmentalists increasingly see refusal to surrender private property as one of the most effective approaches to stopping pipeline development.

Even for small projects, the added costs of delays, lawsuits, and construction damage can be significant. For example, the cost to build a 7.8-mile-long branch off an existing natural gas pipeline in New York has risen from $38 million to $57 million after legal challenges were brought against the project by the state of New York. Among other reasons, the state opposes the pipeline because the gas flowing through it may be produced using hydraulic fracturing, a practice the state bans.

4. Lawsuits hamper natural gas exports

Just like pipelines, export facilities have become flashpoints for the anti-carbon movement. In early November 2017, a federal court rejected three separate lawsuits brought by the Sierra Club to challenge the Department of Energy's approval of liquefied natural gas exports from terminals at Cove Point in Maryland, Sabine Pass in Louisiana, and Corpus Christi in Texas. In response, environmentalists are turning their attention to other LNG projects in earlier stages of development. For example, the Sierra Club is actively opposing the construction of export facilities in Coos Bay, Oregon and Brownsville, Texas.

The case for approval of the Coos Bay terminal is currently proceeding before the Federal Energy Regulatory Commission for a third time, with its Canadian developer Veresen hoping for better

luck under the Trump Administration than under the Obama Administration. Landowners have opposed the project since its inception, raising concerns about safety and the use of eminent domain to secure land for the project. Environmental groups say Oregon should instead develop its renewable energy economy.

5. Coal exports from the Pacific Northwest blocked

Despite the declining use of coal for electricity in the U.S., demand for U.S. coal is growing in the global marketplace, especially Asia. To satiate this demand, companies have been trying to develop coal export terminals on the Pacific Northwest coast of the U.S. In 2016, the Army Corps of Engineers sided with northwestern Indian tribes in a decision to block the construction of the largest coal port ever proposed in North America. The project faced vehement opposition from the local Lummi Nation, which argued that the proposal infringed on their land rights and would have destroyed the ecosystems of local fisheries. After being denied the federal permit and another aquatic land lease permit from the Washington Department of Natural Resources, the backers of the project formally withdrew their existing local permit applications, effectively rendering the project dead.

Meanwhile, Millennium Bulk Terminals of Longview, Washington now has plans to construct the largest coal export facility in North America. The $680 million terminal has the potential to boost U.S. coal exports by 40 percent, and estimates indicate that the project would generate 130 permanent jobs, 1,000 construction jobs, and $5.4 million annually in state and local taxes in an area that has long been starved of new industry. However, in an all-too-familiar story, Millennium Bulk Terminals is struggling to secure the necessary permits. In September 2017, Washington's Department of Ecology rejected a key water quality certification, finding that the project would worsen air quality, vehicle traffic, vessel traffic, rail capacity, rail safety, noise pollution, social and community resources, cultural resources, and tribal resources. In response, Millennium Bulk Terminals is suing the department, marking the beginning of

another potentially lengthy and expensive legal battle for a developer of a U.S. energy infrastructure project.

6. The "Olympia Stand"

During each of the past two Novembers, activists in Olympia, Washington have blocked a train from carrying ceramic proppants to the Bakken shale in North Dakota. The proppants, imported from China to the Port of Olympia, are used to "prop" open the cracks created by hydraulic fracturing, allowing oil and/or gas to flow to the surface of the well.

The scene in November 2016 involved arrests, flash bangs, and the burning of recycling bins. The 2017 blockade is still underway as of this date. These blockades personify the greater anti-carbon movement in the Pacific Northwest. Activists have zeroed in on the region because it is the logical location for new terminals that would export U.S. coal, oil and gas (mainly to Asia) and import extraction equipment and supplies. In the past decade, all 14 oil or coal import/export terminals proposed for the region have been derailed or are currently being challenged pre-approval.

7. The fossil fuel "divestment" movement

In an attempt to combat the perceived risks of climate change, the fossil fuel divestment movement began in earnest in 2011 on college campuses across the U.S., with students urging endowment administrators to sell investments in fossil fuel companies and instead invest in clean energy. Universities such as Harvard and Princeton have rejected calls to divest, while Stanford has committed to divesting from coal-mining companies. Since 2011, the divestment movement has expanded to include municipalities, pension funds, sovereign wealth funds, and even banks that lend to fossil fuel companies.

As of now, fossil fuel companies still have access to a deep pool of investors and banks. What is more, studies have shown that funds pursuing divestment strategies harm shareholder returns by decreasing portfolio diversification. However, the fossil fuel divestment movement shows no signs of

slowing down. In fact, prominent international organizations like the United Nations have begun to champion the cause. At the end of 2016, the value of worldwide investment funds committed to selling off fossil fuel assets reached $5.2 trillion, double the $2.6 trillion reported in September 2015.

Ironically, the Rockefeller family – descendants of John D. Rockefeller who once controlled 90% of the U.S. market for oil refining and sales - has joined the divestment movement. Two separate funds controlled by the family have announced they will no longer hold fossil fuel investments. Furthermore, the family is funding investigative journalism that accuses ExxonMobil, a company directly descended from John D. Rockefeller's Standard Oil, of hiding the risks of climate change from investors and the public.

In another twist of irony, Norway's $1 trillion sovereign-wealth fund, the largest in the world, has said it might stop buying oil and gas stocks. The fund is supported mainly by proceeds from the country's oil industry, and it currently owns large stakes in most of the world's major oil companies, including a 2.23% stake in Royal Dutch Shell and a 0.92% stake in Chevron. Already, the fund has been divesting itself of companies that derive large portions of income from coal.

Finally, BNP Paribas, France's largest bank, recently announced a decision to stop financing shale, Arctic, and oil sands projects. Like Norway's central bank, BNP Paribas has already reduced its financing of coalmines and coal-fired power plants, choosing instead to expand its investment in renewable energy.

Pushback against the DAPL has even entered the realm of the fossil fuel divestment movement. In January 2017, two anti-DAPL activists illegally climbed into the rafters at US Bank Stadium as the NFL's Minnesota Vikings played a football game against the Chicago Bears. From the rafters, they unfurled a banner with the message: "US Bank, DIVEST, #NoDAPL." The two protesters were later arrested for trespassing and burglary, but their actions went viral on social media. They singled out US Bank because of its $175 million line of credit to ETP.

In late 2016, the largest bank in Norway, DNB, sold off its assets in the DAPL. Later, another Norwegian fund, Odin Fund Management, sold $23.8 million worth of shares invested in companies behind the pipeline, and Swedish bank Nordea pulled its financial support from the pipeline. In February 2017, Seattle's City Council voted unanimously to sever ties with the city's primary financial services provider, Wells Fargo, because the bank is an investor in the DAPL and ETP. Shortly after the Seattle decision, the City Council in Davis, California followed suit, and City Councils in Los Angeles and Washington, D.C. are considering similar actions.

Energy infrastructure, economic growth, and national security

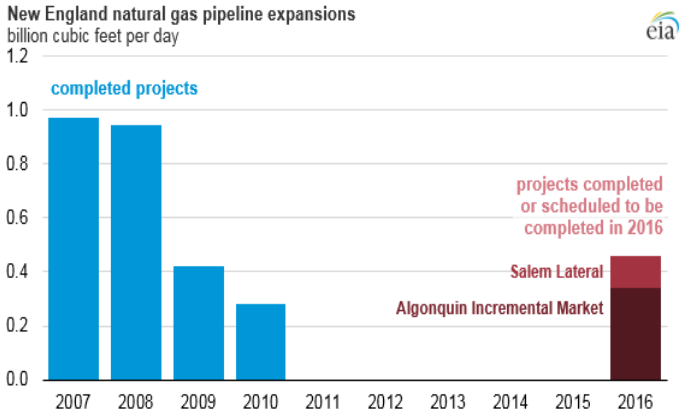
Building out the necessary infrastructure to support America's energy bonanza is not just about helping the oil and gas industry. It's also about fostering domestic economic growth and national security. Environmental organizations, Native American activists and other groups who are fighting pipelines, LNG terminals, and export facilities in an effort to halt fossil fuel use both here and abroad are not only misguided in their actions, but their tactics are increasing costs along the energy supply chain. Lawsuits, permit and eminent domain challenges, and the like—even when the final outcome is approval of proposed projects—invariably lead to lengthy delays and higher costs that are passed on to consumers.

The Keystone XL pipeline is a prime example. When proposed nearly a decade ago, the estimated cost of the project was $5.4 billion. While all the necessary permits have now been granted (though there is still a pending lawsuit), estimated construction costs today are north of $10 billion. Indeed, TransCanada may decide not to proceed with the pipeline after all because of the inflated cost. Another cogent example is the high cost of natural gas in New England where strong opposition to pipelines has resulted in heating and power prices 47 percent above the national average (see Figure 4).

Rather than acquiring cheap gas (about $1.00 per MCF in August) from the Marcellus next door, New England relies heavily on imported LNG whose landed cost was $3.44 per MCF in August 2017.

FIGURE 4

New England Gets First Expansion of Gas Pipeline Capacity in Six Years



What's more, opponents of fossil fuels often fail to acknowledge how the oil and gas industry contributes to America's economic prosperity. The American Petroleum Institute calculates that more than nine million jobs nationwide are supported by oil and gas production. At the same, all U.S. households and businesses benefit from relatively inexpensive and reliable energy supplies that help keep down the costs of heating and cooling, while powering a growing fleet of electronics and appliances in the typical home. What's more, cheap energy holds down manufacturing costs while enhancing the competitiveness of American goods in the global marketplace.

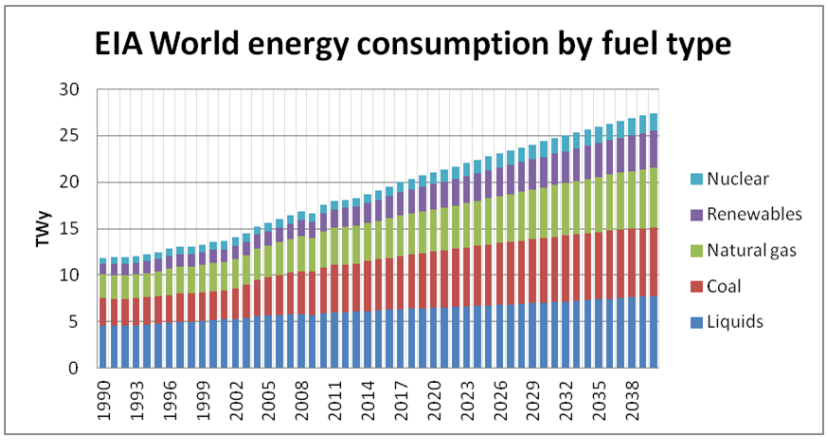
As we become a larger player in the world market, we have the opportunity to utilize our energy abundance in ways that enhance the security of both our allies and ourselves. For example, just recently Poland's state-owned oil and natural gas company signed a five-year deal to import LNG from the United

States. This agreement will make Poland less dependent on pipeline-delivered gas from Russia. Other European countries are also looking to diversify their gas supply away from Russia, offering tremendous opportunities to America's gas producers.

Conclusion

According to the most recent forecast by the U.S. Energy Information Administration (EIA), despite the growing use of renewables oil and gas will still account for the lion's share of global energy supply in the year 2040 (see Figure 5). This reality offers tremendous opportunities to further enhance America's energy dominance, with all the attendant economic and security benefits, by expanding oil and gas exports even as domestic consumption moderates. But the key to realizing this potential lies with building out the requisite infrastructure of pipelines, LNG facilities, and export terminals—a task that has become more difficult and expensive as a result of the growing pushback by anti-carbon activists who are now focused on "shaming" financial institutions, foundations, pension funds, and endowments who hold assets or extend credit to fossil fuel companies.

FIGURE 5



About the Authors

Bernard L. Weinstein, Ph.D. is Associate Director of the Maguire Energy Institute and an Adjunct Professor of Business Economics in the Cox School of Business at Southern Methodist University in Dallas. From 1989 to 2009 he was Director of the Center for Economic Development and Research at the University of North Texas, where he is now an Emeritus Professor of Applied Economics.

Dr. Weinstein has authored or co-authored numerous books, monographs and articles on the subjects of economic development, energy security, public policy and taxation, and his work has appeared in professional journals such as *Land Economics, Challenge, Society, Policy Review, Economic Development Quarterly, Policy Studies Journal, and Annals of Regional Science*. His op-eds have been published in *The New York Times*, *The Wall Street Journal*, *The Washington Times, Investor's Business Daily, The Financial Times, The Los Angeles Times, The Hill* and a number of regional newspapers and magazines.

He has been a consultant to many companies, non-profit organizations and government agencies, and he testifies frequently before legislative, regulatory and judicial bodies. His clients have included AT&T, Texas Instruments, Reliant, Entergy, Devon Energy, Energy Futures Holdings, the Nuclear Energy Institute, the American Petroleum Institute, the U.S. Conference of Mayors, the Western and Southern Governors Associations, the Cities of Dallas and San Antonio, and the Joint Economic Committee of the U.S. Congress.

Dr. Weinstein was director of federal affairs for the Southern Growth Policies Board from 1978 to 1980 and served as director of the Task Force on the Southern Economy of the 1980 Commission on the Future of the South. From 1984 to 1987 he was chairman of the Texas Economic Policy Advisory Council and from 1987 to 1988 served as visiting scholar with the Sunbelt Institute in Washington, D.C. He is currently a panelist with the Western Blue Chip Economic Forecast. Dr. Weinstein is a member of the Dallas-Fort Worth Association for Business Economics and since 1991 has served on the board of directors of Beal Financial Corporation. From 2011 to 2014 he was a Fellow with the George W. Bush Institute, and he is currently an Associate of the John Goodwin Tower Center for Political Studies at SMU and a Fellow of Goodenough College in London.

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Saliba has authored numerous studies and articles, and spoken on issues pertaining to finance, economics, and public policy in the energy sector. In 2013, he was the co-author of the book "The Energy Logjam: Removing Regulatory Obstacles to Fuel the Economy," published by the George W. Bush Institute. Additionally, he has consulted on issues pertaining to energy, economics, and public policy for organizations including Consumer Energy Alliance, Texas Education Service Centers, D Magazine, Bracewell & Giuliani LLP, the Ohio Oil & Gas Association, and Energy Future Holdings.

Saliba is a member of Delta Sigma Pi Professional Business Fraternity, Omicron Delta Epsilon International Honor Society in Economics, and Phi Beta Kappa. He graduated Magna Cum Laude with Honors from Southern Methodist University in May 2014, receiving a Bachelor of Business Administration (B.B.A.) in Finance, a Bachelor of Science (B.S.) in Economics with Financial Applications, and Bachelor of Arts (B.A.) in Public Policy. He also received minors in History and Political Science, along with a concentration in Energy Management.