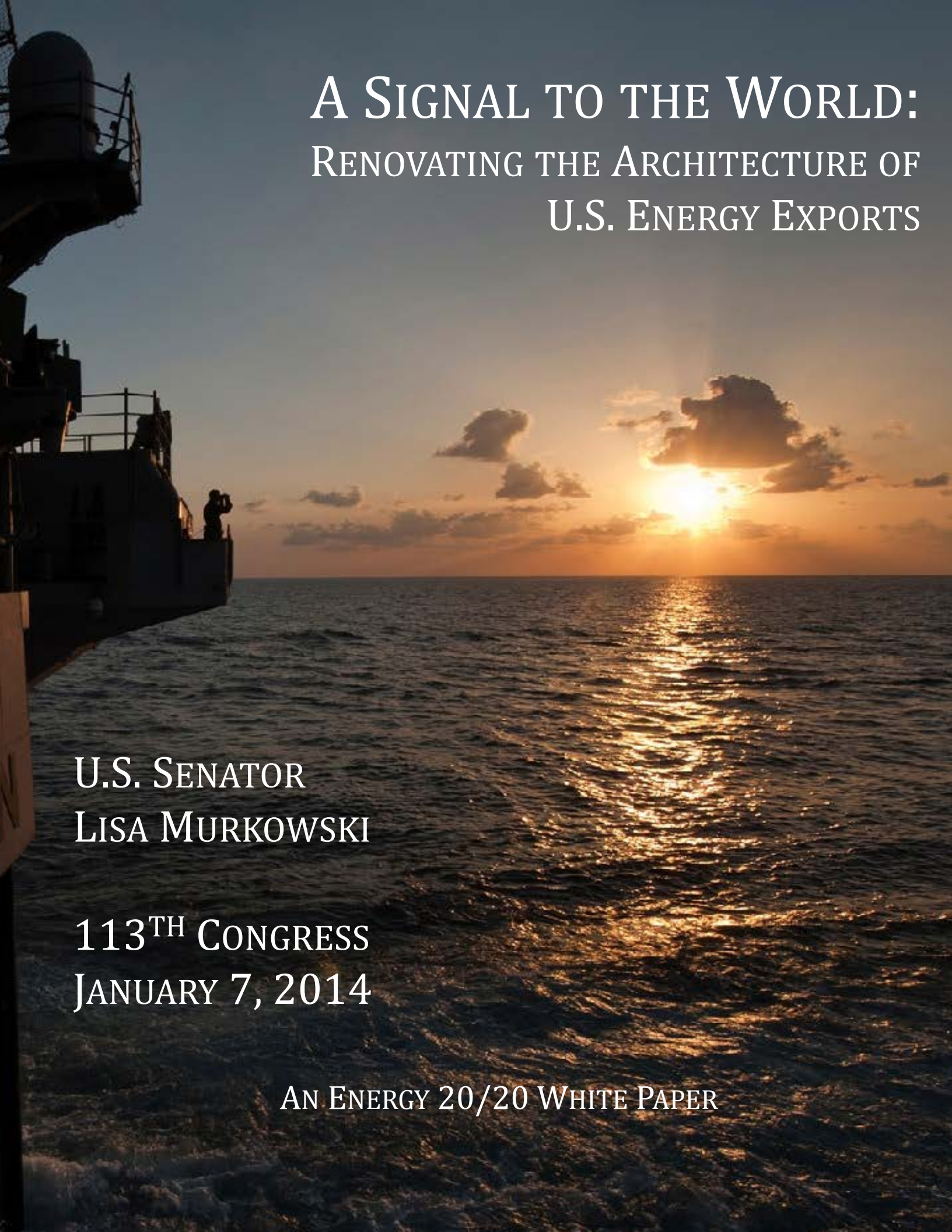


A Signal to the World:
Renovating the Architecture of U.S. Energy Exports

U.S. Senator
Lisa Murkowski

113th Congress
January 7, 2014

An Energy 20/20 White Paper

United States Senate
WASHINGTON, DC 20510

January 7, 2014

Dear Reader:

The United States is producing more energy today than ever before in its history. This energy is coming from all sources – renewables such as solar, wind, geothermal, and hydropower; conventional coal, gas, and oil; and unconventional fossil and biofuels. The possibilities for enhancing our nation's economy and security are simply breathtaking.

So much energy is being produced, in fact, that larger and larger quantities of it are being sold to our friends and allies. Our continental neighbors and countries overseas are importing unprecedented levels of American energy.

For those of us who care about environmental stewardship and energy poverty, a growing U.S. role in the global energy trade holds enormous potential. Energy will be consumed with or without U.S. exports. The question – one of particular importance to the developing world – is where and how this energy will be produced. American coal, gas, and other products are produced by a highly-skilled workforce under strict environmental standards.

Unfortunately, the architecture that governs U.S. energy exports is antiquated. The laws and rules of this trade are applied inconsistently across the spectrum of energy sources. Far from "all of the above," we are forced to deal with "opportunity for some only." The principle of parity should apply across the board in the realm of energy policy. It is time to renovate this regulatory edifice, modernizing it for a 21st century in which the United States is a forward-leaning, outward-facing leader on energy, the environment, and trade.

This white paper is the continuation of the conversation initiated with *Energy 20/20: A Blueprint for America's Energy Future*. It follows another paper, *The Narrowing Window: America's Opportunity to Join the Global Gas Trade*. My hope is that this series can prompt thoughtful discussion as the prelude to sensible and productive action in energy policy.

Sincerely,

Lisa Murkowski
United States Senator

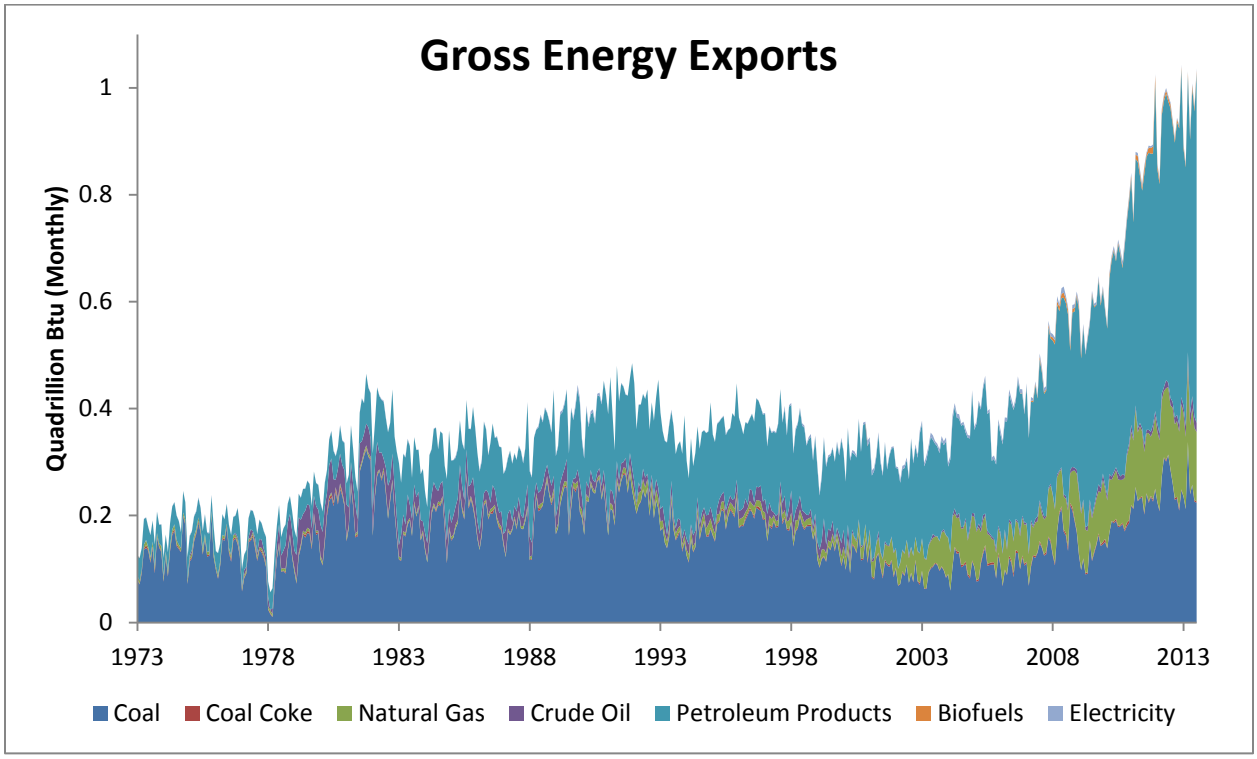
ACKNOWLEDGMENTS

The cover image is a U.S. Navy photograph taken aboard the USS Carl Vinson by Mass Communication Specialist 2nd Class James R. Evans.

Special thanks are also due to the Congressional Research Service for its excellent coverage of the issues discussed herein. All CRS materials cited are available on the Committee's website: http://www.energy.senate.gov/public/index.cfm/documents-republicans.

INTRODUCTION

This paper seeks to educate and to recommend. While many Americans have by now learned about the oil and gas revolution currently transforming the nation's economy, far fewer know about a concurrent surge in energy exports that is remaking the global energy trade. Simply put, the United States is both producing and exporting more energy than ever. Net energy imports are at a 20-year low and projected to fall below 5 percent of total consumption by 2025.[1]



Source: EIA

Energy exports are contributing very substantially to the decline in the nation's trade deficit. From 2006 to 2012, according to U.S. Census Bureau trade statistics, gross exports of "petroleum products" and "fuel oil" have increased in dollar-value more than any other "end-use" category. Over the same period, export values of "coal and fuels, other," "fuel oil," and

[1] Energy Information Administration, *Annual Energy Outlook 2014* Early Release, Table 1: http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282014%29.pdf.

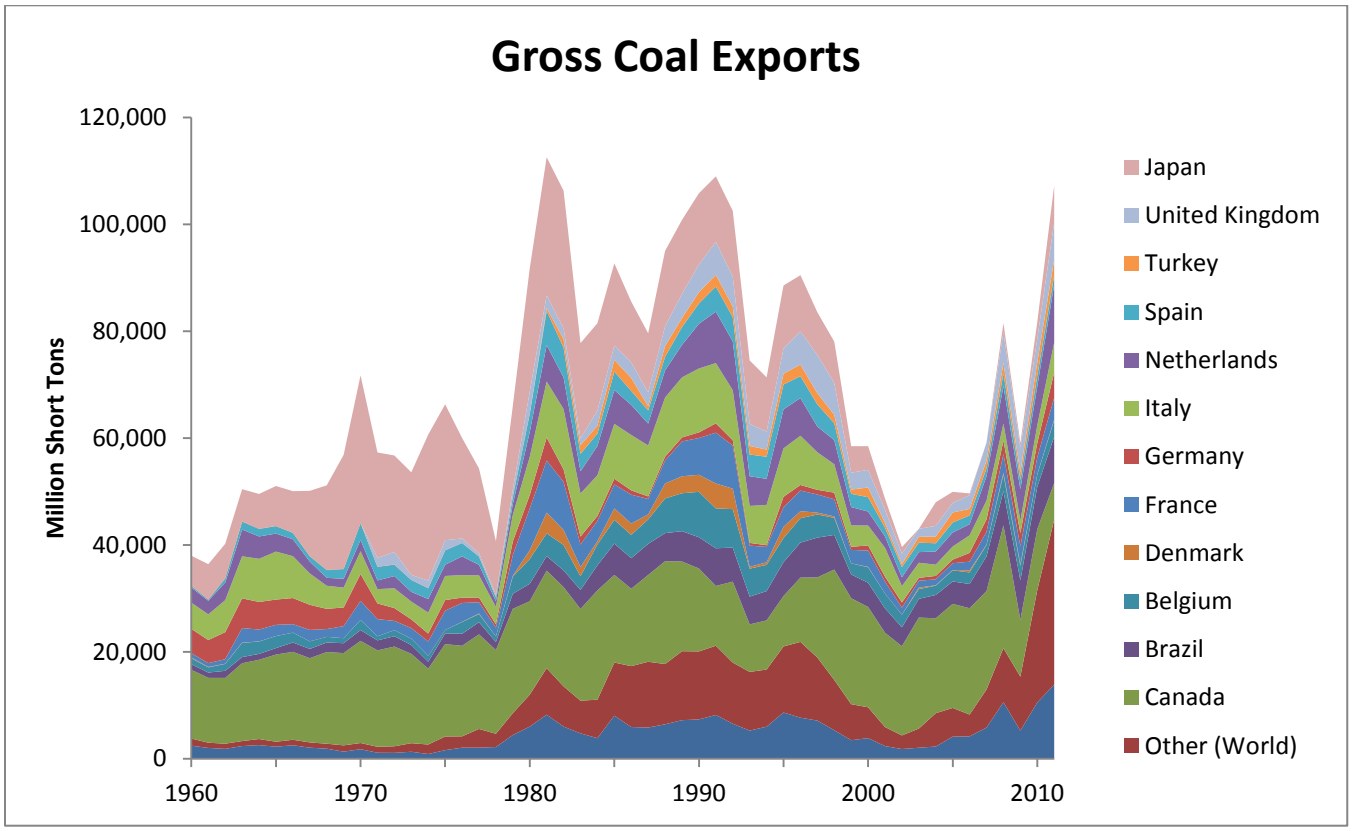
"crude oil" have increased by 432%, 397%, and 342%, respectively.[2] Combined energy exports are accounting for an ever-growing share of total U.S. trade with the world.[3]

The regulatory architecture that governs energy exports is antiquated, however, and applied unevenly across the sector.[4] This paper proposes a series of recommendations to renovate the nation's approach to energy trade and strengthen America's global posture.

[2] U.S. Census Bureau, "U.S. Exports to World Total by 5-digit End-Use Code 2003-2012," http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c0000.html.
[3] Citi Research, "Hydrocarbons Surge to Top of US Export List," 11 November 2013.
[4] See, for example, Sarah O. Ladislaw and Michelle Melton, "The Molecule Laws: History and Future of the Crude Export Ban," Center for Strategic and International Studies (January 2, 2014): http://csis.org/publication/molecule-laws-history-and-future-crude-export-ban.

COAL

These are uncertain times for the traditional backbone of U.S. energy supply. Although coal is projected to remain the top source of electricity for the next two decades, it faces competition from other energy sources and a regulatory onslaught that will make the construction of new plants an extremely difficult endeavor.[5] Nonetheless, trade remains a bright spot for the coal industry. In fact, the U.S. has long been an active exporter in this area, shipping coal from the Rockies, Alaska, and the Appalachians far and wide. Net exports of coal, in fact, are at their highest level on record and, as a share of production, at their highest level in 30 years.[6]



Source: EIA

[5] See the forthcoming white paper on electric grid reliability by Sen. Lisa Murkowski, available later this year.
[6] EIA, *Monthly Energy Review* (December 2013), Table 6.1.

Exports of coal are presently free from burdensome regulations and should remain so. More than 85 percent of coal exports flow out from the Gulf of Mexico and the East Coast, through ports such as Norfolk, Mobile, New Orleans, and Baltimore.[7] "Because coal is generally not exported via a special facility designed to transport the commodity," according to the Congressional Research Service, "there are no special facility permitting requirements applicable to coal exports, but facilities through which coal (or any fossil fuel) may be exported must satisfy these generic federal requirements."[8]

More than half of U.S. coal exports are shipped to customers in Europe, and much of the remainder stays within the Americas. Some industry interests have proposed building special purpose terminals on the West Coast to better serve developing Asian markets. These projects have drawn heavy opposition. Opponents of hydrocarbon fuels have seized this opportunity to pressure federal agencies (e.g., the Environmental Protection Agency and the Army Corps of Engineers) to include greater emphasis on carbon emissions when issuing their rulemakings, even if these emissions would arise from consumption of U.S. coal in other countries.

Recommendations:

- The President's National Export Initiative should place greater public emphasis on the role coal exports are playing to help reach the White House's goal of doubling U.S. exports.

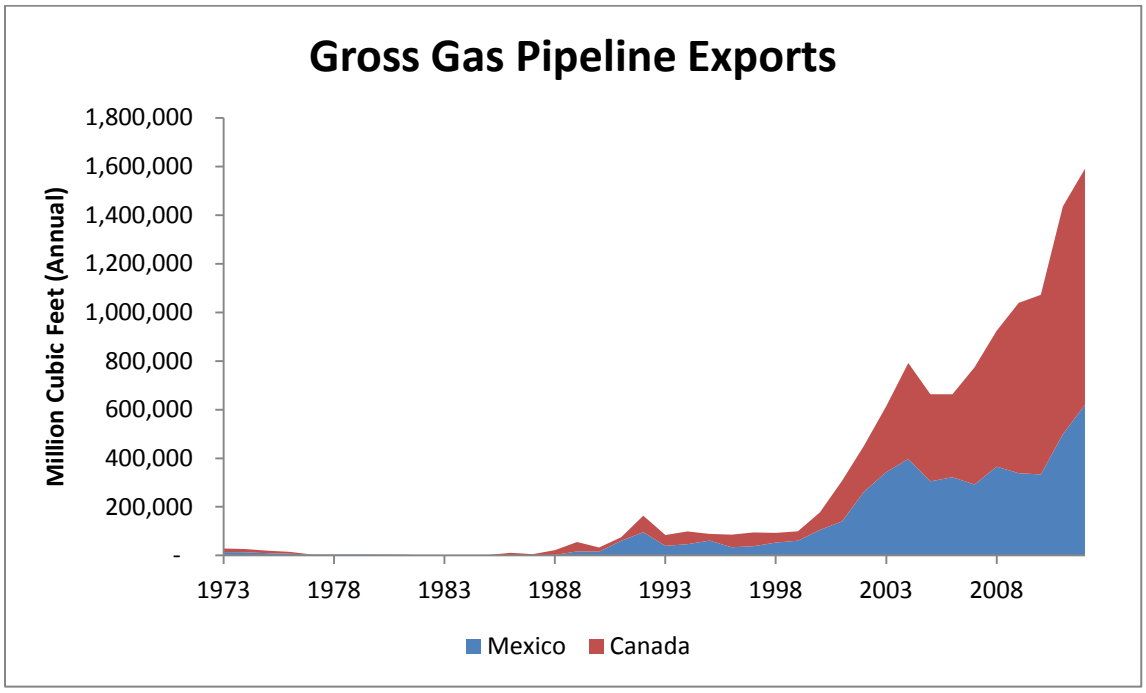
- Federal regulatory agencies should not require climate change studies in the course of their permitting processes for proposed facilities. Coal will be consumed around the world regardless of U.S. trade policy. The only question is whether the coal is produced here in North America, where environmental standards are high, or elsewhere.

- Multilateral development banks, such as the World Bank, should reverse efforts to ban financial support for coal projects overseas.

[7] EIA, *Quarterly Coal Report* (April-June 2013), Table 13.
[8] Congressional Research Service, "Federal Permitting and Oversight of Export of Fossil Fuels," September 17, 2013 (R43231). All CRS materials cited herein: http://www.energy.senate.gov/public/index.cfm/documents-republicans.

NATURAL GAS

North America is quickly emerging as one of the world's most important hubs for the natural gas trade. Record levels are flowing from the United States to Mexico and Canada via pipeline.[9] The build-out of seaborne export capacity, which requires the liquefaction of gas for loading onto cargo ships, is proceeding far too slowly under the Department of Energy's watch. Other nations are approving capacity, securing financing, building projects, and contracting with customers.



Source: EIA

Although cross-border gas pipelines fall under the regulatory overview of the Federal Energy Regulatory Commission, licenses authorizing exports – either via pipeline or as liquefied natural gas – are issued by the Department of Energy. Currently, licenses to export gas to so-called FTA countries (i.e., free trade partners) are granted automatically, while licenses to export gas to non-FTA countries face an onerous review process at DOE that takes more than a year to complete. The actual liquefaction facilities must also be reviewed by FERC.

[9] EIA, "U.S. natural gas exports to Mexico reach record high in 2012," Today in Energy (March 13, 2013): http://www.eia.gov/todayinenergy/detail.cfm?id=10351.

Recommendations:

- Multiple studies have concluded that the domestic price impacts of LNG exports will be minimal and, in any event, will be far outweighed by the net gains to the U.S. economy.[10] Further, geopolitical benefits will accrue from helping our friends and allies overseas, dependent as many of them are on a limited number of suppliers. DOE should expedite its review process for applications to export LNG to non-FTA countries.[11] Greater attention must also be paid to FERC's role approving the actual projects.

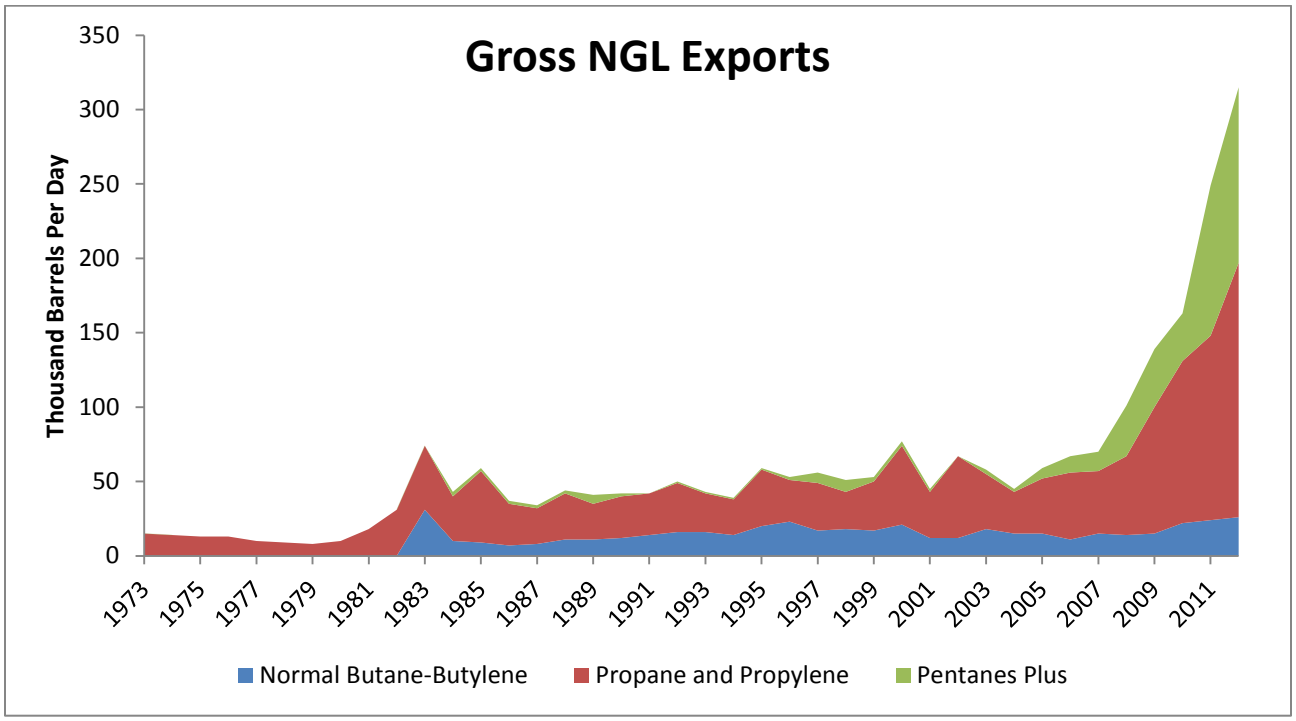
- Federal environmental review of gas projects should not include potential climate change impacts. Natural gas is far more environmentally-friendly than other sources of energy, will be consumed around the world with or without the entry of significant U.S. natural gas onto global markets, and is produced safely and cleanly in the U.S. The only question is whether Americans enjoy the benefits the global gas trade has to offer.

[10] The relevant study commissioned by the Department of Energy is "Macroeconomic Impacts of LNG Exports from the United States," NERA Economic Consulting (December 2012): http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf. Others include Gary Clyde Hufbauer, et al, "Liquefied Natural Gas Exports: An Opportunity for America" (Policy Brief 13-6), Peterson Institute for International Economics (February 2013): http://www.iie.com/publications/pb/pb13-6.pdf; Charles K. Ebinger, et al, "Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas," Brookings Institution (May 2, 2012): http://www.brookings.edu/~/media/research/files/reports/2012/5/02-lng-exports-ebinger/0502_lng_exports_ebinger.pdf; "Made in America: The economic impact of LNG exports from the United States," Deloitte Center for Energy Solutions and Deloitte MarketPoint LLC (2011): http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy_us_er/us_er_MadeinAmerica_LNGPaper_122011.pdf; "New Dynamics of the U.S. Natural Gas Market," Bipartisan Policy Center (May 2013): http://bipartisanpolicy.org/sites/default/files/Bipartisan%20Policy%20Center%20-%20New%20Dynamics%20of%20the%20U.S.%20Natural%20Gas%20Market%20-%20May%202013.pdf.

[11] Sen. Lisa Murkowski, *The Narrowing Window: America's Opportunity to Join the Global Gas Trade* (August 6, 2013): http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=e1527027-558f-4fb0-92bd-f8b9d7515075.

NATURAL GAS LIQUIDS

A variety of fuels are produced alongside oil and gas as part of the energy renaissance underway in the United States. Butane, propane, and so-called "pentanes plus" are known as natural gas liquids. They have various uses and have not typically represented a major source of either revenue or volume to American exporters. Since the energy renaissance began, however, exports of these products have surged, even if most of the production remains in the United States and is consumed by the manufacturing sector.



Source: EIA

Exports of NGLs are loosely regulated by the Department of Commerce.[12] Exporters must apply for licenses, but these are generally granted without much regulatory delay.

The Brookings Institution published one of the few studies on the subject, concluding: "Exporting NGLs will provide producers an incentive to maintain production of both NGLs and, in turn, dry natural gas. Further, many investors see exports as a critical component to

[12] CRS Memo, "Applicability of Federal Export Requirements to Natural Gas Liquids and Condensate," January 6, 2014.

smoothing the price volatility that characterizes the NGL market."[13] The EIA recently forecasted that the "greater availability of natural gas liquids" will benefit the chemical industry, a critical and vibrant segment of the U.S. economy.[14]

Recommendation:

- The regulatory structures surrounding NGL export are working smoothly and require no modification. Trade in these products plays a valuable role in reducing volatility and creating additional demand to stimulate production.

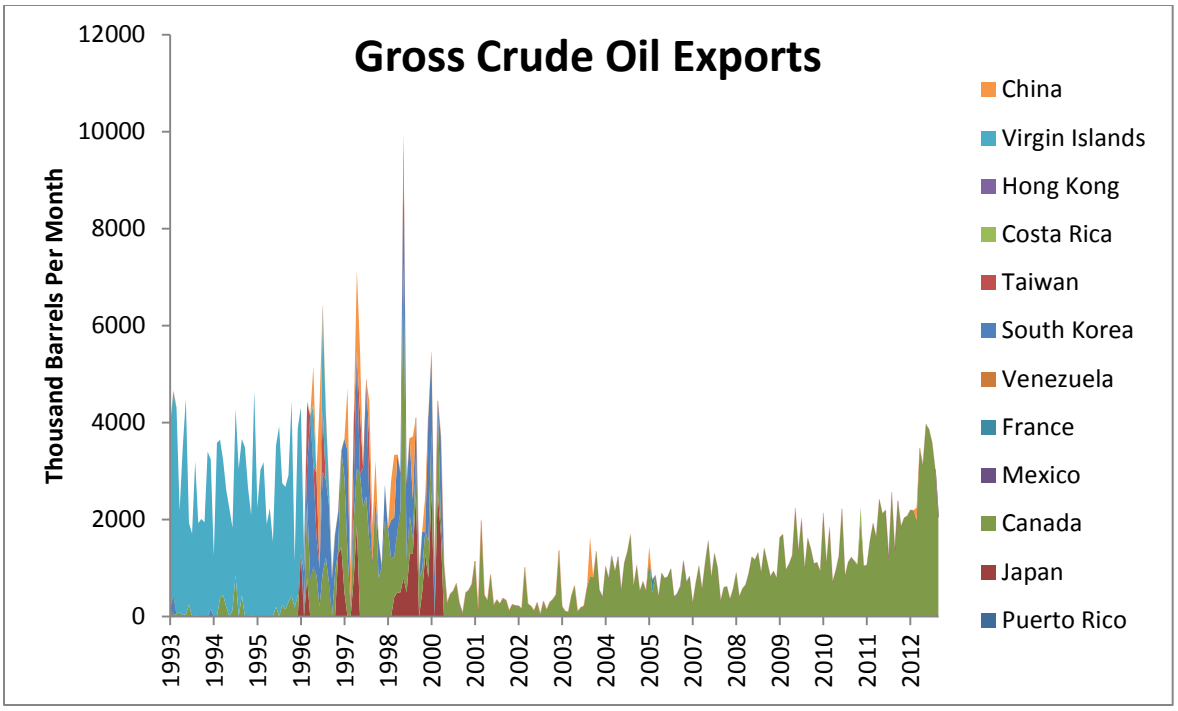
[13] Charles K. Ebinger and Govinda Avasarala, "Natural Gas Liquids," Brookings Institution (March 2013): http://www.brookings.edu/research/reports/2013/04/01-natural-gas-liquids-ebinger-avasarala.
[14] EIA, *AEO2014* Early Release, p. 9.

CRUDE OIL AND CONDENSATES

The United States is producing more oil today than at any point in the past 20 years. The Energy Information Administration projects continued increases in oil production through the end of this decade, after which it is expected to plateau.[15] A flattening of production, however, would still lock in production at a level far higher than in recent memory and would constitute a sustained role for the U.S. as a major player in global energy markets – from the perspective of a producer and consumer.

This increase in production has resulted in a plethora of so-called "light tight oil" from the Bakken, Eagle Ford, and other plays. This crude is lighter and sweeter than the U.S. refinery system was built to accommodate. Existing capacity, upgrades to existing refineries, and logistical feats to transport that light crude to appropriate refiners on the East Coast (instead of the Gulf Coast, where heavy refining capacity dominates) have allowed the new volumes of light crude to be refined and brought to global markets as product. Under existing regulations the Department of Commerce may license the export of crude oil under certain conditions, most notably if the oil is destined for Canada.[16] These narrow exceptions to a general prohibition have enabled the U.S. to be a small player in global oil markets. In addition, large amounts of condensate, another hydrocarbon that cannot be exported, are being produced along with the record levels of crude oil and natural gas.

[15] EIA, *AEO2014* Early Release, p. 2.
[16] CRS Memo, "U.S. Crude Oil Exports: Licensing and data Issues," October 28, 2013.



Source: EIA

Many producers, however, fear that rising light crude production will soon exceed not only the nation's light refining capacity, but also the ability of refiners to adapt to the new production slate. When this point is reached, the U.S. oil resurgence will collide with the de facto ban on crude oil exports.

Opponents of trade argue that lifting the ban would raise the price of gasoline for U.S. consumers. There are a number of sound economic reasons why this will not be the case. First, gasoline is a petroleum product and petroleum products are subject to global pricing, just like crude oil. To the extent that greater U.S. production of crude oil puts downward pressure on international oil prices (e.g., the Brent benchmark), then production increases have benefited U.S. consumers by marginally lowering gasoline and crude oil prices. American consumers are already generally paying a global price for petroleum products, including gasoline, and would also benefit to the extent that lifting the ban on crude oil exports would send a positive signal to oil producers to increase production.

Second, there is the cost of inaction. Prohibitions on the free trade of any product will, all things equal, increase prices, create market distortions, lead to the misallocation of capital, and have a

deleterious impact on job creation. To the extent that the crude oil export ban contributes to supply disruptions and decelerating oil production (which affects employment), then the American consumer will suffer the consequences. If the refining mismatch causes production to become shut-in, as some analysts suggest, then prices could actually rise and increase U.S. dependence on imports. The International Energy Agency has warned that not lifting the ban will create a glut in North America and threaten production.[17] Simply put, the status quo does not benefit the American consumer; in fact, not acting will negatively impact the nation.[18]

All sectors of the U.S. oil industry are global leaders. Upstream, American technology and expertise enables the growth in production. Midstream, a complex network of pipelines transports that oil across the country safely every day. Downstream, American refiners are among the most advanced in the world. Lifting the de facto ban will strengthen this system by protecting jobs, boosting production, and enhancing efficiency and specialization.

Recommendations:

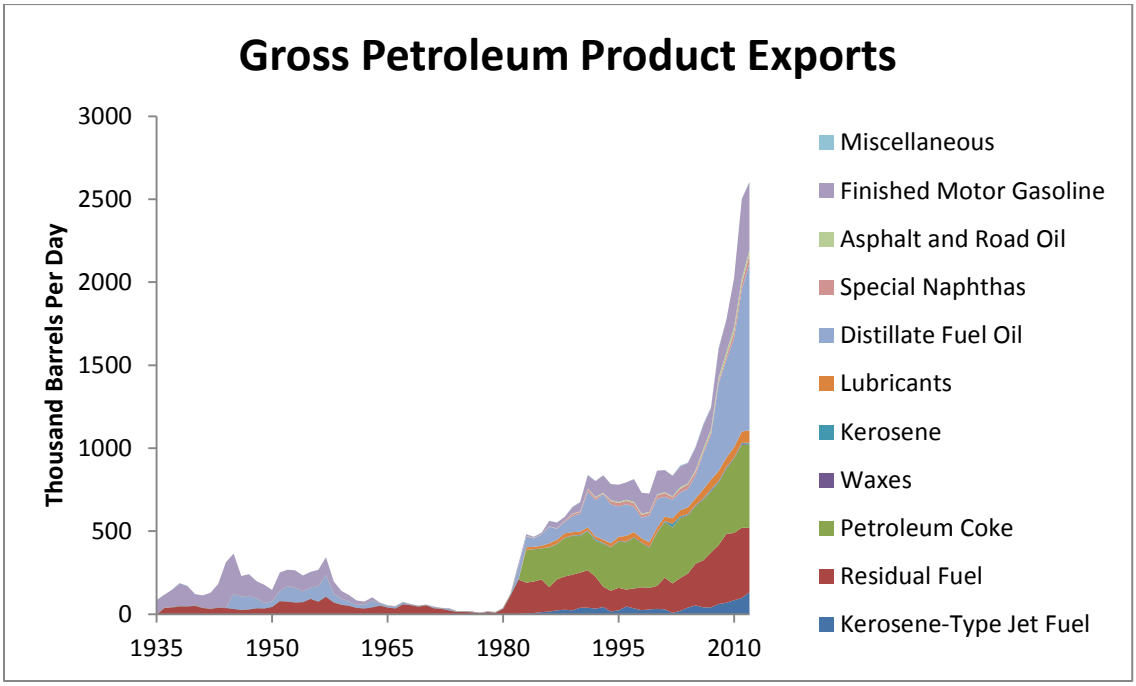
- The Commerce Department may retain sufficient statutory authority to lift the ban on its own. Although the law is complex, the Administration could determine that "for compelling economic or technological reasons that are beyond the control of the applicant, the crude oil cannot reasonably be marketed in the United States."[19] The present situation, in which rising levels of light sweet crude oil and condensate may not be able to be refined economically, may qualify for this exception. The President may also simply make a national interest determination that the present regulatory structure, which generally prohibits crude oil exports, is unnecessary and counter-productive.

[17] Maria van der Hoeven, "US must avoid shale boom turning to bust," *Financial Times* (February 6, 2013).
[18] Editorial, "Exporting American Oil," *Wall Street Journal* (December 16, 2013); Editorial, "The U.S.'s crude oil policy," *The Washington Post* (December 17, 2013); Blake Clayton, "The Case for Allowing U.S. Crude Oil Exports," Council on Foreign Relations (Policy Innovation Memorandum No. 34, July 2013); Editorial, "Time to end the US oil embargo," *The Financial Times* (October 15, 2013). See also Jamie Webster, "The American Energy Reset," IHS-PFC Energy.
[19] CRS Memo, "U.S.-Mexico Swaps," April 2, 2013; CRS, "Federal Permitting and Oversight of Export of Fossil Fuels," September 17, 2013 (R43231).

- If the White House disagrees with this interpretation of its authority and/or chooses to maintain the prohibition on exports, then the Senate should update the law to reflect 21st-century conditions.

PETROLEUM PRODUCTS

An enormous expansion of the American export profile in global petroleum product markets has accompanied the crude oil resurgence. While the United States has long been an active player in these markets, the record-breaking increases in oil production have provided refiners on the Gulf Coast and elsewhere an incredible opportunity to access feedstock at rates cheaper – often far cheaper – than international benchmarks. This has enabled greater exports.



Source: EIA

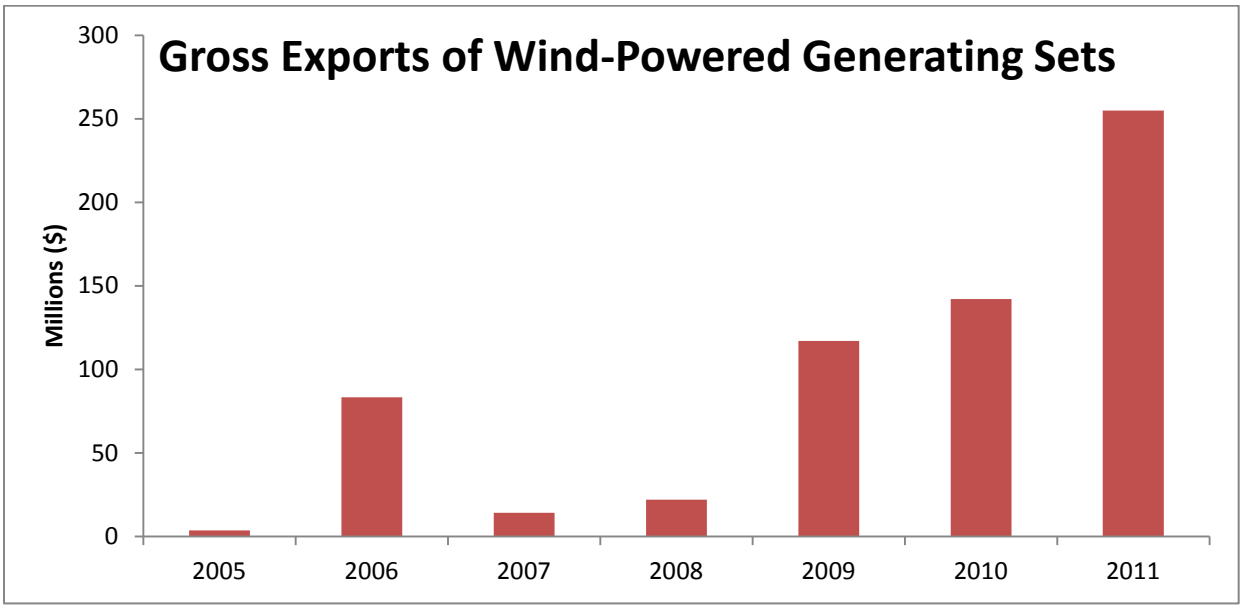
Petroleum product exports are also loosely regulated by the Department of Commerce, which is effectively managing the export architecture surrounding this trade.

Recommendation:

- Exports of petroleum products must continue without burdensome regulations. The U.S. refining industry is the global leader and delivers gasoline, diesel, and other fuel to American friends and allies around the world. These fuels will be consumed whether or not they are imported from the U.S., which enforces strict environmental standards.

RENEWABLE TECHNOLOGY

Producers of wind turbines, solar panels, and other renewable technology also help reduce the U.S. trade deficit through exports. Photovoltaic exports more than doubled from 2006 to 2011.[20] From 2005 to 2011, U.S. exports of so-called "wind-powered generating sets" grew from $3.6 million to $255 million.[21] Despite this significant growth, the U.S. is not generally regarded as a major export leader in either of these fields on the global stage. The nation is also a large importer of solar technology.



Source: CRS/Global Trade Atlas

The Department of Commerce regulates certain components that may be dual-use, posing a security risk. These include carbon fiber, machine tools, and software, as well as material used to produce solar cells. Otherwise, renewable technologies are free from regulation.[22] The Export-Import Bank also supports various projects overseas that serve as a way of boosting renewable exports.

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[20] CRS, "U.S. Solar Photovoltaic Manufacturing: Industry Trends, Global Competition, Federal Support," June 13, 2013 (R42509).
[21] CRS, "U.S. Wind Turbine Manufacturing: Federal Support for an Emerging Industry," January 16, 2013 (R42023).
[22] Department of Commerce, "Critical Technology Assessment: Impact of U.S. Export Controls on Green Technology Items," August 2010: http://www.bis.doc.gov/index.php/forms-documents/doc_view/137-impact-of-u-s-export-controls-on-green-technology-items.

Recommendation:

- The general lack of trade restrictions on renewable energy technology products should not be modified. If renewable technology is the future, then it must be competitive.

NUCLEAR TECHNOLOGY

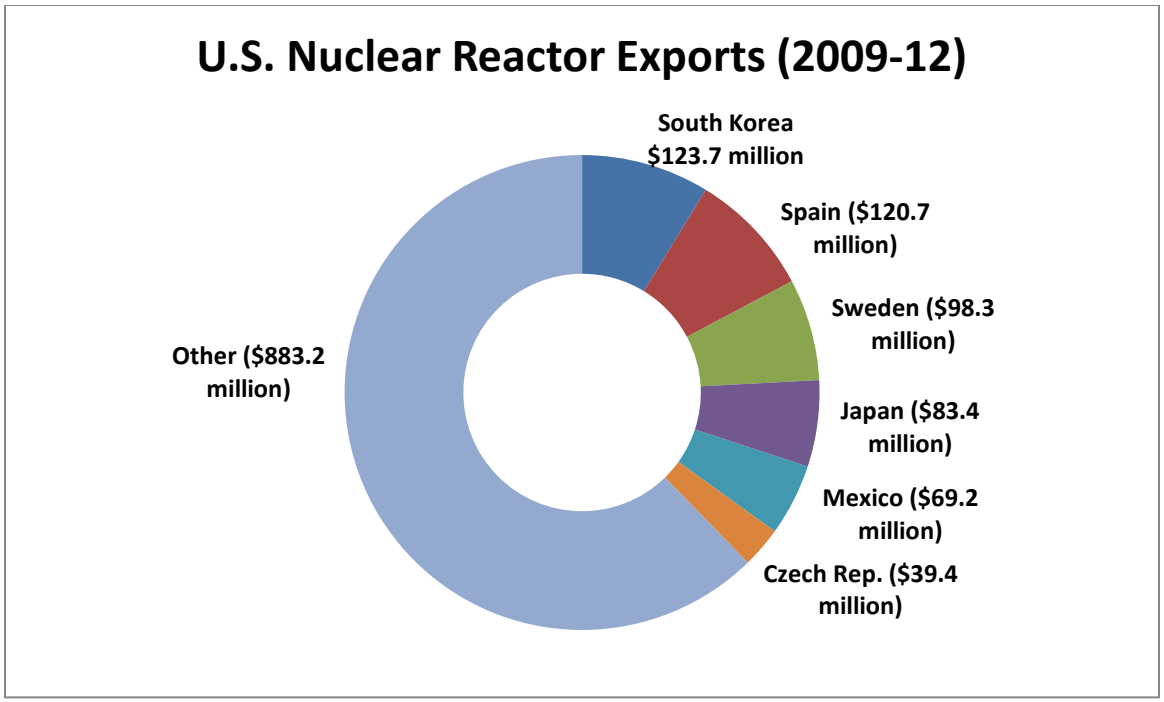
The United States is the undisputed leader of nuclear technology in the world. We produce more nuclear power than any other nation. Many analysts are concerned that this leadership role is on the decline as reactors age, plants retire, and other countries pursue their own work in this area.[23] Fortunately, U.S. reactor designs (e.g., AP 1000) serve as the gold standard for safety and efficacy, and research and development continues at the National Laboratories on next generation designs.

Data on the American role in the global nuclear trade is difficult to access, but not impossible.[24] The U.S. is a significant exporter of minerals critical to the nuclear industry, mostly to Japan, as well as major components of nuclear reactors and equipment to countries in Asia, Europe, and North America. As the global nuclear trade has developed, however, the U.S. market share has declined.[25]

[23] CSIS, "Restoring U.S. Leadership in Nuclear Energy: A National Security Imperative," June 2013: http://csis.org/files/publication/130614_RestoringUSLeadershipNuclearEnergy_WEB.pdf; Bipartisan Policy Center, "Maintaining U.S. Leadership in Global Nuclear Energy Markets," September 2012: http://bipartisanpolicy.org/sites/default/files/Nuclear%20Report.pdf.

[24] CRS Memo, "United States Exports of Nuclear Reactor Technology and Uranium, Top Foreign Country Consumers: 2009 Through 2012," November 19, 2013.

[25] Government Accountability Office, GAO-11-36 "Nuclear Commerce: Governmentwide Strategy Could Help Increase Commercial Benefits from U.S. Nuclear Cooperation Agreements with Other Countries," November 2010: http://www.gao.gov/assets/320/311924.pdf.



Source: CRS

Recommendations:

- The federal government must continue its efforts to help develop small modular reactors. This can be done without putting international security at risk or violating nonproliferation controls.

- The White House and Congress need to articulate a clearer role for nuclear power in the U.S. energy mix. While its environmental benefits are clear, politicians often hesitate to advance it as a source.

CONCLUSION

The energy resurgence has fueled a beneficial expansion of the U.S. energy trade. Energy sources that are free from burdensome regulations have seen the largest increases in their export volumes. In fact, the evidence is clear that exports can help facilitate enhanced production by opening up U.S. supply to global markets. Trade is creating jobs, increasing supply, and enhancing our nation's security. Competition and efficiency are strengths of the American economy system, not defects.

The architecture surrounding U.S. energy exports is not perfect, however. Entire books could be written about the antiquated edifice that oversees trade in American energy. There are types of energy sources that are largely prohibited from export due to outdated regulations that have accumulated over the better part of a century. Petroleum products are traded freely, while the underlying commodity – crude oil – must remain within the North American continent. LNG export facilities take years to approve, yet the Export-Import Bank, the U.S. Trade and Development Agency, and the Overseas Private Investment Corporation provide financing to LNG projects overseas.[26] Coal exports surge, yet the Administration supports the World Bank's decision to bar coal projects from funding in the developing world. U.S. energy exports are also one of the most effective tools we have to help alleviate energy poverty around the world.

Another important lesson from today's positive export trend is that the United States should encourage the free trade of any energy commodity, and not impose trade restrictions to serve a climate change policy agenda. Trade and consumption will occur with or without us, and the only question is whether we enhance or demote our global position. This is true for natural gas, as well as for coal, oil, and other sources of energy discussed herein. The term "clean energy" is relative, not absolute, and to the extent that American-made energy can displace other less clean sources, then the global environment will benefit from enhanced U.S. trade. People come

[26] CRS Memo, "Overseas Private Investment Corporation: Support for Liquefied Natural Gas- Related Transactions," April 19, 2013"; CRS Memo, "U.S. Trade and Development Agency: Support for Energy Projects," May 22, 2013; CRS Memo, "Export-Import Bank Financing of Liquefied Natural Gas-Related Transactions," March 25, 2013.

first, however, and the nation's opportunity to help alleviate energy poverty must not be missed.

At a time when the U.S. is participating in trade talks with friends and allies in Asia and Europe, and enforcing tough sanctions against the rogue regime in Iran, the U.S. must face out to the world, not hide behind our borders. Following some or all of the recommendations contained in this paper would send a powerful signal to the world that the U.S. is ready to reassert its role as a leader on energy, the environment, and trade.