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Testimony

before

U.S. House of Representatives Committee on Energy and Commerce

Subcommittee on Energy and Power

**U.S. Energy Abundance: Regulatory, Market, and Legal
Barriers to Export**

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Submitted by:

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Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee on Energy and Power, I want to thank you for this opportunity to testify on *U.S. Energy Abundance: Regulatory, Market, and Legal Barriers to Export*. This is a timely hearing and I welcome the opportunity to testify before the U.S. House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Power. I am president of the Energy Policy Research Foundation, a non-profit organization that has published extensive research on developments in U.S. and world energy markets since 1944. We have been called on to testify at nearly every session of Congress in the last decade and routinely provide briefings on our research for industry, non-profit organizations, federal, state, and local agencies and Congressional staff. EPRINC has been a source of expertise for numerous government studies.

Technological breakthroughs in the production of natural gas are now opening up highly valuable opportunities for the national economy, not just for domestic use, but also by transforming some of these growing natural gas supplies into LNG (liquefied natural gas) for sales to markets abroad. New opportunities are also opening up for American steam coal exports which have experienced declining domestic demand from the growing use of natural gas in the electric power sector.

Over the last decade the national economy has grown at an average annual rate of less than 2 percent. We should view this low rate of growth as a crisis. While our rate of economic growth has its roots in a range of structural and financial setbacks within the economy, we can also point to regulatory and government policies which are delaying or outright prohibiting a large number of high value-added investments from proceeding. Exports are one area which can provide a much needed boost to economic growth if we can overcome the substantial regulatory and political constraints which place these opportunities at risk. My testimony today will focus largely on the opportunity and challenges to LNG exports. I will, however, provide some observations on the regulatory constraints to American coal exports.

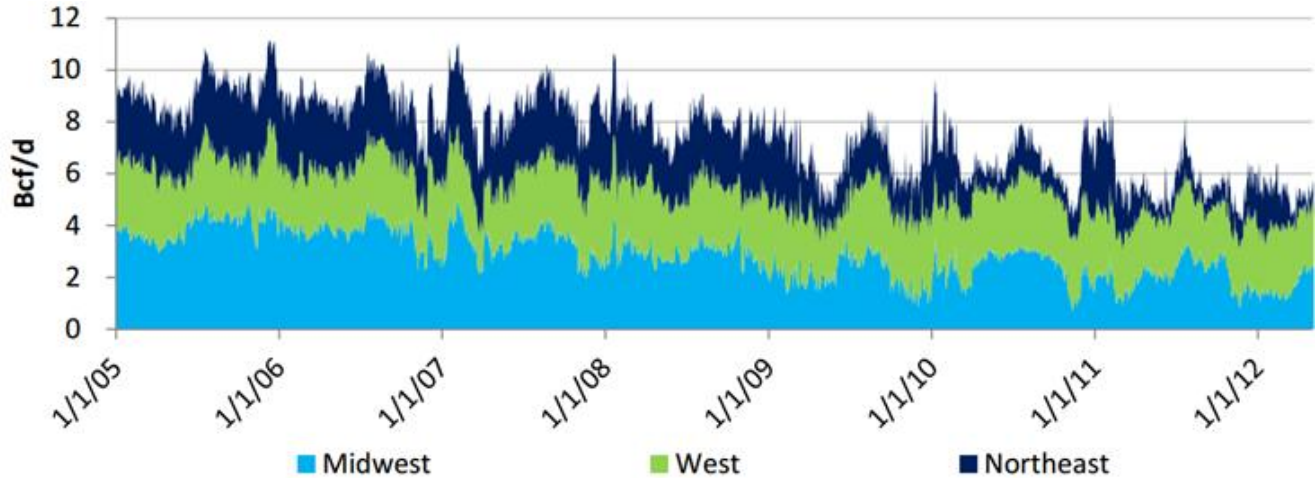
Economic Value of Natural Gas Exports

Research undertaken by National Economic Research Associates (NERA) for the U.S. Department of Energy concluded that exports of LNG yields large economic benefits to the U.S. economy. But where does the high net economic value come from when natural gas is exported? Whenever domestic resources used to produce natural gas can be sold for prices above their cost of production (including any additional processing costs) to foreigners, the national economy benefits. The economic gain occurs because the U.S. can produce a product that will make a claim on foreign resources considerably above its cost of production resulting in wealth transfers from other countries to the U.S. The surplus value from these transactions shows up in higher returns from construction of plant and equipment, additional investment in human capital, employment growth and new revenues for federal, state, and local governments. As export markets grow, opportunities emerge to expand investment to meet foreign demand. Foreign purchasers also benefit as additional supplies of natural gas on world markets provide opportunities to substitute away from more costly energy and/or meet higher environmental standards. There is also a net economic gain for sales to domestic customers in the U.S., but here the value to the U.S. is largely through improved productivity for the domestic economy and lower costs for consumers.

Proposals to Restrict LNG Exports

Many opponents of natural gas exports have raised concerns that, if permitted without controls, North America would return to an era of price and supply volatility. Note that from 2008 to 2012, the price of natural gas at Henry Hub fell from over \$10 per million cubic feet (mmcf) to less than \$4/mmcf, providing large savings to consumers and new opportunities for value added processing for U.S. manufacturers. In approximately the same time frame, as shown in Figure 1 below, U.S. net natural gas imports from Canada fell from over 10 billion cubic feet per day (bcf/d) to 4-5 bcf/d, a net loss of natural gas imports of 5-6 bcf/d to the domestic economy. This reduction in imports was driven by the sustained growth in output from domestic production from the technological breakthroughs associated with hydraulic fracturing. This rapid expansion in shale gas production occurred because it was largely free from highly restrictive government policies. The expansion of shale gas production took place almost entirely on private land and was not subject to extensive access restrictions and other federal regulations common on federal lands or on projects in which federal reviews are extensive.

**FIGURE 1
NET IMPORTS FROM CANADA**



Source: North Dakota Pipeline Authority, Bentek.

Concerns have been raised by certain manufacturing enterprises that natural gas in the form of LNG should not be exported, or the volumes of natural gas at least should be constrained at some level, and these gas supplies should instead be “saved” for domestic manufacturers who could then export a more valuable product. Here the claim is that the national economy would be better off in terms employment and the net gain to the economy would be higher if natural gas exports were limited. These conclusions are not supported by economic analysis.

There are two important claims made on behalf of restricting exports. The first is that the U.S. could generate more jobs by allocating natural gas to domestic manufacturers rather than let it be exported. The problem with this argument is that capital cannot, and unless mandated by the government, will not be allocated on the basis of the number of jobs it creates, but instead its ability to generate value, i.e., a positive rate of return.

It is investment in high return projects that provides the foundation for economic expansion and job growth. Allocating investment strictly on its capacity to provide a short term increase in employment is likely to fail. For example, we could mandate a return of our agricultural sector to 17th century practices and create full employment, but our standard of living would drop substantially. None of this is to say that exports do not contribute to employment growth. Professor Slaughter of the Tuck

School of Business has pointed out that exporting companies are on average more profitable, more productive, and pay about 10-14 percent more in salaries than companies that just sell in the domestic market.

Another issue raised by some U.S. manufacturers is that diverting natural gas exports to domestic use not only provides for more employment, but actually delivers higher added value to the national economy through constraints on U.S. LNG exports. A claim is made that natural gas used in manufacturing raises the economic benefit 8 times above the value of the natural gas used as exports (see <http://www.americasenergyadvantage.org/info/growing-the-economy>). However, official U.S. data do not support this view. The U.S. Department of Commerce, Bureau of Economic Analysis (BEA) estimates that the average GDP growth multiplier for all manufacturing is approximately 2. This means that a \$1 increase in manufactured goods production results in a \$2 benefit to the overall U.S. economy.

The BEA estimates the GDP multipliers for oil and gas extraction, chemicals production, and plastics and rubber production are 1.7, 2.4, and 2.3, respectively. Some petrochemical manufacturers have claimed that the GDP multiplier is only 1 for LNG exports. This neglects the benefits of GDP growth from the LNG export industry which would include additional jobs, tax revenues, and likely increased domestic gas production. The increased gas production would have potential benefits to the chemicals industry through increased NGL (e.g., ethane) production, a common byproduct of natural gas production in many U.S. petroleum plays.

There is concern among some petrochemical and heavy manufacturing companies that the growing demand for natural gas in transportation, power production, and exports, will provide little opportunity for expansion of domestic manufacturing. For example, one petrochemical company has presented an analysis that concludes that between 2012 and 2035, U.S. demand for natural gas will grow by 55 bcf/d resulting from the replacement of one-third of the remaining U.S. coal fleet, one-fourth of daily oil imports through natural gas vehicles, and the installation of 14 LNG export terminals. Note that this estimate of 2035 natural gas demand is 50 percent higher than forecasts provided by EIA in their 2012 Annual Energy Outlook (AEO 2012).

These concerns over “excessive demand growth” in natural gas are driven from a view that all announced projects will reach a final investment decision (FID). However, it is common for companies

to announce a large number of projects, particularly as a hedging strategy when permits to construct and operate facilities are difficult to obtain, but many of these projects will never reach FID. It is worth noting the components of this expansionary view (+55 bcf/d by 2035) of U.S. natural gas demand growth. For example, for the transportation sector, the expectation among some manufacturers that natural gas demand will grow by 15 bcf/d reaching 17 bcf/d in 2035 cannot be supported by either official or industry forecasts. EIA's 2012 AEO forecasts 2035 natural gas demand less than 2 bcf/d for the transportation sector. In addition the robust view of natural gas use in transportation is not supported by trend -- the growth rate for natural gas use in vehicles was steepest over the last two years (2009-2011), and applying this growth rate (9.8 percent per year) out to 2035 would yield an increase of only 2 bcf/d, not 15 bcf/d.

Another concern often raised is that if the U.S. permits large scale natural gas exports, prices will escalate dramatically and natural gas supplies for the domestic market will be severely limited. However, the potential volume of U.S. natural gas resources is substantial and subject to expansion from technological advances. Because source rock is so prolific in the U.S., technology is likely to be the main driver in the expansion of natural gas production. The U.S. is not reserve limited.

Given today's technology and prices, EIA estimates U.S. recoverable natural gas to be 2203 TCF compared to the 2005 estimate of 1600 TCF, representing a 38 percent increase. Estimates of recoverable resource by IHS and in the National Petroleum Council's (NPC) 2011 study exceed 3000 TCF. Concerns over U.S. gas supply do not recognize that significant additional U.S. natural gas resources could still be found in areas that have not been explored. This includes areas of the Arctic and extensive offshore areas under federal control, where exploration has not been allowed. Note that the Lower-48 offshore areas that have been off-limits are estimated – even without exploration – to have 77 TCF of recoverable natural gas, according to API. This expansionary view of the U.S. reserve base is supported by recent natural gas modeling efforts by Deloitte (*Economic impact of LNG exports from the United States*, Deloitte Center for Energy Solutions). The results show that the North American gas market is dynamic. If exports can be anticipated, then producers, midstream players, and consumers can act to mitigate the price impact. There is growing realization that the U.S. natural gas production can be supported at sustained higher levels with relatively modest price increases, i.e., the supply curve for natural gas is relatively flat.

We do not have a fixed amount of natural gas (technology continues to expand production potential) and we should not ignore the potential for substantial supply expansions, particularly if appropriate government policies are put into place. One of the central lessons of the shale gas revolution is the benefit of open systems where ideas move quickly from one to another petroleum province. Here the effective response to concerns over rising gas use is to permit more development of U.S. natural gas from vast federal lands not open to exploration and development. Much more attention should be given to the constraints from the regulatory structure at all levels of government that have constrained not only the growth in new petroleum supplies but the entire range of industrial facilities that can productively use rising gas supplies.

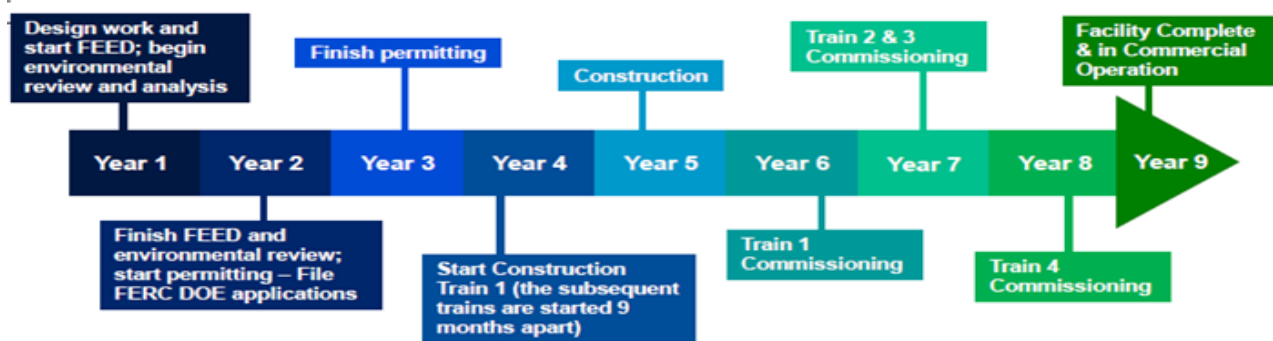
Evaluating Political and Regulatory Risk

The concern over massive LNG exports from the U.S. is misplaced because potential exporters face an extensive regulatory program that effectively limits the construction of new LNG export facilities. A short list includes: FERC approval (based on an Environmental Impact Statement which includes an Endangered Species Act review, and cultural resources assessment); Department of Energy approval of the export licenses; EPA and state approval of air permits for traditional air pollutants and greenhouse gas emissions; US Army Corps of Engineers approval of possible wetlands permits; and EPA and States approval of water quality permits. Even the US Coast Guard plays a role with a water suitability assessment. Note as shown in Figure 2 below, the FERC process combined with the long lead times to construct an LNG export facility, which can easily exceed \$10 billion, already represents an effective (and possibly excessive) process for limiting the pace at which new export facilities can come online.

The DOE review process for LNG exports should not be an evaluation to determine whether exports are in the public interest, as Congress has already established that exports should be viewed as such unless a petitioner can demonstrate otherwise. Petitioners can of course argue that they might be “harmed” from rising prices, but that outcome is remote given advances in drilling technology and the size of the U.S. natural gas reserve base. Furthermore, the deliberative and slow FERC approval process, the high costs and risks associated with siting and building an LNG facility, combined with competition from foreign suppliers all make rapid build out of U.S. LNG export capacity unlikely. Given these

existing constraints the DOE process for approving exports is both unnecessary and counterproductive. (It took 9 months for DOE to grant approval for exports from Cheniere’s Sabine Pass project and two years to approve the Freeport request). In an attempt to carefully evaluate petitioners concerns that LNG exports do not harm the public interest, the slow approval process may actually harm economic growth by creating opportunities for more costly supplies from competitors to gain access to markets that would have been available to U.S. producers. The slow and uncertain regulatory approval process will have the unintended consequence of harming the public interest by strengthening the bargaining position of alternative LNG suppliers.

FIGURE 2
Permitting and Construction Timelines for FERC Approval



Source: FERC, Industry data

LNG projects require shippers and buyers as well as banks and investors that provide funding for constructing the projects, to undertake enormous long-term risks. An LNG facility is expensive, often costing \$10-\$15 billion in direct capital investment just for liquefaction and related facilities. LNG shipping tankers can cost from \$200 million and up. It is not uncommon for an LNG project to spend in excess of \$100 million just to move through the FERC approval process. As a result, an LNG project requires agreements and complex contract structures to address the entire range of project and market risks. .

The one risk that remains nearly impossible to address is political and regulatory risk and a recent report from Bloomberg points out that this risk is rising. According to a report by authors Tony Costello and Jorge Uquillas,¹ U.S. companies' perception of political risk from the U.S. Government for large scale energy projects has risen by 45% since 2005. Although we might debate whether this perception of risk by U.S. companies is accurate, we face no shortage of high value-added projects which continue face enormous delays and rising concerns over whether federal action will either prohibit a project from proceeding or provide so much delay and regulatory risk that investors remain on the sidelines.

Coal Exports

Although on a different and more modest scale, American steam coal exports can also provide substantial benefits to the national economy. The world coal market has experienced some recent setbacks from the contracting world economy, but expectations remain positive for both rising demand and higher prices for steam coal. The U.S. has a large endowment of low-cost, quality coal reserves that can be competitively shipped to high value destinations through rail and seaborne transport. According to the International Energy Agency, by 2016 coal demand in Asia is likely to increase by well over 150 million metric tons above 2011 levels. Australia and Indonesia are well placed to capture some of this market, but U.S. producers can also capture a substantial volume of this growing market.

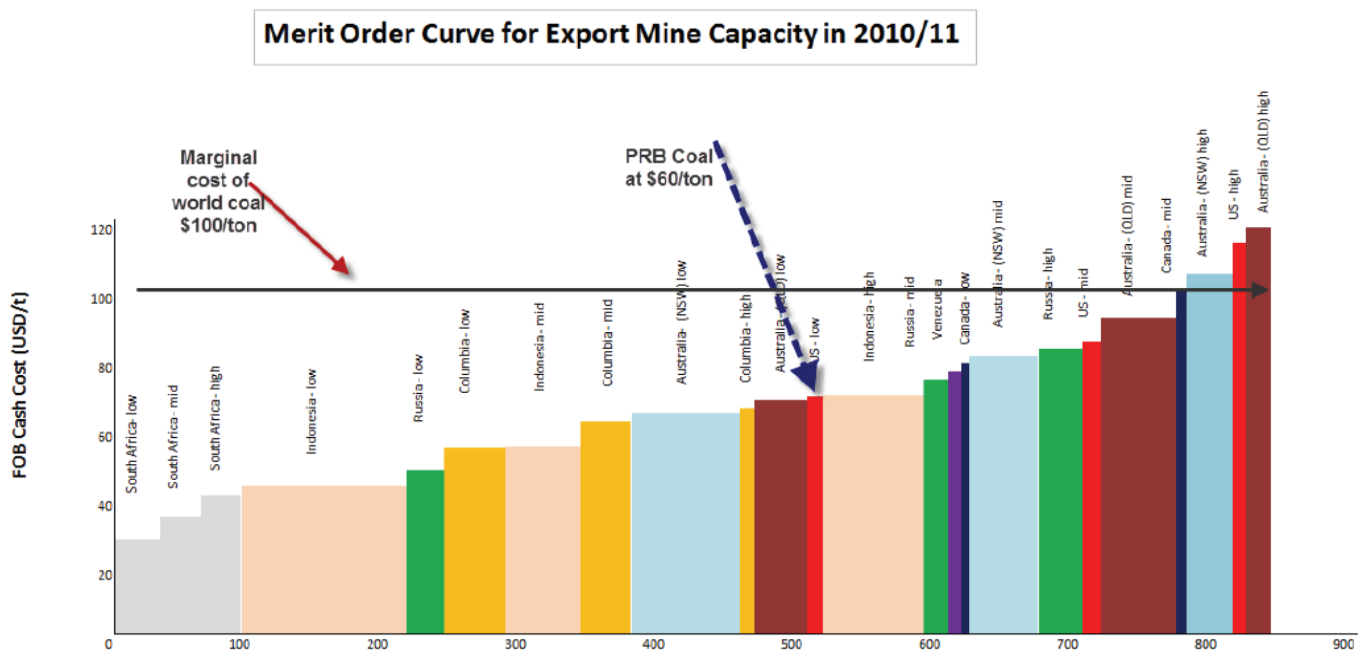
Proposed port construction and expansions in Cherry Point, Long View, and Hoquiam, Washington and other ports in Oregon offer the potential to expand total export capacity to well over 100 million metric tons. Clearly, all of these facilities will not be constructed, but interest in expanding and/or rehabilitating U.S. west coast port facilities point to Asia as the high valued destination for U.S. coal exports. Environmental groups have raised objections in two categories to port expansions and higher volumes of U.S. coal exports. The first is concern over rail traffic, congestion in scenic areas, and potentially higher volumes of coal dust. These tend to be state and local concerns which can be addressed through a number of remedies, but coal exports are also subject to a broader concern that, if

¹ Costello, Tony and Jorge Uquillas, **Companies' Perception of Risk from U.S. Government Actions on the Rise**, Bloomberg Government, June 11, 2013.

permitted in larger volumes, these exports will undermine efforts to control GHG emissions. Many environmental and other groups have called for greater restrictions on coal exports and federal action to limit the necessary permits for port expansions and other requirements to allow these exports cannot be ruled out.

Concern over the potential of U.S. steam coal exports to produce a net increase in emissions of GHGs is misplaced because of the nature of the world supply curve for coal production, known as the “Merit Order Curve.” The Merit Order Curve shows the cash cost of producing and delivering steam coal to major Asian markets. As shown in Figure 3 below, coal production from the Powder River Basin (PRB) is relatively low cost including rail and shipment costs to Asian destinations. Coal production from the PRB can be produced and delivered to Asian markets for approximately \$60 per metric ton (\$54 per short ton). However, these shipments will not set the price. The U.S. is an infra-marginal coal producer, but the world price is set by the marginal producer which is likely to remain from \$90 to \$110 per metric ton. As a result, U.S. PRB production will merely replace higher cost production with relatively small effects on world coal prices. Neither net world coal combustion nor GHG emissions will change substantially as a result of an expansion of U.S. PRB exports.

FIGURE 3



Source: Industry and national country reporting data bases, EPRINC calculations

Concluding Remarks

Improvements in the U.S. outlook for domestic production of natural gas is a remarkable achievement of American technology and innovation and LNG exports can make an important contribution to much needed economic growth. Productive capital allocation and project planning essential for expanding the economy, particularly in very high-cost long-term investments such as exports of LNG require expectations that government policies will be supportive of economic growth, and not create further impediments. A traditional strength of the U.S. economy is that political risk is low and can be contained, but a wide range of policies and regulatory delays are undermining these expectations. Government policy should send strong signals to both producers and the entire range of value-added manufacturers that our economy will remain open and that investment in new natural gas production will have access to the entire range of domestic and foreign markets. These same signals should be sent to exporters of American coal. The benefits of an open market strategy with regulatory stability and common sense policies will lift employment, bolster the national economy, and even enhance our strategic outlook.