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S. 33, THE LNG PERMITTING CERTAINTY AND TRANSPARENCY ACT

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

ON

S. 33,

THE LNG PERMITTING CERTAINTY AND TRANSPARENCY ACT

THURSDAY, JANUARY 29, 2015

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S. 33, THE LNG PERMITTING CERTAINTY AND TRANSPARENCY ACT

THURSDAY, JANUARY 29, 2015

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:34 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Lisa Murkowski, Chairman of the committee, presiding.

OPENING STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

The CHAIRMAN. I'm calling to order the meeting of the Energy Committee this morning.

Thank you to members and thank you to those on the panel for joining us.

As you know we've had kind of a busy week here on the Committee. Senator Cantwell and I have logged a few hours standing up in the chamber trying to move the Keystone bill through, and our hope is that we're on the final run of that.

I appreciate our Committee members coming a little bit earlier. We had initially noticed this for ten o'clock, but in an effort to get through this important hearing and then attend to our business on the Floor, we bumped it up half an hour.

So to our witnesses, thank you for your accommodation as well. We appreciate it.

I want to recognize that Senator Heinrich, as well as Senator Barrasso, who are the lead bipartisan sponsors of S. 33, the LNG Permitting Certainty and Transparency Act, will have some remarks this morning so I'm going to keep my comments brief.

I want to recognize them, congratulate them and their co-sponsors, Senator Capito, here on the Committee, Gardner and Hoeven, all members, as well as Senators Bennet, Udall, Toomey, Kaine and Heitkamp. I appreciate the work that all of you have done to get us here.

I have long argued that exports of liquefied natural gas should be expedited from the United States to our friends and our allies overseas. I made the case in my Energy 20/20 two years ago and again in two more recent white papers, one called "The Narrowing Window: America's Opportunity to Join the Global Gas Trade" as well as "A Signal to the World: Renovating the Architecture of U.S. Energy Exports."

Know from the outset that I fully support the bill we have in front of the Committee. I think it's the culmination of years of leg-

islative work here in the Congress. I can remember when Senator Dick Lugar, who introduced it in December of 2012, laid out the concept that exports for NATO members should receive expedited treatment over at the DOE. As proposals came forth, more and more countries were added to this prospective list, Ukraine, Japan, India and eventually the entire World Trade Organization.

Just yesterday we voted on Senator Cruz's WTO amendment as part of the ongoing Keystone XL debate.

Last year legislative activity turned to the approval process over at DOE. We saw proposals to give the Department a time limit for authorizations, these licenses, with the clock starting at various points, after FERC final authorization, after pre-filing and so forth. Many colleagues co-sponsoring this current legislation were involved in those efforts, as was our former colleague and member of the Committee here, Senator Mark Udall.

I think we all recognize this legislation in front of us, S. 33, is a compromise. Compromises, almost by their definition, are imperfect in certain ways, but I think it is the result of some very serious work by very serious people coming together to try to address an issue. I thank my colleagues for all that they have done to come together on this matter.

With that I will turn to my Ranking Member for her comments.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Well, thank you, Madam Chairman and thank you for the hearing. As you said, we're on the Floor on a pretty serious policy discussion on energy and we're having this hearing this morning. I think it's obvious to everybody we're two female Committee Chairs, but we also have two female staff directors and I think that the fact that we're having this hearing and the Floor debate at the same time just shows that we're capable of multitasking when it comes to energy policy.

So it makes for a busy day.

We're here to discuss S. 33, a bill to seek acceleration and more certainty to the process of determining natural gas exports and whether they are in the public interest. As we consider this bill and how to discuss it, obviously we are interested in taking advantage of America's abundant natural gas and its ability to help transform our economy.

It was only ten years ago we were discussing how we would need to import natural gas and how many new terminals we would need to build to meet growing demand, but over the last eight years natural gas production has increased by 36 percent. Today's natural gas has become so plentiful and inexpensive that we are reversing the flow and turning those LNG import facilities into export facilities.

We're here today, I think five members of our Committee in fact, looking for ways to help speed up that export permitting process. I appreciate that they are doing so in a way that respects the critical NEPA process, maintains the legal requirements for exports to receive a public interest determination and I would note however, that the Department of Energy recently changed the process to approve these new projects. The goal was to speed up the overall ap-

proval process. As we're considering S. 33, I'm interested in finding out whether these issues have actually been addressed.

So is the new revised DOE process actually working?

In the five months since the Department of Energy adopted its new policy, it has issued four separate approvals for LNG export facilities. Of the 37 applications for exports to non-FTA countries that have been filed at the Department of Energy, currently 32 are pending.

We must consider whether the revised process is the best way to evaluate those projects.

Second, what are the policy implications for the fixed deadline? I'm sure we'll get into this discussion here and determination about the public interest.

A fixed deadline is not necessarily always in the applicant's best interest as well. What if the authorization can't be made in 45 days, but it could be made in 60 days or it could be made in 90 days? It would be unfortunate the applicant actually could get turned down simply because of the timeline this bill lays out rather than from a public interest determination.

Third, is it appropriate for DOE to make the public interest decision before the FERC process is completed?

Right now DOE starts its public interest process after the Federal Energy Regulatory Commission approval is issued. The bill would require the Department of Energy to start its process after the NEPA process is complete, but the FERC approval requires more than just NEPA review. The FERC approval process includes a robust public comment period to vet the siting of these facilities.

So all of these are important questions that we'll have for today's hearing.

Madam Chair, thank you so much for giving our colleagues a chance to be here to discuss this issue.

I would say besides the five members who support this legislation and some of which, as I said, has already been implemented, we have great concerns about what is the impact as it relates to pricing in the Midwest into natural gas.

Being from a hydro state, I'm always very aware of how energy is the lifeblood of an economy and how much it has built the Northwest economy over and over and over again. I also want to understand how this legislation will impact our big industrial users?

I look forward to hearing from the panelists who are here today to testify.

Thank you.

The CHAIRMAN. Thank you, Senator Cantwell.

I want to note for the record that Senator Portman was also added as a co-sponsor to this bill, and we appreciate his involvement as well.

I will now turn to Senator Barrasso and Senator Heinrich for brief comments this morning before we go to our witnesses. As the co-sponsors of this bipartisan bill, I'd like to extend them that courtesy.

Senator Barrasso.

STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM WYOMING

Senator BARRASSO. Well, thank you very much, Chairman Murkowski. Thank you for holding today's hearing on liquefied natural gas export legislation.

Two weeks ago Senator Heinrich and I introduced S. 33, the LNG Permitting Certainty and Transparency Act. This bill would expedite the permitting process for LNG exports to countries which do not have free trade agreements with the United States. It would require the Secretary of Energy to make a final decision on an export application within 45 days after FERC completes the environmental review process. In addition the bill would provide for expedited judicial review of legal challenges to LNG export projects. Finally the bill requires exporters to publicly disclose the countries to which LNG is being delivered.

Our bill ensures that the Secretary will make a timely decision on LNG export applications and that legal challenges to LNG export projects will be resolved expeditiously. In short, our bill will give investors greater confidence that LNG export projects will be permitted and built.

Our bill is carefully crafted, and it's a bipartisan compromise. It's co-sponsored by five Democrats and five additional Republicans. It is nearly identical to the legislation that the House of Representatives passed yesterday with the support of 41 Democrats. Like its House companion, our bill offers Congress the best chance to do something meaningful for LNG exports.

Study after study have shown that LNG exports will create good paying jobs all across America, good paying jobs in states like Oregon, West Virginia, Colorado, New Mexico and Wyoming. LNG exports will also reduce our nation's trade deficit which currently stands at $39 billion. It will even help President Obama fulfill his goal of doubling our nation's exports which he set five years ago this week.

Finally, LNG exports are, for the United States, a powerful means to bring about positive change throughout the world. LNG exports will help increase the energy security of key U.S. allies and partners throughout Europe and Asia. LNG exports will provide an alternative source of energy to countries which Russia has ruthlessly exploited. LNG exports will also give countries an alternative to energy from Iran.

In conclusion, I'd like to thank Senator Heinrich for his leadership on this bill. He's been a great partner to work with. I'd also like to thank Senators Gardner, Hoeven, Capito and Portman, members of this Committee, as well as Senators Heitkamp, Kaine, Bennet, Udall and Toomey. Finally, I'd like to thank the witnesses for their willingness to testify here today. I look forward to the testimony.

Thank you, Madam Chairman.

The CHAIRMAN. Thank you, Senator Barrasso.

And again, thank you for your long leadership on this issue and that of Senator Heinrich's as well. We'll turn to you, please.

STATEMENT OF HON. MARTIN HEINRICH, U.S. SENATOR FROM NEW MEXICO

Senator HEINRICH. Great. Thank you, Madam Chairman, for holding this hearing.

I want to say I very much appreciate the work of Senator Barrasso and his staff in working with us putting together this bipartisan bill, and I'm incredibly pleased to join my colleagues, Senators Gardner, Heitkamp, Hoeven, Kaine, Capito, Bennet, Toomey, Udall and Portman, in sponsoring this bill. It just doesn't get much more bipartisan than that around here these days.

As the Chair mentioned, our bill follows directly from the work in the last Congress of our former colleague, Senator Mark Udall and in the House also by our new colleague, Senator Gardner. My home state of New Mexico, some of you know, ranks seventh in the nation right now in gas production. The main gas producing region in New Mexico is the San Juan Basin in the Northwest part of the state around the city of Farmington, Aztec.

The good news is we have large reserves of natural gas; however, the current surge in gas production has depressed prices to less than three dollars per million BTU negatively impacting the economies of domestic gas producing regions including Northwestern New Mexico.

I fully support the measured and cautious approach being taken by Secretary Moniz and Assistant Secretary Smith at the Department of Energy. It makes sense for DOE to complete its review of an application for exports to non-FTA countries only after the NEPA review has been completed.

In addition, recent studies show that the industry can fully support modest levels of exports of LNG with minimal impacts on consumers while boosting the nation's economic output and jobs in states like Senator Barrasso's and mine.

I co-sponsored this bill because I believe it will help stimulate job opportunities for my state's gas industry while fully preserving both FERC's environmental and safety reviews and DOE's determination of public interest including the authority to approve or deny applications to export LNG to non-FTA countries.

Though our bill allows DOE to continue to independently review each application, it will also provide much needed additional certainty and predictability to the industry to market LNG to non-FTA countries, in Europe and Asia. The bill will also provide much needed transparency by making available to the public the countries to which LNG has been delivered.

Thank you again for holding this hearing, and I look forward to hearing from our witnesses today.

The CHAIRMAN. Thank you.

Now we will turn to our panel. We'll begin this morning with Mr. Smith and just go down the row. I will introduce everyone at the outset here, and then we'll move to five minute presentations followed by questions from the members.

We first have Mr. Christopher Smith, who is the Assistant Secretary for Fossil Energy at the Department of Energy. Thank you, Mr. Smith.

Mr. Paul Cicio, who is President of the Industrial Energy Consumers of America, welcome.

Mr. Martin Durbin, who is President and CEO of America's Natural Gas Alliance.

Mr. Ross Eisenberg, who is with the National Association of Manufacturers.

Our last panelist this morning is Mr. David Koranyi, who is the Director of the Eurasian Energy Future Initiative at the Atlantic Council.

Welcome to each of you. We can begin with you, Assistant Secretary.

STATEMENT OF HON. CHRISTOPHER A. SMITH, ASSISTANT SECRETARY FOR FOSSIL ENERGY, U.S. DEPARTMENT OF ENERGY

Mr. SMITH. Thank you, Chairman Murkowski, Ranking Member Cantwell and members of the Committee. I appreciate this opportunity to be here to discuss the Department of Energy's program regulating the export of liquefied natural gas and to answer questions about S. 33, the LNG Permitting Certainty Transparency Act.

Since 2010 when we began receiving long term applications to export LNG to non-FTA countries, the Department has demonstrated its commitment to protecting the public interest. As you know we conduct a thorough public interest determination process, as required by the Natural Gas Act, one that's expeditious, judicious and fair. That process includes ample opportunity for public input in order to evaluate if an export is in the public interest. A determination allows balancing a range of important factors including economic impacts, international dynamics, security of natural gas supply, environmental concerns and market dynamics and developments.

I testified before this Committee last July, and at the time we had just announced a new procedure for processing LNG applications. I told you that by focusing our efforts on the projects that completed FERC's safety evaluation process that reviewed that it would help us to make our decision making more effective and efficient and that it would allow the Department of Energy to focus on those projects that were most mature and therefore, most likely to be constructed.

Since the announcement of the new procedures FERC has completed its decision making process on two projects. The Department promptly issued a licensing decision for each of those applicants. And in total the Department has approved 5.74 billion cubic feet per day in final, long term authorizations to export to lower 48 LNG to non-FTA countries from four proposed liquefaction facilities.

We've issued thorough orders that can stand up to the scrutiny that they are sure to receive, and we've done it within days of the project getting signed off from FERC. I believe that this demonstrates our commitment to act expeditiously and effectively in addressing the Department's responsibilities under the Natural Gas Act requirements.

In conclusion, Madam Chair, I appreciate the Committee's interest in discussing this very important issue with the Department of Energy, and I look forward to this discussion. We understand the

significance of this issue as well as the importance of getting these decisions right.

With that, I'd be happy to answer any questions that the Committee might have.

[The prepared statement of Mr. Smith follows:]

Statement of
Christopher Smith
Assistant Secretary Office of Fossil Energy
U.S. Department of Energy

Before the

Committee on Energy and Natural Resources
United States Senate

Hearing on S. 33, the LNG Certainty and Transparency Act

January 29, 2015

Thank you Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee. I appreciate the opportunity to be here today to discuss the Department of Energy's (DOE) program regulating the export of liquefied natural gas (LNG), and to answer questions about S. 33, "The LNG Permitting Certainty and Transparency Act."

Recent Developments in LNG Exports

The domestic abundance in shale gas provides unprecedented opportunities for the United States. Over the last several years, domestic natural gas production has increased significantly, outpacing consumption growth, resulting in declining imports of natural gas and LNG. Production growth is primarily due to the development of improved drilling technologies, including the ability to produce natural gas trapped in shale gas geologic formations.

Historically, DOE has played an important role in the development of technologies that have enabled the United States to expand development of our energy resources. Between 1978 and 1992, public research investments managed by the Department contributed to the development of hydraulic fracturing and extended horizontal lateral drilling technologies that spurred private sector investments and industry innovation, unlocking billions of dollars in economic activity associated with shale gas.

Today, domestic natural gas prices are lower than international prices of delivered LNG to overseas markets. As in the United States, demand for natural gas is growing rapidly in foreign markets. Due primarily to these developments, DOE has received a growing number of applications to export domestically produced natural gas to overseas markets in the form of LNG.

DOE's Statutory Authority

DOE's authority to regulate the export of natural gas arises under section 3 of the Natural Gas Act (NGA), 15 U.S.C. § 717b. This authority is vested in the Secretary of Energy and has been delegated to the Assistant Secretary for Fossil Energy.

Section 3(a) of the NGA sets forth the standard for review of most LNG export applications:

> [N]o person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the [Secretary of Energy] authorizing it to do so. The [Secretary] shall issue such order upon application, unless after opportunity for hearing, [he] finds that the proposed exportation or importation will not be consistent with the public interest. The [Secretary] may by [the Secretary's] order grant such application, in whole or part, with such modification and upon such terms and conditions as the [Secretary] may find necessary or appropriate.

Section 3(a) thus creates a rebuttable presumption that a proposed export of natural gas is in the public interest. Section 3(a) also authorizes DOE to attach terms or conditions to the order that the Secretary finds are necessary or appropriate to protect the public interest. Under this provision, DOE performs a thorough public interest analysis before acting.

In the Energy Policy Act of 1992, Congress introduced a new section 3(c) to the NGA. Section 3(c) created a different standard of review for applications to export natural gas, including LNG, to those countries with which the United States has in effect a free trade agreement (FTA) requiring the national treatment for trade in natural gas. Section 3(c) requires such applications to be deemed consistent with the public interest, and requires such applications to be granted without modification or delay.

Free Trade Agreement (FTA) Countries

There are currently 18 countries with which the United States has in place free trade agreements that require national treatment for trade in natural gas for purposes of the Natural Gas Act. These 18 countries include: Australia, Bahrain, Canada, Chile, Colombia, the Dominican Republic, El Salvador, Guatemala, Honduras, Jordan, Mexico, Morocco, Nicaragua, Oman, Panama, Peru, Republic of Korea, and Singapore.

There also are two countries — Israel and Costa Rica — that have free trade agreements with the United States that do not require national treatment for trade in natural gas for purposes of the Natural Gas Act.

Because complete applications under section 3(c) must be granted without modification or delay and are deemed to be in the public interest, DOE does not conduct a public interest analysis of applications to export LNG to those countries.

DOE Process to Review Applications to Export LNG to non-FTA Countries

DOE's review of applications to export LNG to non-FTA countries is conducted through a public and transparent process. Upon receipt of an application, DOE issues a notice of the application in the *Federal Register*, posts the application and all subsequent pleadings and orders in the proceeding on its website, and invites interested persons to participate in the proceeding by intervening and/or filing comments or protests. Section 3(a) applicants are typically given an opportunity to respond to any such comments or protests and, after consideration of the evidence

that has been introduced into the record, DOE issues an order either granting the application as requested, granting with additional terms or conditions, or denying the application.

Under the Natural Gas Act, DOE's orders are subject to a rehearing process that can be initiated by any party to a proceeding seeking to challenge DOE's determinations. Court review is available as well after the rehearing process is exhausted.

Public Interest Criteria for NGA Section 3(a) Applications

For applications requesting authority to export LNG to countries that do not have free trade agreements requiring national treatment for trade in natural gas, DOE conducts a full public interest review. While section 3(a) of the NGA establishes a broad public interest standard and a presumption favoring export authorizations, the statute neither defines "public interest" nor identifies criteria that must be considered. In prior decisions, however, DOE's Office of Fossil Energy (DOE/FE) has identified a range of factors that it evaluates when reviewing an application for export authorization. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct its review, DOE/FE looks to record evidence developed in the application proceeding. Applicants and interveners are free to raise new issues or concerns relevant to the public interest that may not have been addressed in prior cases.

Jurisdiction over the LNG Commodity Export Versus the LNG Export Facility

DOE exercises export jurisdiction over the commodity (natural gas), whereas other Federal, state, and local organizations have jurisdiction over the facilities used in the import or export of the commodity, depending on the facility location.

The Federal Energy Regulatory Commission (FERC) is responsible for authorizing the siting, construction, expansion, and operation of LNG import and export terminals. FERC may approve those applications in whole or in part with such modifications and upon such terms and conditions as it finds necessary or appropriate.

The U.S. Department of Transportation's Maritime Administration (MARAD) is responsible under the Deepwater Port Act of 1974, as amended, (33 U.S.C. § 1501 *et seq.*) for the licensing system for ownership, construction, operation and decommissioning of deepwater port structures located beyond the State seaward boundaries including deepwater LNG facilities.

When either FERC or MARAD has jurisdiction over a LNG terminal, that agency serves as the lead for completing the review required by environmental laws and regulations that are included in the National Environmental Policy Act (NEPA) review. DOE serves as a cooperating agency for assessing the environmental impact of the proposed action and may adopt the final document to serve as its environmental review.

Summary of DOE Approvals, Studies, and Procedures, 2011–2014

Sabine Pass Authorization — First Long-Term LNG Export Authorization

DOE granted the first long-term application to export domestically-produced lower-48 LNG to non-FTA countries to *Sabine Pass Liquefaction, LLC*, (*Sabine Pass*) in DOE/FE Order Nos. 2961 (May 20, 2011), 2961-A (August 7, 2012), and 2961-B (January 25, 2013). The LNG export volume authorized is equivalent to 2.2 billion cubic feet per day (Bcf/d) of natural gas for a period of 20 years. In the first of the *Sabine Pass* orders, DOE stated that it would evaluate the cumulative impact of the Sabine Pass authorization and any future authorizations for export authority when considering subsequent applications.

2012 LNG Export Study

Following issuance of the *Sabine Pass* order, DOE undertook a two-part study of the cumulative economic impact of LNG exports. The first part of the study was conducted by the Energy Information Administration (EIA) and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several prescribed export scenarios of natural gas exports of up to 12 billion cubic feet per day. The second part of the study, performed by NERA Economic Consulting (NERA) under contract to DOE, evaluated the macroeconomic impact of LNG exports on the U.S. economy with an emphasis on the energy sector and natural gas in particular.

On December 11, 2012, DOE published in the *Federal Register* a Notice of Availability of the EIA and NERA studies, and inserted both parts of the study into 15 then-pending LNG export application dockets for public comment. An initial round of comments on the study ended on January 24, 2013, and reply comments were due February 25, 2013.

In response to the Notice of Availability, DOE received over 188,000 initial comments and approximately 2,700 reply comments. Proponents of LNG exports generally endorsed the results of the two-part study, particularly the conclusion of the NERA study that increasing levels of exports will generate net economic benefits for the United States. On the other hand, comments filed by opponents of LNG exports raised a number of issues, including challenges to the assumptions and economic modeling underlying the two-part study and assertions that the two-part macroeconomic study should have further examined regional, sectoral, or environmental issues.

Use of Annual Energy Outlook Projections

On May 7, 2014, EIA issued its most recent projections for 2035 in the Annual Energy Outlook 2014 Reference Case (AEO 2014). Compared to AEO 2013 Reference Case, total natural gas consumption for 2035 is projected to increase by 4.7 Bcf/d, from 78.7 Bcf/d to 83.4 Bcf/d. However, total domestic dry gas production is projected to rise by 13 Bcf/d of natural gas, from 85.9 Bcf/d to 98.9 Bcf/d (although this increase includes Alaska natural gas production). Projections from the AEO 2014 reflect net LNG exports from the United States in a volume equivalent to 9.2 Bcf/d of natural gas. Of this projected volume, 7.4 Bcf/d are exports from the lower-48 states, 0.4 Bcf/d are imports to the lower-48 states, and 2.2 Bcf/d are exports from Alaska. This estimate compares with projected net LNG imports of 0.4 Bcf/d in the lower-48 for 2035 in the AEO 2011 Reference Case. The 2035 Henry Hub price in the AEO 2014 Early

Release Reference Case is $6.92/MMBtu, down from $7.31/MMBtu in the AEO 2011 Reference Case (both in 2012 dollars).

In sum, comparing the AEO 2014 Reference Case and AEO 2013 Reference Case projections shows market conditions that continue to accommodate increased exports of natural gas. It should be noted that EIA's projection in the AEO 2014 Reference Case reflects domestic prices of natural gas that rise due to both increased domestic demand and exports, but that these price increases will be followed by "[a] sustained increase in production ... leading to slower price growth over the rest of the projection period." The EIA has announced that the AEO 2015 will be released in March 2015, and DOE will review EIA's updates to natural gas market projections.

Implementation of Procedural Change

Since receiving the first long-term application in 2010 to export LNG to non-FTA countries from the lower-48 states, the DOE has been — and remains — committed to conducting a public interest determination process as required by the Natural Gas Act that is expeditious, judicious, and fair. Throughout this time, the Department has consistently made clear that a close monitoring of market developments plays a critical role in the Department's decision-making process.

On May 29, 2014, in order to reflect changing market dynamics, the Department of Energy proposed to review and make final public interest determinations on non-FTA export applications only after completion of the review required by environmental laws and regulations that are included in the NEPA review, thereby suspending its practice of issuing conditional authorizations. In keeping with the Department's commitment to an open and transparent process, the Department made the proposed procedural change available for a 45 day public review and comment period.

On August 15, 2014, DOE announced its final revised procedures for LNG export decisions. Since then, DOE has acted and will act on applications in the order they become ready for final agency action. An application is ready for final action when DOE has (1) completed the pertinent NEPA review process, and (2) sufficient information on which to base a public interest determination. By acting only on applications that are ready for final action, DOE has avoided devoting resources to applications that have little prospect of proceeding. These saved resources have been better deployed to providing timely action on applications that are furthest along in the regulatory review process.

In addition, the Department initiated an updated two-part economic study to evaluate the impact of LNG exports beyond the 12 billion cubic feet per day evaluated in the 2012 LNG Export Study. EIA completed the first part of the study evaluating exports in the DOE-prescribed range of 12 to 20 billion cubic feet per day of natural gas in October 2014. The second part of the study is being conducted by outside consultants to evaluate the macroeconomic impacts of U.S. LNG exports on the U.S. economy, using multiple economic indicators, with an emphasis on the energy sector, and natural gas and energy-intensive industries in particular. While these efforts are underway, the Department will continue to act on applications as stated above. If the

cumulative export authorizations approach the high end of export cases examined, the Department will conduct additional studies as needed to understand the impact of higher export ranges. At all levels, cumulative impacts will remain a key criterion in assessing the public interest.

LNG Export Applications Status

Consistent with the NGA, as of January 21, 2015, DOE has approved 40 long-term applications to export lower-48 LNG to free trade agreement countries in an amount equivalent to 40.26 billion standard cubic feet per day of natural gas. In addition, DOE has four long-term applications pending to export lower-48 LNG to free trade agreement countries. No large scale liquefaction facilities in the lower-48 currently exist, three facilities are currently under construction, and 26 additional large scale facilities are proposed to be built.

Most of the applicants seeking authorization to export LNG from proposed facilities to free trade agreement countries have also filed to export LNG to non-free trade agreement countries in the same volume from the same facility to provide optionality on the final destination country. The volumes of the applications to export to free trade agreement countries and non-free trade agreement countries are therefore not additive.

As of January 21, 2015, DOE has granted five final long-term authorizations to export lower-48 LNG to non-free trade agreement countries in a total amount equivalent to 5.74 billion standard cubic feet per day of natural gas from four proposed liquefaction facilities. DOE has established a pattern of issuing final LNG decisions promptly after completion of the FERC regulatory process, when FERC has issued its order addressing (to date, denying) rehearing requests. Four of these long-term authorizations have been granted under the revised procedures over the past 4.5 months. As of January 21, 2015, DOE had 32 applications pending to export LNG equivalent to an additional 32.32 billion standard cubic feet per day of natural gas to non-free trade agreement countries.

S. 33, "The LNG Permitting Certainty and Transparency Act"

Under current law and the procedures I have previously described, an LNG export application is ready for final action when DOE has (1) completed the pertinent National Environmental Policy Act review, and (2) sufficient information on which to base a public interest determination. Section 2 of S. 33 would require the Secretary of Energy to issue a final decision on any application for the authorization to export natural gas under section 3(a) of the NGA not later than 45 days after the conclusion of the environmental review required by NEPA. Section 3 of S. 33 would require that exporters of LNG report to DOE the countries to which it has been shipped, and that DOE publish that information on its website.

As described above, DOE's current process is to promptly conduct reviews of final authorizations once FERC has completed its regulatory process. In effect, S. 33 would tie the DOE decision timing to the NEPA process as opposed to the FERC regulatory decision.

The Department has clearly demonstrated a commitment to act expeditiously in its regulatory responsibilities, and as such, we do not believe that S. 33's decision-making timeline is necessary to ensure efficient and responsible action by the DOE. While we understand that the intent of S. 33 is to add greater regulatory assurance to applicants for LNG exports and the Department shares the goals of transparency and certainty of process, we do not believe that S. 33 is necessary to meet these goals.

Conclusion

In conclusion Madam Chairman, I would like to emphasize that DOE is committed to moving the process of making LNG export decisions forward as expeditiously as possible. DOE understands the significance of this issue — as well as the importance of getting these decisions right. I look forward to answering any questions that the members of the committee may have.

The CHAIRMAN. Thank you, Mr. Smith. Mr. Cicio.

STATEMENT OF PAUL N. CICIO, PRESIDENT, INDUSTRIAL ENERGY CONSUMERS OF AMERICA

Mr. CICIO. Chairman Murkowski, Ranking Member Cantwell and members of the Committee, thank you for this opportunity to be here today.

My name is Paul Cicio, and I'm the President of the Industrial Energy Consumers of America. We are an industrial consumer advocate.

IECA is not opposed to LNG exports; however, today there is no energy public policy decision more important than whether or not to approve an LNG export facility for 20 to 30 years. The reason is that all risks associated with the export of LNG fall on the consumer. The larger the LNG export volume, the larger the cumulative risk.

Australia has over a 200 year supply of natural gas which is more than twice that of the U.S., yet today because of unfettered LNG exports domestic prices have tripled because the Australian government has failed to protect the consumer. Manufacturers are shutting their doors. Power plants are converting from gas to coal, and we do not want to see that happen here long term if policy makers do not fully implement the Natural Gas Act.

The DOE sponsored NERA report illustrates that LNG exports create winners and losers. It explains how higher natural gas prices can be expected to have a negative effect on output and employment, particularly by sectors that use large amounts of natural gas. And that is us.

Figure 12 of our written testimony is directed from the NERA report and shows how exports result in loss of labor, income wages, capital income and indirect taxes. Combined these accelerate wage disparity, and the net economic gain at its peak is a mere $20 billion in 2020 and declines from there. The bottom line is that the bulk of the population is negatively impacted to the benefit of a few raising questions about how it can be in the public interest. Despite this the NERA report was used to justify several export applications.

In their wisdom the Congress passed the Natural Gas Act. And they did so with two things in mind, the cost of LNG exports to consumers and implications to trade. Congress understood that unlike so many other tradable products, natural gas is different because consumers do not have a substitute and it is not renewable. Congress felt a responsibility to act in their behalf to protect the unknowing consumer, who does not have the ability to understand the long term implications of LNG exports.

For this reason the Natural Gas Act includes a provision. It's called the Public Interest Determination, and it's completed for each application to export to non-free trade countries.

However, the Government Accountability Office September 2014 report says that the DOE has not defined public interest. That is a glaring omission, if not a legal issue. If the DOE has not defined public interest, how is it that they can make informed decisions on behalf of 72 million natural gas consumers and 145 million consumers of electricity?

Without a definition of public interest how much public hardship can be inflicted before the DOE denies the next application?

The definition of public interest is not a macroeconomic number, like the so called net economic benefit number of the NERA report. The real definition of public interest was pioneered by Justice Brandeis. "The public interest is that which produces the most good for the most people."

Finally, the Natural Gas Act provides for ongoing monitoring and adjustment to an LNG application. The Natural Gas Act specifically anticipates that adjustments to LNG exports would be in the public interest when it states that DOE "may from time to time after opportunity for hearing and for good cause make such supplemental order in the promises as it may find necessary and appropriate." So the Natural Gas Act creates an obligation for the DOE to monitor and to do economic impact assessments at regular intervals to be sure that exports do not harm the economy and jobs long term.

However, contrary to the Natural Gas Act, the DOE has stated that it does not plan to monitor impacts and make such adjustments. To not do so implies that U.S. policy is designed to protect the capital investment of LNG exporters and not U.S. manufacturing assets.

In closing we urge the support of this Committee to conduct oversight and require the DOE to conduct rulemaking to define public interest, create up-to-date decision making guidance, to condition applications for monitoring, conduct economic assessments at regular intervals and be prepared to protect the public. We urge the DOE from refraining from further approvals until such time it makes these necessary rulemakings.

Thank you.

[The prepared statement of Mr. Cicio follows:]

Paul N. Cicio, President
Industrial Energy Consumers of America

Senate Committee on Energy and Natural Resources

Hearing on
S. 33, "LNG Permitting Certainty and Transparency Act"

January 29, 2015

Testimony of
Paul N. Cicio
President
Industrial Energy Consumers of America

TESTIMONY OUTLINE

A. Introduction

B. Linkages of Energy Costs To Manufacturing Jobs

C. The Natural Gas Act (NGA) Is Designed To Balance LNG Exports and Consumer Protections if Policymakers Will Require DOE to Fully Implement Its Responsibilities. Unfortunately, DOE's Implementation Puts the Economy, Jobs, Consumers And Wage Disparity At Increasing Risk Long-term

D. Natural Gas and Electricity Prices are Already Forecasted to Rise Significantly Even Before All of the Nine Approved or Conditionally Approved LNG Export Terminals are Operating

E. IECA Opposes S.33, The "LNG Permitting Certainty and Transparency Act"

1. S.33 short circuits the public interest determination and consumer protections.
2. The DOE has already either approved or conditionally approved a significant increase in LNG exports that by themselves, could pose a long-term economic threat to jobs and wages.
3. LNG exports are not a permanent job creator.

F. DOE Must Comply with the Natural Gas Act

1. Definition of Public Interest
2. Policy Guidance Designed for Exports
3. Analytical Methods Free of Bias
4. Process of Ongoing Monitoring and Adjustment

Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee, thank you for the opportunity to testify before you on S. 33, the "LNG Permitting Certainty and Transparency Act." My name is Paul Cicio and I am the President of the Industrial Energy Consumers of America (IECA). IECA represents energy-intensive trade-exposed (EITE) industries on energy and environmental issues. IECA companies are some of the largest consumers of natural gas and electricity in the U.S.

A. INTRODUCTION

IECA member company revenues exceed $1.0 trillion in annual sales, they operate over 2,900 facilities nationwide, and have more than 1.4 million employees worldwide. IECA membership represents a diverse set of industries including: chemical, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, insulation, glass, industrial gases, pharmaceutical, building products, brewing, independent oil refining, and cement.

IECA has supported legislation by several of members of this Committee to increase production and U.S. natural resources, and we have supported diversity and reliability of energy supply in the power sector with sensitivity to environmental concerns. IECA has also supported transparency and oversight of energy markets and is a champion for industrial energy efficiency and use of cogeneration of power and waste energy to power.

IECA has a high level of respect for this committee, its members, and its importance in steering sound energy policy to ensure affordable and reliable energy for U.S. consumers and economic development and job creation.

B. LINKAGES OF ENERGY COSTS TO MANUFACTURING JOBS

In 2013, EITE industries accounted for about 41 percent of all manufacturing jobs. EITE industries regularly account for about three quarters of all energy consumed by the U.S. manufacturing sector[1], which itself accounts for more than a quarter of U.S. energy consumption[2]. Yet, despite this energy intensity, GHG emissions by U.S. manufacturers are 22.4% below levels set in 1973, and far lower than GHG emissions of our competitors in many non-FTA countries who would benefit by gaining access to the affordable U.S. natural gas produced near our factories.

The price of natural gas is critical to us. From 1999 to 2008, natural gas prices rose over 209 percent (see figure 1), significantly contributing to the loss of 3.9 million good paying manufacturing jobs, and the closing of tens of thousands of facilities[3]. There are direct linkages between energy prices, manufacturing jobs, and the health of the U.S. economy. The above stated concerns are further elaborated in the August 2014 Oil and Gas Journal article entitled,

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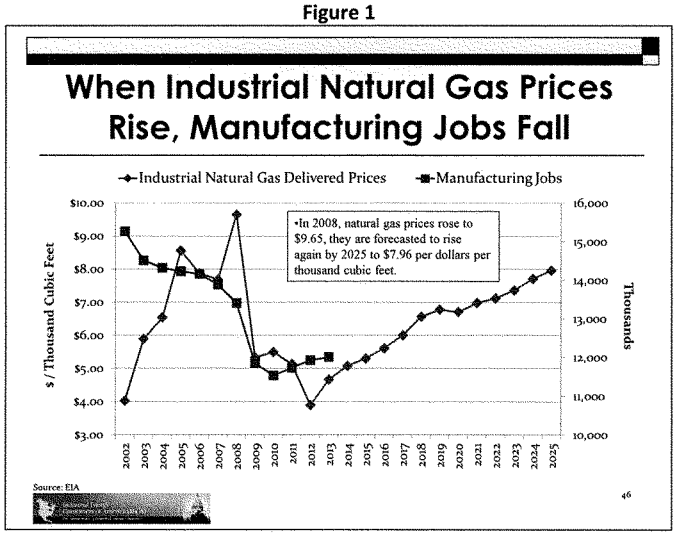
[1] EIA data: In 2010, EITE industries consumed 75.1% of all of the natural gas and 72.7% of all of the electricity used by US manufacturers.
[2] EIA data: In 2013, the manufacturing sector consumed 28.7% of all of the natural gas and 25.9% of all of the electricity used in the US.
[3] Bureau of Labor Statistics.

"Why Manufacturers Oppose Unfettered LNG Exports"[4]. Critics of this data have cited lower Chinese labor as the reason for job losses. IECA's response is that EITE industries' major costs are energy and capital costs, not labor costs.

Figure 1



The linkages of the cost of natural gas to manufacturing's health are also brightly illustrated today in Australia, where steady increases in LNG export volumes have tripled the price of Australian natural gas for their consumers. Manufacturing facilities are shutting down[5] and power generators are converting from natural gas to coal.[6] Policy makers in Australia failed to look at the long-term implications of exports of LNG, and failed to put in place policies that would protect their domestic consumers. Now, it is too late. The U.S. is on track to make the same mistake.

The AEO 2014 reference case provides an illustration of the significant growth of pipeline exports to Mexico and forecasted LNG exports. The LNG portion is but a small fraction of the total LNG export volume that has already been either approved or conditionally approved by the DOE. Figure 2 indicates that total exports will increase 402.7 percent by 2025 and will exceed that of the residential sector.

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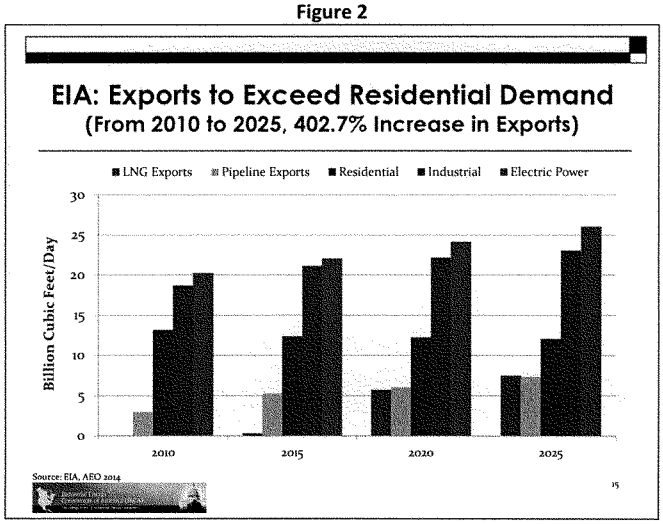
[4] http://pipelineandgasjournal.com/why-manufacturers-oppose-unfettered-lng-exports.
[5] "AFR: Energy, not labour, behind high costs" by Paul Howes, Australian Workers' Union, March 4, 2014, http://www.afr.com/p/opinion/high_costs_due_to_energy_not_labour_fNuuZKaA8DXgSt4ZE9Y69N.
[6] "Australia Going Back to Coal Has Lesson on U.S. LNG Exports," Clyde Russell, Reuters, February 10, 2014, http://www.reuters.com/article/2014/02/10/column-russell-gas-australiaidUSL3N0LF04A20140210.

Figure 2



C. THE NATURAL GAS ACT (NGA) IS DESIGNED TO BALANCE LNG EXPORTS AND CONSUMER PROTECTIONS IF POLICYMAKERS WILL REQUIRE DOE TO FULLY IMPLEMENT ITS RESPONSIBILITIES. UNFORTUNATELY, DOE'S IMPLEMENTATION PUTS THE ECONOMY, JOBS, CONSUMERS AND WAGE DISPARITY AT INCREASING RISK LONG-TERM

The U.S. has the benefit of the NGA which provides policy that is designed to accommodate LNG exports, while preserving affordable prices and job creation. Unfortunately, the DOE has failed to properly implement both the letter and the spirit of the NGA. And, Congressional policymakers have failed in their oversight of the NGA to require the DOE to embrace their responsibilities in behalf of the nation and, importantly, the consumer.

Specifically, IECA urges the following:

1. Sound energy policy decisions require a "long-term" focus because it is impossible to forecast the future and, because so much is at stake and that consumers do not have an alternative. The NERA report (See Figure 12) explicitly makes clear that LNG exports creates winners and losers. The losers are "households with income solely from wages or transfers." And, investment and indirect tax income declines.

2. Energy policy should maximize "permanent" long-term job creation for the U.S. economy, not just the oil and gas industry. Using natural gas in the manufacturing sector will increase 8 times more permanent jobs than exporting it. The top seven LNG export applications combined, will only create 1,890 permanent jobs. Increasing natural gas prices to parity with global LNG prices long-term removes the U.S. economic advantage.

3. Fully comply with both the letter and spirit of the Natural Gas Act. Require the DOE to define "public interest" for purposes of implementing the required public interest determination for review of LNG export applications for non-free trade countries. The "public interest" is NOT the same as the "national interest." *The public interest is that which produces the most good for the most people.* It is NOT a gross economic net benefit calculation such as that used by the DOE.

4. Require the DOE to refrain from using 30-year old, 1984 guidelines for LNG "imports" to inform LNG "export" decision-making.

5. Require the DOE to condition any approval of LNG export applications to protect the consumer, as provided under the NGA. Require the DOE to condition each LNG export application such that, in the event that natural gas prices rise to levels that negatively impact the economy and manufacturing jobs, that the DOE will act to slow export volume as a remedy. *(Some Senators believe that we have unlimited quantities of low cost natural gas and that high prices will never happen. If you believe this to be the case, you should support this provision with the belief that DOE will never have to trigger the conditional provision.)*

6. Be mindful to long-term "natural gas price affordability" realities. According to the EIA, using AEO 2014 2025 demand, the U.S. has 9.6 years of proven reserves and only 49 years of technically recoverable resources in the lower 48. "Technically" recoverable does not mean that it is "economically" recoverable. Despite increases in gas production productivity, there is reason to be wary that substantially higher natural gas prices are necessary to continue to produce year-over-year increased production to meet both U.S. and export demand long-term. The majority of IECA member companies believe that substantially higher natural gas prices will be required in future years to increase year-over-year production increases.

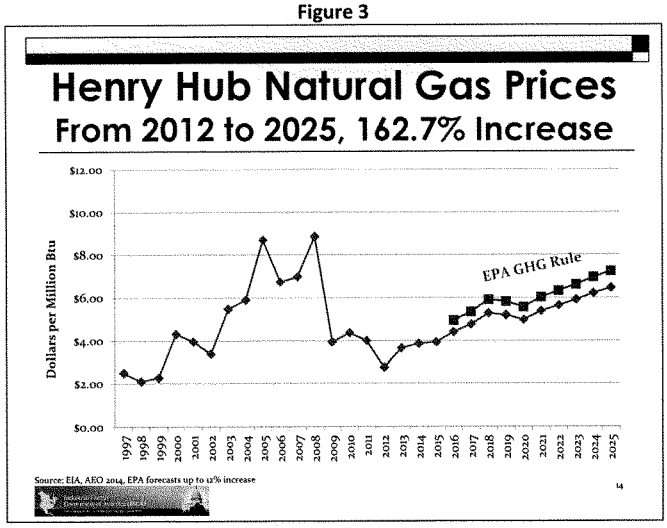
7. All LNG export studies to inform public policymaking decisions should use information only from economic models that have been peer-reviewed. The NERA model was not peer-reviewed.

8. Public policymakers should emphasize LNG exports from Alaska, not the lower 48, where most of the U.S. demand and long-term risks resides.

D. NATURAL GAS AND ELECTRICITY PRICES ARE ALREADY FORECASTED TO RISE SIGNIFICANTLY EVEN BEFORE ALL OF THE NINE APPROVED OR CONDITIONALLY APPROVED LNG EXPORT TERMINALS ARE OPERATING

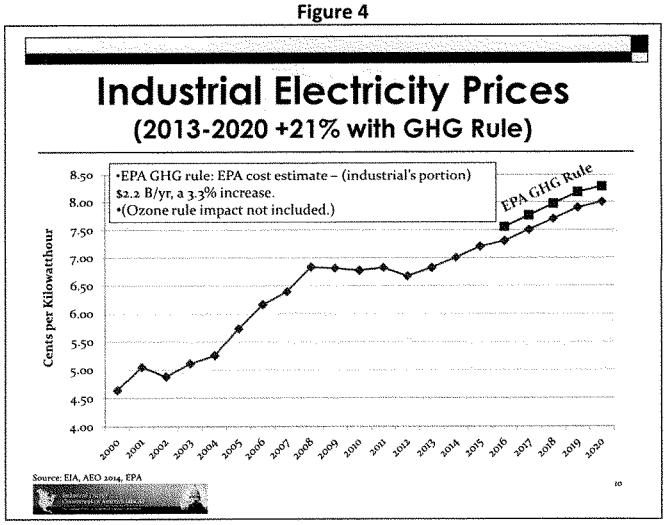
U.S. natural gas demand is at record levels and is forecasted to accelerate due to industrial, power generation and pipeline exports to Mexico. LNG exports are additive. We have included EPA's estimated cost of the Clean Power Plan. When added to the AEO 2014 reference case, the Henry Hub benchmark is expected to increase 162.7 percent in 2025 from 2012.

Figure 3



Electricity prices are also rapidly increasing (see figure 4) due to the combination of coal-fired electric generation plant retirement, and the cost of compliance to environmental regulations. IECA has added EPA's estimated cost of the Clean Power Plan to the AEO 2014 reference case. Together, the reference case suggests that prices will increase 21 percent by 2025 as compared to 2013.

Figure 4



Of increasing concern to industrials is the overreliance on natural gas for power generation. As natural gas prices increase, it will have a dual impact to manufacturing competitiveness. Figure 5 below illustrates how the cost of electricity increases as the price of natural gas rises from $4.00 per million Btu to $7.00 per million Btu, as compared to coal.

Figure 5

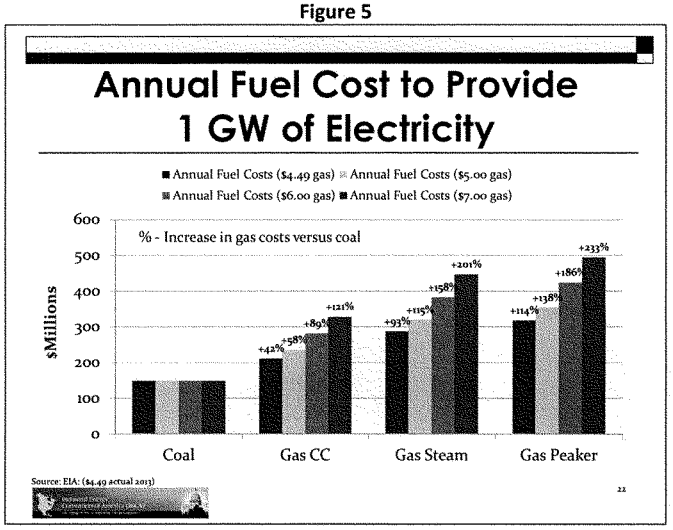
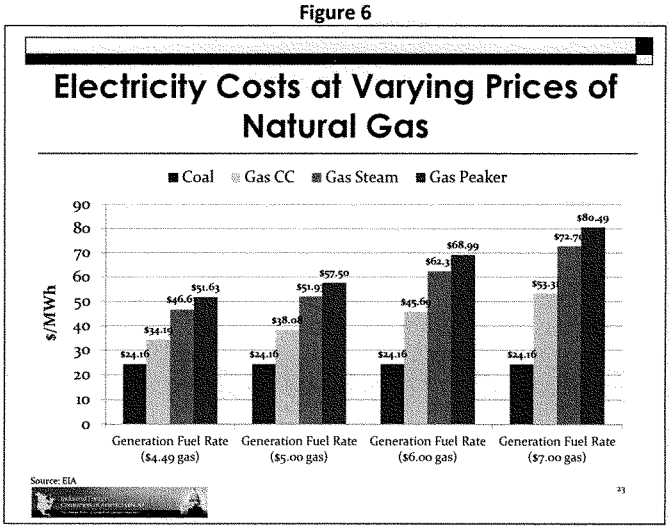


Figure 6



E. IECA OPPOSES S.33, THE "LNG PERMITTING CERTAINTY AND TRANSPARENCY ACT"

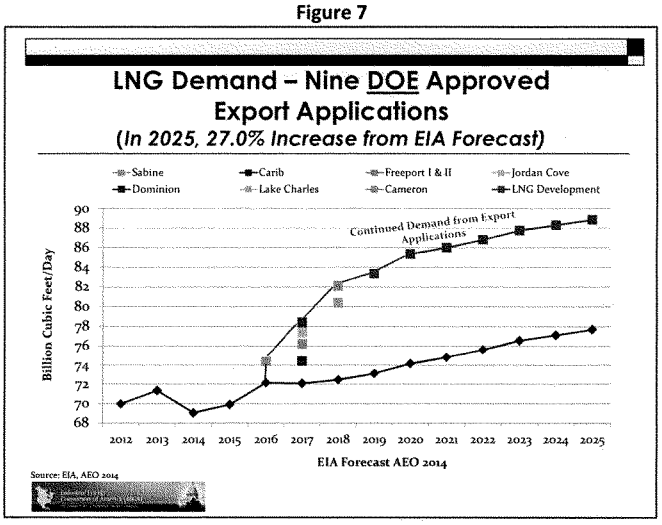
1. S. 33 short circuits the public interest determination and consumer protections.

IECA opposes S.33, the "LNG Permitting Certainty and Transparency Act." The Act requires a 45-day decision deadline that short circuits the thoughtful intent of the NGA and the public interest determination, which could in turn negatively impact 72 million natural gas consumers[7] and 145 million users of electricity,[8] and the price they will pay for heating and cooling in the future.

2. The DOE has already either approved or conditionally approved a significant increase in LNG exports that by themselves, could pose a long-term economic threat to jobs and wages.

The DOE has already either approved or conditionally approved LNG exports to non-free trade countries equal to the largest LNG exporter in the world, Qatar. This is troublesome because, unlike the U.S., Qatar does not have a significant manufacturing sector that is price sensitive. The volume from these nine facilities would increase demand by 27 percent by 2025 (see figure 7.)

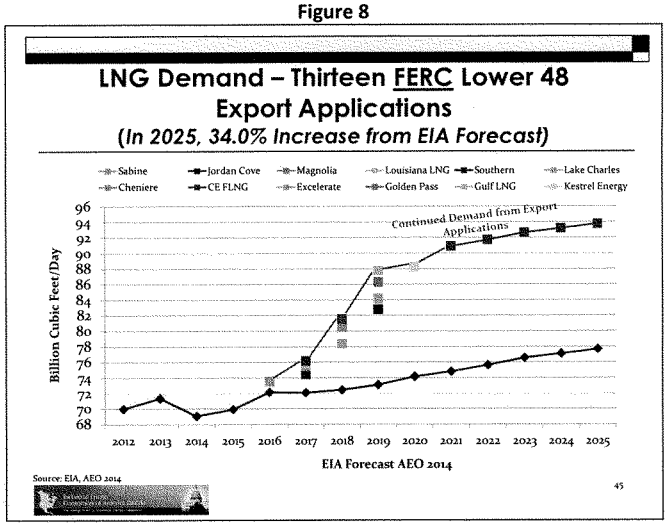
Figure 7



There are also a total of thirteen applications that are seeking environmental permit approval at the Federal Energy Regulatory Commission (FERC). These facilities would increase demand about 34 percent by 2025 (see figure 8)

[7] EIA.
[8] EIA.

Figure 8



Lastly, the DOE has also approved 40 LNG export applications to "free trade" countries equal to 40.2 bcf/day. Using EIA 2014 demand, this means that DOE has already approved shipments which could increase demand by 54.7 percent. The point is, a significant amount of LNG export applications have already been approved.

3. LNG exports are not a permanent job creator.

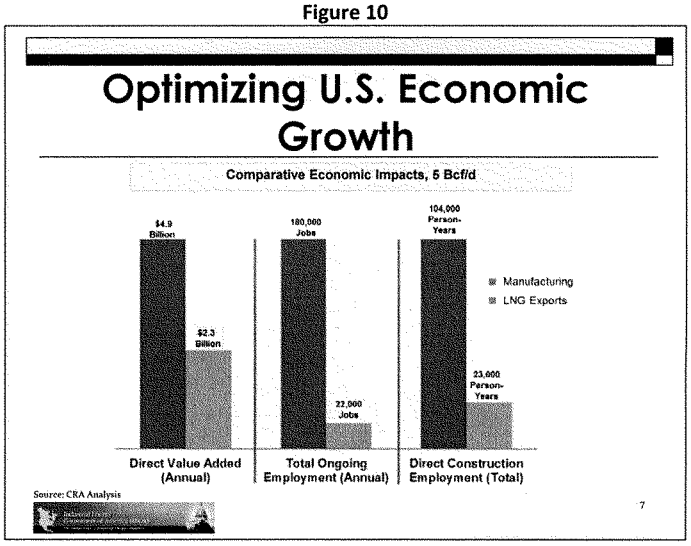
Each LNG export facility creates 2,000 to 3,000 construction jobs. But, after the facility is in operation, very few permanent jobs are created. Figure 9 below captures seven LNG export facilities and the number of reported permanent jobs, as reported on their website.

Figure 9

Export Facility	Permanent Jobs
Sabine Pass Liquefaction	580
Freeport LNG Expansion and FLNG Liquefaction	300
Lake Charles Exports	250
Dominion Cove Point	175
Jordan Cove Energy	150
Cameron LNG	185
Gulf Coast LNG Export	250

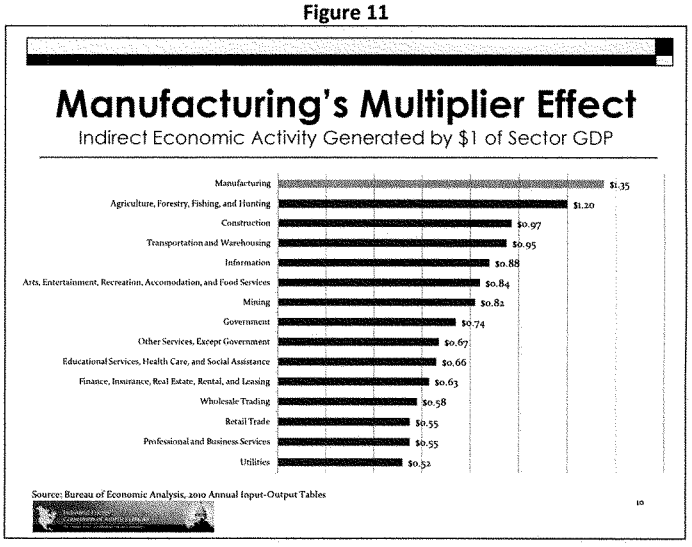
The Charles River Associates 2013 study illustrates the stark comparison in job creation between LNG exports and manufacturing (see figure 10). Using natural gas in manufacturing can create eight times as many jobs as exporting it, twice the value added and eight times as many construction jobs.

Figure 10



Consistent with the above, the National Association of Manufacturers (NAM) has concluded that the manufacturing sector generates the most economic activity for the money as compared to all other sectors. Unfettered LNG exports are inconsistent with long-term manufacturing job creation.

Figure 11



F. DOE MUST COMPLY WITH THE NATURAL GAS ACT

The DOE is not fully complying with the NGA and it is clear that they are failing to honor its spirit. The NGA Section 3 governs LNG exports (and imports):

> "... no person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the Commission authorizing it to do so. The Commission shall issue such order upon application, unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest. The Commission may by its order grant such application, in whole or in part, with such modification and upon such terms and conditions as the Commission may find necessary or appropriate, and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate."[9]

This language contains four essential elements that DOE has not yet completed: the definition of "public interest"; use policy guidance designed for exports; analytical methods free of bias; and a commitment to a process of ongoing monitoring and adjustment.

1. Definition of Public Interest

The definition of "public interest" is at the core of this entire discussion. Yet, we cannot find where DOE has articulated any such definition. More concerning is that the Government Accountability Office (GAO) reached the same conclusion in a September 2014 report.[10] The GAO finds that neither the Natural Gas Act, nor the DOE, has defined "public interest" (page 10). Given the centrality of this term to the public policy decision of approving or not approving LNG export applications, this is a glaring omission if not a legal issue. If the DOE has not defined "public interest," how is it that they can make informed decisions on behalf of the over 72 million[11] consumers of natural gas and 145 million[12] consumers of electricity? Without a definition of the "public interest," how does the DOE determine when the export volume from the next LNG export application, and the resulting increase in natural gas and electricity prices, or a slowdown in manufacturing job creation and investment, justifies a "disapproval" of the LNG export application? Without a definition of public interest, how much public hardship has to be inflicted before the DOE denies the next application?

While DOE has not articulated a definition for public interest, it has cited the results of a December 2012 study, using a model that was not peer-reviewed, by NERA Economic Consulting (NERA Study)[13] to support their finding that LNG Exports is not inconsistent with the

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[9] 15 U.S. Code § 717b - Exportation or importation of natural gas (a) mandatory authorization order.
[10] "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, http://www.gao.gov/assets/670/666177.pdf
[11] http://www.eia.gov/dnav/ng/ng_cons_num_dcu_nus_a.htm
[12] http://www.eia.gov/electricity/sales_revenue_price/pdf/table1.pdf
[13] "Macroeconomic Impacts of LNG Export from the United States" NERA Economic Consulting, December 3, 2012, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf

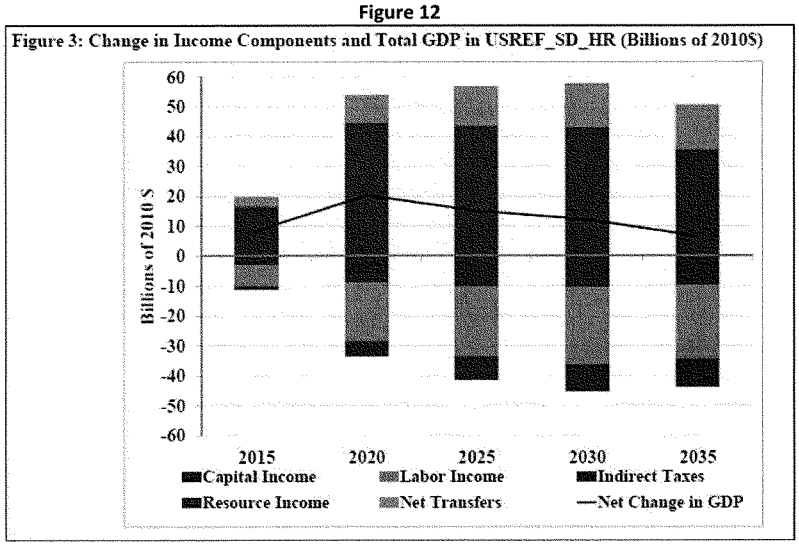
public interest. Actually, the NERA Study says that "US economic welfare consistently increases as the volume of natural gas exports increased.[14]" However, further review of this NERA Study reveals that this is a deeply flawed proxy for a definition of public interest. The NERA study goes on to describe how its metric of economic welfare is nothing more than the aggregated GDP, and that the small increase in GDP is the result of a windfall for a small group of resource owners and export terminal owners being just large enough to offset the losses in lower incomes and higher energy prices inflicted upon the remaining bulk of the population.

The NERA Study discusses a positive macroeconomic impact in one section, but it describes how the export of natural gas would cause shifts in income in the next[15]. The NERA study describes how "[h]ouseholds with income solely from wages or transfers, in particular, will not participate in these benefits.[16]" The NERA study further explains how "[h]igher natural gas prices … can also be expected to have negative effects on output and employment, particularly in sectors that make intensive use of natural gas." In other words, the vast majority of households will transfer income and wealth to a small number of resource owners, as LNG exports place EITE industries at a particular global disadvantage. Figure 12, copied from the NERA report, clearly illustrates this point of winners and losers. The losers, below the horizontal line, are impacted by a consistent loss of capital income, labor income and indirect taxes. Above the line are the winners, those who own natural gas resources and benefit from net transfers.

Even more startling is the meager so-called "net economic gain" under any of the scenarios. NERA projects only a net $10 billion net economic gain in 2015, a $20 billion net gain in 2020 that then declines from there going forward. Given the size of the $16.7 trillion U.S. economy, a $20 billion gain is less than one hour of GDP work, an insignificant economic gain. What this very small economic gain does not account for is the increased probability of risk to the economy long-term. Long-term, LNG exports can only increase economic risk, not decrease economic risk.

[14] Ibid, page 6.
[15] Ibid, pages 6-8.
[16] Ibid, page 8.

Figure 12



In an atmosphere in which we place so much focus on the harmful impact of a highly skewed income distribution, this measure of positive impact is particularly troubling, and this direct attack on U.S. manufacturing jobs is unacceptable. There were several other serious flaws that DOE chose to gloss over, including the use of out-of-date information on EITE industries that downplayed the impact to these industries, and also incorrect assumptions on the economics of LNG exports.

Compliance with this part of the NGA requires a workable definition of public interest faithful to the intent of Congress, consistent with our country's traditions and applicable to how the country uses natural gas and recognizing that exporting LNG is a choice. We suggest starting with the simple concepts pioneered by Justice Brandeis that are in use today by asserting that *the public interest is that which produces the most good for the most people*. To connect this concept to the specific questions raised by LNG export to non-FTA countries we suggest considerations including:

- the value added to the U.S. economy by exporting a raw material (LNG) vs. the value added by exporting a finished manufactured good that uses the natural gas;
- the impact on net permanent U.S. jobs by producing and exporting natural gas (and importing manufactured goods) vs. producing and exporting manufactured goods;
- establish risk factors that guide decision making. Give recognition to the reality that unlike other products, consumers do not have a substitute thus the need to place a value on human safety, comfort and impacts to families, low income citizens, jobs and economic growth.
- the GHG emissions of U.S. EITE industries compared to the GHG emissions of comparable industries in non-FTA countries; and

- the efficiency losses and extra GHG releases inherent in producing a good with energy that must be liquefied, transported and then re-gasified before it can be used vs. using the natural gas in manufacturing operations closer to where it is produced.

More could be done to complete the definition of public interest, but the point is clear. The DOE has failed in its duties to this part of the NGA. The macroeconomic proxy for public interest employed by DOE is literally the antithesis of what Americans actually mean by the term. How can the ongoing national discussion on income distribution accommodate government actions that it admits skews income and wealth from the many to the few? And how can public policymakers say they value manufacturing jobs, yet fail to complete a fair evaluation of the trade-offs of LNG exports to domestic jobs.

2. Policy Guidance Designed for Exports

The NGA requirement for "an opportunity for a hearing" demands a process that is relevant to the questions posed. The previously cited GAO report says that the DOE has based its decision making guidance for LNG exports on a rulemaking it developed in 1984 for LNG imports.[17] In using the policy guidance from a vastly different time for an activity in which the risks and benefits are reversed, the DOE is failing to comply with the spirit of the NGA.

In 1984, natural gas played a relatively small role in the U.S. economy. Even as recently as 2002, "LNG imports accounted for only 1% of total U.S. gas consumption."[18] Thirty years later, and as a direct consequence of deliberate policy decisions[19], it is difficult to identify a source of energy that is more widely relied upon. As cited above, natural gas is a major input to U.S. manufacturing for fuel, feedstock and electricity generation, particularly in EITE industries. Projecting into the future, natural gas will play an increasingly important role in residential, transportation, and power generation applications.

The differences between LNG imports and exports are as stark as they sound. Natural gas imports increase supply and either lower price, make more use possible, or both. Imports reduce consumer risk. Imported natural gas competes with domestic production and, in some cases, can even result in some fuel substitution (e.g. gas replaces coal in power generation). On the other hand, exports reduce supply and force the allocation of a finite resource. In the case of LNG exports, this is a particular challenge because in nearly all of the applications for which natural gas is used, there are few, if any, viable substitutes. Evolution of both physical infrastructure and regulation have so limited the energy choices of industrial users, particularly the EITE industries, that they are either unable to switch from natural gas or can do so only at

[17] "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, http://www.gao.gov/assets/670/666177.pdf (page 11).

[18] "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation" Congressional Research Service (CRS) Report for Congress, January 28, 2004

[19] "Congress could try to reduce the need for new LNG terminals by acting to curb growth in U.S. LNG demand, or growth in natural gas demand overall. For example, Congress could change public and industrial incentives for conservation, switching to other fuels, or developing renewable energy supplies. But other fuels like coal and nuclear power pose their own hazards to communities and the environment, so their expansion may not be preferable to additional LNG infrastructure." "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation" Congressional Research Service (CRS) Report for Congress, January 28, 2004.

great expense. In the case of power generation, for example, the EPA's Clean Power Plan rule explicitly requires dramatically increased dependence on natural gas.

Policy guidance based upon considerations applicable to LNG imports in 1984 is not relevant to exports in 2014, and even less relevant to exports in 2020 or 2025. It is past time for DOE to conduct a rulemaking that identifies the considerations relevant to exporting natural gas now and in the future, and base its policy on those. How else could DOE decide on whether or not an application to export LNG is consistent with the public interest and be credible?

3. Analytical Methods Free of Bias

The NGA requirement for "an opportunity for a hearing" also demands reliance upon analytical methods that are free of bias. The DOE has based its public interest determinations – flawed as they are – on forecasts produced by the EIA. These EIA's models and methods are inappropriate for these purposes because they include three distinct sources of bias against industrial customers that significantly alter decisions for which they are used.

The EIA models are based upon regression analyses calibrated with data not more recent than 2010 – a time most notable for the worst U.S. manufacturing slowdown in the recent past. Predictions from any model calibrated with this data would include a bias that severely understates the gas demand for industrial customers, particularly EITE industries, and likewise severely understates the impact of LNG export on available supply and price.

Even if the EIA models used recent data, the practice of using a regression model based in the past to extrapolate assumed relationships in the future becomes increasingly questionable as the forecast horizon lengthens. As may be observed from the performance of past EIA forecasts, predictions of industrial demand, price and other results beyond about five years are prone to significant error. In a more subtle way, this practice also limits what may be realized in the future by confining it to how things interacted in the past.

However, even if the EIA models used recent data and limited the horizon of their forecasts, they would still be inappropriate to guide decisions on LNG exports. The EIA models use a top-down approach to estimate industrial demand as a 'fill' or means to balance larger equations. It is doubtful that these equations accurately model how industrial demand will interact with a myriad of factors that did not exist in 2010 or earlier. Because the EIA models treat industrial demand as something to be wedged into a number of undefined and external technical factors, they are completely divorced from the new industrial projects and accompanying energy demand that have been announced and are being built[20]. This is perhaps the most significant bias limiting what we might expect from future U.S. manufacturing.

Rather than a regression model calibrated with outdated relationships that estimate a variable as critical to the process as industrial demand as only a top-down 'fill', DOE should explicitly

[20] Paul Cicio Testimony: Hearing on "America's Onshore Energy Resources: Creating Jobs, Securing America, and Lowering Prices" in the House Subcommittee on Energy and Mineral Resources, March 14, 2013, http://www.ieca-us.com/wp-content/uploads/03.14.13_Cicio-Testimony1.pdf.

include the measurable demand expected from scheduled manufacturing projects, gas-fired power generation units and other new sources of demand just as it postulates future levels of LNG export, including potential demand from pending EPA regulations. DOE could accomplish this by using one or more of the readily available models that estimate future industrial demand from the bottom-up by capturing the data on large production projects already in the public (e.g. PIRA, Charles River Associates).

4. Process of Ongoing Monitoring and Adjustment

The NGA specifically anticipates that adjustments to LNG exports would also be in the public interest when it states that the DOE "...and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate."[21] Contrary to the NGA, the DOE does not plan to make any such adjustments. Rather, the DOE has stated that once it issues an Order regarding LNG exports, it will not alter them. In fact, by stating that it would make such an adjustment only under *"extraordinary circumstances"*[22] DOE creates an obstacle to the exercise of its authority that is not in the law. Consequently, these DOE orders on LNG export will be fixed for decades.

Advocates of unfettered LNG exports cite forecasts of natural gas supply that seem endless and claim that no amount of LNG export could drive significant challenges to supply or price. They claim that the U.S. suddenly has access to a 100-year supply of natural gas. (By the way, these are the same people who urged immediate passage of the Energy Policy Act of 2005 because the need to *import* LNG was rising to the level of a national emergency.[23] [24]) On the other hand, those opposing any LNG export point to studies supporting their conclusions. A forward look at U.S. resources raises serious doubt as to whether or not the U.S. does have a significant supply at affordable prices. Factually, the EIA 2025 demand data indicates that the U.S. has only 9.6 years of proven reserves and only 49 years of technically recoverable resources in the lower 48 states. (Figure 13) "Technically" recoverable does not mean that they are "economically" recoverable. The natural gas industry Potential Gas Committee 2013 report makes clear that 74 percent of our technically recoverable resources available in the lower 48 are from "uncertain" resource estimates (see figure 13).

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[21] 15 U.S. Code § 717b - Exportation or importation of natural gas (a) mandatory authorization order.

[22] DOE Letter to Senator Lisa Murkowski, October 17, 2013.

[23] "While LNG has historically made up a small part of U.S. natural gas supplies, rising gas prices, current price volatility, and the possibility of domestic shortages are sharply increasing LNG demand. To meet this demand, energy companies have proposed building dozens of new LNG import terminals throughout the coastal United States." "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation", Congressional Research Service (CRS) Report for Congress, January 28, 2004

[24] "In recent testimony before Congress, the Federal Reserve Chairman (Greenspan) called for a sharp increase in LNG imports to help avert a potential barrier to the U.S. economic recovery. According to the Chairman's testimony: "... high gas prices projected in the American distant futures market have made us a potential very large importer...Access to world natural gas supplies will require a major expansion of LNG terminal import capacity."3 If current natural gas trends continue, industry analysts predict that LNG imports could increase to 20% of total U.S. gas supply by 2020." "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation", Congressional Research Service (CRS) Report for Congress, January 28, 2004.

Recently completed studies by the University of Texas[25 26 27 28], David Hughes[29] and the Oxford Institute[30] and several others, raise legitimate questions about the ability to increase production without significantly higher prices. Certainly, prices that are well beyond what consumers, especially manufacturers' view as affordable. The first two studies illustrate that the EIA overestimates the resource base for the four largest natural gas fields between 30 to 36 percent. These studies are reason enough to put a hold on any final LNG export approval.

Figure 13

EIA: Technically Recoverable U.S. Natural Gas Resources (Tcf)

	Proved Reserves	Unproved Reserves	Total Technically Recoverable Resources
Lower 48 (Onshore)	311	1,352	1,663
Lower 48 (Offshore)	13	309	322
TOTAL	324	1,661	1,985
By 2025, years of supply:	9.6	49.1	58.7

Source: EIA, AEO 2014

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[25] Browning, J., Tinker S. W., Ikonnikova, S., Gülen, G., et al. 2013b. Barnett shale model -1: Study develops decline analysis, geologic parameters for reserves, production forecast. Oil & Gas Journal, 08/05/2013, Volume 111, Issue 8.

[26] Browning, J., Tinker S. W., Ikonnikova, S., Gülen, G., et al. 2013c. Barnett shale model -2 (Conclusion): Barnett study determines full-field reserves, production forecast. Oil & Gas Journal, 09/02/2013, Volume 111, Issue 9.

[27] Browning, J., Tinker S. W., Ikonnikova, S., Gülen, G., et al. 2014. Fayetteville shale reserves and Production forecast, OGJ January 6, 2014.

[28] http://www.beg.utexas.edu/shale/pubs.php.

[29] http://www.postcarbon.org/wp-content/uploads/2014/10/Drilling-Deeper_FULL.pdf.

[30] http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/03/US-shale-gas-and-tight-oil-industry-performance-challenges-and-opportunities.pdf.

Figure 14

Potential Gas Committee Assessment
2013 ("technically recoverable")

	Tcf
Probable (existing fields)	708.5
Possible ("new fields")	952.3
Speculative ("frontier fields")	558.7
TOTAL	**2,225.6**
Alaska	-193.8
Available to Lower 48	2,031.8

Key Point: 74% of potential supply in lower 48 is from "uncertain" resource estimates.

Source: Potential Gas Committee

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The one thing that everyone knows will be right about all of these forecasts is that they will all be wrong. As large employers who have trillions of dollars of capital assets at risk long term, we cannot begin to understand DOE's justification to promise to never revisit or revise a 20 to 30-year decision. In either case, it is not consistent with the law.

Those who claim that the DOE must never alter an order on LNG export once issued argue that by doing so the DOE would introduce great uncertainty into the capital investment plans supporting the LNG export terminals and contracts, and would undermine the entire enterprise. The facts do not support this. The entirety of investment in LNG terminals and contracts is but a small fraction of the global commerce and long-term investment decisions impacted by the value of the U.S. dollar. Yet, the value of the U.S. dollar is subject to constant monitoring and potential adjustment. The U.S. Federal Reserve continuously monitors economic conditions and meets at least 8 times per year to decide whether to make any adjustments. The Federal Reserve does this, in part, because Congress gave it a "dual mandate."[31] We believe the DOE should consider a similar approach to govern its decisions on LNG exports. Specifically, the dual mandate in this context would seek to maximize U.S. employment while promoting responsible development of U.S. energy resources.

[31] The term "dual mandate" refers to direction Congress gave to the U.S. Federal Reserve in a 1977 revision to the Federal Reserve Act. Specifically, US Code states: *"The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates."* (12 USC §225a) While the law actually lists three objectives, they are commonly understood to reduce to the two or 'dual mandates' of maximum employment and low inflation.

Another reason that we reject the DOE argument against adjusting or reviewing approved applications is that it protects investments made by a relative few, while exposing investments made by a much broader part of the economy to the full spectrum of risk in the global energy market. Those with capital investments in LNG export terminals have already accepted and embraced all of the risks that attach to global energy markets, which is far in excess of the uncertainty that would be introduced if the DOE were to 'from time-to-time' review and adjust LNG export orders as anticipated by NGA. On the other hand, with the approval of each new LNG export license the exposure of the U.S. manufacturing sector to all of the uncertainty and risks of the global energy markets intensify. These risks are out of balance, and contrary to the public interest. By refusing to review and adjust approved export applications the DOE is introducing uncertainty to capital investments that are in orders of magnitude larger than the capital invested in LNG export facilities. The comparison is one of tens of billions as compared to trillions. DOE is casting a blind eye to this risk.

In summary, we believe the NGA requires the DOE to articulate a definition of public interest and promulgate rules-based decision policy guidance applicable to LNG exports. We further believe that the DOE should use appropriate modeling methods to monitor the cumulative impacts of LNG exports and periodically make (or not make) supplemental orders as it may find necessary or appropriate per the Natural Gas Act. It is sound public policy that the DOE should use its authority to periodically review LNG exports, and if necessary, issue orders that throttle LNG exports, consistent with the definition of the public interest and the criteria for assessment.

Thank you for your consideration.

Sincerely,

Paul N. Cicio
President

The CHAIRMAN. Thank you, Mr. Cicio. Mr. Durbin.

STATEMENT OF MARTIN J. DURBIN, PRESIDENT AND CEO, AMERICA'S NATURAL GAS ALLIANCE

Mr. DURBIN. Good morning, Chairman Murkowski, Ranking Member Cantwell, members of the Committee. Thank you for the opportunity to appear before you this morning.

America's Natural Gas Alliance strongly supports S. 33 as a means to establish a timely and certain review process for LNG export facilities. This will send a strong pro-infrastructure signal to the investment community and a clear message to our allies and adversaries that the U.S. is determined to play a leadership role in global energy markets. Given the sheer magnitude of U.S. shale gas resources there's no question that our nation can be a global energy leader without sacrificing our domestic advantage. Now is the time to seize this opportunity.

While some have raised concerns regarding supply and price, the markets and experience speak for itself. As recently as 2009 the U.S. Energy Information Administration forecast that natural gas prices would rise to 13 dollars by 2035. Just this year, though, or last year in 2014, in multiple independent projections EIA put that figure below six dollars. If we look at where prices are today, it's going to be hard to get there.

In fact right now in the dead of winter, peak season for natural gas demand, prices are less than three dollars at Henry Hub and even lower if you're in Pennsylvania. So the markets are screaming for new and diversified demand outlets for natural gas. LNG exports offer a prime opportunity to send critical signals to the markets that these outlets are on the way. This in turn will help maintain and grow production so our nation can take full advantage of the promise our shale gas abundance holds for our economy, environment and energy security.

The U.S. is now the world's leading producer of natural gas. With this in context, the U.S. consumed 26 trillion cubic feet or TCF of natural gas in 2013. The most recent supply projections show a range of technically recoverable gas using today's technology from two thousand two hundred to more than three thousand five hundred TCF. The only remaining uncertainty around natural gas supply is where's the top?

As technology continues to advance reserve estimates continue to grow. As a result public and private sector experts agree that the U.S. has enough natural gas at reasonable prices to sustain substantial increases in domestic consumption and significant levels of exports. Global market dynamics will limit both the size of our export opportunity and the number of facilities that ultimately receive financing. As a result EIA projects that natural gas exports will account for less than ten percent of demand for U.S. natural gas by 2040.

Those same global market dynamics also underscore the sense of urgency. LNG facilities cost billions of dollars and take several years to construct. Unless we act quickly to provide greater certainty in the approval process we miss the opportunity to become an integral player in international markets.

Far from competing with domestic interests, LNG export markets will strengthen the U.S. economy. Already, the U.S. is experiencing a manufacturing resurgence thanks to the ready availability of abundant, affordable natural gas. What is less widely known is that the natural gas liquids found within natural gas are an essential feed stock to many industries led by plastics and chemicals.

Simply put, more dry gas production for export means more natural gas liquids for American manufacturers. In fact, as of this week the chemical industry alone has identified 220 announced projects representing 137 billion dollars in potential investment all linked to natural gas. So as markets scream for demand, exports provide a win/win opportunity.

Of course LNG export terminals are just one aspect of energy infrastructure. Timely approvals of new and expanded pipeline projects also require the priority attention of policy makers at all levels. As several members of this Committee know firsthand, this is particularly true in the Northeast where expanded pipeline infrastructure would help consumers and unlock the kinds of natural gas fueled manufacturing opportunities we see flourishing in so many parts of the country.

I thank Senators Barrasso and Heinrich and the bipartisan cosponsors of S. 33 for working to ensure America's competitive advantage. I appreciate the Committee drawing attention to these issues and look forward to our continued work together to build this energy revolution into a sustainable, economic, manufacturing and environmental success story for the nation.

Thank you.

[The prepared statement of Mr. Durbin follows:]

TESTIMONY OF MARTIN J. DURBIN, PRESIDENT AND CEO, AMERICA'S NATURAL GAS ALLIANCE

SENATE ENERGY & NATURAL RESOURCES COMMITTEE

January 29, 2015

Introduction

Good morning, Chairman Murkowski, Ranking Member Cantwell and Members of the Committee. Thank you for the opportunity to testify today. My name is Marty Durbin. I am President and Chief Executive Officer of America's Natural Gas Alliance ("ANGA").

ANGA represents North America's leading independent natural gas exploration and production companies. We work with industry, government and customer stakeholders to increase demand for, and ensure availability of, our nation's natural gas resources for a cleaner and more secure energy future. The collective natural gas production of ANGA member companies is approximately eight trillion cubic feet annually, which represents one third of total U.S. production.

The subject of today's legislative hearing, S. 33, *The LNG Permitting Certainty and Transparency Act*, is important and timely as our nation's energy outlook continues to transform due to the increased production and use of natural gas. First, I want to thank Senators Barrasso and Heinrich and the bipartisan cosponsors of S. 33 for their continued commitment to ensure America's competitive advantage in energy markets. ANGA strongly supports S. 33 as a way to help our nation establish a significant natural gas export policy while strengthening our economy and supporting our strategic alliances abroad.

The United States is now the leading natural gas producer in the world. And, we have an abundant supply of this affordable, reliable resource that will enable us to power our nation for generations to come. A robust natural gas export policy will help grow our economy, support our manufacturing sector, strengthen our national security interests and protect our environment. For these reasons, we urge the Senate to approve S. 33, *The LNG Permitting Certainty and Transparency Act.*

The LNG Permitting Certainty and Transparency Act (S. 33)

Pursuant to Section 3 of the Natural Gas Act, the Federal Energy Regulatory Commission (FERC) is responsible for authorizing the siting and construction of onshore and near-shore LNG import or export facilities. Additionally, the FERC has statutory authority with respect to the interstate transportation of natural gas by pipeline, as well as requirements under the National Environmental Policy Act (NEPA) regarding environmental review of proposed facilities.[1] The FERC process is extensive, predictable, requires a significant amount of resources and investment on the part of an applicant and provides meaningful opportunity for public comment and input.

[1] Natural Gas Act, 15 U.S.C. § 717b (2015), http://www.fossil.energy.gov/programs/gasregulation/authorizations/2011usc15.pdf.

For applications to export natural gas to non-Free Trade Agreement (FTA) countries, the Natural Gas Act directs the Department of Energy (DOE) to grant export authorization unless the DOE finds that the proposed exports "will not be consistent with the public interest."[2] The DOE process for issuing a public interest determination has not been as predictable.

By requiring the Secretary of Energy to issue its public interest determination within 45 days after the conclusion of the NEPA review by the FERC, S. 33 provides this clarity and timeliness. Applicants will be better able to estimate their costs, construction timelines, and labor needs. And, these multi-billion dollar investments will be more likely to progress toward construction and operation. S. 33 also provides for expedited judicial review in the U.S. Circuit Court of Appeals where the terminal in question is located, providing additional predictability.

ANGA appreciates DOE's efforts to improve the LNG export permitting procedures by instituting changes in August 2014.[3] This legislation takes the next step by providing needed certainty to remaining applicants. Half of the applications awaiting DOE approval to export to non-FTA countries applied in 2012 or earlier.[4] S. 33 will expedite the process by reducing the period of time between successful completion of the FERC review and receipt of final DOE approval. Figure 1 shows that those terminals which have received FERC approval all applied to DOE three to five years ago. The two far right columns show that the terminals with final DOE approval took an average of 106 days from the time they were approved at FERC to the time they were given final approval at DOE. S. 33 will help expedite the process and provide DOE with clear direction.

Figure 1: DOE Approval Timeline

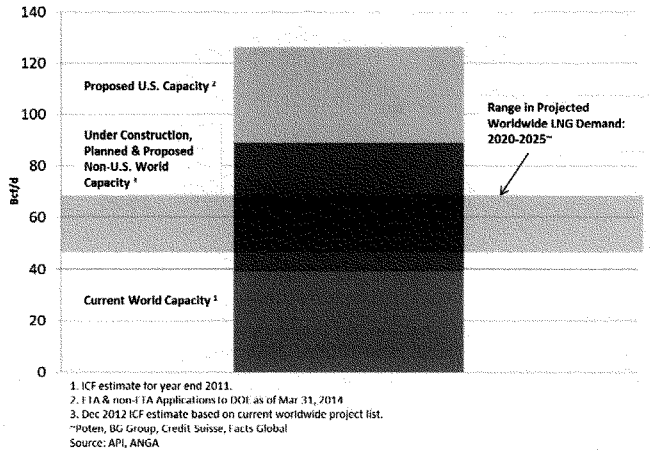
Terminal	Applied to DOE	Final Approval at FERC	Final Approval at DOE	Days between FERC and DOE Approvals
Sabine Pass	7-Sep-10	16-Apr-12	7-Aug-12	113
Freeport LNG	17-Dec-10	30-Jul-14	20-Nov-14	113
Carib Energy	20-Oct-11	N/A	20-Sep-14	N/A
Cameron LNG	21-Dec-11	19-Jun-14	16-Sep-14	89
Cove Point	3-Oct-11	30-Sep-14	Still waiting	121 and counting
Corpus Christi	31-Aug-12	20-Dec-14	Still waiting	40 and counting

Source: DOE & FERC

[2] Ibid.
[3] Department of Energy, "Procedures for Liquefied Natural Gas Export Decisions," *Federal Register* 79 (2014): http://energy.gov/sites/prod/files/2014/08/f18/FR%20Procedures%20LNG%20Exports%2008_15_14.pdf.
[4] "Long Term Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States," last modified December 15, 2014, http://energy.gov/sites/prod/files/2014/12/f19/Summary%20of%20LNG%20Export%20Applications_1.pdf.

The certainty provided by this legislation will allow the US to enter the global LNG markets more quickly. Global demand for natural gas is expected to increase between 18 billion cubic feet per day (bcf/d) and 38 bcf/d by 2025. Proposed new global LNG capacity outside the United States is approximately 50 bcf/d. Given the disparity between projected demand and the number of facilities being proposed worldwide, the window of opportunity for the U.S. is narrow (Figure 2). LNG facilities cost billions of dollars and take several years to construct. Unless we act quickly to provide a greater level of certainty in the LNG approval process, we will miss this opportunity to become an integral player in international markets.

Figure 2: Global LNG Export Capacity and Demand

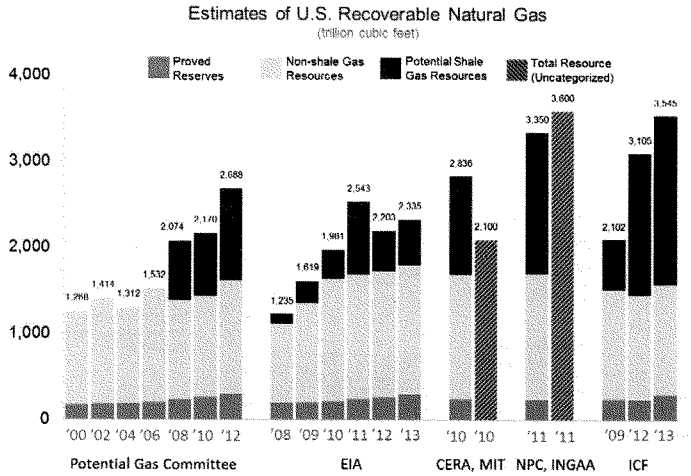


Natural Gas Supply

The United States is now the world's leading producer of natural gas and both our production levels and reserve projections continue to increase. To put our resources in context, the volume of natural gas consumed in 2013 in the U.S. was 26 trillion cubic feet.[5] The most recent projections show a range of technically recoverable gas using today's technology from 2,203 to 3,545 trillion cubic feet (Figure 3). As technology continues to advance in unconventional drilling, reserve estimates continue to grow. Therefore, estimates from across a wide range of public and private sector sources make clear that the United States has enough natural gas at reasonable prices to sustain substantial increases in domestic consumption and to support significant levels of exports. We can be a global energy leader without sacrificing our domestic advantage and we should seize this opportunity.

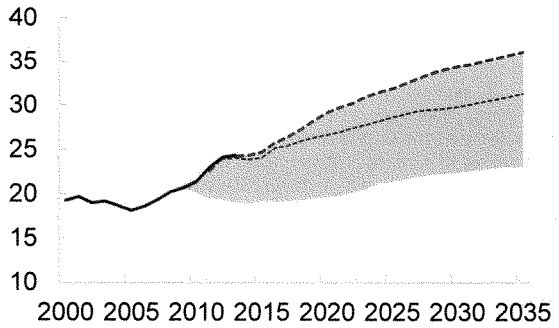
[5] U.S. Energy Information Administration, "Natural Gas Consumption by End Use," December 2014.

Figure 3: Technically Recoverable Reserves



Since the beginning of 2005, natural gas production in the United States has increased 30 percent. Energy Information Administration (EIA)'s 2014 Annual Energy Outlook projects a 56 percent increase in total natural gas production from 2012 to 2040.[6] Figure 4 shows that the most recent projection is 47 percent higher than the projection from 2009 and 10 percent higher than just one year earlier.

Figure 4: U.S. Natural Gas Production
Natural Gas Production (TCF): Reference



[6] EIA, "Annual Energy Outlook 2014." May, 2014.

This abundant, affordable supply is sufficient to support significant demand growth across all sectors of the economy including power generation, manufacturing, transportation and exports. In fact, increased demand from LNG exports will be supported mainly through increased natural gas production.[7] Therefore, the relevant question is not will prices increase due to this growth, rather how much will demand grow to take advantage of this abundant, affordable resource.

Securing the Benefits of LNG Exports

The U.S. has an unprecedented opportunity to be a world leader in setting and driving global energy policy. Just as the trade of any commodity promotes domestic jobs and economic growth, so too will the trade of natural gas. Expanding demand for U.S. natural gas in international markets through LNG exports will result in increased investment, enhanced GDP growth, rising incomes, and more jobs – just as the case has been with increasing exports in other U.S. industries, including those that utilize natural gas.[8] Moreover, U.S. LNG exports will expand global natural gas markets, enhancing U.S. influence to encourage transparency, fair market rules, and strengthen relationships with our allies.

Economic Benefits

A study by ICF International found that LNG exports will contribute up to 665,000 net job gains nationwide and up to $115 billion net gross domestic product (GDP) added to the U.S. economy by 2035.[9] Additionally, according to the NERA Economic Consulting which conducted a study on the macroeconomic impacts of LNG exports at the request of DOE, "LNG exports provide net economic benefits in all the scenarios investigated, and the greater the level of exports, the greater the benefits."[10]

Additionally, studies across a broad range of private and public sector exports serve to alleviate concerns raised by some regarding the potential price impacts of natural gas with an expanded level of exports. Due to our vast levels of available natural gas resources, the incremental demand from LNG exports is projected to result in only small price impacts.[11] In fact, when looking across studies that specifically project domestic price impacts from U.S. LNG exports, the magnitude of these impacts have decreased over time as the reality of U.S. supply abundance and availability has materialized (Figure 5).[12]

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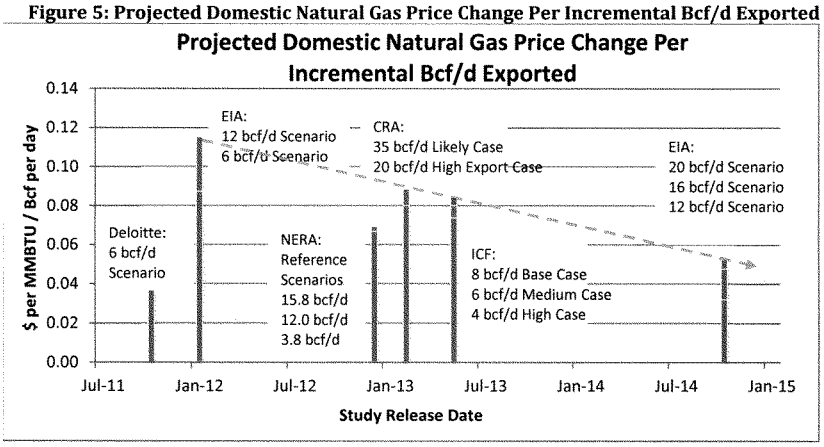
[7] U.S. Energy Information Administration, "Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets," October 2014, 12, http://www.eia.gov/analysis/requests/fe/pdf/lng.pdf.
[8] Raymond J. Keating, "Benefits of Natural Gas Production and Exports for U.S. Small Businesses: Nationally and Key States," *Small Business & Entrepreneurship Council*, November 2014, 2, http://www.sbecouncil.org/wp-content/uploads/2014/11/BenefitsofNaturalGasSBECouncil.pdf.
[9] ICF International, "U.S. LNG Exports: State-Level Impacts on Energy Markets and the Economy," Nov. 13, 2013, Key Findings.
[10] NERA Economic Consulting, "Macroeconomic Impacts of LNG Exports from the United States," Dec. 2012, 1.
[11] Ibid., 2.
[12] Ibid., 1.

Figure 5: Projected Domestic Natural Gas Price Change Per Incremental Bcf/d Exported



The EIA released its LNG export study examining export levels between 12 and 20 bcf/d in October 2014.[13] As found in the NERA study cited above, higher exports lead to higher levels of economic output for the U.S. This further confirms that increased energy exports will result in increased energy production, which spurs investment and economic growth.[14]

Benefits to the Manufacturing Sector

Increased production of natural gas leads to an increase in natural gas liquids (NGL), elements found in natural gas, which are used as petrochemical feedstocks. Because dry natural gas and NGLs are co-products, an increase in dry gas production will result in an increase in NGL production. A new demand outlet for dry gas, such as LNG exports, encourages continued investment in overall production. Therefore, through LNG exports we can further this substantial increase in NGL supply. This natural gas and NGL abundance is driving an unprecedented resurgence in our nation's petrochemical and energy-intensive industries.[15] ICF examined the impacts of LNG exports and found that natural gas liquid volumes would increase between 138,000 and 555,000 barrels per day (bpd) by 2035 due to LNG exports.[16] An increase in NGL supply helps to preserve affordable NGL prices and this benefits domestic manufacturing industries.

Increased natural gas production has already resulted in significant increases in U.S. natural gas liquids (NGL) production. In fact, the American Chemistry Council reports that:

> [a]s of this week, 220 chemical industry projects valued at $137 billion in potential investment have been announced. These projects – new factories, expansions, and process changes to increase capacity – could lead to more than $90 billion per year in new chemical industry output and over 700,000 permanent new jobs across the economy over the next two

[13] As requested by DOE Office of Fossil Energy, May 2014.
[14] U.S. Energy Information Administration, "Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets," October 2014.
[15] Dry natural gas and NGLs are both used as energy in industrial processes as well as feedstocks to create value added products. For example, NGLs are the primary feedstock for chemicals and plastics manufacturing.
[16] ICF International, "U.S. LNG Exports: Impacts on Energy Markets and the Economy." May, 2013. pg. 7.

decades. An additional 275,000 temporary jobs will be created during the capital investment phase, which peaks in 2017.[17]

The resurgence in domestic industrial growth will strengthen the U.S. economy and provide an opportunity to reduce CO_2 globally. This global CO_2 reduction is possible because the energy consumed in U.S. manufacturing is less carbon intensive than other manufacturing areas throughout the world. For example, while the U.S. electric sector had an average carbon intensity of 1,109 lb CO_2/MWh in 2011, the electric sectors in China, India and the Middle East had average carbon intensities of 1,684 lb CO_2/MWh, 1,887 lb CO_2/MWh and 1,493 lb CO_2/MWh respectively.[18] LNG exports allow the U.S. to both reduce emissions globally and continue to support our domestic manufacturing renaissance.

Environmental Benefits

In 2012 U.S. carbon dioxide emissions were at their lowest level since 1994.[19] The principal reason for this decline is the increased use of natural gas by power generators (Figure 6). Natural gas is the cleanest burning fossil fuel. In fact, natural gas will continue to play a critical role in helping the Administration reach its climate goals. Energy Secretary Ernest Moniz notes that, "natural gas will play a crucial role in enabling very substantial reductions in carbon emissions".[20] Just as essential as its role in reducing carbon emissions, greater natural gas production and use lowered emissions of pollutants such as mercury, sulfur dioxide, nitrogen oxide, and particulate matter.[21] According to EPA Administrator Gina McCarthy, "natural gas in the U.S. has been a game changer.... [i]t's been a significant benefit to the United States. It's been a significant benefit to air quality."[22]

Exporting U.S. LNG will also help reduce global greenhouse gas emissions (GHG). ICF International estimates that exported LNG will have GHG emissions 43 to 52 percent lower than the dominant fuel.[23] Further, DOE's study titled, "Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States" concluded that U.S. natural gas consumed in Europe or Asia has lower life cycle GHG emissions than power generation from locally sourced fossil fuels.[24] Encouraging the use of natural gas around the world can reduce emissions both at home and abroad.

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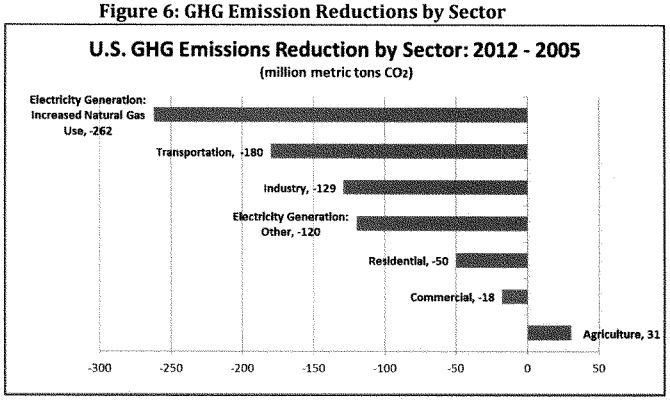
[17] "From Chemistry to Energy," American Chemistry Council, accessed January 24, 2015, http://chemistrytoenergy.com/shale-125-billion.
[18] International Energy Agency, "CO2 Emissions from Fuel Combustion," 2013, http://www.iea.org/publications/freepublications/publication/co2emissionsfromfuelcombustionhighlights2013.pdf.
[19] U.S. Energy Information Administration, "U.S. Energy-Related Carbon Dioxide Emissions, 2013," October 21, 2013, 1.
[20] Steven Mufson, "Ernest Moniz, MIT physicist, nominated as energy secretary," *Washington Post*, March 4, 2013, accessed January 26, 2015, http://www.washingtonpost.com/business/economy/ernest-moniz-mit-physicist-is-to-be-nominated-as-energy-secretary/2013/03/04/e3fe68aa-808c-11e2-a350-49866afab584_story.html.
[21] EPA, "Air Markets Program Data," accessed January 22, 2014, http://ampd.epa.gov/ampd/.
[22] Jeff McMahon, "EPA Administrator Gina McCarthy Defends Natural Gas," *Forbes*, September 25, 2014, accessed January 26, 2015, http://www.forbes.com/sites/jeffmcmahon/2014/09/25/mccarthy-defends-natural-gas/.
[23] ICF International, "Lifecycle GHG Emissions form LNG Exports," February 2014, 1.
[24] U.S. Department of Energy, "Life Cycle Greenhouse Gas perspective on Exporting Liquefied Natural Gas from the United States," May 29, 2014, 9.

Figure 6: GHG Emission Reductions by Sector



Source: EIA 2014, EPA 2014

International Benefits

A strong natural gas exports policy will offer supply diversity to our strategic international allies. In testimony before the Senate Committee on Foreign Relations in July 2014, David Goldwyn, nonresident senior fellow with the Energy Security & Climate Initiative at the Brookings Institution, noted that:

> [f]rom a geopolitical perspective, increased LNG exports from the U.S. and its allies would shift rents away from traditional, autocratic suppliers, including Russia, that have used the proceeds to finance policies at odds with U.S. national security interests. U.S. supply also promotes price competition and stability in global oil and gas markets. Price stability benefits U.S. economic growth, and also better ensures that U.S. adversaries that are major oil and gas exporters are less able to enjoy higher export revenues stemming from major global supply disruptions.[25]

For example, the promise of U.S. LNG exports in the near term has reportedly provided greater leverage to countries negotiating new contracts with existing suppliers, including Russia.[26] Allowing U.S. Henry Hub indexed exports will help sustain lower pricing over the long-term and provide an alternative to oil-linked gas contracts. While U.S. exports will not be available immediately, a commitment to a strong U.S. natural gas export policy will send a powerful signal that the U.S. is dedicated to supporting the energy security of its strategic allies.[27] In short, LNG exports from the U.S. will help prevent geopolitically induced supply disruptions.[28]

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[25] David L. Goldwyn, "The Harmonization of U.S. National Security & Climate Goals," Testimony before the U.S. Senate Committee on Foreign Relations (July 22, 2014), http://www.brookings.edu/research/testimony/2014/07/22-us-energy-climate-security-goldwyn.

[26] The following countries have LNG import terminals under construction or proposed: France, Lithuania, Poland, Spain, Croatia, Estonia, Italy, Romania, and Ukraine.

[27] Cheniere's Sabine Pass Terminal is expected to have its first liquefaction train in-service by the 4th quarter of 2015.

[28] David L. Goldwyn, "Refreshing European Energy Security Policy: How the U.S. Can Help," Brookings Institution (2014). Pg. 1.

A recent IHS study found that:

> [T]he U.S. trade position will continue to improve, owing to the significant reduction in energy imports and the increased global competiveness of U.S.-based energy-intensive industries[...] the trade deficit will be reduced by more than $164 billion in 2020—equivalent to one-third of the current U.S. trade deficit.[29]

It is vital that our export and trade policies best position the U.S. to realize the domestic economic, environmental, and geopolitical benefits associated with both U.S. LNG exports and the increased export of U.S. manufactured goods. While legislation such as S. 33 will instill greater confidence in our licensing and permitting processes, ANGA also encourages Congress and the Administration to help fully realize the geopolitical benefits of LNG exports by ensuring trade negotiations through fast-track trade promotion authority (TPA).

A New Opportunity

Over the past decade, the shale gas revolution has significantly improved our nation's energy outlook. Through technological breakthroughs in horizontal drilling and hydraulic fracturing, the oil and gas industry has the ability to access our nation's vast natural gas resources in an increasingly efficient and productive manner. The Energy Information Administration (EIA), the Potential Gas Committee, and MIT all project a dramatic increase in domestic supplies of natural gas to power our nation for generations. U.S. natural gas is an abundant, affordable and reliable resource and it is imperative that we take full advantage of the opportunity that this supply picture presents.

Today, we are facing a significantly different energy outlook than just a few years ago. Supply is abundant and we now have the opportunity to grow existing markets and create new ones to take advantage of this domestic abundance. The supply-side strength and resiliency of the natural gas industry that will enable us to expand markets was displayed last winter during the coldest period in a generation. These extreme weather conditions presented challenges in certain segments to our energy delivery systems. However, domestic production of natural gas withstood this challenge. In fact, at the end of last year's heating season, as many were concerned that natural gas supplies would not keep pace with demand due to the low level of natural gas in storage, producers responded with increased production making record weekly storage fills throughout the injection season (Figure 7). Natural gas production in 2014 was five percent higher than 2013, thus when combined with storage we had more natural gas at the beginning of this winter than last winter; a testament to the abundance of our supplies and the strength of our industry to respond to growing demand for natural gas.[30]

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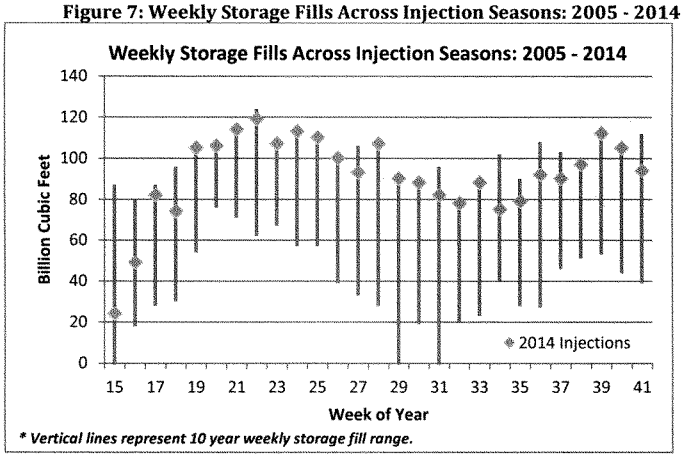
[29] IHS, "America's New Energy Future: The Unconventional Oil and Gas Revolution and the Economy – Volume 3: A Manufacturing Renaissance, (2013), http://press.ihs.com/press-release/economics/us-unconventional-oil-and-gas-revolution-increase-disposable-income-more-270.

[30] U.S. Energy Information Administration, "Short-Term Energy Outlook," January 2013, 8.

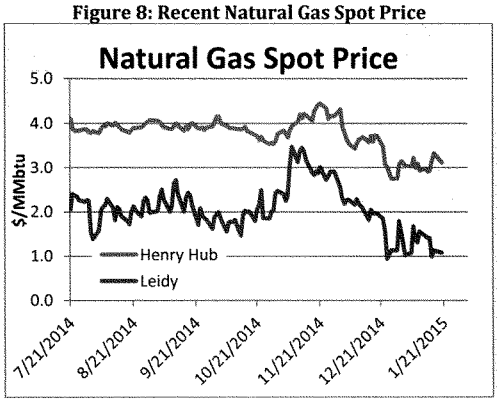
Figure 7: Weekly Storage Fills Across Injection Seasons: 2005 - 2014



Source: EIA Storage Data, ANGA Analysis

And evidence continues to mount. Now in a more normal winter weather pattern, our significant storage and increased production have resulted in an oversupplied market. We are in the middle of winter and Henry Hub prices are near $3 per MMBtu: prices in Pennsylvania (Leidy) are near $1 per MMBtu (Figure 8).

Figure 8: Recent Natural Gas Spot Price



Source: NYMEX

Domestic natural gas production creates jobs, tax revenue and environmental benefits. The current low price environment along with a strong supply picture suggests that we can take even greater advantage of the opportunities presented by increased use of natural gas. A robust natural gas export policy provides us another opportunity to create a new demand outlet and strengthen our nation's energy security.

A strong LNG export policy and the benefits that come with it will require enabling infrastructure. We, therefore, urge policymakers at all levels, with the appropriate public input, to seize the opportunity to enhance our nation's energy infrastructure so that we can continue to benefit from our natural gas abundance. The investments that the industry is making in infrastructure will allow producers to capture and bring this valuable resource to domestic and global markets. In order to take full advantage of our natural gas resources, it is vital that we have the ability to build pipelines to ensure transmission and delivery of natural gas to all markets. Abundant domestic natural gas gives the U.S. the unparalleled opportunities discussed above, but in order to harness these opportunities adequate infrastructure must continue to be developed.

Conclusion

The shale energy revolution allows us to transition from a posture of energy scarcity to one of energy abundance. As this hearing demonstrates, the U.S. has the ability to harness clean, abundant, and affordable natural gas for both domestic consumption and for exports. This paradigm shift is driving economic growth, environmental improvements and enhanced energy security. However, in order to fully realize the extraordinary opportunity presented by our natural gas abundance, it is imperative that we adopt sensible policies such as S. 33, which will help provide certainty in our natural gas export markets. ANGA urges the Senate to approve this legislation.

I am grateful to the Chair, the Ranking Member and the Members of the Committee for the opportunity to testify today on behalf of America's Natural Gas Alliance and I look forward to continuing our work together.

The CHAIRMAN. Thank you, Mr. Durbin. Mr. Eisenberg, welcome.

STATEMENT OF ROSS E. EISENBERG, VICE PRESIDENT, ENERGY AND RESOURCES POLICY, NATIONAL ASSOCIATION OF MANUFACTURERS

Mr. EISENBERG. Good morning, Chairman Murkowski, Ranking Member Cantwell and members of the Committee. On behalf of the National Association of Manufacturers, the largest industrial trade association in the United States, I'm pleased to share our views on S. 33, the LNG Permitting Certainty and Transparency Act. This is a bill that the NAM supports.

Two years ago I had the privilege of coming before this Committee to talk about the exact same issue we're here to talk about today. At the time the Department of Energy had placed all license applications on a temporary hold while it studied the macroeconomic impact of exporting LNG, and that study actually forecasted that the U.S. would gain net economic benefits from doing so.

The NAM at the time urged the Committee that the free market will find equilibrium here and that exports of LNG should be governed by principles of free trade and open markets.

The NAM also urged the DOE to provide LNG license applicants an up or down decision as expeditiously as possible to avoid market distorting barriers to trade.

Now some witnesses at that hearing took the opposing view calling it a question of validity of the DOE study's findings and warning of constrained natural gas supplies, "unfettered" LNG exports and skyrocketing natural gas prices. Now fast forward two years to today and the doomsday predictions really just have not come true. Proven natural gas reserves increased by ten percent in 2013 setting another new record.

We don't have anything even remotely resembling unfettered LNG exports because only five of the terminals out of 37 are under construction. The overwhelming numbers of economists who have looked at this issue, including the DOE itself, have all repeatedly concluded the LNG exports and a strong domestic manufacturing sector can coexist. As of last night the Henry Hub spot price for natural gas stood at $2.92 which is a full 38 cents lower than the day I was here to testify on this issue two years ago.

And throughout, the nation's natural gas boom has sparked a manufacturing comeback. That's a wonderful story. Study after study has confirmed and continues to confirm that manufacturers are investing in the United States thanks to a competitive, abundant and secure supply of energy.

Manufacturers in Arkansas, California, Colorado, Iowa, Louisiana, Maryland, Minnesota, Nevada, New York, Ohio, Oklahoma, Pennsylvania, Texas, Utah, Virginia and many others are already taking part in the LNG supply chain to support the terminals that are under construction.

Dominion's Cove Point LNG facility in Maryland will create 14,600 jobs in manufacturing, service and other sectors across the supply chain.

Cheniere's $12 billion Sabine Pass project, which is quite possibly the largest capital project in Louisiana history, will support

the livelihoods of up to 18,300 Louisiana residents at peak construction at an average of nearly 6,400 Louisiana workers over 8 years.

Now to put 6,400 workers in perspective there's actually 14 individual parishes in the State of Louisiana that have fewer than 6,400 residents employed. The project's supply chain for Sabine Pass contains 54 manufacturers in 17 different states. This is just the tip of the iceberg as many other manufacturers across the United States have made investments in their own businesses to position themselves to participate in LNG exports.

At NAM we applaud the DOE for taking a hard look at the inefficiencies within its own process and trying to fix them. While two license decisions happened relatively quickly after the new procedures went in place, we once again do find ourselves in a situation where the approvals are starting to lag. For Cove Point, a project that received conditional approval as far back as 2013, we're now approaching the end of the fourth month of deliberations on a final license.

So the NAM therefore believes that S. 33, the LNG Permitting Certainty and Transparency Act, is both timely and warranted. This truly bipartisan, heavily negotiated bill ensures that the free hand of the marketplace rather than bureaucratic inertia will govern international trade by providing a 45 day deadline on the DOE to approve or deny pending LNG export applications. It does not impact the economic, environmental or safety studies that the FERC and other agencies are required to conduct, nor does it remove any other relevant regulatory requirement.

By eliminating unnecessary delays, the bill would protect against running afoul of our international obligations under the WTO. It would provide a clear resolution to the outstanding questions surrounding the regulatory approval of the infrastructure necessary to allow the export of a product, and that's a principle that domestic manufacturers strongly support.

Developers looking to build an LNG facility must subject themselves to basically running a gauntlet of a long, complex and multifaceted permitting process. At a minimum they should be able to rely on some amount of certainty that once they've gone through that process and received all their permits and approvals that the DOE will quickly decide on a final license to export. S. 33 provides this certainty while ensuring that all environmental laws will be complied with to their absolute fullest extent.

Manufacturers support S. 33, and we urge the Committee to approve this legislation.

Thank you.

[The prepared statement of Mr. Eisenberg follows:]

NATIONAL ASSOCIATION OF
Manufacturers

Leading Innovation. Creating Opportunity. Pursuing Progress.

Testimony

of Ross Eisenberg
Vice President
Energy and Resources Policy
National Association of Manufacturers

before the Senate Committee on Energy and Natural Resources

on "S. 33, the LNG Permitting Certainty and Transparency Act"

January 29, 2015

TESTIMONY OF ROSS EISENBERG
VICE PRESIDENT, ENERGY AND RESOURCES POLICY
NATIONAL ASSOCIATION OF MANUFACTURERS

BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

Hearing on: "S. 33, the LNG Permitting Certainty and Transparency Act"

JANUARY 29, 2015

Good morning, Chairman Murkowski, Ranking Member Cantwell and members of the Senate Committee on Energy and Natural Resources. My name is Ross Eisenberg, and I am vice president of energy and resources policy at the National Association of Manufacturers (NAM). I am pleased to share the NAM's views on S. 33, the LNG Permitting Certainty and Transparency Act, a bill the NAM supports.

The NAM is the nation's largest industrial trade association, representing nearly 14,000 small, medium and large manufacturers in every industrial sector and in all 50 states. Manufacturers are major energy consumers, using one-third of the energy consumed in the United States. For manufacturers, natural gas is a critical component of an "all-of-the-above" energy strategy that embraces all forms of domestic energy production, including oil, gas, coal, nuclear, energy efficiency, alternative fuels and renewable energy sources.

Two years ago, I had the privilege of appearing before this Committee to discuss the potential opportunities for manufacturers that have resulted from the nation's newfound abundance of natural gas, including the potential for liquefied natural gas (LNG) exports. At the time, the Department of Energy (DOE) had placed all LNG export license applications on hold while it commissioned a study of the potential macroeconomic impacts of exporting LNG—a study that forecasted the U.S. to gain net economic benefits from allowing LNG exports.[1] The NAM urged the Committee that the free market will find equilibrium, and that exports of LNG should be governed by principles of free trade and open markets. The NAM also urged the DOE to provide LNG license applicants an up-or-down decision as expeditiously as possible, to avoid market-distorting barriers to trade. Some witnesses at the hearing took an opposing view, calling into question the

[1] http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

validity of the DOE study's findings and warning of constrained natural gas supplies, "unfettered" LNG exports, and skyrocketing natural gas prices.

Fast-forward to today, and the doomsday predictions have not come true. Proven natural gas reserves increased by 10 percent in 2013, setting a new record of 354 trillion cubic feet. The DOE began issuing export licenses and took steps to update its regulations with the goal of reducing delay. We do not have anything resembling unfettered LNG exports, as only five projects (of 37) are under construction. The overwhelming numbers of economists who have looked at the issue (including the DOE itself) have all repeatedly concluded that LNG exports and a strong domestic manufacturing sector can coexist. The Henry Hub spot price for natural gas today stands at $2.94, a full 36 cents *lower* than the price of natural gas the day of the hearing I appeared at in 2013.

Throughout this debate, the nation's natural gas boom has sparked a manufacturing comeback. According to global research firm IHS Global Insight, the full value chain that is associated with the revolution in unconventional oil and natural gas supported 2.1 million jobs and contributed $283 billion to U.S. gross domestic product (GDP).[2] By 2025, IHS predicts these numbers to grow to 3.9 million jobs and $533 billion in GDP. Manufacturers will benefit too: PricewaterhouseCoopers (PwC) predicted that by 2040, the shale gas boom could create 1.41 million new manufacturing jobs in the U.S. and generate annual cost savings for manufacturers of $34.1 billion due to lower energy and feedstock costs.[3]

The American Chemistry Council reports that the chemical industry alone has announced 215 new projects representing $135 billion in capital investment, much of it geared toward export markets.[4] These energy related chemicals are the primary building blocks for a wide range of manufacturing sectors, including but not limited to fertilizer, plastics, rubber, building and construction, paint and coatings, automotive, and electronics. PwC found a consistent rise in the number of U.S. manufacturers including shale gas in their public filings with the Securities and Exchange Commission, from just one in 2009, to 29 in 2011 and 40 in 2013.

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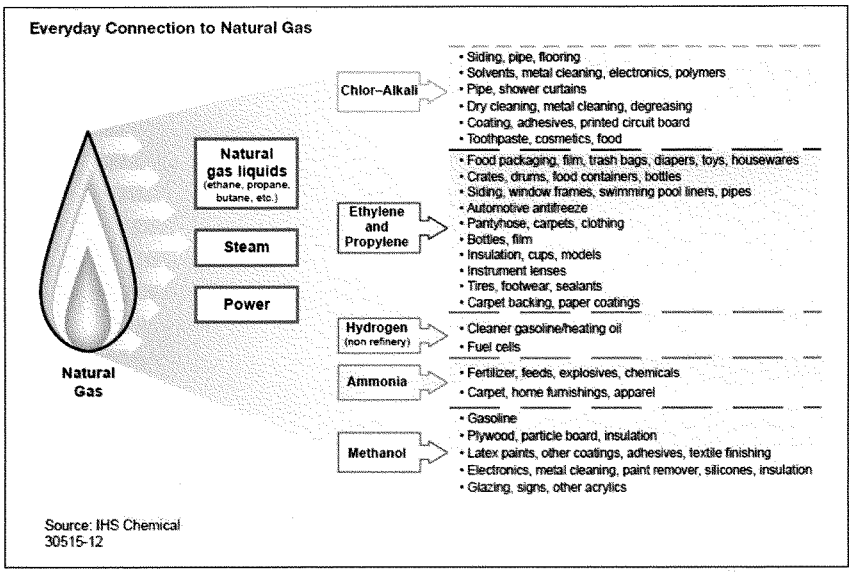
[2] http://www.nam.org/Newsroom/Press-Releases/2013/09/Manufacturers--Shale-Production-Driving-Manufacturing-Renaissance/.
[3] http://www.pwc.com/us/en/industrial-products/publications/shale-gas-transforming-manufacturing.jhtml.
[4] http://www.americanchemistry.com/Media/PressReleasesTranscripts/ACC-news-releases/Lower-Oil-Prices-Recovery-of-End-Use-Markets-Puts-Wind-Back-in-the-Sails-of-American-Chemistry.html.



Both IHS and PwC make these positive projections for manufacturers with the assumption that LNG will be exported. And just as an abundant domestic supply of natural gas provides opportunities for manufacturers to increase their competitiveness, construction and operation of major natural gas-related infrastructure—such as pipelines and LNG export terminals—provide major opportunities for manufacturers up and down the supply chain. Manufacturers in Arkansas, California, Colorado, Iowa, Louisiana, Maryland, Minnesota, Nevada, New York, Ohio, Oklahoma, Pennsylvania, Texas, Utah, Virginia and others are already taking part in the supply chain to support the LNG export terminals under construction. Dominion's Cove Point LNG facility is creating 4,000 jobs in Maryland construction and will create another 14,600 jobs in manufacturing, service and other sectors across the supply chain.[5] Cheniere's $12 Billion Sabine Pass project, under construction since mid-2012, is believed to be the largest capital project in Louisiana state history. The project at peak construction is expected to support the livelihoods of up to 18,300 Louisiana residents and an average of nearly 6,400 Louisiana workers over 8 years. To put this contribution in perspective, there are 14 parishes in the state of Louisiana that have fewer than 6,400 residents employed. The project's supply chain includes 54

[5] http://www.nationaljournal.com/sponsored-content/api/energy-tomorrow/u-s-rep-hoyer-maryland-cove-point-facility-is-necessary-step-in-creating-well-paying-jobs-20141223.

manufacturers in 17 states. Many other manufacturers across the U.S. have made investments in their own businesses to position themselves to participate in LNG export projects.

One of these manufacturers is Chart Industries, an NAM member who testified on our behalf before the House Ways and Means Committee in 2014. Chart is an Ohio-based manufacturer with facilities in Georgia, Louisiana, Minnesota, Oklahoma, Texas and Wisconsin. Chart plays a vital role in the LNG supply chain, producing highly engineered equipment for applications from liquefaction to end use. Approval of pending LNG export terminals would place Chart in a position to create jobs in the U.S. If Chart is selected to supply equipment for just one average-sized export terminal, it would support hundreds of jobs at Chart facilities, and further create hundreds of jobs with Chart suppliers in other communities around the U.S. In recent years, Chart has invested tens of millions of dollars to expand its facilities in various American communities to be prepared for these opportunities.

Chart is one of many manufacturers who would benefit from supply chain opportunities from LNG export terminals. These are major infrastructure projects: each LNG export terminal may cost as much as $10 billion to construct. Each project would create thousands (and in some cases tens of thousands) of jobs and generate billions of dollars in economic benefits. Manufacturers across the country would create jobs making compressors, heat exchangers, storage tanks, pipes, valves and other components of these state-of-the-art infrastructure projects.

To date, the DOE has received 37 applications to export LNG to non-FTA countries, representing 38.07 billion cubic feet per day (Bcf/d) of natural gas. Only five have received final approval from DOE: Sabine Pass in Louisiana, Freeport LNG in Texas, a Freeport LNG expansion, Carib Energy Solutions in Florida, and Cameron LNG in Louisiana. Four others have received conditional approval from DOE: Lake Charles Liquefaction in Louisiana, Jordan Cove Energy Project in Oregon, Cove Point LNG in Maryland, and Oregon LNG in Warrenton, Oregon.

Until late 2014, the remaining LNG export applicants would have been forced to wait for conditional approval as the DOE moved through applications in chronological order based on the date filed, a process that was improving by mid-2014 but remained very slow. On August 15, 2014, the DOE modified its regulations and stopped issuing conditional approvals, choosing instead to wait until applicants had completed the National Environmental Policy Act (NEPA)

environmental review process, after which the DOE would issue a final approval. The DOE stated that the new procedures would make the Department "better able to ensure prompt action on applications that are otherwise ready to proceed, and "would improve the quality of information on which DOE bases its decisions."[6]

The NAM participated in the DOE's rulemaking to modify its LNG export licensing procedures. Although we were disappointed that the DOE did not accept all of our suggestions on ways to improve the licensing process, we applaud the DOE for taking a hard look at the inefficiencies with its own procedures and trying to fix them. Our view was the same then as it is now: if the new procedures serve to clear the logjam for these license decisions and truly speeds up the process, then the regulations will have served their purpose. If they merely shift the delay from the front end of the permitting process to the back end, then the problem is not solved.

The Cameron LNG and Carib Energy final approvals came quickly and were the first issued under the new DOE procedures, as both of these projects had completed their NEPA review and obtained Federal Energy Regulatory Commission (FERC) approval. That was a positive sign. However, FERC completed its environmental reviews for Dominion's Cove Point LNG on May 15, 2014 and Cheniere's Corpus Christi LNG in December 2014. FERC authorized construction on Cove Point LNG on September 29, 2014. Both projects are "on the clock" with the DOE under its new procedures, and neither has received a final decision yet from the DOE. For Cove Point—a project that received conditional approval in September 2013—we are now approaching the end of the fourth month of deliberations on a final license. Given that the DOE was marching through conditional approvals every two months under the old procedures, the extended delay for Cove Point is troubling. After all, the DOE promised that the new process would ensure prompt action on applications that are otherwise ready to proceed.

The NAM therefore believes S. 33, the LNG Permitting Certainty and Transparency Act, is timely and warranted. S. 33 ensures that the free hand of the marketplace, rather than bureaucratic inertia, governs international trade by providing a 45-day deadline on the DOE to approve or deny pending LNG export applications. It does not impact the economic, environmental or safety studies that the Federal Energy Regulatory Commission (FERC) and other agencies are required to conduct, nor does it remove any other regulatory requirement. It would provide a clear resolution to the outstanding questions surrounding

[6] 79 Fed. Reg. 48,133 (Aug. 15, 2014).

regulatory approval of the infrastructure necessary to allow the export of a product—a principle that domestic manufacturers support.

In addition to providing a measure of certainty to the LNG export licensing process, S. 33 protects against running afoul of our international obligations under the World Trade Organization (WTO). In December 2013, former WTO Appellate Body Chairman James Bacchus authored a report for the NAM concluding that prolonged delays by the DOE to issue licenses to export LNG to foreign countries would likely constitute, in and of itself, a violation of our international obligations under the WTO.[7] As a member of the WTO, the United States is bound to comply with trade rules contained in WTO agreements that we helped develop. If the United States is going to continue to lead the world in pursuing a rules-based international system, we should not ourselves be in violation of the very same commitments we ask others to respect. It was the expert opinion of Chairman Bacchus—the "judge" for WTO disputes who authored a significant body of applicable case law—that we could find ourselves in violation simply from prolonged delay.

Some opponents of S. 33 cite a need for a long, drawn-out "national interest" determination phase conducted by the DOE following the completion of the NEPA process, implying that special attention must be given to the economic implications of each terminal. Not only does this argument disregard continuing macroeconomic studies of LNG exports commissioned by the DOE,[8] it would upend NEPA itself, which was designed "to balance environmental, economic, and social objectives in pursuit of NEPA's goal of 'productive harmony' between humans and the human environment."[9] Environmental reviews must look not only at environmental impacts but also economic impacts, so that a proper balancing and cost-benefit analysis can take place. The regulations implementing NEPA require agencies to "identify environmental effects and values in adequate detail so they can be compared to economic and technical analyses."[10] Agencies are required to assess a project's "effects," which in turn are defined specifically to include economic impacts, whether direct, indirect, or cumulative.[11] In compliance with the law, FERC's environmental reviews for each of the completed LNG export applications have included a detailed socioeconomic

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[7] Bacchus, J. and Jeong, R., *LNG and Coal: Unreasonable Delays in Approving Exports Likely Violate International Treaty Obligations*, November 2013, *available at* http://www.nam.org/~/media/9CCC6B36723C4AEDB37F78C19EBE8971.ashx.

[8] 2012 study available at http://energy.gov/fe/services/natural-gas-regulation/lng-export-study and 2014 study available at http://www.eia.gov/analysis/requests/fe/.

[9] http://www.whitehouse.gov/administration/eop/ceq/about (citing 42 U.S.C. § 4331(a)).

[10] 40 C.F.R. § 1501.2.

[11] *Id.* at § 1508.8.

analysis that examines impacts on the local, regional and national economy. For each, FERC prepares draft and final environmental review documents, and takes public comments—a process the opponents of S. 33 have all participated in. The final NEPA reviews are also subject to judicial review. In short, NEPA was designed to provide the sort of detailed economic impact analysis sought by these opponents of S. 33, making a second such examination unnecessary. Moreover, as the DOE stated in its modified regulations for the processing of export licenses, the new process will allow the Department to conduct the national interest determination throughout the review process, so that it does not have to start from scratch once the NEPA process is complete. The 45-day deadline put in place by S. 33 for a final DOE license decision is more than reasonable under the circumstances.

Developers looking to build an LNG export facility must subject themselves to running a gauntlet of a long, complex, and multifaceted permitting process. Applicants not only must apply to the DOE for an export license, but also must engage in an environmental review of their project under NEPA, led by FERC. Compliance with NEPA requires that the project developer first acquire land and begin design and engineering plans, a two-year time commitment. The NEPA review process requires the input of up to 20 federal and state agencies coordinated by FERC that have a say in the review. During the course of the NEPA review, applicants must obtain, among other things, a dredge-and-fill permit from the Army Corps of Engineers (with input from EPA), a Waterway Suitability Assessment from the U.S. Coast Guard, air permits from EPA and state agencies, and the usual state and local permits for construction and related activities. Detailed project engineering design work and project study is required for compliance with NEPA, requiring tens of millions of dollars in up-front capital and a significant commitment in time. Once developers successfully navigate all of these obstacles, they must then seek out long-term contracts and financing for the project.

This amounts to a daunting set of regulatory hurdles for LNG export project applicants. At a minimum, manufacturers should be able to rely on some amount of certainty that once they have received all of their permits and approvals, the DOE will quickly decide on a final license to export. S. 33 provides this certainty while ensuring that all environmental laws will be complied with to their fullest extent. Manufacturers support S. 33 and urge the Committee to approve this legislation.

The CHAIRMAN. Thank you, Mr. Eisenberg. And finally, Mr. Koranyi.

STATEMENT OF DAVID KORANYI, DIRECTOR, EURASIAN ENERGY FUTURES INITIATIVE, ATLANTIC COUNCIL

Mr. KORANYI. Thank you, Madam Chair. Thank you, Ranking Member Cantwell, members of the Committee. I am honored to appear before you today to discuss the LNG Permitting Certainty and Transparency Act geopolitical implications.

I will make three brief points in support of the act.

Point number one, European energy security is a matter of national security for the United States.

As Mr. Putin continues his aggression against Ukraine that threatens the Trans Atlantic community as a whole, energy import dependence points to a strategic vulnerability of key allies especially in Central and Eastern Europe. As a Hungarian I witnessed firsthand the devastating effects of the 2006 and 2009 Russia/Ukrainian gas crises in the region. We cannot be sure that another cutoff does not happen, if not this year, then the next.

Furthermore, compromising energy security and corruption in the energy sector are at the heart of Moscow's strategy to divide our alliance and render it ineffective. OPEC deals cut with the Kremlin question a country's ability to conduct an independent foreign policy that is boasting their national and in the allied interest. This is especially unnerving as the European Union needs unanimity to uphold or extend sanctions against Russia, a critical element in an allied strategy to deter further aggression; therefore, lessening European dependence on Russian natural gas is vital.

The good news is that Europe is finally stepping up to the plate, but Europe cannot succeed without the help of the United States. Europe has access to multiple sources of piped gas as well as LNG supplies. Yet in addition to the risks associated with supplies from Russia current and prospective, pipe supplies from both the south and the southeast face their own challenges due to the turmoil in North Africa and across the Middle East.

Most LNG supplies outside the U.S. are not without risk either. LNG exporters such as Nigeria and Yemen are facing terrorist and insurgent activity. Producers such as Egypt and Indonesia have to grapple with increasing domestic demand that limit their export capabilities, and Qatar is the biggest energy producer to date. Its LNG tankers have to pass through the Strait of Hormuz and the Suez Canal, both potential liabilities.

Meanwhile U.S. LNG supplies do not face such geopolitical qualms. U.S. LNG would provide a reliable and competitive alternative to the allies in Central and Eastern Europe. U.S. LNG would introduce much needed additional liquidity to the global gas markets, complement European measures forcing Gazprom to act in a competitive manner and send a critically important message of strategic reassurance to a region that is under the most serious threat since the end of the Cold War.

Point number two, even if not a single drop of gas makes it to Europe, which I believe is a very unlikely prospect, U.S. LNG exports will nevertheless substantially improve European energy security including that of Ukraine. U.S. LNG is admittedly no pan-

acea. In and of itself it will not solve Europe's energy security problems nor will it push Russia to its knees, but clarity in the LNG export licensing procedure would put a downward pressure on gas prices and accelerate the interconnection of the European gas markets well before, or even in the absence of, a single American gas molecule reaching Europe. That is because LNG markets are global. Markets are shaped by the future expectations and the mere existence of a credible alternative would incentivize infrastructure development and put pressure on the dominant supplier, Gazprom. LNG recertification terminals enabled both Greece and Lithuania recently to secure substantial price discounts from Gazprom.

Finally, unhindered U.S. energy exports, in general, and LNG exports in particular, are critically important for the credibility of the United States foreign and trade policy. Historically the U.S. has been promoting transparency and open markets and opposing resource nationalism to the great benefit of the whole world. Introducing that transparency into the export licensing procedure would be critical to bolster trust in America's global leadership.

Thank you, Madam Chair.

[The prepared statement of Mr. Koranyi follows:]

Written Testimony of

David Koranyi, Director of the Atlantic Council's Eurasian Energy Futures Initiative

Before the United States Senate Committee on Energy and Natural Resources

Accelerating US LNG Export Liberalization – The Geopolitical Context

January 29, 2014

Room 366 Dirksen Senate Office Building

Madam Chair, members of the Committee, I am honored to appear before you today to discuss the geopolitical implications of the LNG Permitting Certainty and Transparency Act.

The growth of natural gas production in the United States in the past decade has been nothing short of spectacular. It has resulted in increased economic competitiveness, particularly in energy intensive industries; reduced dependence on imports; and a relative reduction of greenhouse gas (GHG) emissions. This dynamic growth in gas production is expected to continue in the next decade, according to forecasts from the US Energy Information Administration[1], as well as other respected analyses[2].

The United States is at the cusp of becoming a major exporter of natural gas, which will provide economic, climate, and energy security benefits to America and the rest of the world. We have a historic opportunity to use this natural gas bounty to promote the principle of open global energy markets as well as greater energy security and prosperity in Europe, Asia, Mexico, and the Caribbean, and potentially elsewhere.

In my testimony, I will focus on the direct and indirect economic and security benefits of LNG exports for Europe, Central and Eastern Europe in particular, in the context of the Ukraine crisis; tensions with a resurgent and belligerent Russia; and Europe's overall energy security challenges. I will briefly address the importance of unhindered LNG exports in an Asian context with special regard to Russia's positions and ambitions in the region. Underpinned by the geopolitical arguments, I will conclude by expressing support for the bipartisan LNG Permitting Certainty and Transparency Act.

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[1] http://www.eia.gov/pressroom/presentations/sieminski_01042014.pdf
[2] Such as the 2014 World Energy Outlook by the International Energy Agency, http://www.iea.org/Textbase/nppdf/stud/14/weo2014.pdf

European Energy Security in Light of the Ukraine Crisis

The Ukraine crisis refocused attention on Europe's energy security with natural gas at the center. The crisis is far from over, but it is already clear that both the scope and nature of Russia's relations with the European Union and the United States cannot remain unchanged, and that Russia's posturing and actions have profound repercussions on European and transatlantic security and prosperity.

The European Union is highly dependent on oil and gas imports (85 percent and 65 percent, respectively). This dependence will likely grow in the next two decades. Oil is a fungible commodity with a liquid global oil market, but gas trade is still predominantly regional and often monopolistic, with rigid long-term contracts and oil-linked prices to the detriment of the consumers. Russia's Gazprom still supplies close to a third of Europe's imports, roughly half of which — 82 billion cubic meters — went through Ukraine in 2013. Moscow's use of force and the cutoff of gas supplies, yet again, to Ukraine from June until November of last year was a clear signal to consumers that they will be wise to further diversify their gas supplies.

To be sure, the European Union has done, and is doing, a lot to address its energy vulnerabilities. The situation has vastly improved since the crises in 2006 and 2009 that served as a wake-up call for Europe. The EU has since adopted the Third Energy Package in a bid to create integrated EU markets for electricity and natural gas. They have also built up gas storage capacities, completed interconnectors to link up national gas markets, improved energy efficiency, and — last but not least — actively pursued diversification of sources. At their meeting in March of 2014, European leaders concluded that efforts should be intensified to reduce Europe's high rates of energy dependency. The European Commission presented an in-depth study of EU energy security and a comprehensive plan for the reduction of EU energy dependence in June of 2014. European leaders endorsed the plan in October of 2014[3]. Furthermore, as the next potentially major step in European integration, the European Commission will present a comprehensive Energy Union proposal ahead of the European Council's meeting in March. The Energy Union could be a major step in a long journey to a truly unified European energy market and policy. This journey started more than 60 years ago with the coal and steel community.

Yet the European gas market integration is incomplete and the Ukraine crisis reminded us of the dangers facing European energy security. Europe has only just begun to profit from gas-on-gas competition — benefits the United States has been enjoying since the deregulation of the natural gas market in 1978. While Western Europe succeeded, to a large extent, in diversifying its gas imports through LNG import terminals and agreements with other suppliers (Norway and Algeria), countries in Central and Eastern Europe remain dependent on Russia. Monopolistic markets and anti-competitive business practices prevail and result in a fragmented European gas market, especially in the continent's east.

[3] European Council Conclusions, October 24, 2014:
http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf

European market integration and diversification efforts

There are four key components of reducing this dependence: improving energy efficiency, boosting indigenous (unconventional) gas production, growing renewable energy capacities, and supply source diversification. The first three components are critical elements to be discussed at another time. The fourth is the most relevant within the context of the current debate on US LNG export liberalization.

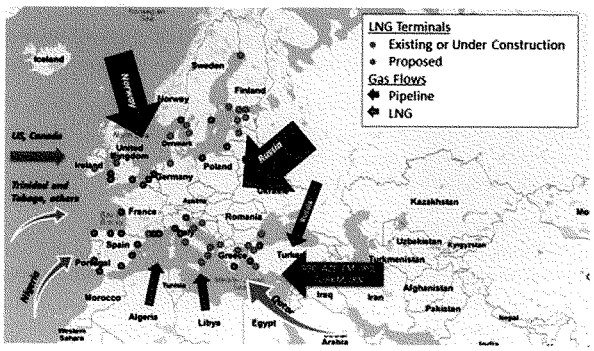
As Europe becomes more and more concerned about Russia's behavior and reliability as a supplier of natural gas, and rethinks its entire energy and gas supply security strategy, the relative importance of alternative sources will grow. Lessening dependence on Russian gas is vital for safeguarding Europe's security and integrity in the medium- and long-term.

Europe has access to multiple sources of piped gas as well as LNG supplies. Yet, in addition to the risks associated with supplies from the east (Russia), piped supplies from both the south (Algeria, Libya, and Egypt), and the southeast (the Southern Gas Corridor) these sources face their own challenges. All these sources have additional costs that Europe will have to factor in. Though Algeria — as the third-largest gas supplier of Europe and with the fourth-largest shale gas reserves globally — has so far escaped the turmoils in the MENA region, one should recall the unprecedented scale of the attack by Islamic militants against the Amenas gas facility in 2013. The Amenas attack and other domestic and regional security challenges raise the spectre of potential disruptions in the future. Libya is in the middle of a civil war with both oil and gas supplies interrupted for prolonged periods of time. Given the political disarray and abysmal security situation, Libyan supplies will likely remain volatile. Egypt has turned into an energy importer as its domestic consumption has increased.

The Southern Gas Corridor could be a critical component in Europe's diversification efforts. In the medium- and long-term (beyond 2020), the corridor has the potential to become a major source of gas for Europe from the Caspian, the Eastern Mediterranean, and the Middle East. Yet the corridor's prospects should be realistically assessed. It is by no means a short-term solution. The corridor faces multiple political and security challenges from a renewed Russian effort to derail it by diverting major volumes of Russian gas through Turkey (as Ambassador Richard L. Morningstar, former Special Envoy on Eurasian Energy argues about the Turkish Stream concept replacing the cancelled South Stream[4]); an increasingly authoritarian and heavy-handed Azeri leadership, under tremendous Russian pressure; instability in the Middle East, especially in Iraq; and the uncertain prospects of securing gas from Central Asia via the planned Trans-Caspian Pipeline.

[4] Ambassador Richard L. Morningstar: The Demise of South Stream. http://www.atlanticcouncil.org/blogs/new-atlanticist/the-demise-of-south-stream

Europe's Supply Options



Data source: Gas Infrastructure Europe and IEA Medium-Term Gas Market Report 2013

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The uncertainty surrounding additional pipeline supplies adds to the importance of LNG supplies to Europe. LNG has many advantages, not least being that prices are set by supply and demand with no political strings attached. However, LNG supplies are not without risk either. LNG exporters such as Nigeria and Yemen are facing terrorist and insurgent activity. Qatar, the largest LNG exporter to date, continues to have a moratorium on further exports. Some traditional Asian LNG exporters, such as Indonesia, face increased domestic gas consumption that limit their export capabilities. Other prospects for major quantities of low-cost LNG are uncertain as Australia is battling with project delays and increased costs, while LNG development in East Africa is facing political, regulatory, and financial challenges.

This combination of factors increases the significance of LNG supplies from the United States, a stable and reliable partner that does not face such geopolitical qualms. Some experts underplay the significance of US LNG exports for European energy security arguing that it does not provide a short-term solution and most, if not all, of the gas will eventually go to Asia where the prices are higher. While both are valid points, the direct and indirect effect of large-scale US LNG exports on European natural gas markets and energy security would be massive.

The United States — together with Canada — is in an excellent position to improve liquidity on the global LNG markets, thereby improving conditions for Central and Eastern European countries to access LNG supplies. Access to LNG could also help Ukraine down the line if the necessary infrastructure is put in place so that Ukraine is fully integrated into a unified Central European gas market with better access to LNG supplies. An accelerated and transparent process of LNG export licensing to non-FTA countries would put a downward pressure on gas prices in Central and Eastern Europe well before or even in the absence of a single American gas molecule reaching Europe. It would also send a critically important message of strategic reassurance to the region, which currently feels the most threatened since the end of the Cold War.

While prices in Asia remain higher than in Europe this gap may close depending on various factors that are difficult to anticipate. Another Russian cutoff would quickly increase prices in Europe, while gas demand in Asia may grow at a slower rate than predicted. Therefore, US gas could be a viable alternative for Europe. Indeed the contracts concluded by Cheniere Energy to ship gas from the Sabine Pass LNG terminal are predominantly with European utilities and traders.

Furthermore, the benefits of major volumes of US LNG exports should not underestimated in the context of their effects on future price formation in various regional gas markets. As distinguished experts such as David L. Goldwyn, Chair of the Atlantic Council's Energy Advisory Group, emphasized in their testimonies before this esteemed Committee, expectations of future supply drive energy prices and impact infrastructure investment decisions made today. I strongly agree with Anita Orbán, Hungarian Ambassador-at-Large for Energy Security, who in her testimony in front of the House Foreign Affairs Committee last April said: "the mere existence of a credible alternative supplier exerted significant downward pressure on the natural gas prices set by the dominant supplier." Receiving clear indications from the United States that LNG exports will be available to European allies for future purchase will have an immediate effect inasmuch as they will put further pressure on Russian market share and prices by presenting an alternative source of supply in the medium term.

Such indications will also guide investment in and construction of gas transportation infrastructure in Europe, particularly in Central and Eastern Europe, where the prospect of increased liquidity on the global LNG markets will accelerate the completion of the planned North-South Corridor. This corridor would help diversify the sources of energy for all Central and Eastern European states, create a regional energy market, and increase leverage vis-á-vis Russia during gas contract negotiations. In Lithuania and Greece, for example, already functioning LNG terminals enabled both countries to secure substantial price discounts from Gazprom. The almost-completed LNG terminal in Świnoujście, Poland, and the one proposed on Krk Island, Croatia, would play a similar role, enabling Central Europe to tap into an increasingly global LNG market. Prospective shipments from the United States will further improve the competitiveness of these projects and help allied nations access cheaper natural gas vital to their economies. As the Atlantic Council's report on the North-South Corridor, co-chaired by Gen. James L. Jones and Central Europe Energy Partners Chairman and Lotos CEO Pawel Olechnowicz, put it: "[the completion of] the North-South Corridor is crucial to the completion of an effective single European energy market, one that can receive inputs of oil, gas, and electricity from a variety of current and prospective European and non-European suppliers, and distribute them throughout Europe on a competitive basis."[5]

US LNG and Russian positions in Asia

Liberalized US LNG exports would also make a difference in Asia. Introducing certainty into the permitting process would benefit Asian consumers and contribute to the emergence of a more liquid and competitive Asian gas market. Russia plans to double its share of the global LNG trade by 2020 (an admittedly ambitious goal given the financial constraints) by increasing LNG supplies to both Europe and Asia, and

[5] Completing Europe – From the North-South Corridor to Energy, Transportation, and Telecommunications Union, November 20, 2014. http://www.atlanticcouncil.org/publications/reports/completing-europe-from-the-north-south-corridor-to-energy-transportation-and-telecommunications-union

tap into the growth of Asian demand. Furthermore, Russia entered into a major deal with China that would, in principle, provide 68 billion cubic meters of gas per year to China for 30 years after 2018/19. Similar to Europe, US LNG exports can be a tool to limit Russian market share and ensure that Russian gas is exported to Asia under competitive terms. Henry Hub-linked US LNG contracts will provide Asian buyers increased negotiating leverage and pricing flexibility.

Why should this matter to the United States?

As Vice President Joe Biden underlined in his speech at the opening of the Atlantic Council Energy and Economic Summit in Istanbul, Turkey, in November of 2014, "Global energy security is a vital part of America's national security... [European] energy security is an especially vital regional security interest because of Russia's track record in using the supply of energy as a foreign policy weapon against its neighbors in violation of basic commercial and international norms."[6] Energy Secretary Ernest Moniz emphasized in his opening speech at the same summit that "[e]nergy security is the collective responsibility of allies and friends."

Europe's energy security, in particular, is a matter of US national security as it points to a strategic vulnerability of key allies. Europe's integrity and unity is, to a large extent, contingent on its ability to secure energy supplies. Of particular concern is Russia's stranglehold over Central and Eastern Europe, especially in the context of the Ukraine crisis. Energy import dependence limits the political options available to Central and Eastern European countries as transatlantic allies. Compromising energy security and corrupting the energy sector are at the heart of Russian ambitions in this space. As we have seen in countries like Hungary and Bulgaria, the energy sector is the primary conduit for heavily corrupted deals with Russia that limit the political room for maneuver and question these countries' ability to act as a reliable ally and conduct an independent foreign policy that is both in the national and allied interest. This is especially unnerving in the context of the ongoing standoff with Russia, where the European Union needs unanimity for every major decision, such as to uphold or extend sanctions.

Of further concern is that lower oil prices that will start to fully feed into Russia's long-term gas contracts in the spring, coupled with the temporary deal with Ukraine, and the promises of Russia to deliver gas through Turkey may lure some countries in Europe into a false sense of security, especially in the absence of alternative supply prospects. Oil-indexed long-term contracts may seem attractive when the prices are down though the oil price drop may very well prove to be short-lived[7].

A robust US energy diplomacy is critical in supporting the European Union on all these fronts. I commend the leadership and efforts by Special Envoy and Coordinator for International Energy Affairs Amos Hochstein and his predecessor, Carlos Pascual, whose Bureau of Energy Resources at the State Department has done, and keeps on doing, a tremendous job in supporting European interconnection,

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[6] Remarks by Vice President Joe Biden on European Energy Security to the Atlantic Council Energy and Economic Summit, Istanbul, Turkey, November 22, 2014. http://www.whitehouse.gov/the-press-office/2014/11/22/remarks-vice-president-joe-biden-european-energy-security-atlantic-counc

[7] David L. Goldwyn: Here's Why Saudi Arabia Has Let Oil Prices Fall — and Why They Could Revive by Year's End. http://www.atlanticcouncil.org/blogs/new-atlanticist/heres-why-saudi-arabia-has-let-oil-prices-fall-and-why-they-could-revive-by-years-end

market integration, and diversification efforts, while also lending critical support to Ukraine to reform its energy sector.

Madam Chair, Members of the Committee:

US LNG export is no panacea. It will not provide a quick fix for Europe's energy security problems, nor will it push Russia to its knees — at least not in the short-term. But major volumes of US LNG would significantly shift the balance on global gas markets, introduce much-needed additional liquidity and potential alternative supplies for allies in a vulnerable energy security position, and push down prices globally, increasing economic growth prospects and the usage of gas replacing coal to the benefit of our climate.

To fully reap the domestic and international benefits of the natural gas boom, the licensing process needs to be accelerated and placed on firm and transparent footing. The US Department of Energy (DoE) has been quicker in granting such conditional approvals in the past year than before. Yet a transparent process for DoE approvals would promote much-needed certainty and predictability. Therefore, I strongly endorse the LNG Permitting Certainty and Transparency Act. It is time for the United States to practice what it preaches: open markets and transparent investment climate versus resource nationalism and unpredictability.

The CHAIRMAN. Thank you. Thank you all this morning for your testimony and comments. We greatly appreciate it.

We'll now begin questions from the members. I would ask members to be sure to limit your time to five minutes as we've got a lot of folks to get through, and we've got votes that are theoretically going to begin around 11 o'clock.

Mr. Smith, I would like to start with you.

Reading through both your written testimony and the comments you've provided this morning, you've outlined the steps that DOE has taken that really get us to a point where there is less time between the approvals. I appreciate what you have done with the realignment.

Your testimony states that this legislation is "not necessary." Now this is not saying that you don't support the legislation. I certainly understand that. Under your leadership and with Secretary Moniz, you've issued several final authorizations.

Again, I appreciate the comments and the direction you're taking, but I think we here in Congress need to be thinking long term. Secretary Moniz has made very clear that he wants to work through this process, but I worry that perhaps a future Secretary of Energy might not be as favorable to LNG exports as we have seen coming out of this Secretary and the Administration.

So the question that I would ask you very directly is whether or not you think S. 33, as it is written, is workable and achievable?

Mr. SMITH. Well, thank you, Madam Chair, for the question.

First of all, we understand the intent and interest of this legislation. In fact, as I listen to many of the comments that have been made here in opening statements, we share many of these drives, many of these core values of transparency, efficiency, of making prudent public interest determinations. So I think we have a lot in common in terms of what we want to accomplish, and we understand the intent of the legislation.

In fact, the changes that the Department has made to our internal process have been along exactly those same lines to make sure that we're making good, solid, public interest decisions that withstand scrutiny. So we think that we are currently moving in that direction, and we're using the current statute in a way that protects the public interest.

That said, your direct question is about the workability of the legislation that's being proposed. Certainly if this legislation is passed as is currently written the Department will be able to accomplish the mission. We will, as always, accomplish the letter and spirit of the law and we believe this is a solution we will be able to comply with.

The CHAIRMAN. Well, I appreciate that. So what you're telling me is you can do it. You have been doing it. 45 days is workable?

Mr. SMITH. Yes, Senator. Again, if this is the legislation that's passed in the current form.

The CHAIRMAN. Understood.

Mr. SMITH. That we can comply with the regulation or the law.

The CHAIRMAN. I appreciate that.

Let me ask you a question regarding LNG and Alaska. As you know the facility there on the Kenai Peninsula has been exporting LNG since 1969. Some forget that Alaska has been engaged in the

export business for a long, long period of time. Granted, these have been small amounts, but it has been a process that has been without interruption. It's been the longest export contract that we've had in the country. I think it has laid the ground work, most certainly, for things to come.

Of course we also have the bigger project, the Alaska LNG project that, I believe, merits a conditional authorization from DOE on the basis of what the Department itself has described as these "unique" features of an Alaska project. Not only will the project require the liquefication facilities, but you've got an 800 mile pipe that we're dealing with.

So the question for you this morning is whether it is DOE's understanding that this legislation would in no way affect Alaska LNG's eligibility for a conditional authorization to export to non-FTA countries? Further that S. 33 will, in fact, impose a 45 day deadline for the project to receive a final authorization after it has completed the environmental review?

Mr. SMITH. Thank you for the question, Madam Chair.

So, I've actually visited the Kenai facility in Alaska and spent time on the North Slope. We've got a keen understanding of the opportunities and some of the challenges with all of those projects.

It is my understanding that we've already stated that we have held the right to do a conditional authorization for projects coming out of Alaska. It's my view that this bill, as written, would not change that. We would still have the ability to issue a conditional authorization for both of these projects, particularly the North Slope project, which has some additional complexities that might require a conditional authorization.

In addition, as we read the law as currently written it doesn't appear to make any distinction between the lower 48 and Alaska in terms of the time limit that it would impose on the Department.

The CHAIRMAN. Okay. Thank you. I appreciate that, and I also appreciate you going up there and spending some time. I'll turn to my Ranking Member.

Senator CANTWELL. Thank you, Madam Chair. I want to be clear. I like the natural gas juxtaposed to what we're discussing on the Floor which, I think, is a dirtier source of fuel, and I definitely like exports. But I like something even better than those two. I like cheap, domestic sources of energy.

So I think part of this discussion is how we ensure that the U.S. economy takes best advantage of this. I have a bunch of different questions, and maybe I can just cue it all up and you guys can go from there.

Mr. Durbin, if you could just talk a little bit about the domestic natural gas markets and some of the other uses that are going to come into the picture like heavy duty fleet trucks and the potential for the maritime industry. We're very, very excited about the transition of the maritime industry to natural gas as a fuel source, again, to comply with environmental issues in places like L.A., Long Beach and all up and down the coast. So how do we get that right?

Mr. Cicio, what price point impacts your business? During the Enron crisis, and again, those were very exaggerated rates, but the aluminum industry and several other mineral industries just had

no choice. The price fluctuation came and guess what? Those factories shut down forever.

So these long term contracts get locked in on export at say a preferential rate for a long period of time because the nature of those contracts. Then the domestic market sees this fluctuation based on that international market, not locked in to long term contracts. What price point do you start worrying about the impact to industry?

My guess is it's a lot narrower than people might imagine. Then the doors shut, and the factory is not open again. It's not like you turn the lights back on. This is what we saw in the Northwest. Aluminum plants shut down forever and forever. Okay? This is very important to Midwest industry issues.

The third point is, Mr. Smith, I just don't know what happens when you get this list and you say, okay, alright, here we are. And we're not done. Denied. Okay? So is that denied and now you're back at the bottom of a hundred permit list or denied and maybe in two years I'll think about you again?

So my question is the denial part of this legislation is a good idea in concept, but I think what it might actually mean on projects that really shouldn't be denied is an interesting question. I wonder if you have a process?

So as quickly as people can answer that would be appreciated.

Mr. DURBIN. Senator, if I could, to start where the markets are for natural gas going forward. It's fairly clear. EIA has come with some very good projections on what they think the demand increase will be in these areas.

We think there may be some additional opportunities as an industry, but nonetheless, first is power generation. I don't think there's any question that we're going to continue to see natural gas grow in the power generation market.

Second is the industrial and manufacturing. Again, petrochemicals are going to be a huge part of that not only because of the dry gas itself but because of the natural gas liquids that we're producing and that's been increasing.

Third is in transportation. It's over the road, rail, and marine. I will tell you that even if we're wildly successful there it barely moves the needle as far as demand goes.

We're all for it. We're pushing for it. We want to see it happen everywhere we can, but that's not a huge demand draw.

Exports, of course, is last.

Senator CANTWELL. Okay, Mr. Cicio, on the price?

Mr. CICIO. My energy intensive consumers consume about 75 percent of all the natural gas of the entire manufacturing sector. Their operating costs range from about 20 percent energy to as much as 80 percent of the cost of making anything from plastics, chemicals to fertilizers, cement, steel, aluminum, plastic, glass.

There's two parts to the answer to that question. There's no specific price point.

First on the table is the fact that natural gas is subsidized and regulated in so many countries across the world that is kept at a low price. For example, China may buy—last year they bought LNG at $16, but they were providing that gas to their non-residential consumers, manufacturers, at $1.78. Alright?

So when we come to this issue, we are not looking short term. We're looking long term because the fact is there are uncertainties. In the domestic market in terms of what price point can producers produce gas? That can impact investments.

No one forecasted the price drop of crude oil. That was a surprise, and that's impacting investment in oil and gas going forward. That will impact the supply. No one forecasted it.

So we can't answer the question what is the price point, but what we do know is from 2000 to 2008 the price of natural gas increased by over 200 percent in the United States. That was over a 20 percent increase per year, and over that time frame we lost 44,000 manufacturing facilities.

Now those plant shut downs were not entirely because of energy, but they were a major part of the plant shutdowns.

Senator CANTWELL. Thank you. Mr. Smith, that's a pretty big question. Our time is over, but we can either get a short answer or a longer written answer. However, Madam Chair, do you want to proceed?

The CHAIRMAN. Very quickly.

Mr. SMITH. I can give a quick answer.

I think it's important to emphasize that when we look at each one of these applicants we are looking at each of these applicants on a case by case basis. Each of the orders is a long, detailed document that we've endeavored to write in good, clear, common sense English that has to address all of the points that are made by the interveners in each of the cases. So we get varied comments. Some strongly pro, some strongly against. And depending on the comments that we get, we have to address each of those comments and make our public interest determination based on a variety of factors. What we do subsequent to that would depend on the individual case. So there's not a rubber stamp. There's not a particular answer that comes out of a spreadsheet. It would depend on the case.

Senator CANTWELL. Thank you.

The CHAIRMAN. Thank you. I'm now going to turn to Senator Barrasso, followed by Senator Heinrich, going a little bit out of order with the early bird rule, as the sponsors of the bill for their questions and then we'll go to those who are next in line which would be Senator Stabenow after that. Senator Barrasso.

Senator BARRASSO. Thank you, Madam Chairman.

Mr. Smith, just following up. You correctly state the intent of S. 33 is to add greater regulatory assurance to the application, to the applicants for the LNG exports. And as you said, the Department does share the goal of transparency and certainty of process.

One of the areas that we disagree a bit is the Department is committed to act expeditiously, but I don't think we've gotten those results because the DOE has given final approval to only five LNG export applications. There are 33 export applications pending at DOE. A dozen have been pending for more than two years. An additional 13 have been pending for more than a year.

So could you explain a little bit this discrepancy that we're seeing here?

Mr. SMITH. Well, thank you, Senator. First of all, I concur that, as we understand the intent of the legislation, I think, there's some agreement.

In terms of how the process currently operates. The way the Department is operating is that there are two important things that a particular exporter needs in order to build a plant.

They need to have authorization from FERC that shows that they can build the plant in a way that's safe. So they have to be able to build the plant. They also need authorization from the Department of Energy to actually export the molecules. And those two together create a project.

Our process now says that we look at a particular applicant after it's completed that FERC process to demonstrate that they can actually build the plant safely. In that aspect we've moved very quickly. Essentially as soon as these projects have come out of the queue, out of the FERC process, we've moved very quickly. And in the case of one of the applicants we acted the next day, within 22 hours.

So I think we've demonstrated that our intent certainly is to move quickly, but we also have to act in a way that's judicious and write these orders in a way that withstands the scrutiny that they're sure to receive. There's a variety of views that we have to balance.

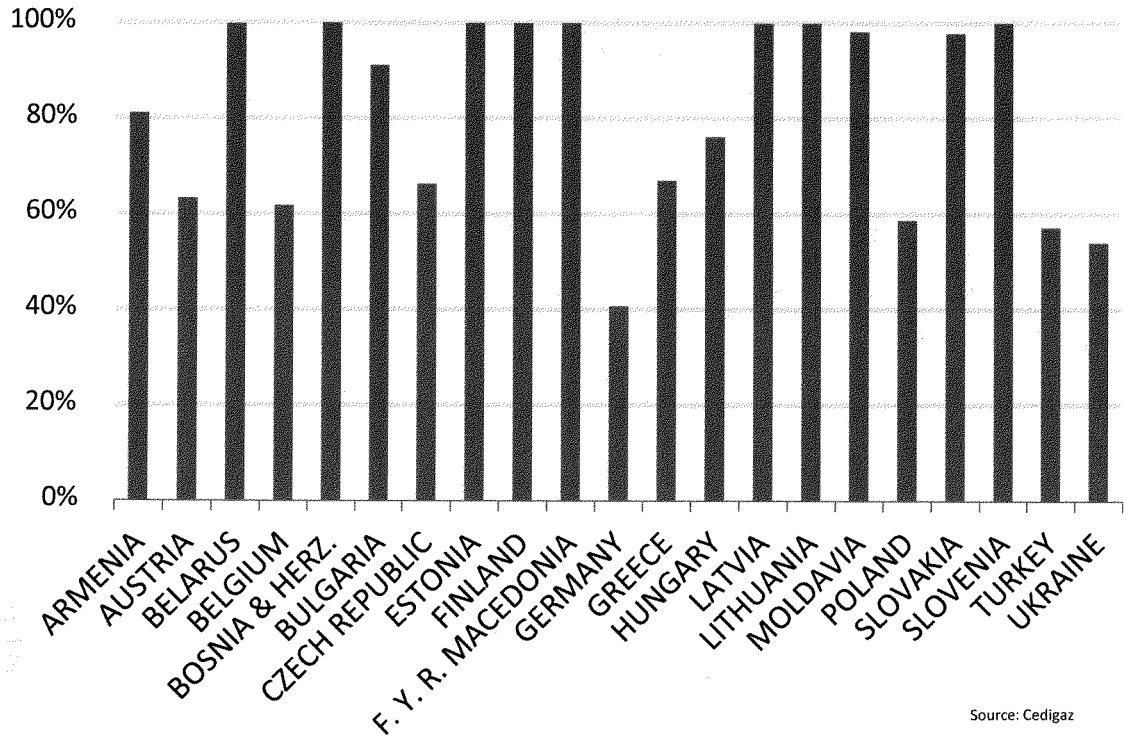
Senator BARRASSO. So is it fair to say that the Department of Energy would be able to comply with the deadline that's set in the bill?

Mr. SMITH. That's my view, yes.

Senator BARRASSO. Thank you very much. Mr. Koranyi, it's my understanding there are 21 countries now that import more than 40 percent of their natural gas from Russia. And we have a list of those.

[The information referred to follows:]

21 Countries Import More Than 40% of Their Natural Gas From Russia



Source: Cedigaz

Senator BARRASSO [continuing]. In your testimony you stated that the United States is in an excellent position to improve liquidity on the global LNG market thereby improving conditions for Central and Eastern European countries to access LNG and that an accelerated process, you go on to say, of LNG export licensing would put downward pressure on gas prices in Central and Eastern Europe well before even a single molecule of American gas might even reach Europe. So would you further explain how U.S. LNG exports can help European nations even if U.S. LNG is actually not shipped to Europe?

Mr. KORANYI. Thank you, Senator. That's an excellent question. It actually already has because the mere fact that the United States no longer imports in large quantities LNG from outside the U.S. actually put a downward pressure on European pressure already. One of the reasons why Gazprom had to renegotiate long term natural gas supply contracts in Europe and in Central and Eastern Europe as well is that these countries built up LNG terminals, reclassification terminals, and they have access to this global energy market. And because supplies from Qatar, supplies from Nigeria, from other places that were supposed to go to the United States ended up in Europe and put a downward pressure on prices. So this has already happened in the past couple of years.

Looking forward if there are additional quantities on the international gas markets, LNG markets, that will put a further downward pressure on these prices, especially if Central and Eastern Europe will manage to complete its regional market integration and integrate well into the rest of the EU. So there is a single, unified European energy market.

Senator BARRASSO. Thank you. Mr. Eisenberg, you stated that the overwhelming number of economists who have looked at this issue, including the Department of Energy itself, have all repeatedly concluded that LNG exports and a strong domestic manufacturing sector can co-exist. Could you expand on your comments for that?

Mr. EISENBERG. Thank you, Senator. That's a really excellent point. I've read most of the studies at this point. I'm not an economist, but I know a lot of very smart ones, and I've read most of them.

The list is pretty long. They've all basically come out to the same place which was NERA. IHS Global Insight, ICF International, Deloitte, NERA, again, Baker Institute at Rice University, Brookings, they all come to the same spot.

If I could read you something—NERA actually updated the study that it did for the EIA or for the DOE a couple years ago. The last page of the Executive Summary has the title, "U.S. Manufacturing Renaissance is unlikely to be harmed by LNG exports." They say, "Our analysis suggests that there is no support for the concern that LNG exports, even in the unlimited export case, will obstruct the chemicals or manufacturing renaissance in the United States."

At the end of the day we're also seeing this is in real life on the ground. Everybody is winning here.

Senator BARRASSO. Thank you. Thank you, Madam Chairman.

The CHAIRMAN. Senator Heinrich.

Senator HEINRICH. Thank you, Madam Chairman.

Mr. Durbin, you've heard the claim that U.S. liquid natural gas exports could result in the kind of inflated LNG prices that we've seen in Australia or that Australia has experienced. Could you talk a little bit about and explain to the panel why the Australia example is not directly analogous to the U.S. markets, particularly in light of the traumatic differences in market size?

Mr. DURBIN. Sure. I appreciate the question, Senator. I would say it would be like comparing apples and oranges, but I'm not even sure they're both fruits.

If you look at the size of the economy, our NGDP, we're more than ten times greater. Our production of natural gas is more than 11 times greater. The infrastructure that we have in the U.S. for being able to produce natural gas is just—there is no comparison which allows us to be able to produce the gas at a much lower cost.

I think the real important point here is that right now what Australia is experiencing is because they're exporting literally 50 percent. In fact, more than 50 percent of what they're producing, they're exporting. Even in, you know, the most—but in the EIA projections show that we'll be exporting only nine percent, between nine and ten percent of our production in 2040.

So I think there really is no comparison to make there and no threat that the United States would end up experiencing the same type.

Senator HEINRICH. My understanding is that our market is roughly about 40 times the size of Australia, and we're talking about much lower levels of overall exports, correct?

Mr. DURBIN. That's correct.

Senator HEINRICH. Yes. Mr. Smith, I want to turn to you real quick. If it were enacted, if this legislation is passed and signed, would you expect our bill to change the number of applications for exports to non-FTA countries that eventually would be approved or disapproved by DOE?

Mr. SMITH. Well, thank you for the question, Senator. I honestly think it would be impossible for me to determine, based on the language, if this is going to impact the number of final applicants. It would depend on the applicants, on the conditions at the time, et cetera. So I would demur from making any prediction or forecast because these are case by case evaluations that we make in a way that's very serious.

Senator HEINRICH. Right. As you know, our bill also requires DOE to publish the list of countries that receive shipments of liquid natural gas from the United States. Do you have a view as to whether or not that would be important information for the public to have access to?

Mr. SMITH. We think that more transparency is good. So we have endeavored to create a process that's open, that is transparent and that makes all this information available to potential interveners. So we think that is important.

Senator HEINRICH. Great. I'll have one last question for you, and then I will yield back the remainder of my time.

One of my interests is making sure that we continue to grow jobs while reordering our energy infrastructure to recognize the challenges that we have with carbon pollution and climate change. Natural gas has a unique place within those changes. We have limited

capacity right now to do electrical storage, for example, but natural gas allows us to see them together. Different sources of energy in more real time much more effectively than old fashioned coal generation just because of how fast you can ramp up and down the turbines.

Do you want to talk a little bit about your thoughts on how relatively low natural gas prices that we have experienced with current policies will affect the ability to deploy those other sources of clean, renewable energies, for example, solar and wind power?

Mr. SMITH. Well, thank you, Senator. So I'll focus on the natural gas portion. That's the technology program that I oversee.

One general comment that I'll make is that these are long term, important and decadal challenges. And so we don't manage our technology programs based on the short term fluctuation or the futures curve. I mean, we think these are important existential challenges, that development of the technologies that are going to drive the clean energy economy of the future.

All of these solutions, from wind to solar to natural gas to enhanced geothermal and nuclear, remain core and important parts of the Department of Energy's technology program.

That said, we have seen big fluctuations in natural gas prices that have come from a variety of sources, and that is something that we have to take into account. We look at the importance of price when we look at our public interest determination. They impact the price it can have on consumers, on manufacturers and a lot of the issues that you've heard here on the panel.

So that is something we're focused on. We think that it is very important. But over time as you look at our research and development program normally in the area that I manage which deals with fossil energy but throughout the Department of Energy we certainly have a commitment to making sure that we're pushing those technologies here in the United States that are going to be important for the clean energy country of the future.

Senator HEINRICH. Thank you, again.

The CHAIRMAN. Senator Capito and then Senator Stabenow.

Senator CAPITO. Thank you, Madam Chair, and I thank the Ranking Member, and I thank the witnesses for being here today.

I'm very pleased to be here and also to be a co-sponsor of Senator Barrasso's bill. Many people think that the shale boom is occurring in the Western states, like Senator Barrasso's home state of Wyoming. But that is not the case, as we know.

The Eastern United States and my home state of West Virginia have been blessed with vast shale gas reserves, and we are just discovering, really, how massive they are.

If I could illustrate the point for a few minutes let me share with you a few facts from the December 2014 Department of Energy report on oil and gas reserves in the United States.

In 2013 West Virginia surpassed Oklahoma to become the third largest shale gas reserve state. West Virginia also had the second largest discoveries of natural gas reserves behind only Pennsylvania. In fact, a full 70 percent of the 2013 increase in proven gas reserves is because of West Virginia and Pennsylvania and the Marcellus shale play.

We have more than enough gas to power both an industrial renaissance back home in West Virginia and to export liquefied natural gas. Supplying LNG to our friends and allies decreases their dependence on often hostile regimes in the Middle East and Russia, as we've heard from the testimony, and as a result will increase our own national security, not to mention a huge economic boon to certain areas of the country and certainly my state of West Virginia.

I'd like to start with a question for Mr. Smith. Just really briefly, as you know the Cove Point LNG facility in Maryland has received a finding of no significant impact on November 5, 2014. That was nearly three months ago. Can you give this Committee an idea of when the DOE expects to provide final approval of the Cove Point LNG application?

Mr. SMITH. Thank you for the question, Senator. So under our current process we move on these applications in the public determination once they've completed the FERC process. That includes all of the deliberations that FERC has to make including the final notice for rehearing in that process. So we watch these as they go through the FERC process. It's our expectation that that would probably be concluding, probably, in the February time frame.

And so, depending on FERC finishing that process, that would allow us to move forward with our final determination.

Senator CAPITO. Thank you. Thank you.

As we all know the estimates of what the actual reserves are is sort of a moving target. It starts slow. It started slower, and it seems to be expanding greatly.

I like the way Mr. Eisenberg framed it that everybody's winning, but I'm curious to know from you, Mr. Eisenberg and Mr. Durbin, as these estimates of the vast resource change, how do your projections on the economic impact they will have and job creation and manufacturing resurgence? How does that change in your estimates and how closely are you monitoring that as we look at what the vast reserves actually provide?

Mr. EISENBERG. Our policy, and frankly the will of the manufacturers that I speak for, is to have a stable, secure and consistent supply of natural gas and so because we use it not only for electricity but also as a feed stock.

Senator CAPITO. Right. Right.

Mr. EISENBERG. For the many things we do. That's a lot of what I do for a living. That's basically, you know, we need to keep an eye on policies that are coming out of Washington, the states and places like that to make sure that manufacturers can still continue to do what they do. And so, obviously, yes, the supply matters significantly.

We are now staring at a situation where EIA every single year tells us we have more and more and more.

Senator CAPITO. Right.

Mr. EISENBERG. And so we're very, very optimistic and continue to be optimistic.

Senator CAPITO. Okay. Mr. Durbin, do you have a response to that?

Mr. DURBIN. Yes, and I've got it in my written testimony, a chart that EIA puts in there for showing the difference in the projections

on reserves from 2009 through today and I mention that. And again, the point is it's dynamic.

Senator CAPITO. Right.

Mr. DURBIN. And what we're saying every year, it's increasing. But I think what's really important about this—even this morning EIA put out a new paper, a new report, or I should say a statement. I'm talking about the vast increases in ethane crackers and propane facilities.

Senator CAPITO. Right.

Mr. DURBIN. All driven by these natural gas liquids that are being produced with these greater reserves.

Senator CAPITO. Right. We're seeing that in West Virginia certainly. I should mention that the Brazilian chemical manufacturing company, Odebrecht Braskem, is looking to site a major cracker in West Virginia which will have major residual economic benefits to that region, and hopefully a resurgence of our chemical industry which has shrunk quite a bit over the last several years because of the usage of the natural gas as a feed stock.

You know, I understand, Mr. Smith, just quickly when you're looking at these wells, I think my time is up and I know we're under. As a good former House member I know that I should quit when the red light comes on, so thank you. [Laughter.]

Senator CAPITO. I'll learn. I'll learn to talk through it eventually I'm sure. [Laughter.]

The CHAIRMAN. We like that part of it, Senator Capito. You are more than welcome to this Committee. With that we'll turn to Senator Stabenow and I thank you.

Senator STABENOW. Well, thank you, Madam Chair. You know, this is a big deal here. We have this great new resource for us in America that's giving us an edge that we haven't had in a long time in other areas, and how we make this decision is really, really important.

I appreciate very much different states, different perspectives, but this is a big deal. And I want to first say to Mr. Smith, thank you for DOE not only taking seriously the need to move forward, but understanding that you need to update your study on economic impact for America and the fact that you are doing that. I don't know why we wouldn't wait for that to happen if we want to make sure we're doing this the right way.

So, but I'm going to thank the Secretary and thank you for doing that.

We know jobs are created when we build export facilities, right? But we also know, according to the Charles River Associates, using natural gas to increase American manufacturing output is twice as valuable to the overall economy as just jobs in general and creates eight times more jobs than exporting. So I don't know why we are not very concerned about what Mr. Cicio is saying here.

You're the end user, right? You're the guys that buy it. You're here, and you're buying it for industrial consumers.

We also have a whole lot of consumers concerned about heating oil and costs and so on. So the consumers, as you said, are taking all of the risks on this. I'd like you to expand a little bit more on this from the standpoint of leveraging this great resource. I get it from an oil and gas standpoint. You want to sell to the highest

user, price. I get that. China says we'll take it for $16 rather than American producers at $4 or $5, and I get that. But from an American standpoint, what I'm hearing, Mr. Cicio, when you're saying that, China buys it for $16 last year and then turns around and subsidizes it so their folks pay $1.78. So now they're paying $1.78 and you're paying $16.

How is that good for American jobs? I'm desperately concerned about manufacturing jobs and getting that eight times leverage here for America. I don't want a China first policy which I'm afraid this is. I want an American first policy.

So if you could speak to that, and then also on Australia. To me it's not the size of the country, it's how the government handled the issue which is exactly what this bill does. This is Australia-like in terms of the bill, and I am very concerned.

I appreciate differences, but I have to say, to me and history, folks are going to look back at this and decide what were we doing here in terms of Americans and American jobs?

Mr. CICIO. Well, thank you for that question. When we come to this issue we are not thinking short term about and particularly looking at the NYMEX and seeing three dollar prices out for the next several years. That is not the point. We are looking out long term.

And there's references to how much gas we have, okay? Now we look at ten years out. And when we look at the EIA technically recoverable resources, we have 58 year supply. We don't have 100 year supply.

So, in terms of jobs, you are correct. We can take that gas and create eight times more permanent jobs than if you export that gas. We recently looked at the permanent jobs created by the export terminals. Great. Any job is a good job, okay? Make no mistake. But construction jobs are short term. These terminals, the seven terminals first up, create 1,890 permanent jobs. When that gas goes offshore, it's gone. Okay?

All we're doing here is—let's emphasize that we need to be looking long term. Each approval puts new demand on the marketplace that will, every study says the same thing, increase the price of gas. And it will increase the price of electricity.

We cannot forget that there's two parts. We can understand that, as I said earlier, manufacturing is subsidized in these countries that we are competing with, the real world.

And so we have to be sensitive. It's not just the price that we're paying here in the United States that matters to manufacturers who compete around the world. So we need to come to this with great care.

Now for those of you who feel that we never have to worry about affordable supply of natural gas then you should be all for putting in place the full implementation of the Natural Gas Act that has these cautions, that ongoing review of these terminals. These applications monitoring and the DOE having a requirement to revisit that and be sure that it's not impacting the economy because if you feel we have so much gas then you know then that trigger will never happen. So you should be supportive and not afraid of fully implementing the Natural Gas Act.

The CHAIRMAN. Senator Portman.

Senator PORTMAN. Thank you, Madam Chair. I appreciate your having this hearing today, and thanks to the witnesses for giving us some great testimony. I represent Ohio which is a state that didn't used to be viewed as a great natural gas producer. Now we are, thanks to the Marcellus shale find and also Utica, most significantly, Utica right now.

We're also a great manufacturing state, and we're proud of that heritage.

I appreciate the fact that the National Association of Manufacturers is here supporting this bill. The Chamber of Commerce supports this bill. I support this bill. I'm a co-sponsor now, because I've looked at all the alternatives. I think this is the best balance.

To Senator Stabenow's point, DOE does have the ability to review these plans and approve or disapprove based on the impact to the American economy. And that's in this legislation. It's a balanced approach. And again, that's why so many manufacturers are supporting it.

Also I will tell you Ohio does a lot of manufacturing for facilities including LNG export facilities. I noticed in your testimony this morning you talked about Chart Industries, who testified in the Ways and Means Committee, an Ohio-based manufacturer that's involved in the LNG supply chain. It's going to help us with the manufacturing as well, but I do think it's important that we have a balance in the legislation.

I'm really interested in the legislation because of a broader interest that I have. I think this regulatory regime we have in this country is putting us behind in so many ways. Back in the good old days you could get a green light to produce something, make something, move forward with a project in the United States of America pretty quickly. Now we're ranked 41st in the world in the dealing with construction permit category by the World Bank.

We're getting worse. Other countries are getting better. Germany is something like number eight. South Korea is something like number 12. Capital is flowing to different places around the world and not coming here because of the time it takes to permit something.

Yesterday I introduced legislation with Senator McCaskill that we also introduced last year that's bipartisan, a balanced approach to how do you get at some of this permitting.

Senator King is a co-sponsor of that legislation. He's got an incredible background in this having been a governor, but also in the private sector dealing with permitting.

What I like about this legislation is it doesn't take away DOE's approval authority, but it does say you've got to do it within 45 days. So it's a certainty.

I appreciate what Mr. Smith said today about the fact that this legislation can be implemented by DOE. That it's enough time given the run up to that to be able to understand whether this is an appropriate project or not.

The legislation that we introduced will help more broadly. This legislation is specifically with regard to LNG exports, but I think it's part of a bigger effort we've got to undertake in this Congress and, by the way, consistent with the 2006 and 2012 transportation

bills. Our legislation pretty much mirrors that in terms of how the permitting and how the litigation reforms work and so on.

So, Mr. Eisenberg, let me ask you a question. Can you speak some more on the importance of the requirement in the bill that DOE does approve or deny these pending permits within the 45 days of a completed NEPA review? Again, Mr. Smith has indicated to you he could live with that. I assume you would agree that a deadline like this gives DOE ample time to review the application, but also is giving investors some certainty that this project is actually going to be completed. Is that correct?

Mr. EISENBERG. That's absolutely correct. Thank you. We poll our members very regularly. And I want to be clear about who we represent. We represent 14,000 members, and that is small manufacturers, medium sized manufacturers and large and energy intensive manufacturers that are also represented by Mr. Cicio's group.

On balance, we are for regulatory certainty for free trade. Regulatory certainty is actually the number one priority of our membership right now as we poll them quarterly. It came up the most. It was the most frequently cited answer.

There are two types of regulatory certainty. There's regulatory certainty on the front end making sure the regulations that are put in place that are new are reasonable, and there's regulatory certainty on the back end to make sure that when you apply for a permit you can get it.

Your legislation that you recently introduced, the legislation in the RAPID Act in the House, these mirror all sorts of other legislation and laws that are in place at the states at the federal level that would impose a deadline or shock clock or something like this that say you can please, please uphold the law but do it in a quick, expeditious fashion. That is the closest thing to what our policy at the NAM wants on this which is just a quick up or down decision on an export license.

Senator PORTMAN. Let me ask another question to you, Mr. Smith and anybody else who wants to chime in.

I think there is some misunderstanding. And again, I really appreciate the leadership Senator Barrasso and Senator Heinrich have brought to this. There is some misunderstanding that this is the only permit that's needed, but the LNG export application is not the only federal permit. What other federal permits are you aware of that projects like this are required to get? And is that in addition to any local or state permits that might also be required? Mr. Eisenberg or Mr. Durbin or anybody else?

Mr. EISENBERG. So sure. Like I said, you have to run a gauntlet to get these things. It takes about two years before you even prefile to scope out the site and all of these kinds of things. Then you have to go through NEPA which on average, I believe, takes about three and a half years by recent studies by the government. It can take longer. It can take less.

But you have all of that time that you have to then have basically, have every single agency check the box and make sure that everything is compliant with environmental laws, with economic interests. That is part of the NEPA process. You do examine the economic impact.

And then you get a final decision. So and once you get that——

Senator PORTMAN. By the way, are there other deadlines associated with those permits?

Mr. EISENBERG. On NEPA, absolutely not. There actually are none, and you can actually sue on it for it falls under the six year civil statute of limitations. So you can sue, basically, forever to delay these things internally. That's part of why the Senate is debating Keystone XL right now.

Senator PORTMAN. Okay, and with regard to state and federal permits? Mr. Durbin or Mr. Smith or others who want to chime in?

Mr. DURBIN. Absolutely. The Cove Point in Maryland, Dominion, is the perfect example where, in addition to everything they're doing at the federal level, there are many state permits they have to get as well.

Senator PORTMAN. My time is expired. I appreciate the indulgence, Madam Chair, and I appreciate your testimony today, gentlemen.

The CHAIRMAN. Thank you, and we turn to Senator Hirono.

Senator HIRONO. Thank you, Madam Chair. Senator Heinrich asked Mr. Smith a question regarding if we could create administrative or regulatory certainty in the time frame for approvals that wouldn't we expect more applications, and Mr. Smith didn't want to reply.

But I'd like to ask the other panelists whether you think, in very brief answers, please, whether you think there would be more applications if we create certainty as this bill does.

Mr. DURBIN. I don't believe the number of applications is going to be affected by the timeline. It's going to be affected by companies that believe they were going to be able to get the financing, be able to line up customers. Again, these are very long term, very expensive propositions.

So, I think those that are moving forward, knowing that there is some certainty at the end, after a very long, extensive and again, but a predictable process at FERC. By the way, during that entire FERC process DOE is one of the cooperating agencies, so they're a part of that effort as well.

Senator HIRONO. Just for clarification, it sounds as though the FERC process is a much longer process than what DOE has to do once FERC approves.

Mr. DURBIN. Indeed.

Senator HIRONO. Is that correct?

Mr. DURBIN. It is a longer process, but DOE is part of that process. And to DOE's credit during that—this entire time, not on a case by case basis, but they have been engaged in the studies that have been raised several times here with NERA to look at the broader national interest, the economic impact and those are ongoing.

So that's why our feeling is having gotten through the FERC process they've got the basic, you know, they've got the foundational items they need, at that point, to then in a very timely and specific way, make a determination.

Senator HIRONO. So I think the rest of you will agree that it's the FERC process that's really the big question mark, and you wouldn't expect additional or increased applications as a result of

this bill. I don't want to open a can of worms, but are you okay with the FERC process?

Mr. DURBIN. Again, I'll speak for ANGA. We believe that the end for the companies that we've worked with. As I've said, it's a long, expensive, comprehensive process—but it's a predictable process.

Senator HIRONO. Okay.

Mr. DURBIN. It's one they're familiar with and so there have not been big complaints about the FERC process.

Senator HIRONO. Thank you. Let's move on.

I do have one note of caution though about exporting natural gas, because it has to do with our ability to predict what is going to happen. After all about ten years ago we thought we would actually be importing natural gas, so it gives me pause.

Also a state like Hawaii, where we're looking to import liquid natural gas, I would love for the industry to help us figure out how we can do that and meet domestic needs in a cost reasonable way. But that's not for this hearing.

I understand that the extraction of gas does create a byproduct, the methane, and that there are methane leaks, and methane is an extremely potent greenhouse gas that contributes to climate change. So I would like to ask this of Mr. Durbin. Assuming that LNG exports increase and therefore there will be more extraction activity, are there efforts by gas producers to reduce methane gas emissions during the production process?

Mr. DURBIN. Thank you, Senator, and I'm glad you asked the question because the answer is an emphatic yes. Now let me tell you what's already happened.

If you just look at EPA's own data, so this is nothing from the industry, on methane emissions from natural gas producers. If you go from 2006 which was kind of a peak to the emissions we saw in 2012, okay? The reduction of methane just from natural gas producers was 39 and a half percent. Now the dates are important here. 2006 was before the shale gas revolution, so in those six years we've added thousands of wells. We've increased production by over 25 percent during that time. Yet methane emissions from natural gas production have been reduced by 39 and a half percent, and that's going to continue because it is in our interest to capture the methane. Methane is natural gas. That's what we're wanting to sell.

It's also just the continued improvements in efficiency and innovation in technology in the industry that have us today where the most productive natural gas well in the country, in Northern Pennsylvania, is producing 30 MCF a day. Ten years ago the most productive well in the United States produced only five. So the numbers are just for relative scale. We are producing a heck of a lot more gas and at the same time methane emissions are plummeting within our industry.

Senator HIRONO. So I take it that you would not be in favor of EPA of regulating methane emissions from this activity?

Mr. DURBIN. Well, to be clear, it is regulated by EPA under current NSPS through volatile organic compound. So—the current regulations, you know, we're having all these reductions under current regulations. I would argue that EPA does not need another new regulation.

Senator HIRONO. Thank you. I think my time is up.

The CHAIRMAN. Thank you, and we are now going to turn to Senator Gardner. I will be excusing myself from the Committee right now. We're going to start votes here very shortly, and Senator Cantwell will be here for a period of time.

We want to make sure that we get through all members and have an opportunity before the panel, so it's going to be a little bit choppy from here on out. I apologize that I won't be able to hear your further comments, but please know how much I appreciate what you have provided the Committee today. This is a very important issue. I think we recognize that. And again, I appreciate the level of cooperation that we have had. I think we have a compromise bill that will be helpful to the country.

With that, I will turn to Senator Gardner, and he will be followed by Senator Franken.

Senator GARDNER. Thank you, Madam Chair, and thank you also, Ranking Member Cantwell, for the hearing today. Thanks to our witnesses for your time.

Over when I was in the House of Representatives we introduced H.R. 6, the Domestic Prosperity and Global Freedom Act, that we passed with overwhelming bipartisan support. One of the things that made that bill so successful was many of the statements made today by the witnesses including conversations that we had with people like Dr. Orbán from Hungary and others who recognize the national security implications of a strong and vigorous opportunity for the United States to share in our energy security with our partners around the globe.

So today we are talking about Senate bill 33, a very short, straight forward piece of legislation, granting approval for LNG export applications already pending or languishing, depending on how you look at it, at the Department of Energy. It's not too often that we share in these kinds of opportunities where you have a bipartisan bill that will create jobs, create energy security, and add to our national security, all at the same time. Something that I wish we could do more of.

I do believe this has the opportunity to create a number of American jobs across this country including in Colorado, my home state, one of the nation's leading producers of both oil and natural gas and renewable energy as well.

Mr. Smith, a question for you just to start with.

Dr. Paula Gant with the Department of Energy testified last Congress, the 113th Congress, that the Department of Energy is keenly interested and invested in the energy security of our allies and trading partners. Do you think American LNG exports add to the energy security of our allies?

Mr. SMITH. Well, thank you for the question, Senator. So we look at a variety of factors including international aspects. I would say that currently the fact that we are importing less LNG than we had expected is already impacting global markets and that's benefitting our allies and trading partners. The fact that U.S. producers are potentially out negotiating contracts in advance of any terminal being built has an impact on global markets. So we think that all those things are positive, and those are things that we explicitly care about and note in our applications.

Senator GARDNER. Okay. Reading between the lines it is clear that you believe the Department of Energy believes that exporting LNG adds to the energy security of our allies?

Mr. SMITH. We believe it has an impact, yes.

Senator GARDNER. Mr. Koranyi, you believe in the same position, correct?

Mr. KORANYI. Absolutely, and that actually goes back also to Senator Barrasso's question as far as the future is concerned. So we have this past benefit of diverting energy supplies that were supposed to come to the United States.

Also looking into the future, if you look what the traditional wisdom says that because Asian gas prices are higher most of the supplies will go to Asia. I'm not really sure about that.

If you look at Cheniere's contracts, a bulk of those actually are going to European countries, European natural gas suppliers. They will provide gas to Spain, and they will provide gas to the UK.

Asian gas prices, since last February, came down by 47 percent. So the gap between European and Asian prices is not that big. If there is another cutoff from Russia through Ukraine, then that very quickly could send up European natural gas prices. So to sum up, yes.

Senator GARDNER. Mr. Smith, again, you, in response to the question by Senator Barrasso you had mentioned that, or I believe maybe it was the Chairman, you had said that the 45 day timeframe in S. 33 was workable. Is that correct?

Mr. SMITH. That's our view. We could comply with the law.

Senator GARDNER. Do you have the same view about Representative Johnson's bill in the House that moved through the House yesterday? I think it's a 30 day timeframe.

Mr. SMITH. I haven't compared the details, but overall I can say that the 45 day limit in this bill is something that we could comply with.

Senator GARDNER. Okay. Mr. Durbin, Dr. Daniel Yergin testified in front of Congress that the United States is demand constrained, not supply constrained. This was testimony last Congress, again, when it comes to natural gas. In Colorado on the Western Slope the Piceance Basin has been suffering due in part to the overabundance of natural gas supplies. Would you agree with Dr. Yergin that the U.S. is demand constrained and not supply constrained?

Mr. DURBIN. Absolutely, and if anything it's a matter of infrastructure that we need to be focusing on that.

Senator GARDNER. If we are demand constrained, as you said that we are, does that lend itself to having too much supply and therefore drive down investment in new production?

Mr. DURBIN. Absolutely.

Senator GARDNER. And is that something S. 33 could achieve, as well as giving our production investment opportunities a chance to once again flourish and make new investment?

Mr. DURBIN. Yes, by making clear that we have a new, robust demand outlet here. It will provide consistency. It will provide the incentive and the motivation for the industry to continue the production not only in the gas for exports, but for the natural gas liquids and everything else is going to drive the manufacturing here in the United States.

Senator GARDNER. Well, I too want to keep in line with the spirit of Senator Capito and the House coming over here, when the red light comes on. Once again I want to express how important this legislation is when it comes to national security. I know last Congress there was significant debate amongst people whose states have put moratoriums in place on practices like hydraulic fracturing, who voted for the LNG export bill knowing full well that our potential to export LNG is only available because of our opportunities to utilize techniques like hydraulic fracturing. They understand and recognize the importance of an abundant supply of energy that we can share with our allies and what it means for national security. I hope that that continues to be a part of this very important debate.

Senator BARRASSO [presiding]. Thank you, Senator Gardner. Senator Franken.

Senator FRANKEN. Well, I'll pick up from Senator Gardner there. We're able to do this because of hydraulic fracturing, and I want everyone here to understand who developed that technology and who is responsible for that. It's the taxpayers of the United States.

Mr. Durbin talked about how in 2009 projections of the supply of natural gas going out were so low that the prices were going to be very, very high and mentions that now they're much lower than the projections.

We're hearing Senators talk about discoveries of reserves of natural gas in their state as if this is just a discovery that happened out of nowhere.

This is because of the taxpayers doing investments in research, into three dimensional, micro-seismic imaging done in Sandia National labs. Please listen to this because I say this over and over again in this Committee. This whole renaissance in natural gas is due to research done by the Department of Energy, paid for by the United States taxpayers and projects done with the oil and gas industry in horizontal drilling.

Understand this didn't come out of nowhere, and let's have some historical context here. Who paid for this? Who is responsible for this unbelievable renaissance? The American taxpayer, and that includes the Minnesota taxpayer.

Now, do you know how much natural gas we produce in Minnesota, just as an estimate? Mr. Durbin.

Mr. DURBIN. I am not aware of natural gas production in Minnesota, Senator.

Senator FRANKEN. Zero. This does us no good whatsoever. This does Minnesota no good whatsoever.

The EIA just says this is going to increase the price of natural gas. This is going to increase the price of electricity to every Minnesotan, of heat to every Minnesotan, the cost of operations to every Minnesota manufacturer. This does my state no good whatsoever.

Now I would appreciate it if those from the other states who will benefit—the benefits of this, the jobs, the GDP growth and the jobs will be very concentrated by sector and region.

Mr. Durbin, you represent the natural gas producers. I would venture to say that your sector will benefit from it the most. Don't you think?

Mr. DURBIN. We certainly are benefitting from it, Senator, but I would argue with your contention and say that the entire nation has been benefitting from this. If we didn't have this natural gas revolution——

Senator FRANKEN. The nation has been?

Mr. DURBIN. If you didn't have the production, the prices where they are, you wouldn't have manufacturers in Minnesota that would be able to take advantage of it.

Senator FRANKEN. So you should be thanking the taxpayers of Minnesota.

Mr. DURBIN. I don't think——

Senator FRANKEN. Don't reward them by raising——

Mr. DURBIN. I don't take question with either your contention of DOE's role in helping us get to this point.

Senator FRANKEN. Okay. I only have a little bit of time, sir. The point is there's no benefit at all for the people of Minnesota in sending this abroad. This is what will happen is this will benefit—the steel workers are against this.

At Minntac in Minnesota they mine iron ore and make pellets called taconite. They heat those pellets up to 25 hundred degrees Fahrenheit with natural gas. This is going to drive up the cost of natural gas.

This is going to hurt Minnesota. This is why the steel workers are against it, the United Steel Workers. Manufacturing creates eight times as much jobs. Yeah, if you export a natural resource the people who produce that natural resource benefit, but it doesn't do anything like the kind of—create the kind of jobs that we, in Minnesota, have created because of this technology that we, taxpayers in Minnesota, helped to promote.

So I just want this perspective. And going forward, I know my time is up, but I've been here a little longer than Senator Capito.

So I just want, going forward, for members when they talk about this natural gas renaissance to understand where this came from. Aside from this subject on natural gas when we're talking about renewable energy, when we're talking about all energy, let's understand the role that research, basic research and applied research, have played in our nation in making sure that we are energy independent.

Thank you.

Senator BARRASSO. Thank you, Senator Franken. Turning to Senator Cassidy let me just remind the Committee and point out that the Committee heard concerns about natural gas prices two years ago.

Prices have fallen since then, and the Obama Administration has issued three separate studies showing that natural gas prices will remain low with LNG exports. The Administration's most recent study shows that prices will remain low even if the Department of Energy approves four times the amount of LNG exports that's already approved, so at least four additional studies have confirmed the Administration's findings.

Senator Cassidy.

Senator CASSIDY. Yeah, to speak of the pervasiveness of the benefits of fracking. I have an article right here where Minnesota actually produces much of the frack sand. So the price of fracking sand

has increased much to the benefit of Minnesotans and Wisconsins. The benefit of this was George Mitchell taking the DOE research, but actually commercializing this. He even goes to Minnesota which is really good.

I have a couple questions though. One related to that, one to another.

In Haynesville this is about jobs. Let me tell you there are families struggling because they don't have jobs. We know there's going to be a downturn in employment in the oil patch because of the falling oil prices.

I'm interested if we can increase the jobs in natural gas production because of an exportation. Haynesville shale is in North Louisiana, and that play has decreased production because it's dry gas. That's not what the people want to make petrochemical products.

Mr. Durbin or Mr. Smith, do you all have an idea of how many jobs will be created if we could unshutter those closed down wells in places like the Haynesville and begin to ship that dry gas to markets that actually want dry gas? Mr. Durbin, any idea of how many jobs would be created by that?

Mr. DURBIN. Well, I don't have the specifics to that, but I know there have been several studies. In fact, NAM had one done with PricewaterhouseCoopers that show with expanding natural gas development we could create a million jobs in the manufacturing sector across the country. So there's no question that by providing for these exports you have now a much more certain demand outlet for this product, and we're very fortunate here in the U.S. that natural gas prices and oil prices are largely decoupled.

Senator CASSIDY. So if we increase that production, by the way, we'll also be decreasing the demand for steel pipe which is produced in places like Minnesota, Ohio, et cetera, correct, fair statement?

Mr. DURBIN. We'd be increasing demand, yes.

Senator CASSIDY. Absolutely. Mr. Smith, it seems this has been a great hearing, but I have a perception, it may be false, but there's a certain kind of languidness about the approval of some of these permits. Now that may be a perception. I, myself, I'm happily married which means I speak of my perceptions, not of what I know, okay?

So that said, when I look at the FERC and DOE processes FERC says I understand under DOE there's a statement that they want to look at the life cycle, the increase in life cycle methane emissions if exportation requires increased production of gas. FERC says in their approval process they cannot ascertain that, therefore they do not consider it.

The fact that DOE would consider something which FERC says is an imponderable to me makes me wonder if they're just, before I throw all the bells, that they're almost inviting litigations by those who wish to retard this process. So why would DOE consider something which FERC considers an imponderable?

Mr. SMITH. Well, thank you for the question, Senator. For aside, I certainly challenge the characterization of "languid" as a process. The most recent authorization that we issued, we literally issued one day after the FERC process was completed.

Senator CASSIDY. As I would say to my wife, I apologize. [Laughter.]

Mr. SMITH. Duly noted. Thank you, Senator. So in terms of the FERC process and DOE/FERC process, I think it's important to consider the fact that we are looking at two very different considerations, two very different decisions.

The job of FERC is to determine if the plant itself can be both safely built and the print of that plant itself is consistent with the values of safety and environmental sustainability. So that's what FERC looks at. Can the applicant build that terminal on that footprint?

Senator CASSIDY. Don't you also consider the life cycle, if there would be an increase in the life cycle release of methane or greenhouse gases relative to increased production?

Mr. SMITH. So that is what the Department of Energy looks at, and the Department of Energy is looking at giving the applicant the ability to actually export the molecule.

Senator CASSIDY. Correct.

Mr. SMITH. We have to look at all the things that would be impacted, all the things will be part of a public interest determination of giving the applicant that ability to export that molecule. And that includes a lot of things that are surrounding——

Senator CASSIDY. But particular consideration is going to be full of assumptions. For example, Mr. Durbin has pointed out since 2006 there's been a dramatic decline in emissions. So you have to predict what in 2022 will be the rate of emissions.

Mr. SMITH. Right.

Senator CASSIDY. You also have to guess the market. You also have to guess the transportation of its life cycle and how much is through pipeline and how much is through whatever.

So it seems, again, an imponderable. But the fact that it's a variable with lots of variables makes me wonder why is it in there?

Mr. SMITH. Well, Senator, you're actually very nicely framing the challenge of this incredibly important public interest determination. These are decadal investments. The decisions that companies make now in terms of spending billions of dollars to build plants are going to have an impact on our economy, on our environment, on job creation, on a lot of things we care about for a very long period of time. In its very nature a lot of that does involve a lot of diverse views.

I hear from Mr. Cicio's members. I hear from Mr. Durbin's members. And they have different views.

Senator CASSIDY. But that——

Mr. SMITH. But we do have to consider a lot of different——

Senator CASSIDY. But really we don't know which of those is correct. So if we have a variable in which we cannot possibly know with any kind of the r square, the statistical analysis of the correlation is going to be huge.

Mr. SMITH. Right.

Senator CASSIDY. And so therefore you are picking a number which is subject to political considerations. Do we want to approve this or not? I think that would be the fear. And we can prove one which has a big number of methane release or one that says no,

this is the glide path. We think it will come to down to your lower number.

Mr. SMITH. Well, Senator, our job is to make good public interest determination. And one thing that I'd point everybody to is when we issue an order it's not a sticky we put up on the wall that says yes or no. We actually issue a very complex document that has to take into consideration all of the arguments that have been made by all of the different stakeholders that intervene in this process.

They include Mr. Cicio's members. They include Mr. Durbin's members. They include all of the diverse ideas that we've heard here in this very hearing.

Our goal is to write an order that's clear, that's consistent with the letter and spirit of the law and that's going to withstand the scrutiny that it's sure to receive.

Our goal at the end of the day is that should we approve a particular applicant that they can look at that order and that applicant has the confidence and go and spend the multiple billions of dollars that it takes to build that terminal because they can see that we've had a thorough process that's consistent with the letter and spirit of the law.

It does require us to think about assumptions, but make those assumptions clear and explicit in a way that withstands scrutiny.

Senator CASSIDY. Well, I'm out of time, way over. I yield back. Thank you.

Senator BARRASSO. Senator King.

Senator KING. Thank you, Senator. First I want to say I'm good with regulatory reform. I like bills that generally lay out clear regulatory guidelines and time. I'm also good with natural gas.

So good with it, in fact, that I don't want to blow an advantage that this country has. I have been to factories, gentlemen, and looked in the eyes of people who have lost their jobs to Asia, to other parts of the world, to Mexico. And they looked at me and said, how did you let them ship my jobs away?

We have no advantage on wages. We have no advantage on labor protections. We have no advantage on environmental protection. We have today an advantage on energy costs. I cannot understand this discussion that will inevitably lead to higher energy costs.

Mr. Eisenberg, I can't understand an organization called the National Association of Manufacturers supporting this program. This bill, maybe. I understand because this is really a regulatory bill. But the larger issue is what really concerns me. Right now if you export, if we export to China, add in the cost of transportation, the cost of liquefication, un-liquefication, you're talking $10 dollars. China is paying $12 or $13, so we're giving them a 30 percent cut in their energy cost. I just don't get it.

Now Mr. Durbin, you testified that you thought projected out 10 years, 20 years, 30 years, I think you said 2040, nine percent would be all we'd be talking about. Would you accept a friendly amendment to this bill that the limit that the presumption of the public interest would be reversed if the export was more than nine percent of domestic production?

I believe you when you say it, but I subscribe to President Reagan's admonition, "Trust, but verify." I trust the industry when they said, oh, we only want us to do just a little bit. It's not going

to really affect the price that much. And there's endless supply. And it's all going to happen.

Okay, fine. Let's put it in writing. Ten percent I'll go with. Nine percent is what you said. So maybe that's where we ought to start the negotiation.

I think this moment will be looked back at, at a time when Americans say what were you thinking when we have, what I call, America's second chance at manufacturing, but we're going to give it away. Mr. Durbin.

Mr. DURBIN. Sure.

Senator KING. There's a question in there somewhere.

Mr. DURBIN. Yeah, and I'm happy to answer it. I think the problem is we're posing a question as an either/or that we can only have this abundance of natural gas domestically for our manufacturing or we can export it. We have both. We can do both. The issues that certainly manufacturers in New England need to be concerned about is pipeline constraints, getting those pipelines. And I——

Senator KING. Oh, that's a separate issue.

Mr. DURBIN. I know you're a very strong supporter of that, and I appreciate that.

Senator KING. Our natural gas prices were the highest in the world last winter, the world.

Mr. DURBIN. Exactly. So I mean——

Senator KING. That's a pipeline problem.

Mr. DURBIN. But if you look at the estimates, not industry estimates, but the government estimates about how much production is going to increase, what demand is going to—how demand is going to increase, going out to 2040. We are going to be outstripping consumption and demand here all along.

Senator KING. That's fine. All I'm saying is put it in writing.

Mr. DURBIN. But I think the other aspect of——

Senator KING. Accept a cap on the export so that we don't end up with Australia. We're producing 75 BCF a day. In the queue is 38 BCF a day for export. That's more than half, and that's what you said was the problem. You said, oh that will never happen, that's Australia.

But that's what worries me. If there's no limit here and there's no definition of the public interest in the statute that these guys are administering, I'm just saying let's define it.

Mr. DURBIN. I'd say the limit is being provided by the global markets. We're not going to be exporting ten, 15, 20, whatever, or the——

Senator KING. Why not if they're going to pay 12 or 15 over there, why wouldn't we?

Mr. DURBIN. Because the markets—if we're going to be exporting that much it's going to be because gas prices here are so low and we have enough to provide it to those markets that they're willing to pay.

I mean, you can see the global market dynamics right now are going to influence the number of facilities that are going to be built, and that's always been the case.

Senator KING. Mr. Cicio, what do you think?

Mr. CICIO. Look at Australia, alright? So, okay, the scale is different. I agree with what was said earlier, but the government did not provide the necessary safety nets. The resources that they have in Australia were contracted out under long term contract to ship LNG offshore to customers at higher prices.

Senator KING. And once you do that you're locked in.

Mr. CICIO. Those are—yeah. And so the reserves were not available for the Australian consumer anymore, and that's why prices went up and the Australian consumer now is being asked to pay an equivalent net back price to that LNG price that they would sell to Japan or South Korea or China. And so, again, think long term here.

Senator KING. That's——

Mr. CICIO. Again if there's lots of resources everybody should support putting the necessary full implementation of the Natural Gas Act in the safety net for the consumer.

Senator KING. Well, thinking long term it seems to me a simple solution is to cap the amount of exports as a percentage of domestic production. Then you can say, okay, there will be some effect on gas prices, but it isn't going to be catastrophic like it was in Australia.

There's one law Congress can't repeal, the law of supply and demand, and if you increase demand Economics 101 says the price is going to go up. So you can't deny that the price is going to go up. That's the whole point.

But the question is how far is it going to go up? I realize you've got to have a price that's sufficient to call forth the production and open the wells and all those kinds of things. I don't know exactly where that number is, but if we take an action here in this Congress to just open the door and end up with an Australia situation, shame on us, in my opinion.

Thank you, Mr. Chair.

Senator BARRASSO. Well, thank you very much, Senator King. And before turning to Senator Daines, I want to, without objection, put into the record an article from the Boston Globe by Jay Fitzgerald, December 5th, 2014 outlining the concern with natural gas in New England last year related to inadequate pipeline capacity to get the gas to where it needed to go.

Senator KING. Absolutely. I'm fully in agreement with that, on that problem. Thank you.

Senator BARRASSO. Thank you.

[The information referred to follows:]

Boston Globe

In face of opposition, company to reroute gas pipeline

By Jay Fitzgerald GLOBE CORRESPONDENT

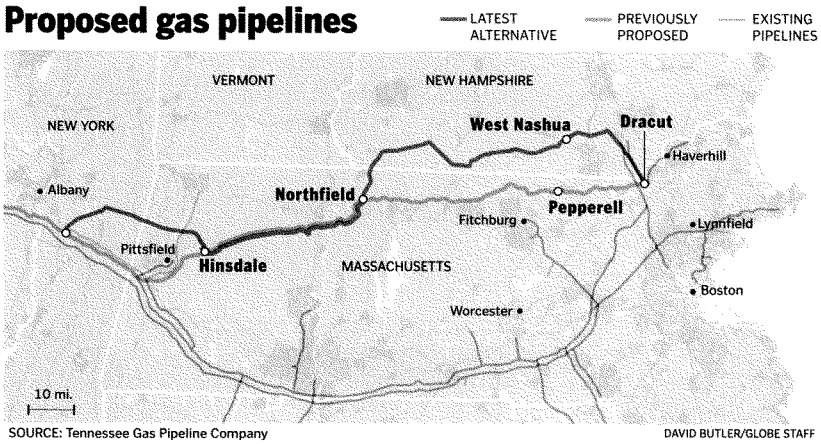
DECEMBER 05, 2014

Stung by intense local opposition to a proposed natural gas pipeline winding through western and central Massachusetts, a Houston energy company said Friday that it will pursue an alternative route that bypasses many Massachusetts communities by veering north and shooting across southern New Hampshire.

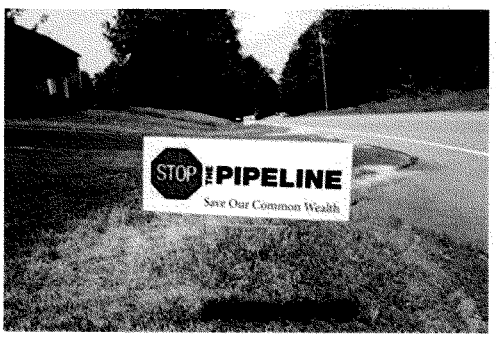
Kinder Morgan Inc. said much of the alternative path would follow existing rights-of-way along utility lines in the two states, meaning it would cross fewer residential properties and undeveloped lands. Kinder Morgan plans to file the new route on Monday with the Federal Energy Regulatory Commission, which has final say on gas pipelines in New England.

Kinder Morgan officials said that 14 Massachusetts towns along the northern tier of the state, from Dracut to Northfield will no longer be in the pipeline's path. But the pipeline would cross four new Massachusetts towns: Cheshire, Hancock, Lanesborough, and Shelburne, and a southern stretch of New Hampshire.

To meet the region's growing demand for natural gas, Kinder Morgan previously sought to build a 127-mile pipeline stretching from Richmond near the New York border across Massachusetts' northern spine to a transmission hub in Dracut, about 30 miles from Boston. Kinder Morgan's original multibillion-dollar plan aimed to tap abundant, inexpensive natural gas from Eastern shale fields to help ease a shortage here blamed on inadequate pipeline capacity.



That shortage has led to skyrocketing electric rates this winter in Massachusetts since most power plants use natural gas to generate electricity. The company hopes to have the pipeline operating by late 2018.



- **Protests grow over proposal**

  Kinder Morgan's first pipeline proposal met widespread opposition from residents, environmentalists, and politicians who argued the pipeline would needlessly rip up

private yards, parks, forests, and other properties along its path through about 45 communities. But if Kinder Morgan's goal is to lessen opposition by proposing a new route, it may have miscalculated.

Diane Hewitt, a member of the Stop the Pipeline Coordinating Committee in Groton, said she and other critics will still oppose Kinder Morgan's plans, even though the proposed pipeline would no longer go through Groton. She added that her group is already in contact with New Hemisphere residents, where a meeting to fight the pipeline is planned for later this month.

"It doesn't change people's minds," said Hewitt. "It still begs the question whether the pipeline is even needed."

Kinder Morgan's alternative would still entail 64 miles of new pipeline in Massachusetts, starting along the New York border in Hancock, then snaking its way through Hinsdale and northwest to Northfield.

The alternative pipeline would then head into southern New Hampshire, running east along existing electric and natural gas corridors, before dipping back into Massachusetts near Dracut, according to Kinder Morgan. The New Hampshire section of the main pipeline would stretch 70 miles through 17 communities, the company said.

In Massachusetts, the main alternative pipeline would be entirely on or adjacent to transmission lines owned by Northeast Utilities. A spokesman for Northeast Utilities, the parent of Boston's NStar and Western Massachusetts Electric, said Kinder Morgan officials have contacted the utility about its plan, but Northeast has not seen details.

"We haven't authorized the use of our rights-of-way, nor have we taken a position on their proposal," said Mike Durand, the spokesman.

Allen Fore, a spokesman for Kinder Morgan, expressed confidence that the company can work out a deal with Northeast Utilities. He also acknowledged that fierce local opposition drove Kinder Morgan's decision to go with an alternative plan.

"We have heard and we have listened," said Fore. Ideally, he said, Kinder Morgan would like to start construction on the pipeline in 2017.

Doug Whitbeck, a resident of Mason, N.H., said he opposed the first Kinder Morgan plan because it was so close to New Hampshire and thought it was a bad idea for the entire region. Whitbeck, a retired technical writer, is helping to organize a Dec. 13 informational meeting in Mason about Kinder Morgan's latest plan.

Whitbeck said the reasons for opposing the pipeline in "live free or die" New Hampshire may be different than in more liberal Massachusetts, but opposition could be just as strong.

"There's a lot of people up here who may not be as concerned about climate change, but they do very much care about property rights," said Whitbeck.

Kinder Morgan has not ruled out isolated cases of eminent domain property takings, although Fore stressed that 90 percent of the main pipeline through New Hampshire would be on or near transmission-line rights-of-way owned by utilities.

William Hinkle, a spokesman for New Hampshire Governor Maggie Hassan, said in a statement that rising energy costs are a major concern and Hassan is exploring ways to bring more natural gas into the state. But she has not embraced Kinder Morgan's plan.

"Governor Hassan will continue to urge the company to listen to communities, take steps to reduce impacts, and ensure local benefits," said Hinkle.

In Massachusetts, Governor-elect Charlie Baker came out against the Kinder Morgan's original proposal during his campaign, saying that its impact on communities was too great and he favored increasing capacity on existing pipelines. This week, a spokesman said Baker will review the new Kinder Morgan plan after he takes office in January.

Senator DAINES. Thank you, Mr. Chairman. I remember back in the 70s I was going to high school and in the early 80s when I was going to college studying chemical engineering and hearing the concerns about someday we're going to run out of oil and what that might mean to the United States and mean to the world. Here we sit today as we've shifted from what used to be a scarcity mentality, certainly, on oil and natural gas. Now we're in an abundance mentality.

The Bakken formation bleeds into Montana. We are seeing firsthand what's going on with hydraulic fracturing, with oil production, with natural gas production, and I can tell you we would like to produce more natural gas in Montana. Our natural gas production has declined for lack of demand, and this intersection of the demand and also the transmission issues and the pipeline issues that the Senator from Maine was painfully aware of last winter. I believe as we move to an abundance mentality, as we gain more production which increases the supply chain and pipelines ultimately the person who wins is the American consumer.

As we've seen what's happened with oil where with the drop in oil prices we're going to go from $3100 per average household expense of oil to $1900. That's $1200 a year for the average American household as a result of what's happened here in America and the shale play.

The geopolitical implications are significant. I saw Senator Barrasso's chart. I was struck by the dependency of the European nations on Russia for natural gas.

I remember when I was serving back in the House in the last term getting letters from leaders from the European nations who were looking to America for energy leadership. How can we now start supplying natural gas to Europe instead of the dependence upon the Putin regime? So I'm very excited about where this might lead to.

In terms of global competitiveness I was a manufacturing guy for years. I had a day job in the private sector for 20 years before I came up here. I looked at operations in China. I managed an operation to Asia/Pacific.

What these mean? Low energy and low natural gas prices and the ability to export is great for global competitiveness to bring these manufacturing jobs back to America. We can't underestimate, I think, the national security implications as well. This is a very exciting discussion. It's been a great hearing for me.

But I was struck, Mr. Eisenberg. You made a comment, and I guess let's bring it back to the scope. I've been up here at 40 thousand feet. Why are we here in this hearing today? Because we're looking at the permitting process. That's the scope of this legislation. How do we create more certainty in this uncertain process about permitting? Mr. Eisenberg, I believe you said that regulatory uncertainty, was it the number one issue?

Mr. EISENBERG. Currently it is the most cited issue that our members would like to see Washington fix right now.

Senator DAINES. Number one issue of your manufacturers?

Mr. EISENBERG. Yes.

Senator DAINES. So I guess with my engineering background I look at what problem are we trying to solve here today. I know

we've been circling the globe on a lot of things in this hearing, but we're looking at regulatory uncertainty, the number one issue for manufacturers in jobs here in this country.

Mr. EISENBERG. That's correct, and I would take it one step higher. We're talking about free trade also, right? I mean, this is the intersection of two sets of policies. This is energy policy, and this is trade policy.

And to Senator King's last point, the reason the NAM came out the way we did on this and we are not for or against anything. We were founded 120 years ago, so the manufacturers could find markets to export to. We believe that you're either for free trade or you're not, and we are.

Imposing some sort of delay or cap or something like that would stand in the way of exporting just about anything whether it's a Honda Civic or a Bic razor blade or energy, and that is why we've come out the way we have on this issue which is at the end of the day on balance free trade wins.

Senator DAINES. Well, I think we will have further debates about the merits of increasing exports in natural gas or not, but this legislation is about creating a regulatory certainty in an uncertain environment. I think we want to keep the conversation focused there because that's what we're going to be voting on, on uncertainty and the regulatory process.

Mr. Eisenberg, could you expand, perhaps, on the resources that are spent on the exporting permitting process including NEPA and how important certainty is for both energy security and the American taxpayer?

Mr. EISENBERG. So this is, obviously, not an inexpensive process. No manufacturer would take on this without knowing it's going to cost you quite a bit both in terms of the upfront costs to actually do the environmental studies and all of the research and all the background, but also the cost of delay, right? I mean, at the end of the day time is money and the longer it takes—the more you are spending to not do this.

So obviously as you said, permitting certainty is what we're looking for. We're just looking to make sure that the rules of the road are there. That if we comply with them, we get an up or down answer so that we can control those costs and we can expect those costs and we know, going in, that there is an end of the road to this problem.

Senator DAINES. Alright. And Mr. Chairman, I too was taught in the House you don't run red lights, so I guess my time is up.

Senator BARRASSO. Well, I appreciate that, Senator Daines, because in terms of certainty I am certain that the voting has started on the Floor of the Senate. And I am certain it is on the Daines amendment. It's being voted on right now, and I'm certain that there are certain people on this panel that don't want to miss that vote.

Thank you very much. I appreciate all of the witnesses for being here today. This hearing is adjourned.

[The bill follows:]

114TH CONGRESS
1ST SESSION

S. 33

To provide certainty with respect to the timing of Department of Energy decisions to approve or deny applications to export natural gas, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JANUARY 6, 2015

Mr. BARRASSO (for himself, Mr. HEINRICH, Mr. GARDNER, Ms. HEITKAMP, Mr. HOEVEN, Mr. KAINE, Mrs. CAPITO, and Mr. BENNET) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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A BILL

To provide certainty with respect to the timing of Department of Energy decisions to approve or deny applications to export natural gas, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "LNG Permitting Certainty and Transparency Act".

SEC. 2. ACTION ON APPLICATIONS.

(a) DECISION DEADLINE.—For proposals that must also obtain authorization from the Federal Energy Regu-

1 latory Commission or the United States Maritime Admin-
2 istration to site, construct, expand, or operate liquefied
3 natural gas export facilities, the Secretary of Energy (re-
4 ferred to in this section as the "Secretary") shall issue
5 a final decision on any application for the authorization
6 to export natural gas under section 3(a) of the Natural
7 Gas Act (15 U.S.C. 717b(a)) not later than 45 days after
8 the later of—
9 (1) the conclusion of the review to site, con-
10 struct, expand, or operate the liquefied natural gas
11 export facilities required by the National Environ-
12 mental Policy Act of 1969 (42 U.S.C. 4321 et seq.);
13 or
14 (2) the date of enactment of this Act.
15 (b) CONCLUSION OF REVIEW.—For purposes of sub-
16 section (a), review required by the National Environ-
17 mental Policy Act of 1969 (42 U.S.C. 4321 et seq.) shall
18 be considered concluded when the lead agency—
19 (1) for a project requiring an Environmental
20 Impact Statement, publishes a Final Environmental
21 Impact Statement;
22 (2) for a project for which an Environmental
23 Assessment has been prepared, publishes a Finding
24 of No Significant Impact; or

1 (3) determines that an application is eligible for
2 a categorical exclusion pursuant to National Envi-
3 ronmental Policy Act of 1969 (42 U.S.C. 4321 et
4 seq.) implementing regulations.
5 (c) JUDICIAL ACTION.—
6 (1) JURISDICTION.—The United States Court
7 of Appeals for the District of Columbia Circuit or
8 the circuit in which the liquefied natural gas export
9 facility will be located pursuant to an application de-
10 scribed in subsection (a) shall have original and ex-
11 clusive jurisdiction over any civil action for the re-
12 view of—
13 (A) an order issued by the Secretary with
14 respect to such application; or
15 (B) the failure of the Secretary to issue a
16 final decision on such application.
17 (2) ORDER TO ISSUE DECISION.—If the Court
18 in a civil action described in paragraph (1) finds
19 that the Secretary has failed to issue a decision on
20 the application as required under subsection (a), the
21 Court shall order the Secretary to issue the decision
22 not later than 30 days after the Court's order.
23 (3) EXPEDITED CONSIDERATION.—The Court
24 shall set any civil action brought under this sub-
25 section for expedited consideration and shall set the

1 matter on the docket as soon as practical after the
2 filing date of the initial pleading.
3 (4) APPEALS.—In the case of an application de-
4 scribed in subsection (a) for which a petition for re-
5 view has been filed—
6 (A) upon motion by an applicant, the mat-
7 ter shall be transferred to the United States
8 Court of Appeals for the District of Columbia
9 Circuit or the circuit in which a liquefied nat-
10 ural gas export facility will be located pursuant
11 to an application described in section 3(a) of
12 the Natural Gas Act (15 U.S.C. 717b(a)); and
13 (B) the provisions of this Act shall apply.
14 **SEC. 3. PUBLIC DISCLOSURE OF EXPORT DESTINATIONS.**
15 Section 3 of the Natural Gas Act (15 U.S.C. 717b)
16 is amended by adding at the end the following:
17 "(g) PUBLIC DISCLOSURE OF LNG EXPORT DES-
18 TINATIONS.—
19 "(1) IN GENERAL.—In the case of any author-
20 ization to export liquefied natural gas, the Secretary
21 of Energy shall require the applicant to report to the
22 Secretary of Energy the names of the 1 or more
23 countries of destination to which the exported lique-
24 fied natural gas is delivered.

1 "(2) TIMING.—The applicant shall file the re-
2 port required under paragraph (1) not later than—
3 "(A) in the case of the first export, the
4 last day of the month following the month of
5 the first export; and
6 "(B) in the case of subsequent exports, the
7 date that is 30 days after the last day of the
8 applicable month concerning the activity of the
9 previous month.
10 "(3) DISCLOSURE.—The Secretary of Energy
11 shall publish the information reported under this
12 subsection on the website of the Department of En-
13 ergy and otherwise make the information available
14 to the public.".

○

[Whereupon, at 11:31 a.m. the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

Department of Energy
Washington, DC 20585

February 26, 2015

The Honorable Lisa Murkowski
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

Dear Madam Chairman:

On January 29, 2015, Christopher Smith, Assistant Secretary, Office of Fossil Energy, testified regarding S. 33, the LNG Permitting Certainty and Transparency Act.

Enclosed are the answers to eight questions that were submitted by Senators Al Franken and Joe Manchin to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Lillian Owen, at (202) 586-2031.

Sincerely,

Christopher E. Davis
Principal Deputy Assistant Secretary
for Congressional Affairs
Congressional and Intergovernmental Affairs

Enclosures

cc: The Honorable Maria Cantwell, Ranking Member

Printed with soy ink on recycled paper

QUESTIONS FROM SENATOR FRANKEN

Q1. The Department of Energy's (DOE's) approval of liquefied natural gas (LNG) exports to non-free trade agreement countries requires a public interest determination. The DOE has justified recent authorizations with its own commissioned economic studies, which predict that LNG exports could lead to a net increase in the United States gross domestic product (GDP). I have some concerns about using GDP to determine whether LNG exports are in the public interest, because it does not capture regional and sectoral impacts. For example, states with little or no natural gas production stand to lose relative to states with large production. Mr. Smith, do you believe that a net gain in GDP is sufficient for determining public interest? Are there other criteria—such as wages, number of permanent jobs, energy prices, and investment income—that could help inform how much certain regions and sectors in the economy are sharing in this macroeconomic gain or loss?

A1. DOE considers a range of factors when reviewing an application for export authorization, in addition to the impact on U.S. GDP. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct this review, DOE looks to the evidence of record developed in the application proceeding.

DOE's evaluations contain analysis of regional impacts of LNG exports when those impacts are included in dockets submitted by the applicants, proponents or opponents in DOE proceedings. For example, DOE included a section on Regional Impacts in *Jordan Cove Energy Project, L.P.*, DOE Order No. 3413 (Order Conditionally Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Jordan Cove LNG Terminal in Coos Bay, Oregon, to Non-Free Trade Agreement Nations), March 24, 2014. The applicant in this case included a study that addressed regional economic benefits that would accrue from a grant of the application. DOE found that, in this case, the record contained substantial evidence of regional economic benefits from a grant of the application.

Q2. Under the various conditions considered in your commissioned economic studies, are there any export scenarios where American consumers and industries do not pay higher prices for natural gas and electricity?

A2. The two-part study of the cumulative economic impact of LNG exports commissioned by DOE was conducted by the Energy Information Administration (EIA) and NERA Economic Consulting (NERA). In all natural gas export cases evaluated by EIA, domestic natural gas and electricity prices were higher than the reference case without natural gas exports. In many of the NERA cases in which U.S. LNG exports were allowed to compete internationally, no LNG exports occurred in NERA's model because the delivered price of U.S. produced LNG to international markets was not competitive with LNG delivered from other sources. In those cases, domestic natural gas prices did not rise. In other NERA cases in which international natural gas demand was higher than in NERA's reference case, or if international, non-U.S. supplies of LNG were restrained in different scenarios, U.S. LNG exports were projected to occur and in those cases, prices of domestic natural gas rose. NERA's model found that across all the scenarios studied, the U.S. would gain net economic benefits from allowing LNG exports. For every market scenario examined, net economic benefits increased as the level of LNG exports increased.

As you may be aware, on October 29, 2014, EIA issued the report titled "Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets." This report responded to a request from DOE for an update of the EIA January 2012 study of LNG export scenarios. On average across the projection period (through 2040), domestic natural gas prices were higher when higher LNG export volumes were imposed on the five Annual Energy Outlook (AEO2014) baseline cases evaluated by EIA in the 2014 update. In only

one case (with high oil and gas resources), when the increased level of LNG exports over the baseline case averaged only 3 billion cubic feet per day (Bcf/d) and was greater in the earlier years, were natural gas prices lower than the baseline case in the latter years of the projection period. Across the four export scenarios imposed on the Annual Energy Outlook 2014 Reference case, residential natural gas end-use prices increased between 2.1 and 4.8 percent and electricity prices increased between 1.0 and 2.3 percent. In these cases, LNG exports were increased on average by 4.6 Bcf/d to 10.3 Bcf/d.

Q3. If future analyses demonstrate that your authorized LNG exports fail to produce the predicted GDP gains, or result in larger-than-expected burdens on American households and industries, would this constitute sufficient grounds to review your existing authorizations?

A3. As we have stated consistently, DOE would not rescind a previously-granted authorization except in the event of extraordinary circumstances, nor would we use this authority as a price maintenance mechanism. However, DOE has indicated its intention to monitor the conditions of the natural gas market in the future to ensure that the authorized exports of LNG and any future authorizations of natural gas exports do not subsequently lead to a threat to the public interest. In the event of unforeseen developments of such significant consequence as to put the public interest at risk, DOE is fully authorized to take action as necessary to protect the public interest. Specifically, DOE is authorized by section 3(a) of the Natural Gas Act, after opportunity for a hearing and for good cause shown, to make a supplemental order as necessary or appropriate to protect the public interest. Additionally, DOE is authorized by section 16 of the Natural Gas Act "to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate" to carry out its responsibilities.

Q4. An argument has been made that LNG exports could promote greater energy security for European nations, by helping to reduce their dependence on Russian natural gas. But in order to receive large volumes of natural gas from the United States, European nations will need LNG import terminals. Can you describe the current state of European LNG import terminals, particularly in Central and Eastern Europe where demand for Russian natural gas is high? Please also indicate 1) the total capacity of LNG that these terminals are able to receive; and 2) how much of that capacity is currently available to be contracted with the United States. Finally, what would be the timeline for bringing online new LNG import terminals in European nations that rely heavily on Russian natural gas, such as Germany or Ukraine?

A4. The only LNG terminal with regasification capabilities in Central or Eastern Europe is off the coast of Lithuania. The Klaipeda LNG Floating Storage and Regasification Unit Terminal began operations in December 2014 with a current capacity of 71 billion cubic feet per year (Bcf/yr), rising to 140 Bcf/yr near the end of 2015. Consequently, this terminal and its capacity represent the total capacity of LNG import capability in Eastern Europe. The terminal is currently supplied by StatOil, which has a five year contract to supply the minimum amount of gas (19 Bcf/yr) required to maintain operations. In addition, much of northeast Europe (Germany, Poland, Estonia, Latvia, Czech Republic, etc.) have some ability to access existing LNG import capacity via pipeline connections with the United Kingdom and the Rotterdam GATE terminal, and with the new Lithuanian terminal; and Western Europe has currently unused LNG import capacity. In 2013, total European regasification capacity was over 6,700 Bcf/yr, concentrated in Spain, the United Kingdom, and France. Total European LNG imports during 2013 were over 1,600 Bcf/yr.

Neither Ukraine nor Germany has an LNG terminal with regasification capabilities. Ukraine has been in the planning stages of setting up a terminal with a capacity of 355 Bcf/yr near Odessa on the Black Sea, but planning and progress on the terminal is unclear.

Germany does not have any LNG regasification terminals planned or proposed, but is planning on building LNG bunkering terminals for fuel in shipping vessels in both Hamburg and Bremerhaven. Poland is in the process of building an LNG terminal with regasification capabilities in Swinoujscie, with a capacity of 266 Bcf/yr.

The Department of Energy does not have information on how long it would take to bring on new LNG import terminals in European nations that rely heavily on Russian natural gas. Those timelines would depend on local conditions and financing.

Q5. The DOE is currently considering applications for approximately 38 billion cubic feet per day of LNG exports to non-free trade agreement countries. For the pending LNG export applications, what volume and fraction of the proposed LNG exports is contracted with European utilities and traders? What volume and fraction of the proposed LNG exports is contracted with Asian utilities and traders?

A5. DOE regulations require applicants to supply transaction-specific factual information to "the extent practicable" (10 CFR § 590.202(b)). DOE considers submission of all such agreements or contracts within 30 days of their execution to be consistent with the "to the extent practicable" requirement of section 590.202(b).

For pending applications that have not received DOE final authorization, the following summary of LNG export contracts is based on information filed with the Department. DOE has received contract information involving utilities, traders, or end users for 1.5 billion cubic feet per day (Bcf/d) of exports for pending applications. Of that volume, 0.85 Bcf/d is contracted with European utilities and traders; 0.65 Bcf/d is contracted with Asian utilities and traders.

QUESTIONS FROM SENATOR MANCHIN

Q1. In your testimony you discuss the process for approving export authority to non-FTA countries, specifically mentioning the public interest determination. As you note, the Natural Gas Act does not explicitly define public interest. Can you provide more detail about the economic impacts you consider during these evaluations, specifically the potential price impacts on the domestic market?

A1. DOE considers a range of factors when reviewing an application for export authorization, in addition to the impact on U.S. GDP. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct this review, DOE looks to the evidence of record developed in the application proceeding.

In 2012, DOE undertook a two-part study of the cumulative economic impact of LNG exports. The first part of the study was conducted by the Energy Information Administration (EIA) and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several prescribed export scenarios. The second part of the study, performed by NERA Economic Consulting (NERA) under contract to DOE, evaluated the macroeconomic impact of LNG exports on the U.S. economy with an emphasis on the energy sector and natural gas in particular. The NERA study was made available on December 5, 2012. The focus of the analysis was the macroeconomic impacts of LNG exports on the entire U.S. economy, which included the price impact of those exports on the domestic economy.

NERA's model found that across all the scenarios studied the United States would gain net economic benefits from allowing LNG exports. For every market scenario examined, net economic benefits increased as the level of LNG exports increased. Scenarios with unlimited exports had higher net economic benefits than corresponding cases with limited exports.

The study found that U.S. natural gas prices would increase if the United States exports LNG. However, NERA stated that the global market limits how high U.S. natural gas prices can rise under pressure of LNG exports because importers will not purchase U.S. exports if U.S. wellhead price rises above the cost of competing supplies. NERA found that natural gas price changes attributable to LNG exports remain in a relatively narrow range across the entire range of scenarios. Natural gas price increases at the time LNG exports could begin range from zero to $0.33 (2010$/Mcf). Price increases that would be observed after five more years of potentially growing exports could range from $0.22 to $1.11 (2010$/Mcf). The higher end of the range is reached only under conditions of ample U.S. supplies and low domestic natural gas prices, with smaller price increases when U.S. supplies are more costly and domestic prices higher.

Q2. What, if any, actions have you explored to curtail future exports if domestic price spikes occur as a result?

A2. As we have stated consistently, DOE would not rescind a previously-granted authorization except in the event of extraordinary circumstances, nor would we use this authority as a price maintenance mechanism. However, DOE has indicated its intention to monitor the conditions of the natural gas market in the future to ensure that the authorized exports of

LNG and any future authorizations of natural gas exports do not subsequently lead to a threat to the public interest. In the event of unforeseen developments of such significant consequence as to put the public interest at risk, DOE is fully authorized to take action as necessary to protect the public interest. Specifically, DOE is authorized by section 3(a) of the Natural Gas Act, after opportunity for a hearing and for good cause shown, to make a supplemental order as necessary or appropriate to protect the public interest. Additionally, DOE is authorized by section 16 of the Natural Gas Act "to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate" to carry out its responsibilities.

Q3. What should Congress do to enhance DOE authority to curtail exports in the case of price spikes?

A3. Congress has given DOE authority under section 3(a) of the Natural Gas Act, after opportunity for a hearing and for good cause shown, to make a supplemental order as necessary or appropriate to protect the public interest. Additionally, DOE is authorized by section 16 of the Natural Gas Act "to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate" to carry out its responsibilities.

Industrial Energy Consumers of America
The Voice of the Industrial Energy Consumers

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February 19, 2015

The Honorable Lisa Murkowski
Chairman
Senate Committee on Energy and Natural Resources
304 Dirksen Senate Building
Washington, DC 20510

The Honorable Maria Cantwell
Ranking Member
Senate Committee on Energy and Natural Resources
304 Dirksen Senate Building
Washington, DC 20510

QUESTIONS FOR THE RECORD
JANUARY 29, 2015
HEARING: S. 33, THE LNG PERMITTING CERTAINTY AND TRANSPORTATION ACT

Dear Chairman Murkowski and Ranking Member Cantwell:

Thank you for the opportunity to testify before the Senate Committee on Energy and Natural Resources in regards to S. 33, the "LNG Permitting Certainty and Transportation Act." We deeply appreciate your interest in ensuring that the Natural Gas Act is fully implemented as it was intended, supporting LNG export volumes, while ensuring affordable natural gas and electricity for all consumers long-term.

The three questions from Senators Manchin and Franken seek answers to fundamental public policy issues. IECA's answers to these questions provide a foundational and relatively comprehensive roadmap for public policymakers to move forward with and achieve the desired result (LNG exports plus consumer protections), consistent with the Natural Gas Act and continue to reflect a rich history of federal public policymaking that starts with addressing the "public interest."

As of February 18, 2015, 38 applications to ship to non-free trade countries have been submitted to the U.S. Department of Energy (DOE) for approval, which totals 38.07 Bcf/day. Five are approved and four are conditionally approved. Plus, 40 applications have been received to ship to free trade countries totaling 40.2 Bcf/day, or 54.7 percent of U.S. 2014 demand.

DOE approval of export applications are commitments to export LNG for periods of 20 to 30 years and invoke significant consequences that substantially increase risks to economic growth, job creation, income disparity, and investment. These risks are illustrated today in Australia.

A February 17, 2015 news story from The Sydney Morning Herald entitled, "Australia's LNG market a 'slow train crash' says Credit Suisse analyst" should give all policymakers pause. Below are the key paragraphs that state, in short, that there is a significant shortfall of natural gas for export, an equivalent to 12 times the annual consumption of gas across Australia, excluding Western Australia and the Northern Territory.

> "Australia's emerging gas market is like a "slow train crash" because of a huge shortfall in gas needed to fulfil contracts over the next 20 years according to an analysis that has infuriated an industry that spent $75 billion building LNG plants over the past decade.
>
> Credit Suisse energy analysts calculate that the three Queensland LNG projects are short of as much as 8800 petajoules of gas reserves to meet their 20-year LNG sales contracts, an amount equivalent to 12 times the annual consumption of gas across Australia excluding Western Australia and the Northern Territory.
>
> The reality is that over the 20-year contracts that have been signed for these projects, you are broadly taking 40 years worth of domestic east coast supply and sending it offshore."[1]

What happened in Australia can happen in the U.S., unless the Natural Gas Act is fully implemented as it was intended, with consumer safeguards. Australia did not put safeguards in place. The IECA position on these matters is addressed in the answers below to the questions submitted by Senators Manchin and Franken.

RESPONSES TO SENATOR MANCHIN

Question 1: Like you, I do not oppose natural gas exports but do believe in approaching this issue with caution. In your testimony, you suggest that DOE conduct a rulemaking to define public interest. What do you think should be included in that definition?

I. Introduction

As an initial matter, we appreciate your accurate representation of our position. We do not oppose natural gas LNG exports. In fact, we do not oppose the export of natural gas, *provided* these exports flowed from a *process* that recognized the value of natural gas to *all* of the participants in our domestic economy, and the risks of LNG exports. This is what we believe Congress intended in 1938 when the Natural Gas Act made such imports and exports subject to the "Public Interest."[2]

As you note, we suggest that DOE conduct a rulemaking to define "public interest." This is because we believe the task of defining that term, as well as establishing a process within which to apply that definition, is both important and complex enough to warrant such a comprehensive effort. We believe that only a comprehensive rulemaking could produce a workable definition of public interest and a process characterized by balance, transparency, open participation, and consistent focus on the original intent of Congress.

While we do not attempt to short-circuit such an effort here, we welcome the opportunity to outline our ideas and suggest an agenda of considerations to address in the rulemaking.

II. A New Rulemaking is Needed – and Overdue

A rulemaking to develop a relevant definition of the "public interest" is overdue. This same rulemaking also needs to update the policy guidance and review procedures used to apply the new definition to the export of LNG to non-Free Trade Agreement (non-FTA) countries. The definition of "public interest" is at the core of this entire discussion. Yet, we cannot find where DOE has articulated any such definition.

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[1] "Australia's LNG market a 'slow train crash' says Credit Suisse analyst," by Angela Macdonald-Smith, Sydney Morning Herald, February 17, 2015, http://www.smh.com.au/business/australias-lng-market-a-slow-train-crash-says-credit-suisse-analyst-20150217-13gnh8.html.

[2] 15 U.S. Code § 717b - Exportation or importation of natural gas (a) mandatory authorization order.

We note that the Government Accountability Office (GAO) reached the same conclusion. In a September 2014 report entitled, "Federal Approval Process for Liquefied Natural Gas Exports,"[3] the GAO finds that neither the Natural Gas Act, nor the DOE, has defined "public interest" (see page 10). Given the centrality of this term to the entire enterprise, this is a glaring omission, if not a legal issue.

More practitioners at the energy bar are also coming to concur in the need of a better definition. A recent post by the University of Texas at the Austin School of Law, Energy Center observed that the DOE "...relies on its limited precedent and an old and increasingly out-of-step internal guideline. As a result of this practice, the "public interest" – which in any context can come across as slippery – remains a somewhat amorphous and unpredictable standard."[4]

An historical perspective also shows the need for a new rulemaking – the thinking on how to apply the concept of the "public interest" within the Natural Gas Act (NGA) has atrophied. By way of contrast, the evolution of this approach to regulation in the communications field shows an active and continuous development of new ideas from the Titanic to the internet. The Radio Act of 1912, passed in the wake of the Titanic disaster, required broadcasters to obtain federal licenses. However, as broadcasting quickly grew, the radio waves were threatened with chaos because the Secretary of Commerce lacked the authority to differentiate which applicants would or would not receive a license. The Radio Act of 1927 borrowed the so-called pubic interest standard from railroad and utility regulation as a way to give the Secretary the needed degree of discretion – i.e. the authority to say "no." Congress never defined the term or how it was to be used. Instead, Congress left the definition and application of the term to the discretion of the Secretary of Commerce, Herbert Hoover, who they trusted to achieve the ends they intended. In applying this standard to the export of LNG, it is instructive to note that, from the outset, they created a standard that gave the broadest possible consideration to the public at large instead of the broadcasters. In 1928, the Federal Radio Commission (FRC) issued its first comprehensive interpretation of the public interest standard that concluded with the admonition useful to our consideration of LNG export.[5] [6] [7] The FCR said, "The emphasis must be first and foremost on the interest, the convenience, and the necessity of the listening public, and not on the interest, convenience, or necessity of the individual broadcaster or the advertiser."[8] This inclusive emphasis has been consistently applied to the regulation of communications following the evolution of technology from radio, to television, to cable, to satellite, and to the internet. Even the FCC's most recent proposal on the internet places the highest value on the needs of the broad public and not the large Internet Service Providers (ISPs).

Since 1938, when Congress wrote the public interest standard into the NGA, it has been exercised only once, 30 years ago, for a different application and under very different circumstances. The previously cited GAO report notes that the DOE has based its decision-making guidance for LNG exports on a

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[3] "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, http://www.gao.gov/assets/670/666177.pdf.

[4] Brown, Jeremy, "An Inconsistent Approach to "Public Interest" Consistency Determinations: Section 3 of the Natural Gas Act and the Rush to Export LNG", University of Texas at Austin School of Law, Energy Center, September 26, 2014.

[5] "The Radio Act of 1927 as a Product of Progressivism" Mark Goodman, Mississippi State University.

[6] "A Brief History of the Public Interest Standard" Carrie McLaren.

[7] Krasnow, Erwin G., and Jack N. Goodman, "The 'public interest' standard: The search for the Holy Grail," *Federal Communications Law Journal,* May 1998.

[8] Federal Radio Commission Annual Report 166 (1928) at 169-70.

rulemaking it developed in 1984 for LNG imports.[9] In 1984, natural gas played a relatively small role in the U.S. economy. Even as recently as 2002, "LNG imports accounted for only 1% of total U.S. gas consumption."[10] Thirty years later, and as a direct consequence of deliberate policy decisions,[11] it is difficult to identify a source of energy that is more widely relied upon. In 2015, natural gas is a major input to U.S. manufacturing for fuel, feedstock, and electricity generation, particularly in energy-intensive industries. Projecting into the future, natural gas will play an increasingly important role in residential, transportation, and power generation applications.

The differences between the consequences of LNG imports and exports are as stark as they are sound. Natural gas imports increase supply and lower price, and make more use possible. Imports reduce consumer risk. Imported natural gas competes with domestic production and, in some cases, can even result in some fuel substitution (e.g. gas replaces coal in power generation). On the other hand, exports reduce supply and force the allocation of a finite resource. In the case of LNG export, this is a particular challenge because in nearly all of the applications for which natural gas is used, there are few, if any, viable substitutes. Evolution of both physical infrastructure and regulation have so limited the energy choices of industrial users, particularly the energy-intensive industries, that they are either unable to switch from natural gas or can do so only at great expense. In the case of power generation, for example, the EPA's proposed Clean Power Plan and the new lower ozone limits explicitly require dramatically increased dependence on natural gas.

Policy guidance based upon considerations applicable to LNG imports 30 years ago, in 1984, is not relevant to exports in 2015, and even less relevant to exports in 2020 or 2030, 25 years from now. It is past time for DOE to conduct a rulemaking that identifies the considerations relevant to exporting natural gas now and in the future, and base its policy on those. By continuing to use policy guidance from a vastly different time for an activity in which the risks and benefits are reversed, the DOE is failing to comply with the spirit of the NGA. For all of these reasons, a new rulemaking is overdue.

III. Problems with Present Tools, Models and Processes

One outcome of a new rulemaking needs to be DOE's abandoning most of the tools, models, and processes it now uses to review LNG export applications. Specifically, this would include DOE's inappropriate use of Gross Domestic Product (GDP), models not suited to the purposes and a refusal to reopen the process when warranted.

The DOE has based the measurement of "public interest" almost entirely upon the misapplication of an estimated growth in GDP. As cited by Jeremy Brown in his article entitled, "An Inconsistent Approach to 'Public Interest' Consistency Determinations: Section 3 of the Natural Gas Act and the Rush to Export LNG", the DOE:

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[9] "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, http://www.gao.gov/assets/670/666177.pdf (page 11).

[10] "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation" Congressional Research Service (CRS) Report for Congress, January 28, 2004.

[11] "Congress could try to reduce the need for new LNG terminals by acting to curb growth in U.S. LNG demand, or growth in natural gas demand overall. For example, Congress could change public and industrial incentives for conservation, switching to other fuels, or developing renewable energy supplies. But other fuels like coal and nuclear power pose their own hazards to communities and the environment, so their expansion may not be preferable to additional LNG infrastructure." "Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety and Regulation" Congressional Research Service (CRS) Report for Congress, January 28, 2004.

> "...has incorporated the EIA[12] and NERA[13] studies into the administrative records for subsequent non-FTA applications. In its conditional orders, the agency has included standard – and lengthy – discussions of these studies and responses to the comments received on them. In effect, DOE/FE has anchored its public interest assessments to the studies and used them to rebuff arguments of inconsistency with the public interest".[14]

At its core, the NERA study claims: "In all of the scenarios analyzed in this study, NERA found that the U.S. would experience net economic benefits from increased LNG exports."[15]

The misapplication of GDP refers to how the NERA study reaches its sweeping conclusion that is then used by the DOE to justify approval or conditional approval of nine LNG export applications to non-free trade countries. Further review of the NERA study reveals that it is a deeply flawed proxy for a definition of public interest. The NERA study goes on to describe how its metric of economic welfare and a small overall increase in GDP is nothing more than a windfall for a small group of [natural gas] resource owners and export terminal owners being large enough to offset the losses from lower incomes and higher energy prices inflicted upon the remaining bulk of the population. The NERA study discusses a positive macroeconomic impact in one section, but it describes how the export of natural gas would cause reductions in income in the next.[16] The NERA study describes how "[h]ouseholds with income solely from wages or transfers, in particular, will not participate in these benefits."[17] The NERA study further explains how "[h]igher natural gas prices ... can also be expected to have negative effects on output and employment, particularly in sectors that make intensive use of natural gas." In other words, the vast majority of households will transfer income and wealth to a small number of resource owners, as LNG exports place energy-intensive industries at a particular global disadvantage. It is difficult to escape the fact that this assessment of what is "in the public interest" is completely contrary to the tradition, long adhered to in the regulation of communications. Further, in an environment in which we openly acknowledge the harmful impact of a highly skewed income distribution, this measure of so-called "positive impact" is particularly troubling, and this direct attack on U.S. manufacturing jobs is unacceptable.

GDP is an inappropriate/insufficient metric, even if it is not being misapplied. As explained in a 2011 Demos report,

> "GDP measures the total monetary value of goods and services produced within our national borders in a given period. Developed in the 1930s to help policymakers gauge our recovery from the Great Depression, essentially GDP is a measure of raw economic activity and was considered even by its chief architect, Simon Kuznets, to be a very poor instrument for measuring economic development, let alone social progress. But in the

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[12] "Effect of Increased Natural Gas Exports on Domestic Energy Markets, as requested by the Office of Fossil Energy" U.S. Energy Information Administration (EIA), January 2012, http://energy.gov/sites/prod/files/2013/04/f0/fe_eia_lng.pdf.
[13] "Macroeconomic Impacts of LNG Export from the United States" NERA Economic Consulting, December 3, 2012, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.
[14] Brown, Jeremy, "An Inconsistent Approach to "Public Interest" Consistency Determinations: Section 3 of the Natural Gas Act and the Rush to Export LNG", University of Texas at Austin School of Law, Energy Center, September 26, 2014.
[15] NERA Study (p. 6).
[16] Ibid, pages 6-8.
[17] Ibid, page 8.

> decades after World War II and especially in the last two decades, GDP has become synonymous with the broader welfare and progress of society, (i.e. public interest)..." [18]

This same report goes on to outline how "the case against GDP can be broken down in seven ways"[19]:

1. **Distribution:** GDP tells us nothing about how growth is distributed at the household level.
2. **Quantity vs. Quality:** GDP measures the quantity of goods and services, but not the quality.
3. **Defensive Expenditures:** GDP does not distinguish between expenditures that positively increase human welfare, such as college tuition, and "defensive expenditures" that protect against threats.
4. **Real Economic Value vs. Borrowed and Speculative Gains:** GDP tells us nothing about the sustainability of economic activity. Consumption financed by borrowing adds to GDP just like consumption financed by real gains in household buying power.
5. **Depletion of Natural Capital and Ecosystem Services:** GDP essentially ignores environmental problems. Economic activity that depletes natural resources is just as valuable, by GDP standards, as economic activity fueled by renewable resources.
6. **Non-Market Activities:** GDP tells us nothing about the value generated by non-market services provided in the household, in the public sector, in civil society, and in the broader ecological systems that surround us.
7. **Social Well-Being:** GDP does not always track with indicators of social well-being, such as rates of poverty, literacy, and life expectancy.

This is not to completely discard the use of GDP. Demos agrees, "GDP is a good general barometer of levels of economic activity."[20] The chief difficulty arises from DOE using no other metric to assess the "public interest," that is transparent to the public. While overall economic growth is usually a good outcome, it is not, by itself, a sufficient basis to support a claim of public welfare – it was never intended for this purpose.

DOE's Analytical Methods and Models are Inappropriate for the Purpose

The macroeconomic studies performed by NERA use the forecasts generated by the aforementioned EIA study. However, the EIA models and methods are inappropriate for these purposes because they include distinct sources of systemic bias against industrial customers that significantly alter decisions for which they are used.

The EIA models are based upon regression analyses calibrated with data not more recent than 2010 – a time most notable for the worst U.S. manufacturing slowdown in the recent past. Predictions from any model calibrated with this data would include a bias that severely understates the gas demand for industrial customers, particularly energy-intensive industries, and likewise severely understates the impact of LNG export on available supply and price.

Even if the EIA models were built using more recent data, the practice of using a regression model-based years in the past to extrapolate assumed relationships far into the future becomes increasingly questionable as the forecast horizon lengthens. As may be observed from the performance of past EIA forecasts, predictions of industrial demand, price, and other results beyond about five years are prone

[18] Daly, Lew and Posner, Stephen "Beyond GDP, New Measures for a New Economy" Demos, 2011 (p.4).
[19] Ibid.
[20] Ibid (p. 4).

to significant error. In a more subtle way, this practice also limits what may be realized in the future by constraining it to how market components interacted in the past.

Rather than a regression model calibrated with outdated relationships, DOE should explicitly include the measurable demand expected from announced manufacturing projects under construction, gas-fired power generation units and other new sources of demand just as it postulates future levels of LNG export. DOE could accomplish this by using one or more of the readily available models that estimate future industrial demand from the bottom-up by capturing the data on large production projects already in the public (e.g.: PIRA, Charles River Associates). IECA can provide several forecasts by independent consultants that show much higher industrial natural gas demand than that of the EIA.

DOE Does Not Intend to Review Licenses, Once Issued

In an October 2013 response to Senator Murkowski, DOE stated, "we take very seriously the investment-backed expectations of private parties and would not rescind a previously granted authorization except in the event of extraordinary circumstances."[21] For a series of reasons, this is an unacceptable abdication of DOE's responsibility under the NGA.

- There is inherent uncertainty in all of the forecasts being used to make these long-term decisions. In fact, the magnitude of these uncertainties several years into the future rivals the size of the marginal gains in GDP used to find that these authorizations were not inconsistent with the public interest.

- This commitment positions DOE to place a higher economic value and priority on the tens of billions invested in LNG export facilities than the trillions invested in the nation's manufacturing base and infrastructure. In terms of jobs, this commitment will have the perverse consequence of protecting less than 1% [22]of the country's good paying jobs while exposing the other 99% to the risks of higher energy prices at home and lower wages, while manufacturers in competing non-FTA countries benefit from low-cost U.S. natural gas.

- It is contrary to the NGA. On its face, protecting 1% while placing 99% at risk is the opposite of the "public interest." It is also contrary to the NGA itself which states, in part: "...The Commission may by its order grant such application, in whole or in part, with such modification and upon such terms and conditions as the Commission may find necessary or appropriate, and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate (emphasis added)."[23]

The Brookings Institute, an organization robustly in favor of LNG exports, suggests one of several possible solutions. "Finally, the Department should take an audit of the natural gas export policy every five years. This should serve as an important information-gathering exercise. Such an audit would identify what happened to domestic natural gas supply, demand, prices, and international markets

[21] Letter, Paula A. Gant, Deputy Assistant Secretary, DOE Office of Oil and Natural Gas to The Honorable Lisa Murkowski, Senator Alaska, October 17, 2013.
[22] The first seven LNG export applications to non-free trade countries, according to their websites will result in 1,890 permanent jobs.
[23] 15 U.S. Code § 717b - Exportation or importation of natural gas (a) mandatory authorization order.

during each five-year period. Policy adjustments, if determined necessary, could be made following the review."[24]

The Process is Unduly Constrained

A rulemaking should adjust the review process to allow reasonable, meaningful, and balanced participation by all affected stakeholders. Due to the disparate economic interests involved (successful applicants stand to gain billions once shipments commence, while other parties seek to protect the status quo) and the built-in tilt provided by the NGAs's rebuttable presumption, the review of an LNG export license application is a decidedly one-sided enterprise. The costly studies and other resources available to LNG export applicants used to justify approval to DOE, is easily far beyond the means of other stakeholders, even sophisticated industrials. To see each LNG application legal intervention to its conclusion include estimated legal costs of $125,000, plus an economic study of $100,000, costing upwards to $8,550,000 dollars for 38 applications to ship to non-free trade countries. Moreover, due to the rapid emergence of shale gas in the U.S. market, there was a tremendous rush to export. A fair amount of applications to export LNG to non-FTA countries were filed and queued in short order. As DOE performed its EIA and then its NERA studies, and developed its review process through late 2011 and 2012, intervention deadlines for most of the applications passed, leaving no legal recourse. Even then, DOE did not substantively address comments offered on the NERA study. After about 188,000 initial comments and over 2,700 reply comments, of which approximately 800 were unique, DOE did not see the need to make a single adjustment to its NERA study. It is IECA's observation, having reviewed the comments, that very few comments were, for example, from homeowners. Confirming our view that the general public is disconnected to these public policy decisions that will directly and negatively impact them long-term. During that same time supply, demand, and price expectations continued to undergo significant and material changes.

However, in the case of the Freeport LNG terminal application, industrial stakeholders sought to intervene out-of-time in order to raise the serious questions concerning the then out-of-date data and studies being used by the DOE to review the application, the inappropriate application of the "public interest," as well as the accumulating volume of LNG exports already (conditionally) approved. While these interventions were 17 months past the deadline for the subject proceeding, that was the point. The DOE had not substantively addressed the comments submitted offering concerns on the EIA and NERA studies, and the basis for approval was now 17 months further out-of-date. Nonetheless, when new stakeholders with reasonable concerns cited these materially changed conditions as grounds to intervene out-of-time, DOE declined to engage the new interventions on their merits. In a victory of procedure over substance, the DOE did not consider any fact other than the date of the motion to intervene.[25]

IV. Considerations to Govern a Rulemaking – a Roadmap

The preceding sections identify a significant number of widely varied, substantive difficulties with the present definition of "public interest" and how it is applied to reviewing applications to export LNG to non-FTA countries. We therefore believe that, lest the effort be lost in all of the detail, it would be more constructive to suggest a thoughtful process that a rulemaking might use to fashion an updated,

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[24] Ebinger, Charles K. and Avasarala, Govinda, "Natural Gas Briefing Document #2: Revising the LNG Export Process", Brookings Energy Security Initiative, Natural Gas Task Force, August 2013.

[25] FE DOCKET NO. 11-161-LNG, Order Conditionally Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Freeport LNG Terminal on Quintana Island, Texas to Non-Free Trade Agreement Nations, DOE/FE Order No. 3357, November 15, 2013.

relevant definition, as well as a durable process within which to apply it before offering any specific considerations for a new definition. A June 2012 position paper by The International Federation of Accountants (IFAC)[26] presents an outline that could serve as a roadmap to that end. The process IFAC uses to produce its standards can be adapted to the process of establishing and applying a new definition of public interest. We outline a condensed adaptation of that process map here.

By way of example, IFAC used this process to produce the following concise, yet comprehensive and inclusive definition of 'public interest' as applied to the accounting profession:

> "The net benefits derived for, and procedural rigor employed on behalf of, all society in relation to any action, decision or policy."

In settling out, IFAC stresses the importance that an agency attempting to serve the "public interest" consider the implications of its actions, decisions, and policies on society overall. While IFAC stressed that "public" is inclusive of all society, it identifies the broad groups that comprise the public and how each group is impacted by the decision. For a final time, we emphasize that it in this regard that the present use of GDP, as a principle metric of public interest, is most deficient.

Who is the "Public"?
On the broadest level, "public" includes the widest possible scope of society: for example, individuals and groups sharing a marketplace for goods and services (including those provided by government), as well as those seeking sustainable living standards and environmental quality, for themselves and future generations.

Although the impact of the decisions differs among these groups, there is a fundamental obligation to act in the interest of each group.

What are the "Interests" of the Public?
In the broadest respect, "interests" are all things valued by individuals and by society. These include rights and entitlements (including property rights), access to government, economic freedoms, and political power. Interests are things we seek to acquire and control; they may also be ideals we aspire to, and protections from things that are harmful or disadvantageous to us.

General Assessments for Determining if Actions, Decisions, or Policies are in the Public Interest
A definition of the public interest has limited practicality without some way of determining whether something does or does not serve the public interest. To determine whether an action, decision, or policy has been undertaken in the public interest, an assessment can be made against public interest criteria, being conscious of the dimensions of both outcome (net benefits) and process. That is, there are two general assessments:

- The Assessment of Costs/Benefits – The extent to which, for society, as a whole the benefits of the action, decision, or policy outweigh the costs; and
- The Assessment of Process – The extent to which the manner of considering the action, decision, or policy was conducted with the qualities of transparency, public accountability,

[26] "A Definition of the Public Interest" International Federation of Accountants Policy Position #5, June 2012.

independence, adherence to due process, and participation that includes a wide range of groups within society.

It is important to note that the private and public interest are not necessarily in conflict. A profitable entity (e.g. LNG export terminal) may be generating public benefit. However, the two may diverge where, for example, there are externalities or circumstances where one imposes considerable negative impacts on the other. One could not claim such an outcome as being consistent with the public interest.

The Trade-Off between Outcomes and Process

Demonstrating that the public interest has been served requires that any action, decision, or policy be assessed against public interest criteria, being conscious of the dimensions of both outcome (net benefits) and process—that is, undertaking the two assessments described above.

Assessment of Costs/Benefits

The first assessment is a consideration of the public interest in terms of negative and positive outcomes or "costs and benefits" for society as a whole. Cost/benefit analysis is the formal process of evaluating the negative and positive outcomes—both short- and long-term—of a particular action, decision, or policy to determine whether or not (and the extent to which) positive outcomes outweigh negative ones. Costs and benefits can be assessed in both quantitative and qualitative terms.

It is important to distinguish the application of cost/benefit analysis in a societal context from the project or investment appraisal undertaken by individual organizations seeking to maximize profit. It is feasible for an action to have a positive net benefit for an entity, while having a net cost to society as a whole. In the public interest context, this assessment refers to the impact on society as a whole, rather than to the entity. It is an assessment of whether or not an action, decision, or policy does more good to the public than harm. However, when assessing the impacts on society as a whole, it is important to consider the distribution of benefits and costs, between different parts of society. The assessment should be cognizant of situations where an action, decision, or policy that benefits one group within society, may come at a cost to another. Those undertaking the action, decision, or policy need to consider whether such an outcome was anticipated, and desired.

Additionally, cost/benefit analysis is often followed by some form of post-implementation review or process used to evaluate the effectiveness of policies or actions taken. This is to assess whether those policies or actions have fulfilled their intended purpose, and the extent to which costs and benefits were accurately determined. In many cases, post-implementation review also provides information into how such policies or actions can be further modified for improvement, and concludes the cost/benefit analysis cycle.

Assessment of Process

The second assessment is a consideration of the procedural aspects of acting in the public interest. This involves considering the extent to which an action, decision, or policy was developed or conducted with the qualities of transparency, public accountability, independence, adherence to due process, and participation that includes a wide range of groups within society.

Transparency is the process of making information accessible to the public. Such information includes the decisions that are reached, including the process by which they are made.

Public Accountability refers to processes designed to ensure that public organizations meet their obligations to their stakeholders and society at large.

Independence – Institutions charged with acting in the public interest should be established to reinforce independence from special interest groups, political pressures, and personal interests—matters that can have undue influence over responsibilities to the public. They should enable and require the consideration of potential conflicts of interest and threats to independence. The independence of such bodies should be considered in their design and composition, incorporated into their procedures of due process, and ensured by their funding arrangements. The appearance of independence should also be considered in public statements and actions made by individuals representing or leading these institutions.

Competence – Institutions charged with acting in the public interest should also ensure that they have the capability, in terms of appropriate, competent, and knowledgeable personnel resources, to ensure that the objectives of the organization, project, or outcome can be achieved.

Establishment of, and Adherence to, Due Process refers to the establishment of procedures of governance and operation, and the accurate, consistent observance of them.

Inclusive Participation from a Wide Range of Groups within Society refers to two main concepts:

- *Fair and balanced participation in decision-making* means that, while a decision process should never be unduly delayed or abused, when an individual or group has something new, significant and material to say, the substance of that contribution must be considered.
- *Opportunity for public consultation (e.g. reply/rebuttal and sur-rebuttal comments)* – this process provides for greater inclusiveness in the design of public policy by involving the participation of a wide range of opinions and expertise. It also allows for greater transparency and acceptance by providing the public with insights into how the final decision was made.

V. Some Specific Criteria

The roadmap suggested in Section IV, when applied to address the concerns and gaps identified in Sections II and III, will undoubtedly identify and evaluate additional criteria that can be used to measure "public interest." However, we suggest starting with the simple concepts that flow from the body of public interest thought pioneered by Justice Brandeis – i.e. *that the public interest is that which produces the most good for the most people.*

To connect this concept to the specific questions raised by the export of LNG to non-FTA countries we suggest considerations including:

a) the degree to which the costs and benefits of exporting LNG to non-FTA countries are proportionately distributed across all households, i.e. all segments of the U.S. economy and all geographic regions of the country (median vs. mean)[27] [28];

[27] This is also to satisfy the imperative to recognize that the entrepreneurial development of hydraulic fracking that is largely responsible for the recent growth in US domestic natural gas production and reserves had its origins in early basic and applied research conducted by the US DOE and funded by all of the nation's taxpayers.

[28] It is also important to note that unlike companies engaged in exploration and production of energy even in the recent past, producing natural gas by fracking shale formations involves much less risk. Producers have even made

b) the value added to the U.S. economy by exporting a raw material vs. the value added by exporting a finished manufactured good;
c) the impact on net permanent U.S. jobs by producing and exporting natural gas (and importing manufactured goods) vs. producing and exporting manufactured goods, especially in price sensitive industries;
d) the loss of a significant U.S. competitive advantage as energy prices in the U.S. (both natural gas and electricity) approach parity with energy prices globally;
e) the compounding higher risk to the U.S. consumer and the economy with each additional LNG export approval;
f) the degree to which physical linkage to natural gas markets in other countries that are price insensitive, that do not approach the natural gas storage capacity in the lower 48 states of the U.S., will increase price volatility and trigger reliability issues, especially during summer and winter peak demands;
g) the degree to which operation of an LNG export terminal affects the reliable operation of the natural gas pipeline network in the vicinity of the terminal, as well as the reliability of the electricity grid via the gas-fired electricity generating stations in the same region;
h) the degree to which modest increases in the price of natural gas make the country's GHG goals more costly and more difficult to attain;
i) the degree to which the DOE is able to revisit and adjust licenses to export LNG to non-FTA countries should future conditions of supply, reserves, production, demand or price differ significantly from those assumed when the DOE granted the license (i.e. what if the forecasts prove incorrect?);
j) the degree to which the DOE is able to periodically review, revisit and adjust, if needed, the volume of LNG approved for export to non-FTA countries under any license (e.g. every two years);
k) the GHG emissions of U.S. energy-intensive industries compared to the GHG emissions of comparable industries in non-FTA countries;
l) the impact that exporting LNG to a non-FTA country will have provide a disincentive for that country to open its domestic markets to U.S. manufactured goods by implementing a fair and comprehensive Free Trade Agreement with the U.S.; and
m) the efficiency losses and extra GHG releases inherent in producing a good with energy that must be liquefied, transported and then re-gasified before it can be used vs. using the natural gas in manufacturing operations closer to where it is produced, in manufacturing facilities with a high degree of attention to GHG releases; and
n) as U.S. supply and demand balance, the impact to the marginal cost of natural gas and electricity driven by foreign government backed LNG buying entities that are price insensitive, especially during summer and winter peak demand.

VI. An Alternate Approach to Achieving the Intent of Congress

The concept of "public interest" started as a shortcut in the process of drafting legislation governing regulated enterprises (e.g. railroads, radio, etc...). It was used in legislation from the New Deal Era and it is a product of the Progressive Era that preceded it. While the term "public interest" provides an expedient way to draft legislation delegating the details of achieving the Intent of Congress to an

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the comparison to manufacturing or farming rather than exploring. Consequently, producers who are now exposed to mush less risk in their exploration and production operations, no longer merit the high returns or the regulatory deference they once deserved.

agency, that agency must work continuously to ensure it is defining and applying the term in a way that keeps up with developments in technology, markets and mores. It is a challenging concept to use.

However, there are alternatives. In 1977, Congress amended the Federal Reserve Act[29] and empowered the Federal Reserve to achieve its monetary policy objectives with language the established much more concrete goals. Rather than resorting to the vague and difficult to use "public interest," Congress directed that:

> "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates." [30]

Because "stable prices" and "moderate long-term interest rates" effectively collapse into the same thing, this is known as the Fed's dual mandate.

To apply this concept to the NGA, Congress could direct the DOE to 'promote effectively the goals of maximum employment and responsible development of U.S. energy resources.' Such a dual mandate could be easier to maintain and apply than the present public interest standard.

There are other advantages to a 'dual mandate' standard. Chief among these is the explicit directive for the DOE to consider the impact of their decisions on U.S. employment. While most would have assumed that the longstanding national objectives of full employment and stable prices[31] were close to the core of the New Deal intent of "public interest" when Congress chose those words in 1938, the results of their own NERA study combined with their subsequent licensing decisions indicate that domestic employment is not a priority of the DOE. A 'dual mandate' standard also comes equipped with the implicit flexibility to allow the DOE to monitor and periodically adjust the LNG export licenses, as needed to achieve both objectives.

In any event, while some could have strong concerns with changing the NGA from a "public interest" standard to a sort of "dual mandate,"[32] we believe it is an idea that would be interesting to explore as part of the rulemaking discussed herein.

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[29] Steelman, Aaron, "The Federal Reserve's "Dual Mandate": The Evolution of an Idea", The Federal Reserve Bank of Richmond, December 2011.

[30] 12 USC 225a. As added by act of November 16, 1977 (91 Stat. 1387) and amended by acts of October 27, 1978 (92 Stat. 1897); Aug. 23, 1988 (102 Stat. 1375); and Dec. 27, 2000 (114 Stat. 3028).

[31] Steelman describes the "Employment Act of 1946" (p.1) and the "Full Employment and Balanced Growth Act or the Humphrey-Hawkins Act of 1978" (p.3).

[32] Those who claim that the DOE must never alter an Order on LNG export once issued, claim that by doing so, the DOE would introduce great uncertainty into the capital investment plans supporting the LNG export terminals and contracts and would undermine the entire enterprise. The facts do not support this. The entirety of investment in LNG terminals and contracts is but a small fraction of the global commerce and long-term investment decisions impacted by the value of the U.S. dollar. Yet, due to the "dual mandate," the value of the U.S. dollar is always subject potential adjustment. The US Federal Reserve continuously monitors economic conditions and meets at least 8 times per year to decide whether to make any adjustments. The Federal Reserve does this, in part, because Congress gave it the "dual mandate".

Question 2: Beyond defining public interest, what other approaches do you suggest Congress take to protect domestic manufacturing and American consumers from the potential negative impacts of increased natural gas exports?

We appreciate this timely question. Since 1938, the Natural Gas Act (NGA), with a few amendments, has guided our country's development and use of this valuable but finite natural resource. Natural gas is a high-value fuel that is a primary driver of the U.S. economy in applications including residential and commercial cooling and heating, manufacturing, power generation, and even transportation. Study after study confirms that a unit of natural gas utilized in manufacturing will yield 4 to 8 times the economic value as the same unit of natural gas exported as a commodity. Entire industries have been built on the long-term expectation of reliable and affordable natural gas, including many that have recently announced plans to leverage recent increases in natural gas production to grow their U.S. operations. Unfortunately, if LNG exports are not either governed within a Free Trade Agreement or otherwise prudently managed consistent with the "public interest," LNG exports could actually subsidize the decline of American manufacturing.

We believe that the NGA, as well as other law, presently contains sufficient provisions to encourage the continued utilization of natural gas as a high-value fuel in a robust and growing domestic economy, while supplementing that economic growth with a vigorous, but prudently monitored volume of natural gas or LNG exports. Our concern is that the DOE is not implementing the NGA in a manner consistent with the original intent of Congress.

Therefore, we believe it best for Congress, with your leadership, to take to two-phased approach to encourage domestic manufacturing and protect American consumers from the potential negative impacts of increased natural gas exports. First, Congress should intensify and sharpen its monitoring and oversight of DOE in a few focused areas of concern. Second, and only if oversight efforts do not return DOE to implementing the will of Congress, Congress should pass legislation amending the NGA in a way that makes its expectations clear.

Our concerns focus on four areas:

1. DOE's definition and application of the "public interest";
2. DOE's continued role in monitoring the impact of natural gas exports;
3. FERC's role in ensuring the reliable operation of the energy delivery infrastructure surrounding LNG terminals – both natural gas and electricity; and
4. Ensure that trade agreements do not allow countries that purchase U.S. natural gas to use the natural gas to subsidize their manufacturers.

We discussed our concern with DOE's definition and application of the "public interest" standard at some length in our response to your first question. We believe Congress should encourage DOE to conduct a rulemaking to address these concerns, and if that fails to address the concerns, we suggested how Congress could replace the "public interest" standard with a version of the "dual mandate" standard Congress gave the Federal Reserve.

Similarly, our response to your first question also discussed how DOE's October 17, 2013 letter to Senator Murkowski[33] contained commitments contrary to the NGA. Fortunately, concerns raised by a

[33] Letter, Paula A. Gant, Deputy Assistant Secretary, DOE Office of Oil and Natural Gas to The Honorable Lisa Murkowski, Senator Alaska, October 17, 2013.

letter can also be cured by a letter. Congress, perhaps a number of Senators under your leadership, could request a statement from the DOE in which DOE reconciles Congress's intent in the NGA, as detailed in our response to your first question, with their commitments to Senator Murkowski. If this or similar oversight efforts fail to address the concern, Congress could pass legislation amending the NGA to clarify its intent.

The third area involves the role of the FERC in ensuring that the operation of a new LNG terminal does not adversely affect the reliable operation of the interstate natural gas pipelines and electric power grid in the surrounding region. The increasing use of natural gas as a power generation fuel has created a growing number of complex interrelationships between interstate pipelines and regional electricity grids. It has also identified a growing number of strains in the U.S. energy infrastructure, particularly serious questions as to whether or not there exists sufficient pipeline capacity.[34] In response, FERC has seen fit to exercise its various authorities under the NGA, as well as under the Federal Power Act, to open investigations, convene technical conferences, initiate rulemakings, and issue orders that address these interrelationships and how it regulates pipelines and electricity systems.[35] An LNG export terminal could easily draw as much or more natural gas from its surrounding network of interstate gas pipelines as an electric generation station.[36] If there are concerns arising from the impact of electricity generation on the operation of surrounding gas pipelines, the operation of an LNG export terminal should raise similar concerns.

Moreover, precisely because these systems are interconnected, the operation of an LNG export terminal should also raise concerns on the durability and reliability of the surrounding electricity grid. While we do not assert the existence of a problem with any specific application, we certainly believe that these are concerns that FERC should include in its review of LNG terminal applications. Despite this, we cannot find where FERC has addressed these concerns in their review processes. Consequently, we believe that Congress should ask FERC to explain how it assesses these concerns, how FERC addresses and documents its conclusions on them in their review of LNG terminals applications, as well as what could cause FERC to withhold approval or recommend modifications to an LNG export terminal application. Again, if this or similar oversight efforts fail to address the concern, Congress could pass legislation amending the NGA to clarify its intent.

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[34] "Gas-Electric Coordination Quarterly Report to the Commission" FERC Docket No. AD12-12-000, Sept 18, 2014.

[35] On November 20, 2014, FERC issued an order directing regional electric power market operators to file reports on their efforts to address the need for fuel assurance. Fuel assurance describes the broad set of issues in RTOs and ISOs associated with generator access to sufficient fuel supplies and the firmness of generator fuel arrangements. FERC said that "while issues surrounding increased reliance on natural gas acts as an important driver of current fuel assurance concerns, the need to address fuel assurance continues to apply to all resources, regardless of fuel type." FERC said that a failure to address this issue now could lead to volatile and high fuel prices or costly RTO/ISO actions to ensure reliability. The RTOs/ISOs must file reports within 90 days (or by February 18, 2015) that describes the nature of the fuel assurance concerns specific to the region, comprehensive strategies the RTO/ISO has implemented to address market and system performance, and the specific programs and mechanism the RTO/ISO will use to carry out the strategies. Upon issuing this Order, Chairman LaFleur said: "We learned from the technical conferences, the events of last winter, and our efforts on gas-electric coordination that fuel assurance is critical to ensuring energy markets support reliability at just and reasonable rates."

[36] In 24 hours of operation at 100% power, an efficient 500 MW electric generating station will produce 12,000 MWH of electricity and will require 84,000 MMBtu of natural gas. A LNG Export terminal operating at 1 BCF/day, will demand 1,000,000 MMBtu/day of natural gas or 11.9 times as much as the 500 MW electric generating plant.

Fourth, under free trade agreements, U.S. natural gas should not be sold to countries that subsidize the price of natural gas to their industrial consumers. It does little good to have a free trade agreement with a country that gives them access to a finite U.S. resource that is then subsidized to provide unfair competitive advantage over U.S. manufacturers who are not subsidized and defeats the underlying purpose of a free trade agreement.

RESPONSE TO SENATOR FRANKEN

Question 1: The economic studies commissioned by the Department of Energy predict that liquefied natural gas exports could lead to natural gas price increases of 14 to 36 percent. What is the expected impact of such price increase in the manufacturing sector?

We appreciate your insightful question. As you know, the manufacturing sector is characterized by energy-intensive operations and, as such, we share several attributes:

- We are the only sector of the economy that requires globally competitive energy;
- Small changes in energy price, both natural gas and electricity, become large changes in cost;
- We compete globally and in an environment of unfair competition – in several cases, our competitors benefit from government assistance with energy and other costs; and
- Our companies are able to shift production to more welcoming locations that value manufacturing jobs.

The intuitive answer is correct: increases in natural gas prices will harm the manufacturing sector. This is the essential fact. But, there are also other embedded costs on which the increased price of natural gas is additive. We believe it important for policymakers to appreciate a more complete picture that is more complex, more dynamic, and worse than one would assume intuitively.

The manufacturing sector does not come to this discussion with a level playing field versus our global competitors. Rather, we have a burdensome costly and disadvantaged background from non-energy costs. For example, the expense of complying with federal regulations is steep. Manufacturers spend an estimated $192 billion annually [37] to comply with environmental, and workplace safety regulations, and ensure tax compliance—equivalent to an 11 percent.

As an example, U.S. industry is faced with the highest pollution abatement costs compared with its major trading partners—even higher than the so-called "green economies" of Western Europe. In 2007, U.S. manufacturers spent an estimated 6.2 percent of value-added complying with air and water emissions standards (which are among the strictest in the world), compared with 6 percent in France and Germany, 5.5 percent in Canada, and 3.5 percent in the UK. When compared to major manufacturing companies from non-OECD countries, the comparison gets substantially worse.

Furthermore, we arrive at today's discussion still struggling against a wide array of headwinds that have been opposing our progress for years, if not decades. The following quote from Richard McCormack's

[37] Cost of Regulatory Compliance, NAM, http://www.themanufacturinginstitute.org/Research/Facts-About-Manufacturing/Costs/Regulations/Regulations.aspx.

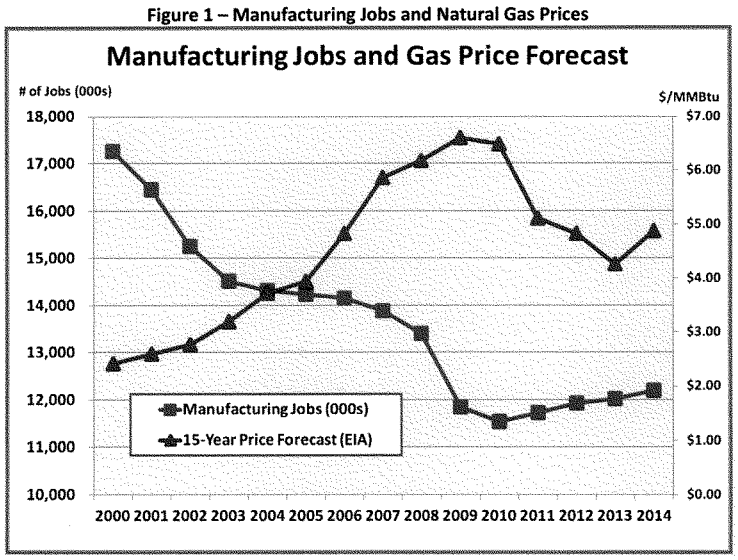
article entitled, "The Plight of American Manufacturing" is lengthy, but important (we recommend the entire article to your attention).

> "For American manufacturers, the bad years didn't begin with the banking crisis of 2008. Indeed, the U.S. manufacturing sector never emerged from the 2001 recession, which coincided with China's entry into the World Trade Organization. Since 2001, the country has lost 42,400 factories, including 36 percent of factories that employ more than 1,000 workers (which declined from 1,479 to 947), and 38 percent of factories that employ between 500 and 999 employees (from 3,198 to 1,972). An additional 90,000 manufacturing companies are now at risk of going out of business.
>
> Long before the banking collapse of 2008, such important U.S. industries as machine tools, consumer electronics, auto parts, appliances, furniture, telecommunications equipment, and many others that had once dominated the global marketplace suffered their own economic collapse. Manufacturing employment dropped to 11.7 million in October 2009, a loss of 5.5 million or 32 percent of all manufacturing jobs since October 2000. The last time fewer than 12 million people worked in the manufacturing sector was in 1941. In October 2009, more people were officially unemployed (15.7 million) than were working in manufacturing.
>
> When a factory closes, it creates a vortex that has far-reaching consequences. The Milken Institute estimates that every computer-manufacturing job in California creates 15 jobs outside the factory. Close a manufacturing plant, and a supply chain of producers disappears with it. Dozens of companies get hurt: those supplying computer-aided design and business software; automation and robotics equipment, packaging, office equipment and supplies; telecommunications services; energy and water utilities; research and development, marketing and sales support; and building and equipment maintenance and janitorial services. The burden spreads to local restaurants, cultural establishments, shopping outlets, and then to the tax base that supports police, firemen, schoolteachers, and libraries.
>
> Has U.S. manufacturing declined because its companies are not competitive? Hardly. American companies are among the most efficient in the world. The nation's steel industry, for instance, produces 1 ton of steel using two man-hours. A comparable ton of steel in China is produced with 12 man-hours, and Chinese companies produce three times the amount of carbon emissions per ton of steel. The same kinds of comparisons are true for other industries.
>
> But American companies have difficulty competing against foreign countries that undervalue their currencies, pay health care for their workers; provide subsidies for energy, land, buildings, and equipment; grant tax holidays and rebates and provide zero-interest financing; pay their workers poverty wages that would be illegal in the United States, and don't enforce safety or environmental regulations.
>
> Proponents of free trade and outsourcing argue that the United States remains the largest manufacturing economy in the world. Yet, total manufacturing gross domestic product in 2008 (at $1.64 trillion) represented 11.5 percent of U.S. economic output, down from 17 percent in 1999, and 28 percent in 1959. As for our balance of trade, U.S.

> imports of goods totaled $2.52 trillion in 2008, while exports came to $1.29 trillion -- creating a goods deficit of $821 billion. Those imported goods represented 17.6 percent of U.S. GDP. The U.S. trade deficit in goods and services in 2008 stood at $700 billion -- or more than $2,000 for every American."[38]

Figure 1 charts manufacturing jobs[39] and the price of natural gas.[40] While the decline in manufacturing jobs is the result of all of the headwinds mentioned by McCormack, when one critical input changes direction – lower natural gas prices – the U.S. manufacturing employment begins to build.

Figure 1 – Manufacturing Jobs and Natural Gas Prices



To be clear, none of the other factors listed by McCormack changed in 2009-2010. This should highlight the importance – the leverage – of natural gas prices to U.S. manufacturing.

We also pause to note that, while some advocates of unlimited LNG export justify their position by resorting to the all-encompassing slogan "*Free Trade,*"[41] the array of headwinds opposing the U.S. manufacturing sector listed by McCormack could hardly be characterized as *Free Trade*.

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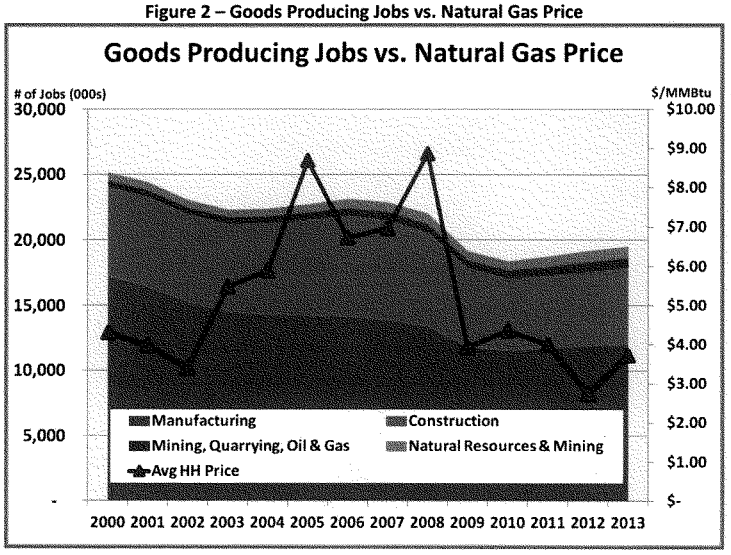
[38] McCormack, Richard, "The Plight of American Manufacturing" The American Prospect, December 21, 2009.
[39] Total annual average manufacturing jobs from monthly data reported by US Bureau of Labor Statistics.
[40] Manufacturing decisions are long-term decisions, made with expectations of conditions over several years. Instead of a single-year price, each point along the "15-Year Gas Price Forecast" is a representation of the Reference Case, long-term natural gas price forecast published by US EIA. To simplify the appearance of the chart, each point is the arithmetic average of the first 15 years of the forecast published for that year. While these forecasts could be simplified into single points using different methods, any method, consistently applied, would yield roughly the same line.

The manufacturing sector is critical to the U.S. economy. Figure 2 charts all "Goods Producing Jobs"[42] and "Natural Gas Price"[43] and illustrates a number of important facts. (The blue area in Figure 2 represents the same manufacturing jobs represented by the blue line on Figure 1.)

Figure 2 – Goods Producing Jobs vs. Natural Gas Price



- Even in 2014, the manufacturing sector represents almost 61% of all Goods Producing Jobs, which is down from 69% in 2000, but still the foundation of the U.S. economy, and more than 14 times the number of jobs in the "Mining, Quarrying, Oil & Gas" sector.

- The entire "Mining, Quarrying, Oil & Gas" sector, of which the Oil & Gas jobs touted by natural gas industry advocates are only a small part, increased by 29% from 2010 to 2014, but the actual job growth in this sector (189,000) is only about 11% of the total increase in Goods Producing Jobs over the same period (1,660,000). Over this same period, growth in manufacturing jobs (660,000) accounted for almost 40% of job growth in Figure 2.

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[41] This was essentially the position repeated by Mr. Ross E. Eisenberg, Vice President, Energy and Resources Policy National Association of Manufacturers and Mr. Martin J. Durbin, President and CEO America's Natural Gas Alliance during January 29, 2015 Hearing on LNG Export Legislation by The Senate Energy and Natural Resources Committee.

[42] Goods Producing Jobs (high-paying jobs) is total of Manufacturing; Mining, Quarrying, Oil & Gas; Construction; and Natural Resources and Mining Jobs, reduced to annual average totals from monthly data reported by US Bureau of Labor Statistics.

[43] Annual average natural gas price published by U.S. EIA.

- The entire "Mining, Quarrying, Oil & Gas" sector never accounts for more than 4.5% of all U.S. Goods Producing Jobs (in 2104). Despite the enthusiasm of energy industry advocates, part of 4.5% of U.S. Goods Producing Jobs could never be considered foundational to the U.S. economy.

It has been said, and we repeat that without manufacturing jobs, the U.S. has no middle class. From all of the above, we see the vulnerability of the manufacturing sector to increases in natural gas prices. By extension, and despite the flawed way DOE uses overall GDP to represent the "public interest," we believe these charts also show just how vulnerable the entire U.S. economy is to unlimited LNG exports, which will never be reviewed once licenses are approved.[44]

Hence, our two primary recommendations on optimizing the economics of LNG export[45] are:

1. Update the manner in which the "public interest" standard is defined and applied (see our responses to Senator Manchin); and

2. Supplement the domestic economic growth enabled by affordable energy with a carefully balanced volume of LNG exports that is reviewed and adjusted periodically.

We are grateful for your questions, and would be happy to address others if you require our assistance. I can be reached at 202-223-1661.

Sincerely,

Paul N. Cicio
President

The Industrial Energy Consumers of America is a nonpartisan association of leading manufacturing companies with $1.0 trillion in annual sales, over 2,900 facilities nationwide, and with more than 1.4 million employees worldwide. It is an organization created to promote the interests of manufacturing companies through advocacy and collaboration for which the availability, use and cost of energy, power or feedstock play a significant role in their ability to compete in domestic and world markets. IECA membership represents a diverse set of industries including: chemical, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, insulation, glass, industrial gases, pharmaceutical, building products, brewing, independent oil refining, and cement.

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[44] See statement DOE makes to Senator Murkowski regarding its stance on reviewing export licenses once they are issued. Letter, Paula A. Gant, Deputy Assistant Secretary, DOE Office of Oil and Natural Gas to The Honorable Lisa Murkowski, Senator Alaska, October 17, 2013.

[45] We also have concerns with FERC's attentiveness to how LNG export terminals could affect the operational reliability of the surrounding energy delivery infrastructure that we describe in our response to Senator Manchin.

Questions for the Record
January 29, 2015
Hearing: S. 33, the LNG Permitting Certainty & Transparency Act

Questions from Senator Barrasso

Mr. Martin J. Durbin

Question 1: During the hearing, Senator Franken stated that LNG exports and S. 33 "does Minnesota no good whatsoever." Do you agree with that statement? If not, would you explain how Minnesota can benefit from S. 33?

I respectfully disagree with Senator Franken's assertion that Minnesota will not benefit from US exports of natural gas. As I stated in my response to Senator Franken during the hearing, LNG exports will provide national benefits including economic, environmental and increased energy security.

Further, the economic benefits associated with planned LNG terminals are already happening in many states, including Minnesota. In fact, Matthew Kablen, Vice President, General Counsel & Secretary of Chart Industries, Inc., testifying on behalf of the National Association of Manufacturers before the House Ways & Means Committee last April stated that his company's Minnesota employees play a vital role in the LNG supply chain. He noted "...in places like New Prague, Minnesota, Owatonna, Minnesota and Canton, Georgia, we design and manufacture vacuum-insulated tanks, trailers and other transportation and dispensing equipment, which customers use to store, transport and deliver LNG."[1] *Mr. Klaben went on to note that "Approval of pending LNG export terminals would place Chart in a position to create jobs in the U.S. Chart designs and manufactures equipment that is needed to construct the export terminals in communities like La Crosse, Wisconsin, New Iberia, Louisiana, The Woodlands, Texas and New Prague, Minnesota. If Chart is selected to supply equipment for just one average-sized export terminal, it would support hundreds of jobs at Chart facilities, and further hundreds of jobs with Chart suppliers in other communities around the U.S."*

Study after study confirms that U.S. exports of LNG will result in significant economic benefits. A study by ICF International found that LNG exports will contribute up to 665,000 net job gains nationwide and up to $115 billion net gross domestic product (GDP) added to the U.S. economy by 2035.[2] *Additionally, according to the NERA Economic Consulting, which conducted a study on the macroeconomic impacts of LNG exports at the request of DOE, "LNG exports provide net economic benefits in all the*

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[1] Testimony of Matthew J. Klaben, Vice President, General Counsel, & Secretary, Chart Industries, Inc. before the House Ways & Means Subcommittee on Trade on "Trade Implications of U.S. Energy Policy and the Export of Liquefied Natural Gas (LNG)." April 9, 2014.
[2] ICF International, "U.S. LNG exports: State Level Impacts on Energy Markets and the Economy," Nov. 13, 2013, Key Findings.

scenarios investigated, and the greater the level of exports, the greater the benefits."[3] *Finally, in its 2015 Economic Report to the President, the White House Council of Economic Advisors stated that, "an increase in U.S. exports of natural gas, and the resulting price changes, would have a number of mostly beneficial effects on natural gas producers, employment, U.S. geopolitical security, and the environment."*[4] *S. 33 will provide certainty and transparency to the DOE permitting process for non-FTA nations thereby allowing the U.S. to fully realize the opportunities associated with LNG exports in states throughout the country, including Minnesota.*

Question 2: During the hearing, Senator King stated that New England's natural gas prices were the highest in the world last year – the world – that's a pipeline problem." Do you agree with Senator King that the problem with high natural gas prices in New England is the result of insufficient natural gas pipeline capacity in the region rather than LNG exports? Please elaborate.

New England, unlike the rest of the country, does not have a sufficient natural gas delivery system in place to fully service its gas demand during winter periods. FERC's 2012 State of the Market Report identified New England "as a market particularly at risk for service disruption due to limited pipeline capacity into the region."[5] *The lack of sufficient pipeline capacity coupled with high winter demand creates periods of notable price levels and volatility. Further, the U.S. currently does not export LNG, therefore these periodic winter price increases that New England experiences are not caused by LNG exports. New England is a relatively short distance from the largest natural gas field in the United States. Over the last several years we have seen dramatic increases in natural gas production in the Marcellus Shale. This presents us with an opportunity to strengthen our infrastructure to deliver this abundant, affordable and reliable natural gas to New England markets.*

Question 3: In your testimony, you state that: "Increased production of natural gas leads to an increase in natural gas liquids (NGLs)." You explain that: "Because dry natural gas and NGLs are co-products, an increase in dry gas production will result in an increase in NGL production." You go on to say that: "A new demand outlet for dry gas, such as LNG exports, encourages continued investment in overall production. Therefore, through LNG exports we can further this substantial increase in NGL supply." Finally, you state that: "An increase in NGL supply helps to preserve affordable NGL prices and this benefits domestic manufacturing industries." Would you explain which specific manufacturing industries benefit from increase in the supply of natural gas liquids?

The petrochemical industry and its downstream customers are direct beneficiaries of an abundant and consistent supply of natural gas and natural gas liquids (NGLs).

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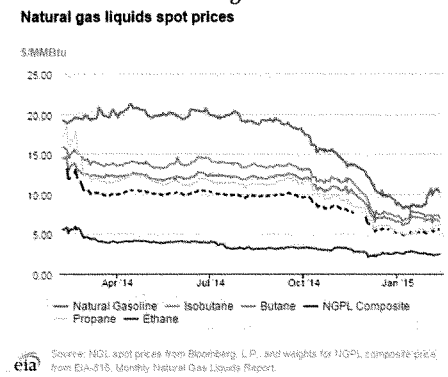
[3] NERA Economic Consulting, "Macroeconomic Impacts of LNG exports from the United States," Dec., 2012, 1.
[4] White House Council of Economic Advisors, 2015 Economic Report to the President, February 2015, accessible at http://www.whitehouse.gov/sites/default/files/docs/cea_2015_erp.pdf.
[5] Federal Energy Regulatory Commission, 2012 State of the Market Report, July 3, 2013, accessible at http://www.ferc.gov/market-oversight/reports-analyses/st-mkt-ovr/2012-som-final.pdf.

Some of the most commonly used NGLs are ethane, butane, and propane:

- *Ethane is used as a feedstock (raw material) in the production of ethylene for plastics. Ethane is also used in the production of detergents, plastics, antifreeze, pipes, packaging and more.*[6]
- *Butane is used as a feedstock for production of isobutene and butadiene, and as a blendstock for gasoline production.*[7] *Products from butane include synthetic rubber for tires, liquefied petroleum gas (LPG), and lighter fuel, to name a few.*[8]
- *Propane is used in the petrochemical industry to produce propylene. However, it is more commonly used for residential and commercial water heating, cooking, and space heating systems, as well as manufacturing plastics and solvents.*[9]

The revitalization of U.S. industrial activity is the result of an abundant and affordable natural gas and NGL supply (See Figure 1). Exporting natural gas through LNG exports will be an important tool in maintaining the U.S. manufacturing industry's influence both at home and in the international market. Permitting LNG exports drives demand for U.S.-produced dry natural gas and continued investment in overall production. Ultimately, this helps preserve low NGL and natural gas prices, which allows the domestic chemical, fertilizer, and plastics industries to produce products cost effectively.

Figure 1



[6] Energy Information Administration, "Hydrocarbon Gas Liquids (HCL): Recent Market Trends and Issues," (2014): 23, accessed January 2, 2015, http://www.eia.gov/analysis/hgl/pdf/hgl.pdf.
[7] A blendstock is a gasoline blend that has a lower volatility and octane rating than finished gasoline. When mixed with an oxygenate, such as ethanol, it has the same characteristics as finished gasoline.
[8] Energy Information Administration, "Hydrocarbon Gas Liquids (HCL): Recent Market Trends and Issues," (2014): 23, 25, accessed January 2, 2015, http://www.eia.gov/analysis/hgl/pdf/hgl.pdf.
[9] Ibid, 23, 24.

Questions for the Record
January 29, 2015
Hearing: S. 33, the LNG Permitting Certainty & Transparency Act

Questions from Senator Manchin

Mr. Martin J. Durbin

Question 1: You state in your testimony that "the relevant question is not will prices increase...rather how much will demand grow to take advantage of this abundant affordable resource." However, you also state that exports are projected to result in small price impacts. We know from the studies that you reference that in virtually every scenario, LNG exports result in increased prices. The most recent EIA study explicitly says: increased LNG exports lead to increased natural gas prices. Do you dispute that natural gas exports will lead to increased prices?

Since 2011, a number of analyses have examined the price impacts of LNG exports on domestic natural gas prices. The consensus among these studies is that under the likely levels of natural gas exports we will see very modest increases in the domestic price of natural gas and net economic benefits.

In a DOE commissioned study by NERA, examining 63 potential price scenarios issued in December 2012 (updated in March 2014 with several new scenarios) the study found that, "LNG exports provide net economic benefits in all the scenarios investigated, and the greater the level of exports, the greater the benefits."[1]

In their 2015 Report to the President ("the Report"), the White House Council of Economic Advisors found that LNG exports would result in economic and national security benefits for the United States. The report cites EIA estimates that "an increase in exports of 12 bcf per day by 2020 would raise U.S. residential retail prices by 2 percent between 2015 and 2040, although the EIA considers such a large exports increase by 2020 to be almost impossible."[2] *The Report found that an increase in U.S. exports of natural gas, and the resulting price changes, would have a number of mostly beneficial effects on natural gas producers, employment, U.S. geopolitical security, and the environment.*[3]

Question 2: What policies does Congress or DOE implement to safeguard against price increases from increased LNG exports that negatively impact the manufacturing sector or American consumers?

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[1] "Updated Macroeconomic Impacts of LNG Exports from the United States", http://www.nera.com/publications/archive/2014/updated-macroeconomic-impacts-of-lng-exports-from-the-united-sta.html, February 20, 2014.
[2] White House Council on Economic Advisors, "Economic Report of the President", http://www.whitehouse.gov/sites/default/files/docs/cea_2015_erp.pdf, February 2015, 261.
[3] Ibid.

As the lead federal agencies for permitting LNG terminals and approving exports of LNG, the Federal Energy Regulatory Commission (FERC) and the Department of Energy (DOE) undergo comprehensive reviews prior to approval. The FERC process includes a full NEPA analysis. The DOE subsequently is able to take FERC's conclusions from the NEPA review into consideration when making its determination as to whether exporting to non-FTA nations is in the public interest.

In a report requested by Senate Energy & Natural Resources Committee Chairman Lisa Murkowski, the GAO provided an overview of the DOE public interest determination:

> *According to DOE, when determining whether approval of an application is in the public interest, DOE focuses on (1) the domestic need for natural gas, (2) whether the proposed export threatens the security of domestic natural gas supplies, and (3) whether the arrangement is consistent with DOE's policy of promoting market competition along with other factors bearing on the public interest, such as environmental concerns. In passing the NGA, Congress did not define "public interest;" however, in 1984, DOE developed policy guidelines establishing criteria that the agency uses to evaluate applications for natural gas imports ((49 Fed. Reg. 6684 (Feb. 22, 1984)). The guidelines stipulate that, among other things, the market—not the government—should determine the price and other contract terms of imported natural gas. In 1999, DOE began applying these guidelines to natural gas exports.*[4]

The DOE process has led to a deliberative and comprehensive review for determining whether U.S. exports of LNG are in the public interest. However, due to unpredictability in approval timelines, that process needs greater certainty. S. 33, the LNG Permitting Certainty & Transparency Act, will simply add needed certainty and transparency for applicants investing (or planning to invest) billions of dollars in the construction or conversion of LNG terminals.

As I discussed in my testimony, increased domestic production of natural gas will continue to lead to increased production of natural gas liquids ("NGLs"), which will maintain and grow the abundant supply of NGLs for use in the petrochemical sector. According to the EIA, between 2014 and 2018, U.S. petrochemical capacity expansion projects are projected to increase domestic demand for ethane by nearly 600,000 barrels per day (bbl/d) and propane by nearly 200,000 bbl/d. This growing demand is due to the favorable prices of NGL's as a result of increased natural gas production. A strong export policy will ensure that this growth in production continues, and in turn will continue to benefit the industrial sector.

A robust natural gas export policy, including enactment of S. 33, will help strengthen our domestic manufacturing sectors. That is the reason S. 33 has received strong support from the National Association of Manufacturers.

The State of West Virginia is also benefiting directly from the increased production of natural gas and NGLs. West Virginia is home to the Utica and Marcellus formation –

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[4] U.S. Government Accountability Office, "Federal Approval Process for Liquefied Natural Gas Exports", http://www.gao.gov/assets/670/666177.pdf, Feb. 11, 2015, p. 9.

two of the most prolific shale plays in the world. Southwestern Energy, an ANGA member, is developing over 400,000 acres of reserves in the shale fields of West Virginia and Pennsylvania alone. Last year, the Small Business & Entrepreneurship Council, released a study highlighting that employers in the oil and gas industries added 5,731 jobs from 2005 to 2012 - that's over 40% of the 14,084 direct jobs created during the same period.[5]

In his State of the State address, Governor Tomblin highlighted Project ASCENT – a multi-billion dollar cracker plant by Odebrecht and Braskem planned for West Virginia. The Governor noted that "This type of project will serve as an anchor for new value-added industries and chemical hubs that will be part of a manufacturing renaissance in America."[6] *The plant would create thousands of construction jobs and hundreds of permanent jobs in the State and a robust natural gas production environment with diverse demand outlets will support it.*

As the FERC and DOE processes help safeguard the public interest, increased natural gas production is benefiting domestic manufacturers and a strong export policy will continue those benefits into the future for the United States and West Virginia.

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[5] Small Business and Entrepreneurship Council, "Benefits of Natural Gas Production and Exports for U.S. Small Businesses: Nationally and Key States," http://www.sbecouncil.org/wp-content/uploads/2014/11/BenefitsofNaturalGasSBECouncil.pdf, accessed Feb. 11, 2015, p. 66.

[6] Governor Earl Ray Tomblin, "State of the State Address", January 14, 2015, available at http://www.governor.wv.gov/media/pressreleases/2015/Pages/Governor-Tomblin-Delivers-State-of-the-State-Address.aspx.

Questions for the Record
January 29, 2015
Hearing: S. 33, the LNG Permitting Certainty & Transparency Act

Questions from Senator Wyden

Mr. Martin J. Durbin

Question 1: As the former Chairman of the Senate Energy and Natural Resources Committee, I continue to have a strong interest in making sure that all of the benefits that the shale gas revolution has brought to the American economy are not undone by adverse impacts on the environment and on communities. One issue I continue to be concerned with is the substantial increase in earthquakes in parts of the country that are associated with increased amounts of wastewater injection from oil and gas activities.

The linkage between earthquakes and wastewater injection is something that the National Academy of Sciences highlighted as a potential cause for concern in its 2013 report "Induced Seismicity Potential in Energy Technologies", as well as in testimony before the Senate Energy Committee. The United States Geological Survey (USGS) monitors these potential linkages, and its findings are also concerning. I have included figures below from the USGS that have been excerpted from a report prepared for me by the non-partisan Congressional Research Service. The first figure shows that the USGS had found that a significant increase in earthquakes greater than magnitude 3.0 has occurred in the Central and Eastern United States since 2009. The second figure shows that the State of Oklahoma averaged about 2 earthquakes greater than a magnitude of 3.0 from 1978 to 2008, but has shown a steep increase in the number of such earthquakes since 2009, to the point that USGS had recorded 145 earthquakes greater than magnitude 3.0 in just the first four months of 2014.

Do you believe that there is a link between increased activities related to oil and gas development and the substantial increase in earthquakes greater than 3.0 in magnitude in Oklahoma and elsewhere in the central and eastern United States?

If the answer to the first question is yes, what action can and should be taken, and by whom, to reduce the risks of human-induced earthquakes as domestic oil and gas resources are being developed?

Whether or not a direct link is ultimately made between wastewater injection wells and increased seismic activity in specific areas, much is already being done by industry, states, academia and others to identify potential causes and manage potential risks. Two noteworthy examples include the State Oil and Gas Regulatory Exchange (SOGRE) Induced Seismicity Work Group and the Stanford Center for Induced and Triggered Seismicity Work Group.

In the spring of 2014, the state oil and gas regulatory agencies and geological surveys partnered with the Interstate Oil & Gas Compact Commission (IOGCC) and Ground Water Protection Council (GWPC) to form a work group to share information regarding the possible association between recent seismic events occurring in multiple states and injection wells.

State agencies participating in the SOGRE Induced Seismicity Work Group collaborate and share science, research, and practical experience to equip the states with the best decision-making tools to evaluate the possible connections between seismic events and injection wells, minimize risk, and enhance appropriate readiness when seismic events occur.

Additional stakeholders including industry, environmental groups, and the scientific community have been invited to participate and are part of a current exercise to develop an Induced Seismicity Primer, which is slated for completion by late September 2015. This work will be instrumental in guiding states on important decision-making regarding oil and gas injection wells.

The Stanford Center for Induced and Triggered Seismicity (the "Center") was established to examine the topic of induced and triggered earthquakes. The Center's mission is to "conduct fundamental research on the physical processes responsible for induced and triggered seismicity, to carry out intensive case studies and to develop a scientifically-based framework for seismic risk assessment."[1] In addition to examining fluid injection and hydraulic fracturing, the Center also studies geothermal energy development, injection of carbon dioxide, wastewater disposal, fluid extraction and mining activities. Representative members of industry[2] are working with the Center to (1) cultivate an improved understanding of the science behind induced seismicity; (2) develop a consensus-driven risk management framework; and (3) develop consensus-driven risk management tool kits.[3]

Our shale energy abundance is the result of significant technological innovation by oil and gas industry, and we will continue to be part of the solution in addressing important questions such as this.

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[1] Stanford Center for Induced and Triggered Seismicity, https://pangea.stanford.edu/researchgroups/scits/about.
[2] Members include Baker Hughes, BHP Billiton, BP America Production, Chesapeake Energy Corporation, Chevron Corporation, Conoco Philliips, Continental Resources, Devon Energy, Encana Corporation, Exxon Mobil Corporation, Gulfport, Halliburton Corporation, Hess Corporation, Laredo Petroleum, Marathon Oil Corporation, Newfield Exploration, Nexen Petroleum USA, Pioneer Natural Resources, Sandridge Energy, Schlumberger and Shell International Exploration.
[3] Stanford Center for Induced and Triggered Seismicity, https://pangea.stanford.edu/researchgroups/scits/about.

RESPONSES TO QUESTIONS FOR THE RECORD

ROSS EISENBERG, NATIONAL ASSOCIATION OF MANUFACTURERS

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
HEARING ON S. 33, THE LNG PERMITTING CERTAINTY AND TRANSPARENCY ACT

FEBRUARY 19, 2015

Questions from Senator Barrasso

1. **During the hearing, Senator Franken claimed that LNG exports and S. 33 "does Minnesota no good whatsoever." Do you agree with that statement? If not, would you explain how Minnesota businesses and workers can benefit from S. 33?**

The NAM continues to believe that natural gas and liquefied natural gas (LNG) exports will benefit Minnesota. In fact, several manufacturers in Minnesota are actively producing components of LNG export terminals under construction *right now*, and others are preparing to take part in the LNG supply chain. Attached is written testimony of NAM member Chart Industries, given to the House Ways and Means Committee in April 2014. As stated in its testimony, Chart Industries has facilities in New Prague, Minnesota, and Owatonna, Minnesota where it designs and manufactures vacuum-insulated tanks, trailers and other transportation and dispensing equipment, which customers use to store, transport and deliver LNG. In addition, Cargill received authorization from the Department of Energy (DOE) on January 8, 2015, to export LNG to Canada and Mexico.

The natural gas industry is creating opportunities for manufacturers throughout Minnesota. For instance, 3M manufactures advanced natural gas storage tanks. Ecolab and its Nalco subsidiary provide a wide range of gas production and processing solutions and natural gas water management technologies. Valspar manufactures functional coatings for natural gas pipelines, a business that has grown significantly in recent years and enabled the company to expand production facilities. Graco manufactures drilling equipment, fluid handling solutions, pumps and compressors, and many other products and technologies for the natural gas sector.

In 2012, IHS Global Insight found that the economic activity associated with unconventional gas production directly and indirectly supported over 19,000 jobs in Minnesota. IHS predicted this number to grow to 35,000 jobs by 2020 and 42,000 jobs by 2035. The bulk of this growth will be manufacturing employment, because, as IHS found, "the state has a highly-educated workforce that will prove beneficial as manufacturers struggle to find well-trained employees for high-tech manufacturing. This will be a draw to manufacturing firms looking to build new facilities in the United States."[1]

2. **During the hearing, Senator Stabenow cited a study entitled, "U.S. Manufacturing and LNG Exports," prepared by Charles River Associates. Please explain the flaws in the assumptions underlying this study.**

[1] http://www.api.org/~/media/Files/Policy/SOAE-2013/Americas_New_Energy_Future_State_Highlights_Dec2012.pdf.

In February 2013, Charles River Associates released an economic study of the potential macroeconomic impacts of LNG exports. Like any economic study, attention must be paid to the assumptions. In the case of this study, the authors made extremely aggressive assumptions regarding the amount of LNG that would ultimately be exported and extremely conservative assumptions about the amount of domestically-produced natural gas available to the market. As with any commodity, if one assumes that demand will be sky-high and supply will be constrained, prices increase. However, as the DOE and the Energy Information Administration (EIA) have both routinely found, neither assumption is supported by fact: we have a rapidly expanding, cost-effective supply of natural gas as well as a projected international demand that will be more moderate than Charles River Associates forecast. The Charles River Associates report remains an outlier among the dozens of economic studies produced by experts on LNG exports in recent years.

3. **During the hearing, Senator King suggested that Congress should cap the total amount of LNG exported from the United States. Are there legal implications for such a cap with respect to the United States' international trade obligations?**

In helping to create the multilateral trading system now known as the World Trade Organization (WTO), the United States and other WTO members agreed to international rules that prevent member countries from imposing any quantitative restrictions on the exportation of products (GATT 1994, Article XI), subject only to limited shortages and agricultural exceptions. As a result, any hard cap on U.S. exports would run afoul of this internationally recognized commitment. The United States has worked vigorously to enforce this commitment globally, including through bringing successful WTO cases against China for its quantitative export limits on raw materials and rare earths.

In a November 2013 report for the NAM, former WTO Appellate Division Chairman James Bacchus described the legal justification against such caps or export restraints:

> The United States has, since its creation, recognized the importance of exports to growing the domestic economy. From the beginning, the United States enacted its own prohibition on export tariffs in Art. I, clause 5 of the U.S. Constitution. As the lead architect of the GATT in 1947, the United States promoted and readily agreed to a multilateral prohibition on quantitative export restraints.
>
> The strong U.S. preference for exports and its clear rejection of export limits and restraints comes from both a recognition of the importance of exports to growth and the negative consequences that would ensue if other countries could block the export of valuable natural resources, commodities or even technologies. That recognition deserves equal weight today as export restraints on a variety of raw materials and resources are cropping up worldwide in ways that limit competitive U.S. access to valuable inputs and supplies. Full implementation of core WTO principles—particularly the prohibition of export restraints—is very strongly in the United States' interest. Action by the United States that would undermine or bring into question the U.S. commitment to that obligation raises very important issues.[2]

[2] Bacchus, J. and Jeong, R., *LNG and Coal: Unreasonable Delays in Approving Exports Likely Violate International Treaty Obligations*, November 2013, *available at* http://old.nam.org/~/media/9CCC6B36723C4AEDB37F78C19EBE8971.ashx.

4. **During the hearing, Senators Stabenow and King raised concerns that S. 33 would result in a situation similar to that in Australia. Do you agree with this comparison? If not, please explain why such a comparison is factually inaccurate.**

I disagree with this comparison, for several reasons. First off, the characterization of Australia's natural gas situation at the hearing appears to be overblown. Assertions that Australian natural gas prices have almost tripled in recent years are not grounded in fact. The 2014 IGU Wholesale Gas Price Survey reports that average Australian wholesale natural gas prices are around US$4.50/mmbtu, up from around US$4.00/mmbtu in 2010, with an average annual increase of just 3 percent over this period.[3]

Moreover, Australia appears to enjoy a relative advantage over many of its competitors on natural gas. Australia's natural gas is priced at less than half of European supplies or emerging nations like China, and only about 25 percent of premium markets like Japan. This is a likely reason why Australian manufacturers have signed 19 long-term gas supply contracts since December 2012, reflecting a positive long-term outlook for industrial gas prices.[4]

Finally, this comparison rests on an assumption that S. 33 would cause "unfettered" exports, which history has already proven is not a threat. S. 33 ensures that the free hand of the marketplace, rather than bureaucratic inertia, governs international trade by providing a 45-day deadline on the DOE to approve or deny pending LNG export applications. The DOE admitted at the Committee's hearing, and Secretary of Energy Ernest Moniz recently reiterated, that the 45-day deadline imposed by S. 33 would not be a problem for the DOE to meet.

Questions from Senator Manchin

1. **Today we heard from Paul Cicio with the Industrial Energy Consumers of America about the devastating impacts that he believes higher energy prices could have on Energy Intensive Trade Exposed industries. Additionally, some chemical companies and labor groups have raised similar concerns. Does the National Association of Manufacturers share those concerns? Why or why not?**

The NAM was founded 120 years ago to promote open markets and free trade for domestic manufacturers. These principles are embedded in our policies today, including those for energy exports. Regarding LNG and natural gas, the NAM's official policy positions were established in March 2012 by the NAM Board of Directors, with full participation in the drafting by both energy producers and users, including the energy-intensive manufacturers represented by IECA and NAM at the Committee's hearing. The NAM's policies are as follows:

Liquefied Natural Gas
The dramatic increase in the domestic natural gas resource base has reduced the likelihood of the need for significant Liquefied Natural Gas (LNG) imports. Some now believe the U.S. could eventually become a net exporter of natural gas. An adequate supply of natural gas is needed to meet the growing demand of the U.S. manufacturing sector in a recovering economy. The NAM strongly supports federal and state policies to accommodate growth in domestic natural gas production. We further believe abundant

[3] http://www.igu.org/publications.
[4] http://www.appea.com.au/wp-content/uploads/2014/09/Gas-supply-deals-since-Nov-2012.pdf.

domestic natural gas resources can fuel a renaissance in U.S. manufacturing. The NAM fundamentally supports free trade and open markets. We support a natural gas policy process that is open, transparent and objective.

Natural Gas and Manufacturing
Industry relies on natural gas for much of its energy needs and as a raw material. The NAM believes policies that encourage the cost-effective use of natural gas to grow American manufacturing should be encouraged.

The U.S. economy relies on natural gas for much of its energy needs and as a feedstock for commercial products. Natural gas is and will remain an important manufacturing commodity because of its scalability, affordability, versatility and efficiency. The NAM supports policies at the federal and state level that facilitate the responsible and expeditious development of natural gas resources, allowing these benefits to contribute to America's economic recovery and to accrue for energy consumers.

The principles above remain the policy of the NAM on LNG and natural gas.

As clearly indicated by the policy language above, the NAM is not calling for policies that favor LNG exports over the use of natural gas domestically. Nor are we calling for policies that would engineer the opposite. Our policy statements highlight the important role domestic natural gas resources can have for the manufacturing economy. Natural gas has proven itself to be a game-changer that is fueling major investments across the manufacturing supply chain, supporting millions of jobs and ensuring that the United States remains the world's top manufacturing economy. As our policy makes clear, we believe "abundant domestic natural gas resources can fuel a renaissance in U.S. manufacturing," and "encourage the cost-effective use of natural gas to grow American manufacturing." We believe in "a natural gas policy process that is open, transparent and objective." Manufacturers absolutely need a cost-effective, secure supply of natural gas, particularly as market conditions and environmental regulations have limited other fuel choices for our operations. But these needs must be balanced with manufacturer's commitment to free trade and open markets.

2. **What policies does Congress or DOE implement to safeguard against price increases from increased LNG exports that negatively impact the manufacturing sector or American consumers?**

Certainly, Congress and DOE can and should conduct oversight over energy exports to ensure that the process continues to be open, transparent and objective. DOE is clearly doing this already. Each final DOE authorization requires the exporter to provide the following information on a monthly basis: (1) the name(s) of the authorized exporter registered with DOE/FE; (2) the name of the U.S. export terminal; (3) the name of the LNG tanker; (4) the date of departure from the U.S. export terminal; (5) the country (or countries) of destination into which the exported LNG was actually delivered; (6) the name of the supplier/seller; (7) the volume in Mcf; (8) the price at point of export per million British thermal units (MMBtu); (9) the duration of the supply agreement; and (10) the name(s) of the purchaser(s). Failure to make such a report constitutes grounds for the DOE to rescind export authorization.

Enclosure: Written Testimony of Chart Industries before the House Committee on Ways and Means, April 9, 2014

NATIONAL ASSOCIATION OF
Manufacturers

Leading Innovation. Creating Opportunity. Pursuing Progress.

Testimony

of Matthew J. Klaben
Vice President, General Counsel and Secretary
Chart Industries, Inc.

before the House Committee on Ways and Means
Subcommittee on Trade

on "Trade Implications of U.S. Energy Policy and the Export of Liquefied Natural Gas (LNG)"

April 9, 2014

TESTIMONY OF MATTHEW J. KLABEN

BEFORE THE HOUSE COMMITTEE ON WAYS AND MEANS, SUBCOMMITTEE ON TRADE

Hearing on: *"Trade Implications of U.S. Energy Policy and the Export of Liquefied Natural Gas (LNG)"*

APRIL 9, 2014

Good morning, Chairman Nunes, Ranking Member Rangel, and members of the Subcommittee on Trade. My name is Matt Klaben, and I am Vice President, General Counsel and Secretary of Chart Industries, Inc. Chart is a leading independent global manufacturer of equipment for a wide variety of cryogenic and gas processing applications. Our equipment is used in the production, storage, distribution and end-use of atmospheric and industrial gases as well as natural gas itself. Chart has about 3,000 employees at locations in a dozen states across the U.S. From communities in Minnesota to Texas, and California to New York, and in between, my colleagues make high quality products for both domestic consumption and export to markets around the world.

I appear here today on behalf of Chart and the National Association of Manufacturers (NAM), an organization in which Chart is a proud member. The NAM is the nation's largest industrial trade association, representing nearly 12,000 small, medium and large manufacturers in every industrial sector and in all 50 states. Manufacturers are major energy consumers, using one-third of the energy consumed in the United States. For manufacturers, natural gas is a

critical component of an "all-of-the-above" energy strategy that embraces all forms of domestic energy production, including oil, gas, coal, nuclear, energy efficiency, alternative fuels and renewable energy sources.

Today's hearing is about the trade implications of U.S. energy policy, in particular how the export of liquefied natural gas, or LNG, fits into our energy strategy. It is also about the potential opportunities that exist for companies like mine and our employees in communities across the United States.

Natural gas liquefaction is a manufacturing process. To convert natural gas to LNG, the gas is processed to remove impurities, like water, condensates as well as other gases, such as carbon dioxide, hydrogen sulfide and sometimes nitrogen and helium. The gas is then super-cooled in several stages until it is liquefied and ready for shipping.

Chart plays a vital role in the LNG supply chain, producing highly engineered equipment for applications from liquefaction to end use. For liquefaction, at facilities in places like La Crosse, Wisconsin, New Iberia, Louisiana, The Woodlands, Texas, and Tulsa, Oklahoma, we design, manufacture and fabricate equipment, such as heat exchangers, pressure vessels and cold boxes, that customers use to process and chill natural gas to produce LNG. Continuing along the LNG supply chain, in places like New Prague, Minnesota, Owatonna, Minnesota and Canton, Georgia, we design and manufacture vacuum-insulated tanks, trailers and other transportation and dispensing equipment, which customers use to store, transport and deliver LNG. Finally, we design and manufacture fuel tanks for trucks, buses, railroad

locomotives and even ships that use LNG as a transportation fuel in places like Canton, Georgia and New Prague, Minnesota.

Chart's participation in the LNG value chain has put us in a position to create many good-paying jobs in communities across the U.S. In recent years, we have invested tens of millions of dollars to expand our facilities in various American communities to be prepared for these opportunities. Let me take a few moments to tell you about one of those in La Crosse, Wisconsin, where we recently completed the expansion of our brazed aluminum heat exchanger manufacturing plant. This $50 million project increases the manufacturing capacity for our heat exchangers in La Crosse by 40%, doubles our engineering space and includes an additional vacuum brazing furnace, which is the largest of its type in the world. Our La Crosse facility employs more than 600 people and has a rich heritage boasting more than 60 years of uninterrupted heat exchanger manufacturing in the area. We have a five year contract with Machinist Union Local Lodge 2191, which continues our proud 60 year partnership with the International Association of Machinists and Aerospace Workers. In La Crosse, as we have done in other communities across the U.S., we have laid the foundation to support job growth, in anticipation of LNG-related opportunities continuing on their natural course, without artificial barriers.

The Department of Energy, or DOE, has received applications for 31 proposed terminals seeking to export LNG to non-free trade agreement (FTA) countries. While most of these proposed terminals have received approval to export to FTA countries, only seven have obtained approval to export to non-FTA

countries. Once built, these seven facilities are estimated to produce 12.87 billion cubic feet per day (Bcf/d), of which a significant portion would only be allowed for export to FTA countries.[1] The DOE licensing process has become a regulatory choke point for LNG export applicants; at DOE's current pace, some of the applications in the queue could be waiting until 2016 or later before they can move to the next step in the multi-year permitting process. As we look at demands growing in Europe, Asia and elsewhere, we believe this process is far too slow and contrary to our long tradition as an exporting nation and to our international obligations.

Manufacturers believe LNG exports should be governed by principles of free trade and open markets. Manufacturers also oppose bans or similar market-distorting barriers to exports of LNG or any other commodity here in the United States and around the world. For this reason, the NAM has called on the DOE to accelerate the decision making process for the remaining 24 applications in its queue. The DOE owes applicants an up-or-down decision as expeditiously as possible, so that the market may operate properly.

Approval of pending LNG export terminals would place Chart in a position to create jobs in the U.S. Chart designs and manufactures equipment that is needed to construct the export terminals in communities like La Crosse, Wisconsin, New Iberia, Louisiana, The Woodlands, Texas and New Prague, Minnesota. If Chart is selected to supply equipment for just one average-sized export terminal, it would support hundreds of jobs at Chart facilities, and further hundreds of jobs with Chart suppliers in other communities around the U.S. And

[1] http://energy.gov/fe/downloads/summary-lng-export-applications.

we do expect that we will participate in this infrastructure build-out, if it moves forward.

Chart and its suppliers are not alone—we represent just a small part of the LNG value chain and the total work needed. Each LNG export terminal costs roughly $10 billion to construct. Each project would create thousands (and in some cases tens of thousands) of jobs and generate billions of dollars in economic benefits. Manufacturers across the country would create jobs making compressors, heat exchangers, storage tanks, pipes, valves and other components of these state-of-the-art infrastructure projects.

Importantly, even after construction is completed, the operation of LNG export terminals could put Chart and other manufacturers in a position to create many more U.S. jobs, while enhancing American energy security through the creation of needed domestic infrastructure. Let me suggest a few examples. First, the demand for natural gas from these terminals would lead to production of additional natural gas liquids—valuable by-products from gas that generally are not part of natural gas liquefaction but instead are used in other manufacturing processes. Chart and other manufacturers make the equipment needed for processing these liquids and for their use in industry. In addition, we believe the construction of these terminals would promote an environment of further business investment in LNG applications, providing an opportunity for Chart and other manufacturers to create more jobs building things like domestic infrastructure for use of LNG as a transportation fuel. Finally, some of the LNG output of these terminals could serve domestic LNG fueling needs if market

conditions support it, potentially relieving domestic LNG supply shortfalls that today limit our use of this clean-burning American fuel. In the end, we expect the existence of LNG export terminals will help unlock the true potential that America's natural gas wealth holds for American manufacturing, job growth and energy security.

From our country's earliest days, the United States has recognized the importance of exporting to grow our economy. Indeed, Article I section 9 of our own Constitution banned the imposition of export taxes. The United States has also led the world in adopting international rules to prohibit countries from using export restrictions to gain an unfair competitive advantage. The NAM was pleased to see the World Trade Organization (WTO) enforce these obligations with China, which was restricting exports of raw materials and rare earths to the detriment of U.S. industries and workers.

For the United States, the same principles must apply. In December 2013, former WTO Appellate Body Chairman James Bacchus authored a report for the NAM concluding that the delay by the DOE to issue licenses to export LNG to foreign countries likely constitutes, in and of itself, a violation of our international obligations under the WTO. As a member of the WTO, the United States is bound to comply with trade rules contained in WTO agreements that we helped develop. If the United States is going to continue to lead the world in pursuing a rules-based international system, we should not ourselves be in violation of the very same commitments we ask others to respect.

With 95 percent of the world's consumers living outside of the U.S., export bans on any product, including LNG, can be expected to have far-reaching negative effects, including on domestic economic opportunities, employment and ultimately economic growth. The U.S. government's ability to convince other countries to eliminate their existing export restraints on agricultural, forestry, mineral and ferrous scrap products—just to name a few—will be seriously compromised if the U.S. imposes its own export restrictions. Even worse, as the world's largest economy and largest trading country, U.S. actions are often replicated by our trading partners to our own dismay. If the United States goes down the path of export restrictions, even more countries would quickly follow suit and could easily limit U.S. access to other key natural resources or inputs that are not readily available in the United States.

At Chart, last year we manufactured and sold over $800 million of high quality products from communities across the United States. We exported over 44% of those American-made products to customers around the world in places as diverse as China, Europe and Australia. Chart and many others across the U.S. benefit from the principles of free trade to support American manufacturing jobs from coast-to-coast and in between. Deviations from those principles, whether at home or abroad, can only hurt us and our communities as a whole.

Conclusion

With the right energy policies in place, manufacturers could experience a true resurgence. Chart is no different. Robust development of our nation's vast natural gas resources will help drive domestic manufacturing as a critical

component of a true “all-of-the-above” energy strategy. To the extent the market creates opportunities for LNG exports the government should not be standing in the way of those opportunities. We believe the market can provide equilibrium between affordable, abundant gas supplies for domestic manufacturers and opportunities for LNG exports.

Answer to Questions for the Record

Testimony of David Koranyi, Director of the Atlantic Council's Eurasian Energy Futures Initiative

Before the United States Senate Committee on Energy and Natural Resources

Accelerating US LNG Export Liberalization – The Geopolitical Context

January 29, 2014, Room 366 Dirksen Senate Office Building

Questions from Senator Barraso

1. Lithuania commissioned its floating regasification terminal, aptly named the "Independence" in 2014. Even before the terminal started operating, Gazprom – no longer being able to retain its monopoly positions on the Lithuanian gas market - agreed to a significant price concession amounting to at least 20%[1]. Greece has a functioning LNG terminal since 1999, with an increased capacity (5.2-5.3 billion cubic meters annually) since 2007 which it successfully used as a leverage to extract price concessions from the Russian supplier, most lately during the renegotiation of its gas supply agreement with Gazprom during 2013-14[2].
2. (1) US LNG exports to Asia would increase liquidity on the Asian markets and create competition for Russian (as well as Australian, Central Asian and other) gas by increasing the source options available for China, Japan, South Korea and other buyers and breaking the oil-indexed pricing model that Russia traditionally favored. This is in the interest of the US and its allies for several reasons. Firstly increased usage of gas in Asia to replace coal fired power generation and limit the rapid growth of CO2 emissions is a global interest in the fight against climate change (burning gas to generate electricity emits roughly 50% of coal). Secondly it limits Russia's ability to replenish its lost revenue streams in Europe sustaining the Putin regime and its cronies and forces Russia to compete on a more liquid market, limiting rent-seeking. Thirdly helping to provide energy resources to enable uninterrupted Asian economic growth is also in the interest of the US and its allies as it fuels economic growth back home.

[1] See more: Lithuania claims gas price victory in battle with Gazprom, Financial Times, May 13, 2014 http://www.ft.com/cms/s/0/2b6f3ef0-dab2-11e3-9a27-00144feabdc0.html#axzz3SCqmvnj2

[2] See more: Greece confirms 10-yr extension of gas supply deal with Russia's Gazprom, Reuters, February 25, 2014 http://www.reuters.com/article/2014/02/25/greece-gazprom-idUSL6N0LU3JG20140225

3. The Russian leadership actively uses corrupt practices to further its geopolitical ambitions in Europe and beyond. The Kremlin targets countries with already highly corrupt political elites in Europe and entices them to enter into major energy deals with Russia on nuclear energy and natural gas. These deals are very often not in the interest of the given country in the long-term, are opaque and awarded without proper tendering process (like the Paks nuclear power plant expansion in Hungary) and run against European legislation (like the now defunct South Stream pipeline project in Bulgaria or Serbia). Elements of personal enrichment and the ability to reward cronies from these major construction projects are critically dangerous, since the expose the leadership of these countries to blackmail and foreign influence – thus limiting their ability to act as responsible allies and partners.
4. The United States just as Europe benefited enormously in the past decades from a global economic system that slowly moved towards more openness and transparency, creating more stable trade and investment conditions and enriching all communities in the process. Limitations on oil and natural gas trade in the United States have been based on exceptional historical circumstances that no longer stand in the age of the North American unconventional revolution and oil and gas abundance. The continuation of restrictive measures not only hurts the credibility of the US in global trade talks but is also detrimental to its economic development and job creation potential. Even in the case of unlimited exports of natural gas, the US will retain its competitive edge as in the absence of a similar and highly unlikely shale gas revolutions there, gas prices in Europe and Asia will remain substantially higher due to the liquefaction, transport and regasification costs.

Questions from Senator Franken

1. There is significant LNG infrastructure in place in Europe available to contract and to receive LNG shipments from the United States and elsewhere. LNG terminal capacity amounted to close to 200 billion cubic meters per year at the beginning of 2014 (see figure 1.), significantly higher than Gazprom's export to the EU (161.5 billion cubic meters in 2014).

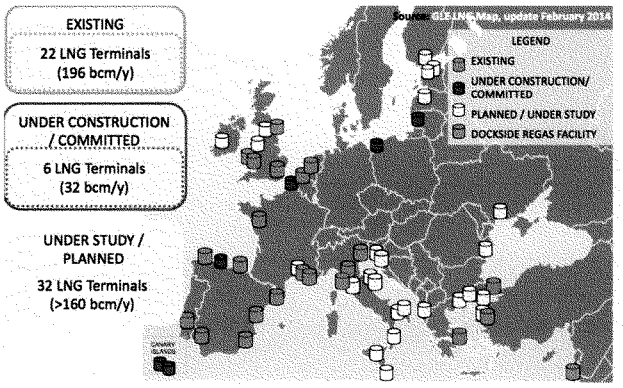

Figure 1. LNG terminals in Europe

Indeed there is a structural problem in terms of access: most of these terminals are located in Western Europe, limiting the ability of the more vulnerable Central and Eastern European Member States to access them. Nevertheless, there are terminals under construction or planned there as well (Poland's Swinojuisce is almost ready as of early 2015 and Croatia's Krk LNG terminal is also gathering speed – though the surrounding political and financial problems will not be easy to surmount). Furthermore, the European Union is actively working on creating a single European energy market by linking up isolated and lesser-integrated gas markets around the continent. That process is also gathering speed and hopefully will be completed by the time major shipments of LNG will be available to be contracted and delivered from the US (2017-18 onwards), enabling both physical gas flows and swap deals even through Western terminals.

2. Further to the answer above, I would like to refer to an Atlantic Council – CEEP study on critically important infrastructure links in Central and Eastern Europe. The report notes the significant progress made on reverse flows from and interconnections between the Western and Eastern part of the continent and outlines a strategy to finalize the missing infrastructure pieces to enable these countries to tap into the more liquid Western gas markets and LNG shipments: http://www.acsummit.org/wp-content/uploads/Completing-Europe_web.pdf

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January 28, 2015

The Honorable Lisa Murkowski
Chairman
Energy and Natural Resources Committee
Washington, DC 20510

The Honorable Maria Cantwell
Ranking Member
Energy and Natural Resources Committee
Washington, DC 20510

Dear Chairman Murkowski and Ranking Member Cantwell:

For the first time in generations, the U.S. is an energy superpower. Natural gas production has increased by 43 percent since 2005, helping to transform America's energy outlook from one of scarcity to one of abundance. Fully harnessing this economic opportunity will require smart, 21st century energy policies that promote our ability to grow as an energy leader. Toward that end, the American Petroleum Institute thanks the committee for holding a hearing on S. 33, the LNG Permitting Certainty and Transparency Act, and offers its support for this important legislation sponsored by Senators John Barrasso (R-WY) and Martin Heinrich (D-NM).

According to an ICF International study, liquefied natural gas (LNG) exports could contribute up to 452,000 jobs to the United States, add up to $74 billion in annual GDP growth, and generate as much as $40 billion in government revenue between 2016 and 2035. Even non-producing states could see economic gains as high as $2.6 billion to $5 billion due to demand for steel, cement, equipment and other goods used in natural gas development. A related study, commissioned by the Department of Energy in 2012, projected net economic gains across all export-level scenarios, and an update to the report by NERA Economic Consulting specifies "the greater the level of exports, the greater the benefits."

These studies also confirm that higher export levels stimulate even more production, dispelling unsubstantiated arguments that LNG exports could jeopardize affordable energy supplies here at home. As stated in a 2014 Columbia University study, U.S. LNG exports "will allow for more competition in the global market, putting downward pressure on prices and giving gas-importing nations more leverage with traditional suppliers."

LNG exports represent a critical opportunity to harness the power of America's energy revolution. By strengthening our role in the global market, we can accelerate the flow of benefits to consumers in the form of reliable and affordable energy, to workers in the form of thousands of new jobs, and to U.S. citizens in the form of greater energy security. That is why support for natural gas exports is strong across the country and why bipartisan legislation like S. 33 is critical to our economic future.

An equal opportunity employer

We applaud the work your committee is doing to make LNG exports a priority and we urge you to act quickly on this important legislation. Now is the time to build our energy infrastructure, expand exports, and lock-in the economic and geopolitical opportunities that our energy revolution has created.

Please contact me if we may be of any assistance with your efforts.

Sincerely,

Louis Finkel

CHAMBER OF COMMERCE
OF THE
UNITED STATES OF AMERICA

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January 28, 2015

The Honorable Lisa Murkowski
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

The Honorable Maria Cantwell
Ranking Member
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

Dear Chairman Murkowski and Ranking Member Cantwell:

The U.S. Chamber of Commerce, the world's largest business federation representing the interests of more than three million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations, and dedicated to promoting, protecting, and defending America's free enterprise system, strongly supports S. 33, the "LNG Permitting Certainty and Transparency Act," and encourages the Committee on Energy and Natural Resources to favorably report this bill, which would reduce trade barriers limiting and delaying the export of natural gas and bring more supply of this critical energy source to the world, while spurring additional job creation and government revenue in the U.S.

The United States is the largest producer of natural gas in the world and has a large and growing natural gas resource base. The Energy Information Administration (EIA) estimates that proved and unproven reserves of nature gas are 2,266 trillion cubic feet. EIA also acknowledges the uncertainty of the shale gas numbers based on the limited development that has occurred. Historically, as new resources are developed, actual reserves increase. Even this current resource estimate would sustain domestic demand for a century.

Lessening existing restraints on the free trade of liquefied natural gas (LNG) would provide an economic boost across the economy and enable America to more fully capitalize on its incredible natural gas resource base. This view is sustained in a NERA Economic Consulting study sponsored by the Department of Energy (DOE) released in December 2012, which examined the economic implications of exporting LNG and concluded that "in all of the scenarios analyzed…the U.S. would experience net economic benefits from increased LNG exports."

The increasing production of natural gas from shale formations has been one of the few economic bright spots over the last five years. A 2012 study sponsored by the Chamber's Institute for 21st Century Energy and published by IHS concluded that unconventional gas development supported over 900,000 jobs in 2012. The majority of these jobs have been created in the previous five years, coinciding with the Great Recession and some of the highest unemployment in a generation. This study also found that unconventional gas development added over $120 billion to the U.S. GDP in 2012. This rapid development was catalyzed by market forces and the unleashing of technology and innovation developed over many decades. The current regulatory limitation of LNG exports creates an artificial barrier that constrains production and all of the associated economic benefits.

The laws of supply and demand dictate that licensing new export facilities would send the necessary market signal to encourage producers to increase natural gas production and exploration. Because the construction of an export facility requires some three to five years, there would be ample time for the market signal to result in additional production coming on line. A follow-on IHS study published in 2013 that examined the impact of unconventional energy development on the manufacturing sector concluded that by 2025 over 318,000 jobs would be supported and over $50 billion in additional GDP created, in part because it assumes the U.S. would be exporting LNG.

Additionally, the increased exploration and production of methane would have an ancillary impact of also increasing the production of natural gas liquids (NGLs). These hydrocarbons, such as ethane and butane, are feedstocks of the petrochemical industry and are used to produce plastics, fertilizers, and pharmaceuticals. This increased production would, in turn, place downward price pressure on NGLs, helping to offset any potential and temporary upward pressure created by LNG exports.

U.S. natural gas exports would have a pronounced impact on the global market geopolitical calculus of most nations in Europe and Asia even if they would not be direct recipients of U.S. gas. Prices for LNG in Europe and Asia's are upwards of double U.S. prices, and forecast to grow at a faster rate than in the U.S. Global demand has been outstripping supply recently. As demand continues to increase, the risk that exports controlled by central governments may be utilized as an extension of that country's geopolitical goals has increased. Any additional supply entering the market places downward price pressure on traded natural gas, undermining the potential influence exporting states may exert on their constrained customers. This is especially true for U.S. exported gas, which most assume will be tied to U.S. prices (set at supply and demand equilibrium) as opposed to the historic global pricing scheme tying natural gas prices directly to crude oil. Owing to increased supply from shale development, U.S. natural gas prices are lower than most global sources.

If S. 33 is enacted and present natural gas export barriers lessened, the global market would benefit from increased competition, and importing countries would be provided with greater freedom of choice. While it would take several years to construct new export facilities, the impacts would be felt in the near-term. Importers would immediately begin competing for potential future shipments from the U.S., significantly reducing the leverage maintained by countries that may use natural gas exports for political purposes.

Existing U.S. energy export policy is a vestige of previous eras of energy scarcity. Owing to American ingenuity, the U.S. is blessed with energy abundance, and U.S. policies must be brought into the 21st century to reflect that. The Chamber strongly supports S. 33, the "LNG Permitting Certainty and Transparency Act," and encourages the Committee to favorably report this important bill.

Sincerely,

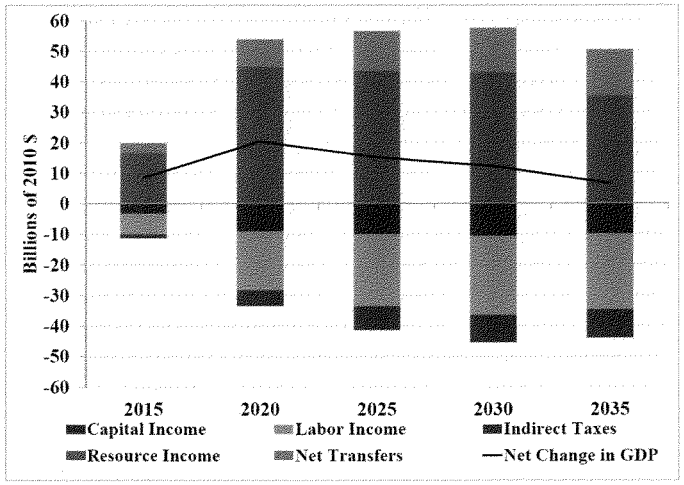
R. Bruce Josten

Macroeconomic Impacts of LNG Exports from the United States

NERA
Economic Consulting

Change in Income Components and Total GDP

Figure 3: Change in Income Components and Total GDP in USREF_SD_HR (Billions of 2010$)



Source: NERA Consulting Report, "Macroeconomic Impacts of LNG Exports from the United States"

Industrial Energy Consumers of America (IECA)

CONSUMER ENERGY ALLIANCE
THE VOICE OF THE ENERGY CONSUMER

January 28, 2015

The Honorable Lisa Murkowski
Chairman of the Senate Energy & Natural Resources Committee
United States Senate
709 Hart Senate Office Building
Washington, DC 20510

The Honorable Maria Cantwell
Ranking Member of the Senate Energy & Natural Resources Committee
United States Senate
522 Hart Senate Office Building
Washington, DC 20510

Dear Chairman Murkowski and Ranking Member Cantwell:

Thank you for you leadership in addressing key issues involving responsible energy development and management of our nation's vast natural resources. We believe the 114th Congress will address many critical issues facing energy consumers, and we look forward to working closely with you as the Committee pursues its agenda. S. 33 addresses a number of the challenges and regulatory uncertainties the market is encountering, and we are pleased that the Committee is considering this important legislation.

Founded in 2006, Consumer Energy Alliance (CEA) is a nonpartisan, nonprofit organization advocating for a balanced energy policy and responsible access to resources. CEA represents virtually every sector of the U.S. economy – from the iron and steel industry to truckers, airlines, agriculture, restaurants, chemicals, small business and every day consumers – that are all concerned about North American energy policies, energy security and long-term price and supply stability. CEA has over 260 corporate members and more than 400,000 individual members throughout the United States.

CEA strongly believes that the United States must continue to promote access to our abundant natural resources, including oil, natural gas and renewable resources. It is clear that new technology and innovation in the past decade has helped launch the Energy Revolution. This Revolution has fundamentally changed the geopolitics of energy, making America safer and more secure today that at any time in the past several years. It is incumbent upon all of us to make sure that the nation continues to realize the potential our natural resources bring. Recent signals from the Administration on such issues as Arctic energy, the Keystone Pipeline, overly burdensome coal regulations, and limited offshore access, seem to indicate that either the Administration does not think the Energy Revolution is real, or they do not understand the best ways to ensure that it continues. Your effort to provide more regulatory certainty through S. 33 is a welcome endeavor.

In concert with ensuring sustained access to our energy resources, CEA believes that we need to continue to look for expanded energy markets. Well balanced policies will ensure that consumer prices remain reasonable while we are able to create new jobs across every economic sector and have the infrastructure available to meet the challenges of the next generation. Expanded energy markets will add additional revenue and further bolster America's recovering economy.

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CONSUMER ENERGY ALLIANCE
THE VOICE OF THE ENERGY CONSUMER

We strongly believe that North American energy development is in the national and the consumers' best interest, and we commend the committee's efforts to move forward with review of legislation that provides the market with more regulatory certainty.

Again, thank you for your leadership on this important issue, and we look forward to working with you on energy development issues affecting consumers in all industries throughout the United States.

Sincerely,

David Holt
President

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Recent Australian Natural Gas Pricing Dynamics and Implications for the U.S. LNG Export Debate

August 29, 2014

Submitted to:
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America's Natural Gas Alliance
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Key Findings

- Critics of U.S. LNG exports have cited events in eastern Australian gas markets as a cautionary tale for U.S. policy toward LNG. Their claims are (1) that demand by eastern Australian liquefaction facilities for natural gas feedstock has driven up long-term natural gas contract prices and made it difficult for industrial gas customers, gas-fired power plants, and local gas distribution companies to procure long-term gas supplies and (2) that a similar fate awaits U.S. gas consumers if a substantial number of U.S. LNG projects are approved and enter operation.

- The first key finding of this report is that the demand for natural gas feedstock by eastern Australian liquefaction plants has indeed been large (in absolute terms and as a percentage of the non-LNG market) and has affected long-term natural gas pricing, the availability of long-term natural gas contracts, and non-LNG gas consumption plans in eastern Australia.

- However, the second finding of this report is that market characteristics of eastern Australia are much different from those in the United States and that the large movements seen in eastern Australian long-term contract prices are not expected to occur in this country. Instead, it is expected that U.S. gas supplies will grow along with new demands from U.S. liquefaction plants and that the U.S. gas market is expected to experience only modest price increases and losses of non-LNG loads.

- The first and most important factor that points to a different expectation for the U.S. market is that the domestic market in eastern Australia is small compared to the size of any one LNG project and to all projects in aggregate. In contrast, the U.S. LNG projects individually and in total are a much smaller part of the U.S. natural gas market.

- The second and closely related factor is that regional markets in Australia are not adequately interconnected to each other by pipeline and so demand increases can have big price effects. In the United States, the markets are strongly interconnected through the extensive gas pipeline network and the impacts of demand increases can be spread out over a much larger market area. Moreover, the U.S. trades gas through pipelines with Canada and Mexico making the effective market size even larger.

- A third important consideration is that the supply sources in eastern Australia for the LNG projects are new coalbed methane (CBM) development projects, which have not all performed as well as expected.[1] More wells and higher capital costs will be needed to achieve target production rates at CBM sites. The United States has a much more

[1] The Australian, 2013, "Triple whammy sparks $5bn blowout for BG's Gladstone project," http://www.theaustralian.com.au/business/companies/triple-whammy-sparks-5bn-blowout-for-bgs-gladstone-project/story-fn91v9g3-1226346265187#.

diverse set of supply options and recent well productivity tends to be at or above expectations.[2]

- There are challenges to developing CBM in eastern Australia due to environmental rules related to water disposal and drilling, and fracking moratoria that are in place in some areas.

- Australia has a relatively small population base with low levels of unemployment, especially in construction and high skilled sectors. This has led to cost increases in LNG export projects (both upstream and downstream segments and in both western and eastern Australia) and has slowed development of new gas supplies.[3] The United States has a much larger labor market and greater ability to meet incremental demands for labor, equipment, and materials with manageable cost increases.

- The natural gas contracting structure in Australia is very different from that in the United States. Australian long-term contracts are a large part of the overall market; they typically have relatively long terms of 10 to 20 years and rely on nontransparent prices determined through confidential negotiations. In contrast, most gas sales in the United States are monthly and daily spot sales or medium-term sales of 90 days to five years, which are typically indexed to reported/published monthly and daily gas price indices.

  Increases in long-term contract prices that affect large numbers of customers—similar to what has happened in eastern Australia—is unlikely to happen in the United States because such long-term contracts with fixed or oil-linked prices are very rare. In addition, price increases related to increased U.S. LNG exports would impact the market gradually through greater production and lower non-LNG consumption of gas as each U.S. LNG project comes online.[4] Although there is a loss in industrial and power sector gas use, there is a partially offsetting increase in U.S. domestic consumption in lease and plant gas use in the mining sector, pipeline fuel use in the transportation sector, and liquefaction plant fuel consumption in the manufacturing sector. The U.S. market is large and regionally interconnected and thus can rapidly adjust to incremental new market demands.

---

[2] The Energy Information Agency of the U.S. DOE reports new-well production per rig is growing in most plays. See http://www.eia.gov/petroleum/drilling/.

[3] ABC, 2013, "Chevron reveals second Gorgon gas project cost blowout," http://www.abc.net.au/news/2013-12-12/gorgon-gas-project-cost-blowout/5151982.

[4] ICF International. "U.S. LNG Exports: Impacts on Energy Markets and the Economy." The American Petroleum Institute (API), March 2013: Washington, D.C. Available at: http://www.api.org/~/media/Files/Policy/LNG-Exports/API-LNG-Export-Report-by-ICF.pdf.

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Executive Summary

Critics of U.S. LNG exports have cited recent events in Australian natural gas markets, particularly those in eastern Australia, as a basis for a policy of restricting U.S. exports of LNG. The critics argue that liquefaction facilities now under construction in eastern Australia have driven up the demand for long-term natural gas contracts, thus forcing up prices and making it difficult for industrial gas customers, gas-fired power plants, and local gas distribution companies to procure long-term gas supplies. The critics further assert that U.S. gas consumers will see the same sharp increases in prices if a substantial number of U.S. LNG projects are approved and enter operation.

This study was requested by the American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) to provide policymakers and other interested parties with information on the Australian natural gas market and the extent to which the Australian experience could inform the debate on how LNG exports might affect future U.S. gas markets and prices. The Australian gas market differs from the U.S. gas market in important ways that are relevant to how developments there can be understood.

Our report provides information on the structure of the Australian natural gas market and gives an overview of the Australian gas supply, demand, and infrastructure. The report then explores recent trends in the Australian natural gas markets including pricing on new long-term gas contracts and spot market prices. In the final section, this report compares the U.S. and Australia markets and details the fundamental differences between the two markets in terms of overall market size, interregional and international pipeline interconnectivity, diversified resource base, gas supply industry size and capability, market structure, contracting practices, and price transparency. Some of those differences are shown in Exhibit 1 below.

In a previous report for API, ICF concluded that U.S. LNG exports will deliver positive job and GDP impacts, with moderate gas price increases and loses of non-LNG gas loads. This report confirms these conclusions and demonstrates that the Australian experience is very unlikely to be replicated in the U.S. context. Although average Australian gas prices under long-term contracts are expected to appreciate significantly in the coming years—due to price increases stemming from higher LNG export demand for feedstock supplies—the prediction of a similar phenomenon of sharp price increases in the U.S. gas market fails to consider the major differences between the two gas markets.

The most obvious major difference is **the overall economy and population of the United States is much bigger than that of Australia**. The U.S. Gross Domestic Product is 10.8 times that of Australia and the U.S. population is 13.8 times as large. Australia has a relatively small population base with low levels of unemployment, especially in construction and high-skilled sectors. This has led to cost increases in LNG export projects (both upstream and downstream segments and in both western and eastern Australia) and has slowed the development of new gas supplies. The U.S. has a much larger labor market and a greater ability to meet incremental demands for labor, equipment, and materials.

Because U.S. economy, population, and labor market are bigger, the **U.S. gas market is also much larger than that of Australia**. In terms of domestic gas production, the United States is 12.7 times as large as Australia (24.06 Tcf vs. 1.90 Tcf per year) and in terms of the domestic gas consumption, it is about 24 times as large as Australia (25.53 Tcf vs. 1.045 Tcf per year). The larger North American gas market (i.e., adding Canada and Mexico) is about 31 Tcf.

Regional markets in Australia are not well interconnected to each other by pipeline. This means the Australian gas market is really several smaller gas markets, so a large demand increase or a supply disruption in any one of them can have big price effects. In the United States, the markets are strongly interconnected and the impacts of demand increases and supply developments can be spread out over a much larger market area. The United States has approximately 305,000 miles of gas pipelines compared to 15,000 in Australia. The U.S. pipeline network is 20.3 times larger than Australia's. Moreover, the country trades gas through pipelines with Canada and Mexico making the effective market size even larger.

Another major difference is that **the United States has a much more diversified natural gas resource base and upstream infrastructure to supply gas for liquefaction**. The supply sources in eastern Australia for the new LNG projects are newly developed coalbed methane (CBM) plays, which provide the only foundation for export projects. The performance of these resources in Australia has been disappointing, which means that more gas wells and higher capital expenditures will be needed to achieve target production rates for LNG export commitments. By contrast, the United States has a much more diverse set of supply options—including shale, conventional, gas produced with oil, deep tight formation, offshore and onshore from about 483,000 wells. The resource base is geographically dispersed. And the country has a much larger drilling and well services infrastructure. For example, the Hughes rig count for the United States for a recent week stood at 1,860 while in Australia it was just 20—a difference of a factor of 93.0. Moreover, the U.S. gas industry has an extensive and highly developed base of knowledge in unconventional gas extraction.

Another difference is that CBM **development in eastern Australia has also been affected by environmental concerns** related to water disposal and drilling, and fracking moratoria that are in place in some areas. These concerns highlight Australia's lack of supply diversity and a technological knowledge base that is not yet mature. By contrast, U.S. production has consistently increased in part due to better established and understood regulations and practices, primarily at the state level.

A final major difference lies in how the gas markets of the two countries operate in **contracting practices, regulation, price formation, price discovery, and operational transparency**. The United States has a highly developed market operating under a robust regulatory regime with a vigorous spot market, locational price discovery, a well-developed futures market, multiple supply and pipeline contracting practices that together support a well-functioning market where prices are known. Australia lacks most of these mechanisms, and only recently has initiated a form of spot market trading. Contracts in Australia are long term and pricing is confidential. This has a major effect on the efficiencies of the market.

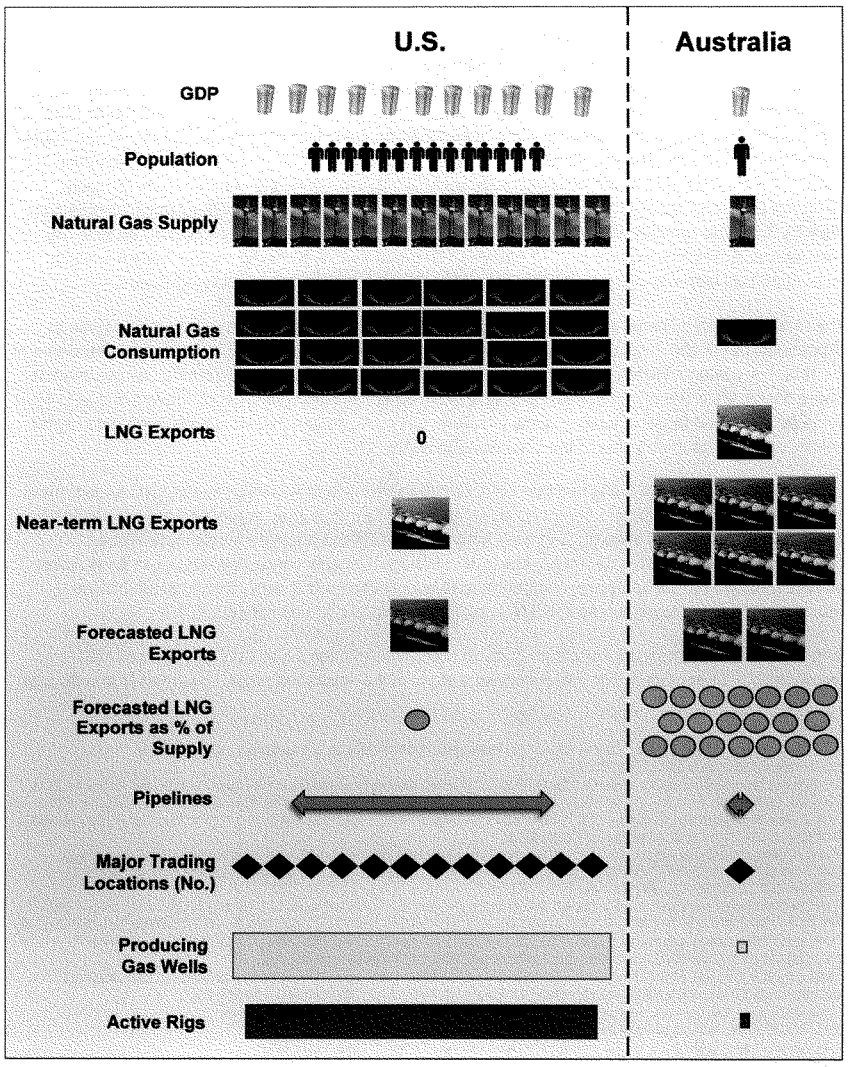
The differences in gas market characteristics between Australia, and eastern Australia in particular, and the United States, means that the large price increases arising from demand for LNG exports that have been reported for eastern Australia has little applicability to the United States. Instead, U.S. gas supplies are expected to grow along with new demands from U.S. liquefaction plants, largely obviating the need to reduce demand in other sectors through higher prices.

Exhibit 1: Summary Comparison of U.S. and Australian Natural Gas Markets

Criteria	Unit	U.S.	Australia
2012 GDP	Trillion current US$	$16.2	$1.5
2012 Population	Million people	313.9	22.7
2012 Total Supply (Dry Production + Imports)	Bcf	27,195	2,096
2012 Domestic Consumption	Bcf	25,533	1,045
2013 LNG Export	Bcf	0	1,050
Near-term LNG Export (2013 LNG export + LNG capacity under construction)	Bcf per year	803 (Sabine Pass, 2.2 Bcfd)	4,680
Forecasted LNG Export	Bcf per year	2,570 (per EIA AEO for 2025), 3,840 (assuming all 10.52 Bcfd of non-FTA DOE conditionally approved projects are in place)	4,680 (excluding Arrow LNG), 4,911 (including Arrow LNG)
Forecasted LNG Export as % of 2012 Total Supply	%	9.5%-12.4%	223%-236%
Pipelines	Miles	305,000	15,000
Number of Major Trading Locations	No.	58	5
Producing Gas Wells (2013)	No.	483,000	3,900 (CBM only)
Currently Active Rigs (2014)	No.	1,860	20
Market Structure		Highly integrated, price discovery and transparency, close regulation of pipelines, multiple contract options,	Unconnected markets ,loose pipeline regulation, no price discovery or transparency, long-term contracts

Source: EIA, World Bank, Baker Hughes, BREE Energy Statistics.

Exhibit 2: Relative Economic Comparisons



1 Introduction

With the advent of the shale gas revolution, U.S. gas production increased by over 20 percent over the 2008–2013 period.[5] The new abundance of natural gas has led to major transformations in the domestic gas market, with U.S. gas net imports declining sharply and multiple LNG export projects being announced. As of June 2014, the U.S. Department of Energy has conditionally approved seven LNG export applications for a total export volume of 10.52 billion cubic feet per day (Bcfd) to non-Free Trade Agreement (non-FTA) countries, equivalent to nearly 15 percent of U.S. domestic gas consumption in 2013.[6, 7] Please note that seven of the approvals are conditional. Only one of these seven projects, Cameron LNG, has secured authorization of its facility by the Federal Energy Regulatory Commission (FERC). The total conditionally approved LNG exports for FTA countries total more than 38 Bcfd. By comparison, Australia's exports in 2013 equaled 100 percent of its domestic market. LNG is a much more important element of the Australian gas sector than it is or will be in the United States.

The recent DOE conditional approval of applications for LNG export permits has led some parties to express concerns about possible negative implications of LNG exports for U.S. gas consumers. Some of the recent arguments these parties made drew on the experience of the Australian natural gas market, where the recent wave of investments in LNG export terminals is alleged to be controversial due to what some believe is evidence of soaring costs of natural gas to Australian industrial consumers and higher energy prices, presumably due to the LNG developments.[8, 9]

Critics of LNG exports have claimed that domestic gas shortages in Australia, due to LNG export, may cost more than 100,000 jobs in the manufacturing sector.[10] Further, they argue increases in electricity prices and significant increase of gas prices since 2007–2008 are affecting household welfare, particularly for lower-income families.[11] Manufacturers are allegedly concerned about gas price spikes and are finding it difficult to secure competitive gas supply contracts. Lastly, critics assert that the situation is expected to get worse if all LNG projects in Australia are completed.[12, 13]

In this context, the American Petroleum Institute (API) and America's Natural Gas Alliance (ANGA) requested ICF International (ICF) to undertake a study of the Australian natural gas market and discuss

[5] U.S. Department of Energy (DOE). "U.S. Dry Natural Gas Production." DOE, 28 May 2014: Washington, DC. Available at: http://www.eia.gov/dnav/ng/hist/n9070us2a.htm.

[6] DOE. "Long Term Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of June 11, 2014)." U.S. DOE: Washington, DC. Available at: http://energy.gov/sites/prod/files/2014/06/f16/Summary%20of%20LNG%20Export%20Applications.pdf.

[7] U.S. Energy Information Administration (EIA). "Natural Gas Consumption by End Use." U.S. EIA, June 17, 2014: Washington, DC. Available at: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.

[8] Fazzino, James. "Australian nitrogen fertilizer CEO confirms unfettered LNG exports have tripled natural gas prices." Industrial Energy Consumers of America, 15 April 2014: Washington, DC. Available at: http://www.ieca-us.com/wp-content/uploads/04.15.14_Australia-Congressional-Communication_Incitec-Pivot.pdf.

[9] Industrial Energy Consumers of America (IECA). "The Australia LNG export story should sound as a warning to U.S. policymakers." IECA, 15 April 2014: Washington, DC. Available at: http://www.ieca-us.com/wp-content/uploads/03.28.14_Australia-Congressional-Communication-2.pdf.

[10] Hoy, Greg. "Gas exports, price boom threaten 100,000 Australian jobs: manufacturers." ABC News, 27 March 2014. Available at: http://www.abc.net.au/news/2014-03-27/gas-boom-threatens-australian-manufacturing-jobs/5349822.

[11] Wells, Rachel. "Families going without food and medicine to pay the bills." The Sydney Morning Herald, 26 March 2013. Available at: http://www.smh.com.au/national/families-going-without-food-and-medicine-to-pay-the-bills-20130325-2qq2e.html.

[12] Chambers, Matt. "LNG demand to force spike in gas prices." The Australian, 07 March 2014. Available at: http://www.metgasco.com.au/industry-news/lng-demand-force-spike-gas-prices-2.

[13] Howes, Paul. "High costs due to energy, not labor." Financial Review, 04 March 2014. Available at: http://www.afr.com/p/opinion/high_costs_due_to_energy_not_labour_fNuuZKaA8DXgSt4ZE9Y69N.

the extent to which the Australian experience could inform the debate on how LNG exports might affect future U.S. gas prices. Our report addresses a number of issues.

- It is important to understand the developments in Australia and whether these developments offer a cautionary tale for the United States given the major differences between the U.S. and Australian gas markets. Most important from a market standpoint is that Australia is a resource-rich country where gas exports as LNG will exceed the size of the domestic market.
- The Australian market operates in ways very different from the U.S. market. The Australian domestic markets in the west, north, and east are not interconnected and the trading market is thin. Most gas moves under long-term contracts (10 to 20 years) at prices that are confidential. Pipelines are lightly regulated and there is considerable vertical integration of the industry. The small spot market deals in daily balancing volumes and is, at present, not reflective of underlying long-term trends.
- The timing of gas resource development to meet the anticipated LNG demand in eastern Australia—the locus of the controversy—has been complicated by unforeseen technical difficulties in developing the coalbed methane (CBM)[14] which is the source of new supply in eastern Australia. Adapting operations to environmental regulations and bans also has been a challenge. Production costs have been higher than expected. Producers are challenged to meet their obligations to exporters as well as to local markets.
- At the same time, liquefaction plant owners are developing and purchasing gas resources to supply their facilities. Many domestic supply contracts appear to be expiring and are up for renewal. With the stresses on production and attendant uncertainties, producers appear to be reluctant to commit to new long-term contracts at less than the full opportunity cost of meeting their long-term LNG contract requirements. Thus, it does appear that long-term gas prices supporting power generation and industrial customers have risen from around $3 to $4 per MMBtu to perhaps between $7 and $9 per MMBtu.[15] This may very well be a near term phenomenon until production grows to meet new demands and a new gas supply/demand balance reasserts itself.
- Australia is seeing a large expansion of LNG export facilities in both the traditional export region of the northwestern part of the country, where offshore-based production for LNG has been established for 20 years, as well as the new projects drawing on the CBM developments in the east. The demand for labor, materials, and resources has been large for an economy the size of Australia. This has contributed to increases in the cost of LNG plant construction and other construction around the country.
- The Australian and U.S. gas markets are profoundly different in size, structure, market rules, pipeline interconnectivity, regulation, price formation, contracting, and price transparency. These differences suggest that using Australian experiences to make predictions for U.S. gas price impacts from LNG exports is not advised.

This report expands on these themes and compares the Australian and U.S. markets, and points out key differences in the U.S. energy markets, which would lead to different outcomes for U.S. consumers. ICF has quantified various energy market outcomes of LNG exports for the U.S. market in a previous

[14] In Australia the term is coal seam gas (CSG). Throughout this report we use the term CBM, which is more common in the United States.
[15] All dollar figures are in U.S. dollars, unless otherwise stated.

analysis for the API.[16] This analysis concluded that U.S. LNG exports would increase GDP, increase employment, and promote manufacturing, while inducing only a modest increase in natural gas prices. Nevertheless, the assertions about Australia's experience deserve to be addressed and understood in the appropriate context.

This report is divided in three parts. The first part (Section 2) of the report discusses the structure of the Australian natural gas market and gives an overview of the Australian gas supply. Section 3 then explores recent trends in the Australian natural gas market. Although Australian gas prices are expected by various analysts to appreciate significantly in the coming years due to much higher LNG export demand from new terminals,[17] the comparison to the U.S. gas market situation fails to consider the major differences between the two gas markets. This comparison between the U.S. and Australia is detailed in Section 4. There are fundamental differences between the U.S. and Australian markets in terms of resource base, market structure, and demand patterns. This report reiterates the conclusions ICF found in its previous analysis for the API, and argues that the Australian experience is very unlikely to be replicated in the U.S. context.

[16] ICF International. "U.S. LNG Exports: Impacts on Energy Markets and the Economy." ICF, 15 May 2013: Fairfax, VA. Available at: http://www.api.org/~/media/Files/Policy/LNG-Exports/API-LNG-Export-Report-by-ICF.pdf.

[17] Wood, Tony and Carter, Lucy. "Getting gas right: Australia's energy challenge." IGU. Available at: http://grattan.edu.au/static/files/assets/ba24a4e0/189_getting_gas_right_report.pdf.

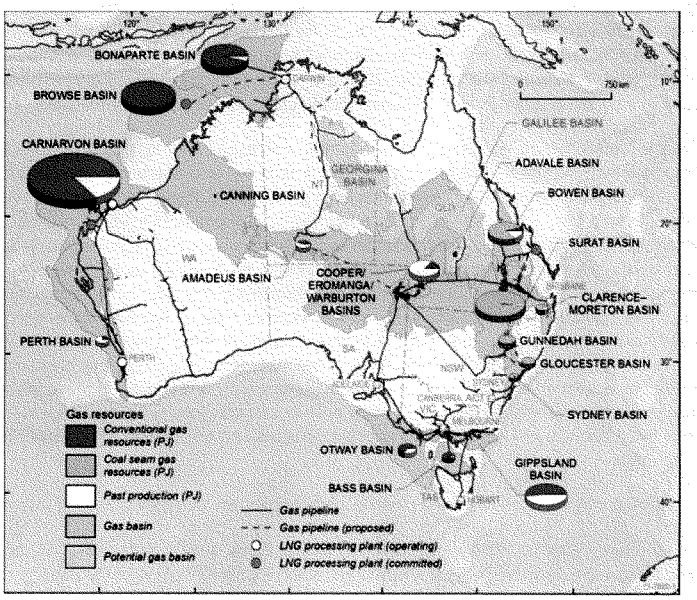
2 Australian Gas Market Structure

2.1 Overview

Australia is a major natural gas producer and exporter, but is not a large natural gas consumer. Australia produced about 2,096 Bcf, and exported 1,050 Bcf in 2012–2013. Most of the exported gas has historically come from offshore production in Western Australia and the Northern Territory. Total domestic consumption is about half that of total production (1,045 Bcf in 2012–2013[18]) where the bulk of the consumption is in the population centers in the east and south (New South Wales, Victoria, South Australia, and southeastern Queensland—eastern Australia). Putting this in perspective, total Australian domestic consumption is less than gas consumption in New York State alone (1,226 Bcf in 2012).

Australia's gas market is divided into three physically unconnected geographic gas markets (eastern Australia, northern Australia, and Western Australia). This is in contrast to that of the North American gas market, which has a large, highly integrated, continental domestic gas market. There is no national market in Australia.

Exhibit 3: Australia Natural Gas Infrastructure



Source: "Eastern Australia Domestic Gas Market Study," (p. 20). Available at: http://www.industry.gov.au/Energy/EnergyMarkets/Pages/GasMarketDevelopment.aspx.

[18] Australian Energy Regulator, 2014, "State of the energy market." Available at: http://www.aer.gov.au/node/23147.

The main gas basins in eastern Australia are connected to demand centers by long distance gas transmission pipelines. Conventional gas from the Cooper-Eromanga Basin in central Australia and the southeastern offshore Gippsland Basin has historically supplied the majority of demand in eastern Australia. The production of CBM in Queensland has expanded rapidly over the past decade. The development of a link between Queensland and South Australia in 2010 allowed CBM from Queensland to be supplied to markets in South Australia and New South Wales.

Conventional gas from offshore gas fields in the Carnarvon Basin supply the majority of demand in Western Australia and have supplied LNG exports since 1989. Gas consumers, almost entirely made up of mining, manufacturing, and electricity generation, are supplied under long-term bilateral contracts.

In northern Australia, gas demand is comparatively low with most of the gas consumed by a small number of gas power plants. Gas fields in the Amadeus Basin have historically supplied most of the gas demand in the Northern Territory. Gas is transported to Darwin from offshore gas fields in the Timor Sea where it is processed into LNG and exported to Japan.

The country has three operating LNG terminals, namely the North West Shelf, Darwin, and Pluto. Seven new projects are being developed to take advantage of the country's large conventional gas and CBM resources. Australia is the third largest exporter of LNG, behind only Qatar and Malaysia.[19] Three of the new projects are based on CBM production from the Surat and Bowen Basins, and the other four are based on conventional gas production from the offshore Carnarvon and Browse Basins. The growth in production in recent years from CBM in eastern Australia has contributed to increased domestic consumption in the east, and is providing the basis for the LNG exports planned from Queensland.

Most of the gas traded in Australia's domestic gas market is done so under long-term bilateral contracts between producers on the sell side and power generators, industry, and distribution companies on the buy side. These contracts keep pricing confidential among the parties. Regulators have no review authority over these prices. There are few publicly reported gas price indices to assist in price discovery. Eastern Australia has facilitated spot markets under two different pricing regimes one in Victoria and a second in eastern Australia for the distribution networks in Sydney, Adelaide, and Brisbane. A recent development has been a spot market centered on the Wallumbilla gas supply hub in central Australia. The spot markets provide wholesale participants with a mechanism for trading their short-term imbalance positions and have enhanced short-term price transparency and efficiency. Unlike the United States, however, these short-term prices do not inform pricing for longer-term contracts. They only address imbalances in the system. In addition, there is a lack of transparency and liquidity in the long-term contract market that has contributed to considerable price uncertainty for gas consumers. Most of what is known about this market comes from occasional press releases and other public statements made by market participants.

In terms of pipeline infrastructure, the main pipeline inter-connections currently operating in Australia are:

- Wallumbilla to Moomba: Relatively recent connection allowing 365 million cubic feet per day (MMcfd) western flow on the South West Queensland Pipeline (SWQP) to Moomba.
- Flows from Moomba: Conventional gas from the Cooper-Eromanga basin has been an important supply source for Sydney—via Moomba Sydney Pipeline(MSP)—which has an east flow capacity

[19] International Gas Union. "World LNG Report – 2014 Edition." IGU, 2014. Available at: http://www.igu.org/sites/default/files/node-page-field_file/IGU%20-%20World%20LNG%20Report%20-%202014%20Edition.pdf

of 416 MMcfd) and Adelaide—via Moomba to Adelaide Pipeline System (MAPS)—which has a south flow capacity of 240 MMcfd) demand centers.

- Flows from Victoria: Conventional gas from Victorian offshore gas fields is becoming increasingly important for supply to Sydney—via Eastern Gas Pipeline (EGP)—which has a north flow capacity of 274 MMcfd) and Adelaide—via SEA Gas Pipeline (SEAGas)—which has a western flow capacity of 284 MMcfd) demand centers.
- The Dampier to Bunbury Natural Gas Pipeline (DBNGP) transports gas from gas fields in the Carnarvon Basin off the north-west coast of the state to customers in the south west.
- The Amadeus gas pipeline is the main gas transmission pipeline in the Northern Territory running from the Amadeus gas fields in the south to the main demand center of Darwin. The Bonaparte pipeline, which connects to the Amadeus pipeline, was commissioned in 2008 to bring gas from the Bonaparte Basin to the Northern Territory.

The interconnection of the east coast markets is a relatively recent development that occurred with the construction of the Queensland to South Australia/New South Wales Link (QSN Link) between Moomba and Ballera. The QSN Link has connected the gas market in Queensland to markets in the south and east of Australia.

The Australian natural gas industry is organized into production, transmission, marketing, and distribution, with private companies owning and operating the various components of the system. There are nine distribution companies that provide distribution services in eastern Australian cities. These systems operate as "pipes" companies; they do not own gas or provide merchant gas services. They charge tariffs and are regulated by the individual states. Distribution tariffs are largely fixed cost recovery. Retailers buy gas at wholesale from the producers under long-term contracts, and contract for capacity on the pipelines and distribution networks in order to sell gas to individual customers. Retailers are who the customer deals with; the retailer manages all of the supply and transportation requirements to get the gas to the customers. There are approximately 20 retailers in eastern Australia. The large retailers operate across multiple states, in multiple markets, and they will sometimes have upstream positions in production and in power generation.

2.2 Australian Natural Gas Demand

Coal and petroleum products have historically supplied much of Australia's energy needs, but natural gas has grown in importance as an energy source in the last two decades as resources have been developed in offshore Victoria and in the central part of the country around Wallumbilla. Like the United States and other developed countries, natural gas replaced manufactured town gas in the major cities of Melbourne, Adelaide, and Sydney.

Eastern Australia

Exhibit 4 shows the recent history and outlook for gas demand in eastern Australia and highlights the significance of LNG exports. Non-power consumption has grown slightly from about 450 Bcf per year to almost 500 Bcf per year since 2010. Most of the residential demand is centered in the state of Victoria because of highly developed distribution networks. Most of the manufacturing and mining demand are in the other eastern states and have historically accounted for the majority of gas demand. Over the past decade, demand for gas for power generation grew faster than other segments of the market and now accounts for a third of gas demand in eastern Australia.

Domestic gas demand is forecasted to fall over the next decade. Most of the decline is expected to be from power plants, while demand across the other market segments is forecasted to remain the same or grow slowly. Factors contributing to the expected decline in power demand for gas include higher gas prices, likely removal of the carbon tax (by removing the disincentives for coal), falling electricity demand, and growing levels of renewable generation.[20]

A number of gas-fired power generators have contracted, or plan to contract, for the sale of their gas back into the gas market to adjust to the prevailing gas and electricity market conditions. For example, in February 2014 Stanwell Corporation, the Queensland Government-owned energy company, announced its plan to mothball the Swanbank E Power Station near Brisbane in October 2014 for a three year period. Stanwell will sell its gas supplies into the gas market, rather than use these supplies to generate electricity. This will enable Stanwell to take advantage of recent high gas prices in the face of relatively weak electricity demand and low prices. Stanwell will restart some of its mothballed coal fired generation to replace Swanbank.

Redirecting long-term gas supplies from power generation is occurring elsewhere in eastern Australia. Origin Energy, which has a portfolio of power generation assets, including a gas-fired power plant, in eastern Australia, reportedly has entered into gas sales agreements with Gladstone LNG (GLNG)[21] and Queensland Curtis LNG (QCLNG).[22] These sales arrangements will allow Origin to divert supply from power generation to the LNG facilities when gas is not economic in the power sector.

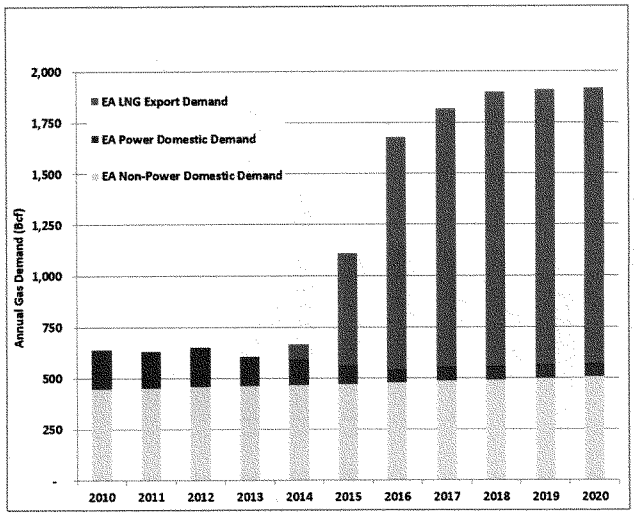
LNG exports from eastern Australia will begin in 2014 with the commissioning of QCLNG's first LNG train. LNG production will ramp up over the course of the following three years. By 2018, gas demand in eastern Australia is expected to be more than three times the current demand.

[20] See ABC News July 10, 2014: "More than a million Australians have already installed solar panels on their roofs, causing demand for electricity from the grid to plummet. Australia's household solar revolution has caught the energy sector by surprise, and may leave NSW and Queensland taxpayers footing the bill for billions of dollars' worth of "stranded assets." Retrieved July 11, 2014 from http://www.abc.net.au/news/2014-07-09/solar-panels-leads-to-less-demand-for-electricity/5586036.

[21] Origin Energy, 2013, "Origin announces new agreement to sell gas to GLNG." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1539.

[22] Origin Energy, 2013, "Origin announces gas supply agreement with QGC." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1535.

Exhibit 4: Gas Demand – Eastern Australia

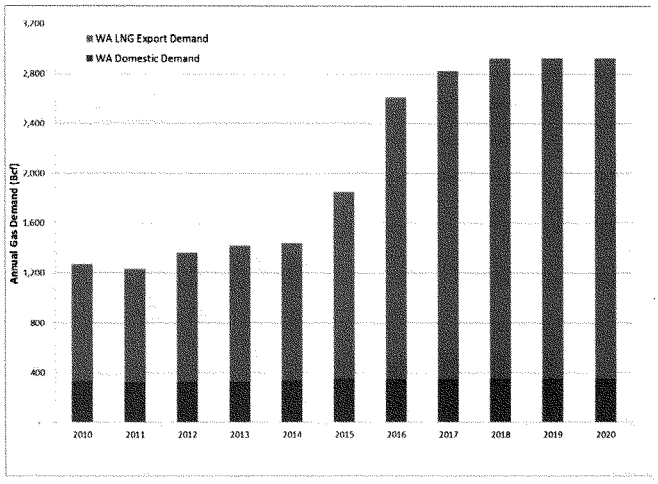


Source: AEMO 2013 national gas forecast, AEMO GSOO May 2014 Update.

Western Australia

Manufacturing, mining, and electricity generation have historically accounted for the majority of domestic gas demand in the state of Western Australia (WA). Demand from the residential sector is relatively small (around 1 percent) as households are more reliant on energy for cooling rather than for heating. WA has been exporting LNG since 1989 and the industry has continued to grow with the expansion of the NWS and Pluto projects. WA is entering a period of LNG export growth with the completion of the Gorgon, Wheatstone, and Prelude projects by 2018. Gas supplying LNG export demand is currently triple the size of domestic gas consumption. As shown in Exhibit 5, gas supplied to LNG exports will be more than seven times the size of domestic gas demand by 2018.

Exhibit 5: Gas Demand – Western Australia



Source: WA IMO GSOO 2014, LNG export demand is a function of liquefaction capacity.

Northern Territory

Northern Territory domestic gas consumption, estimated to be 30 Bcf in 2013–14,[23] is relatively small compared to other Australian states and territories. Gas power plants, which supply Darwin and the remote power grids, account for the majority of gas demand.[24]

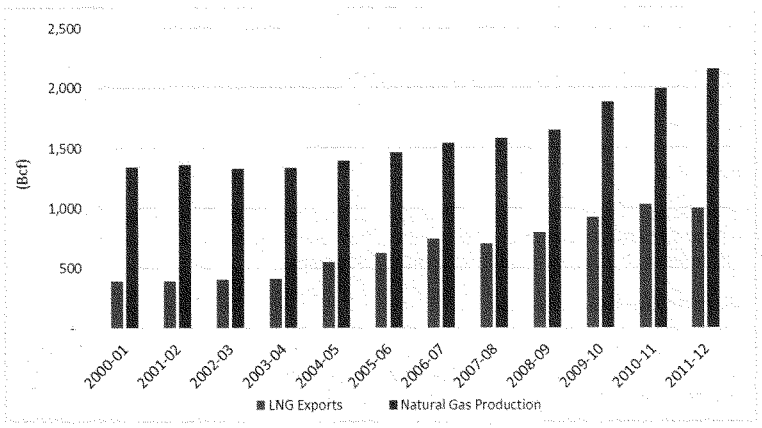
2.3 Natural Gas Production

Australia's natural gas production in recent years has averaged about 2,000 Bcf per year or 5.5 Bcf per day. Exhibit 6 shows historical Australia gas production, consumption, and net exports starting from 1990. The LNG component is sourced from production in the Carnarvon Basin, which is the location of current LNG export-related production. In recent years, CBM has increased to a level of 233 Bcf per year or 638 MMcfd. Operators are ramping up coal seam production in eastern Australia in anticipation of supplying LNG export facilities.

[23] APA Group, 2011, "Amadeus Gas Pipeline Access Arrangement Information." Available at: http://www.aer.gov.au/node/4760.

[24] AER, 2011, "N.T. Gas Access arrangement proposal for the Amadeus Gas Pipeline." Available at: http://www.aer.gov.au/node/4760.

Exhibit 6: Recent Historical Australia Natural Gas Production



Note: The LNG data series presented represents gas production that directly supplies an LNG export facility.
Source: BREE Energy Statistics.

Eastern Australia

Historically the majority of gas supplied to the eastern gas markets has been sourced from conventional gas reserves in the Cooper-Eromanga Basin (via the Moomba processing facility) and offshore gas fields in the Gippsland Basin (via the Longford processing plant).

Exploration for CBM in Australia began in Queensland's Bowen Basin in the 1970s, and the first CBM extraction in Australia began at the Dawson Valley project in central Queensland in 1996. The Queensland Gas Scheme, commencing in 2005, helped the development of the CBM industry by requiring 15 percent of electricity in the state to be sourced from gas-fired generation (GFG).

The prospect of selling LNG into the higher priced Asian markets sparked interest from large domestic and international gas producers and triggered a wave of investments and merger and acquisition activity culminating in the development of three CBM-to-LNG export projects on Curtis Island near Gladstone, Queensland.

Western Australia

Offshore gas fields in the Carnarvon Basin supply the LNG export projects and the majority of the Western Australian (WA) domestic market. Gas supplied to LNG export facilities does not enter the domestic gas transmission network.

WA has been exporting LNG from the Carnarvon Basin since 1989 when the North West Shelf (NWS) joint venture made its first shipment to Japan. The NWS project expanded over the next 20 years with the fifth LNG train, taking the total capacity to 794 Bcf per year, commencing production in 2008.

The Pluto project (209 Bcf) commenced in 2012. There will be a significant expansion of LNG exports with the Gorgon (760 Bcf), Wheatstone (433 Bcf), and Prelude (175 Bcf) projects currently under construction.

The WA government introduced a domestic gas reservation policy in 2006 that requires LNG export projects to reserve 15 percent of the gas from each LNG project and develop processing facilities for the domestic market.[25]

Northern Territory

Since the commissioning of the Bonaparte Pipeline in 2008, gas from the Bonaparte Basin has supplied the majority of domestic consumption in the Northern Territory.[26] The Amadeus Basin, near Alice Springs, historically supplied the majority of domestic consumption.

2.4 Australian Gas Resource Base

The U.S. Energy Information Administration (EIA) maintains a data series for Australia's proved gas reserves. The BP Statistical Review of World Energy also reports reserves (see Exhibit 7). The BP publication reserves figure is 133 Tcf as of year-end 2012. EIA reports only 43 Tcf of reserves as of year-end 2013.[27]

The assessment of conventional and unconventional gas recoverable resource by the Australian government totals to 820 Tcf as shown in Exhibit 8.[28] The Bureau of Resources and Energy Economics (BREE)'s 2012 analysis indicates the 820 Tcf of assessed gas resource to consist of 167 Tcf of conventional gas (new fields and reserve appreciation) including inferred resources, 204 Tcf of CBM, 20 Tcf of tight gas, and 398 Tcf of shale gas. The assessments of tight gas and shale gas are preliminary and ongoing. In its report on shale gas in Australia, the Australian Council of Learned Academies (ACOLA) concluded that there is uncertainty around the resources in Australia due to the limited appraisal of unconventional resources.[29] There is no commercial production of tight gas or shale gas. Current CBM production is 0.64 Bcf per day or about 12 percent of the total production.

In comparison to the 820 Tcf of Australian resources, North American resources total to over 4,000 Tcf, which include about 2,000 Tcf of shale gas.[30] The U.S. gas resource base quantities are considered much less uncertain than those of Australia, especially for shale gas. This is because almost all of the plays included in the 2,000 Tcf US estimate have been proven to be productive and economic on a large scale. The Australia recoverable shale gas resource base is still speculative.

[25] Government of Western Australia, Department of State Development, retrieved on July 11, 2014 from http://www.dsd.wa.gov.au/8482.aspx.

[26] Australian Energy Regulator, 2014, "State of the energy market 2013," http://www.aer.gov.au/node/23147.

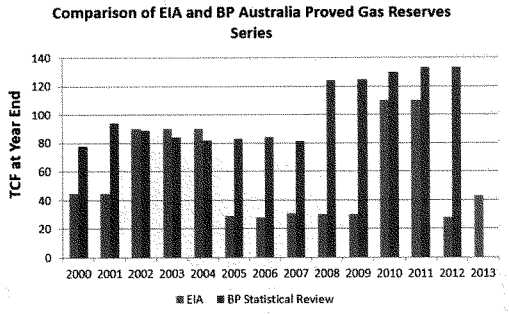
[27] U.S. EIA International Statistics page for Australia. Available at: http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=3&aid=6&cid=AS,&syid=2010&eyid=2014&unit=TCF.

[28] Australian Bureau of Resources and Energy Economics, 2012, "Australian Gas Resource Assessment 2012." Available at: http://www.ga.gov.au/webtemp/image_cache/GA21116.pdf.

[29] Australian Council of Learned Academies, 2013, "Engineering Energy: Unconventional Gas Production, A study of shale gas in Australia." http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-6.

[30] Source of U.S. shale is ICF International, resource assessment.

Exhibit 7: Australia Proved Gas Reserves



Source: EIA and BP Statistical Review of World Energy 2014.

Exhibit 8: Australia Gas Resource Assessment Summary

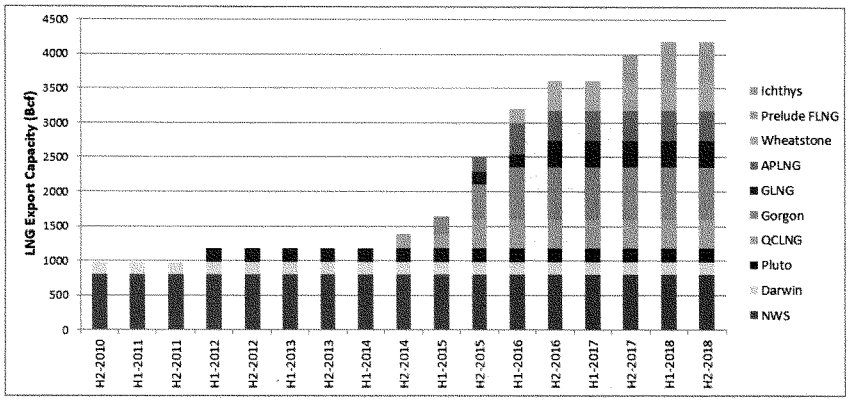
Category	Recoverable Resource (Tcf)				
	Conventional	CBM	Tight	Shale	Total
Economically Demonstrated (EDR)	103	33	0	0	136
Sub-economic Demonstrated (SDR)	54	60	0	2	116
Inferred	10	111	20	0	141
Sum of Identified Resources	***167***	***204***	***20***	***2***	***393***
Potential Additional Resources	0	31	0	396	427
Identified, Potential, Undiscovered Total	**167**	**235**	**20**	**398**	**820**

Note: this is the latest assessment as referenced in the October, 2013 BREE Market Report.
Source: Australian Gas Resource Assessment - 2012", BREE, 2012.

2.5 LNG Export Projects

Over $150 billion USD is being invested in LNG export projects across Australia. As shown below in Exhibit 9, once projects currently under construction have been completed Australia will have more than 3,896 Bcf of LNG export capacity making it one of the largest exporters of LNG in the world. More details about the LNG projects are in Appendix B.

Exhibit 9: LNG Export Capacity in Australia by First and Second Half of Each Year (Existing and Under Construction)



Source: BREE, project / company websites.

Eastern Australia

Three liquefied natural gas (LNG) export projects are currently under construction in Queensland. These projects will triple the gas demand in eastern Australia and drive a rapid increase in the production of CBM in the Surat and Bowen basins in Queensland. Each project is constructing a pipeline to transport gas from their gas processing facilities to their liquefaction facilities in Gladstone. The liquefaction facilities, each consisting of two LNG trains, are located side-by-side on Curtis Island in the Gladstone Harbor where LNG will be loaded onto LNG carriers for transport to Asia.

Modeling performed by AEMO for the May 2014 update of the GSOO showed that supply shortfalls could occur in Sydney on peak winter demand days from 2020 if Moomba gas production is diverted to Queensland to supply LNG export project demand. The modeling included new CBM projects in Narrabri (94.8 MMcfd) and Gloucester (75.8 MMcfd) from 2018.

In response to growing concerns from gas consumers, the Australian Department of Industry and the Bureau of Resources and Energy Economics (BREE) conducted a joint study on the outlook for the eastern Australian gas market. The study found that there are sufficient gas resources to meet domestic and export requirements. The study recommended that the short-term focus of gas policy should be on improving transparency of pricing information, making markets more efficient, and the removal of unnecessary regulatory impediments to developing new gas supply.[31]

Gas flows around eastern Australia are expected to change as LNG export projects start drawing upon gas supplies from the Cooper-Eromanga Basin. Over the past five years the increased production of CBM in Queensland has been transported to other markets in eastern Australia, flowing west to Moomba

[31] Department of Industry, 2014, "Eastern Australian Domestic Gas Market Study." Available at: http://www.industry.gov.au/Energy/EnergyMarkets/Pages/GasMarketDevelopment.aspx.

and then onto Sydney and Adelaide demand centers. However, flows are expected to reverse on the SWQP from 2015 as the APA Group, backed by long-term contracts with Santos and GLNG, is installing new compression to allow 322 MMcfd of gas to flow east from Moomba to Wallumbilla.

Gas flows to Sydney and Adelaide from Victorian gas fields are expected to increase to replace Moomba gas that will be diverted to Queensland. In late 2013 the APA Group entered into contracts with three gas retailers[32] (Origin Energy, Energy Australia, and Lumo) to increase the northern flow capacity of the Victoria Transmission System to allow additional Victorian gas supplies to flow to Sydney via the NSW-Victoria Interconnector and the Moomba Sydney Pipeline.

New gas transmission pipelines are being constructed by the LNG export projects to transport gas to the LNG facilities in Gladstone. The capacity of each of these new pipelines exceeds that of any existing pipeline in Australia, and in total, the capacity of pipelines under construction exceeds 4 Bcfd.

Exhibit 10: LNG Project Gas Transmission Pipelines

Project	Length (km)	Capacity (Bcfd)	Status	Description
QCLNG	334	1.34	Under construction	High pressure, 42 inch pipeline from Surat and Bowen Basin gas fields to the QCLNG export facility in Gladstone.
GLNG	435	1.35	Under construction	High pressure, 42 inch pipeline from Fairview gas fields to the liquefaction facilities in Gladstone.
APLNG	362	1.48	Under construction	Two lateral pipelines will feed gas from the gas fields in the Surat and Bowen Basins to the 42 inch mainline that transports gas to the liquefaction facilities in Gladstone.
Arrow Bowen	450	0.46 to 0.95	Proposed	High pressure, up to 42 inch diameter, pipeline that would transport gas from Bowen Basin gas fields, west of Mackay, to the proposed ALNG liquefaction facilities in Gladstone.
Arrow Surat	470	0.46 to 0.95	Proposed	High pressure, 32 to 34 inch diameter, that would transport gas from Surat Basin gas fields to the proposed ALNG liquefaction facilities in Gladstone.

Source: Project websites, AEMO GSOO.

Northern Territory and Western Australia

New LNG export projects are currently under construction in Northern Territory and WA to meet rising international demand. At an estimated cost of over $50 billion USD, the Gorgon LNG project is the largest construction project in Australia and will be the one of the world's largest LNG facilities. Two new projects will source gas from the Browse Basin located off the north west coast of Western Australia, the floating Prelude LNG facility and the Ichthys project, which will use an undersea pipeline over 800km long to transport gas to Darwin for liquefaction.

2.6 Gas Market Structure in Australia

Traditionally, wholesale gas supply has been dominated by long-term bilateral gas supply contracts between producers and retailers, large industrial end users, and power generators. The commercial terms of contracts are confidential and not available to regulators or the public. Key characteristics of

[32] APA Group, 2013, "APA to further expand VIC NSW interconnect." Available at: http://www.apa.com.au/investor-centre/news/asxmedia-releases/2013/apa-to-further-expand-vic-nsw-interconnect.aspx.

these contracts govern the term of the supply (years); the firmness of the supply (e.g., "firm" or "reasonable endeavours"); take-or-pay obligations; annual and daily contract quantities; and price. Price terms typically are for fixed prices with limited periodic price reopeners (often five years) or with known escalation factors that reflect parties' views on market values and costs.

A key distinguishing feature of the Australian market, in comparison with the United States, is that there is no mechanism to relate contract prices to current market price indicators that would reveal the state of the market or market conditions. Delivered prices for gas are confidential with no transparent national price reporting mechanism.[33] The U.S. gas market by contrast has both daily and monthly price indices at widely dispersed geographic locations where contract pricing is tied to the indices most relevant to the buyers and sellers. The liquidity of the U.S. market is supported by the broad transparency of pricing, which is absent in Australia.

There are, however, three gas trading markets in eastern Australia to address daily or short-term supply-demand imbalances, to facilitate the trade of variances between gas delivered and actual withdrawal:

1) **Victoria Gas Market:** The State of Victoria has had an operating spot market for natural gas since 1999 along the Victorian Transmission System, and not at a single hub. The market is operated by the Australia Energy Market Operator (AEMO). The spot market accounts for about 10 to 20 percent of all wholesale volumes in Victoria with the majority of gas traded under bilateral contracts. Nevertheless, AEMO schedules all flows on the pipeline.

   The Australian Stock Exchange (ASX) introduced trading in Victorian wholesale gas futures and options in July 2009. In general, gas futures markets tend to develop only after the underlying physical (spot) markets reach a certain level of maturity, with significant trading between buyers and sellers under transparent short-term contracts. The futures market, therefore, enables participants to manage price volatility and revenue risk by trading in financial gas futures and related options. However, there have been a relatively small number of trades on the exchange.

   The Victorian gas market uses a sophisticated market arrangement for scheduling network injections and withdrawals. An unconstrained market model determines a single market price. An operational model of the physical system determines out-of-market actions in the event of congestion. Payments, based on market bids, are made to those shippers who are scheduled to take out-of-market actions and the costs are allocated to those that cause the congestion. A financial right provides some hedging against congestion related costs.

2) **Short-term Trading Market (STTM):** The STTM is a market-based day-ahead wholesale gas balancing mechanism at defined gas hubs in Sydney, Adelaide, and Brisbane. The STTM facilitates trading between shippers, retailers, and large end users at the intersection of the transmission and distribution network. The STTM overlays a pipeline contract carriage model with pipeline operators continuing to be responsible for system operation. The STTM is a mandatory market that operates in conjunction with longer-term gas supply and transportation contracts. It provides an option for users to buy or sell gas on a spot basis without needing to enter delivery contracts in advance. It also allows contracted parties to manage short-term supply and demand

[33] Natural gas pipeline transmission prices are also confidential. Pipelines nevertheless are required to abide by the Australian Gas Law and Gas Rules.

variations to their contracted quantities. The STTM began its operation in Adelaide and Sydney on September 1, 2010 and in Brisbane on December 1, 2011.

3) **Gas Supply Hub (GSH):** The Gas Supply Hub is a wholesale exchange for trading natural gas at the Wallumbilla gas hub. The Wallumbilla gas hub is located at the intersection of gas transmission pipelines in southern Queensland and is near CBM gas fields, gas-based power plants, and gas storage. The market commenced operation in March 2014.

Unlike in eastern Australia, there are no gas hubs or market pricing points in the Northern Territory or Western Australia. In Western Australia, gas producers, aggregators, and users bilaterally trade their short-term gas requirements and imbalances. Western Australia also has a small number of brokers that provide short-term transaction matching, nomination, and contract management services to gas users.

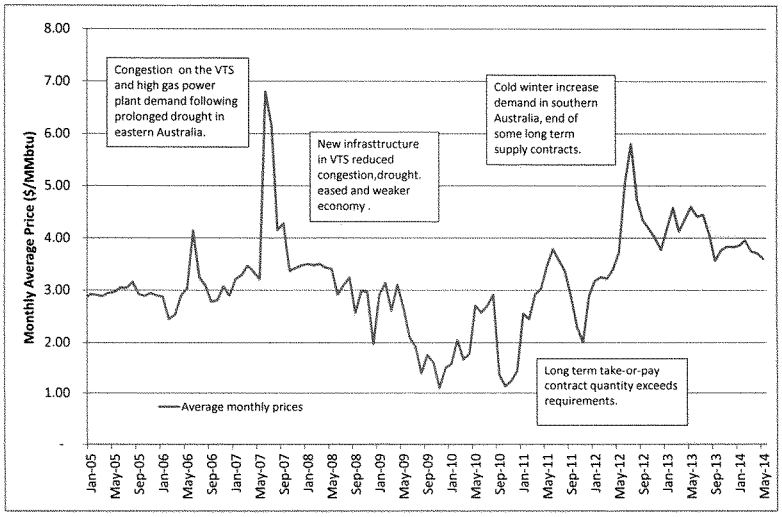
3 Analysis of Recent Australian Natural Gas Trends

In this section, we present the discussion of gas price trends in the Australian gas markets, keeping in mind that the Australian markets are relatively new and the gas prices at the three markets (Victoria, STTM, and GSH) reflect short-term spot prices. Longer-term gas contracts are not linked to these indices, unlike in the United States where long-term gas contracts are linked to a specified hub index price (e.g., the Henry Hub).

3.1 Victorian Gas Market

Data for gas prices in the Victorian market are available from January 2005 from AEMO, as shown in Exhibit 11.

Exhibit 11: Average Monthly Spot Gas Prices in Victoria[34]



Source: AEMO.

Aside from a small number of winter gas days, gas supply and network capacity were sufficient to meet demand during the early years of the Victorian gas market. In 2007, the gas market experienced a very high spike in prices due to increased demand for GPG that occurred as a result of reduced coal-fired and hydroelectric generation from pro-longed drought conditions in eastern Australia. During this period there

[34] In February 2007 reforms to the gas market introduced rescheduling at five time intervals over the day. From the 2007 the average prices are based on the first schedule of each gas day.

were an increased number of injections into the pipeline from LNG storage[35] to meet the higher demand and congestion on the network—the price jumped to a record $330/MMBtu on July 17, 2007.

The combination of drought conditions easing in 2008 and new capacity added in Victoria, reduced the price volatility experienced the previous winter. However, on November 22, 2008 the 10 p.m. schedule price spiked to $786/MMBtu, due to unexpected cold weather combined with planned and unplanned outages of a gas processing plant.[36] With mild winter conditions and a weaker economy, prices trended down between 2009 and 2011 as retailers and consumers had sufficient contracted supply to meet their demand.

Prices increased in 2012, as a result of some long-term supply contracts expiring and a colder winter increasing demand across southern Australia. Current prices remain at about $4/MMBtu and are fairly stable.

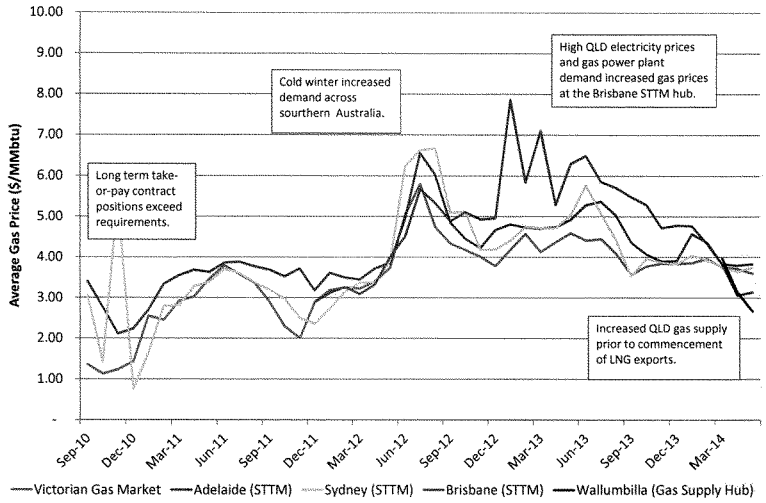
3.2 STTM Gas Prices

Since the commencement of the STTM, prices have moved in lock step across all STTM hubs (Adelaide, Sydney, and Brisbane) and the Victorian gas market. This is despite the fact that the Victorian gas market is a commodity-only market while the STTM prices represents gas delivered to the hub. The majority of gas traded through the STTM is transported on long-term, firm, take-or-pay contracts and as such the transportation charge is often treated as a sunk cost by participants. Victoria supplies a large share of demand in NSW and SA and consequently Victorian supply and demand conditions have a significant bearing on the STTM spot prices. Exhibit 12 shows the monthly average price for the spot markets in eastern Australia. Again, these prices represent the clearing prices for daily imbalances in the system. They do not reflect a robust spot market for trading gas broadly. Most gas continued to move under confidential pricing in the long-term contracts that are the norm.

[35] There is an LNG storage facility that provides peak shaving services to the Victoria gas market and is a supplier of transport fuel.

[36] AEMO, 2010, "Significant Price Event Report Gas Day: 22 November 2008." Available at: http://www.aemo.com.au/Gas/Resources/Reports-and-Documents/~/media/Files/Other/reports/gas/1150-0003%20pdf.ashx.

Exhibit 12: Average STTM Spot Market Prices[37]



Relatively low gas prices were observed during the first 18 months of the STTM. The ex-ante market price at the Sydney hub was regularly below $1/MMbtu during the initial months of the market. It is believed that many retailers and users had long-term take-or-pay contract positions that exceeded their requirements. Excess gas contract positions were offered into the market by these participants at relatively low prices.

A cold winter in 2012 increased demand across southern Australia, which resulted in high prices—as high as $17/MMBtu at the Sydney STTM hub on 23 June 2012. Following the strong winter prices, the spot market prices remained above contract prices (which were believed to be $3.00 to $4.00) during 2012 and 2013. Some long-term contracts supply contract expired during this period. It is believed that in response to the expected rise in contract prices, some participants were banking gas under their long-term contracts so that it could be used to supply their customers at a later date. Therefore, the amount of gas supply offered into the short-term market decreased, resulting in higher prices.

High power prices in Queensland throughout the first quarter of 2013 increased demand from gas power plants located within and upstream of the Brisbane hub. This high demand from gas power plants pushed up prices at the Brisbane STTM. The high electricity prices were triggered by network congestion, disorderly bidding and tight supply conditions.[38]

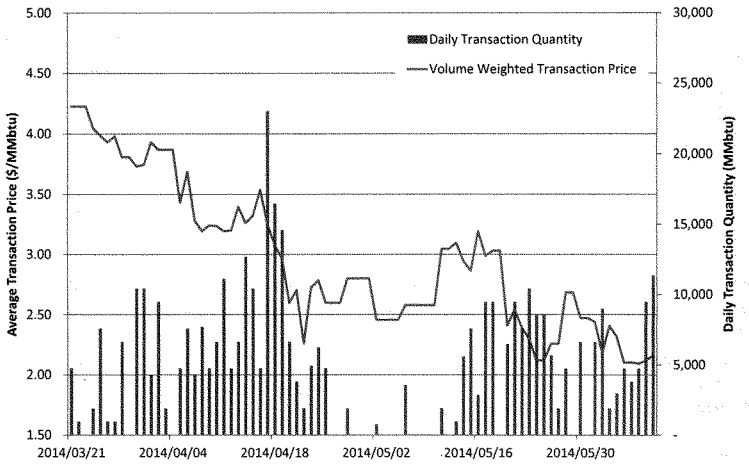
[37] AEMO, 2014, "Short Term Trading Market." Available at: http://www.aemo.com.au/Gas/Market-Data/Short-Term-Trading-Market-Data.
[38] AER, 2014, "State of the energy market 2013." Available at: http://www.aer.gov.au/node/23147.

Spot market prices, particularly those in Queensland, have eased in 2014 due to increased gas production in Queensland, ahead of the first cargo of LNG from Gladstone towards the end of 2014. This injection of "ramp-gas" into the market has decreased spot prices in all of eastern Australia.

3.3 Gas Supply Hub (Wallumbilla) Prices

The higher gas production in Queensland has had the most impact on prices in the new GSH market at Wallumbilla. Relatively low demand, due to mild weather and low electricity prices, combined with increased production has pushed the spot prices below $2.50/MMbtu. Daily transaction price and quantities since the commencement of the GSH are shown below in Exhibit 13.

Exhibit 13: Gas Supply Hub (Wallumbilla) Daily Price and Quantity[39]



3.4 Eastern Australian Contract Markets and Price Discovery

The majority of gas supply in Australia is traded through long-term bilateral contracts between gas producers, direct customers (e.g., industry and power plants) and retailers. Over-the-counter markets and brokers were established over a decade ago in electricity and environmental products, but have not yet established a role in the trading of natural gas products in eastern Australia. A natural gas futures contract, cash settled against the Victorian gas market, is managed by the ASX. However, the contract has only had a small number of trades and a representative forward curve has not been established.

[39] AEMO, 2014, "Gas Supply Hub." Available at: http://www.aemo.com.au/Gas/Market-Data/Gas-Supply-Hub-Market-Data.

Prior to the establishment of the Gas Supply Hub, industry commented that a lack of standardization and forward trading mechanisms increased transaction costs, making it difficult to trade short- to medium-term contracts.

The development of secondary pipeline capacity trading arrangements is seen by industry as an important development to improve liquidity and efficiency of natural gas trading in Australia.

3.4.1 Price Discovery Process

There is limited transparency of forward gas prices in Australia. Wholesale market participants regularly test the market through direct negotiation with gas producers and other wholesale participants. Stock exchange announcements and media reports (see Exhibit 14) are the main source of public information about the forward contract market.

In the retail market, large gas users often run a competitive tender process to procure their long-term gas supplies.

3.4.2 Recent Contract Trends

An increase in the price of long-term gas supply contracts in eastern Australia has been widely reported, as noted in the Introduction. Buyers have also reported a fall in the number of parties able to make long-term offers for gas supply. Exhibit 14 below contains a summary of recent transactions, including indicative pricing and total quantities, reported by one of the counterparties to the transactions through stock exchange reporting requirements or reported by the Australian press.

LNG participants have been the most active and hence they are prominent in the list below. The pricing of most of the transactions are reported as being linked to oil prices, now or in the future. That the sales to the LNG exporters would be linked to oil is not surprising. Sales to domestic consumers linked to oil may represent the competition between LNG exporters and domestic users and may also reflect a desire for more transparent pricing. That said, from the announcements there is no way to determine how the pricing mechanisms work or what oil indices are used.

Exhibit 14: Recent Gas Sales Contract Transaction Announcements

Date	Seller	Buyer	Start Date	Term (Years)	Pricing	Volume	Delivery location
27/03/2014[40]	WestSide Corp. Ltd. (Meridian Field)	GLNG	2015	20	Oil linked in 2016	Up to 62 MMcfd	GLNG pipeline. (passes adjacent to the fields)
19/12/2013[41]	Origin	GLNG	2016	5	Oil linked	95 Bcf over 5 years	Wallumbilla
28/11/2013[42]	Origin	QGC	2014	2	Oil linked	28 Bcf per year	Wallumbilla
19/09/2013[43]	Exxon	Origin	2014	9	Current market price and then oil linked	410 Bcf over 9 years	Sydney, Longford
10/04/2013[44]	Beach	Origin	Mid-2015	8	Combination of an oil linked curve and other parameters	16 Bcf per year (up to 132 Bcf over 8 years)	Moomba
20/12/2012[45]	Origin	MMG	2013	7	Media report estimated $8.85/MMbtu	21 Bcf per year	North West Queensland
2/05/2012[46]	Origin	GLNG	2015	10	oil linked	95 MMcfd	Wallumbilla
25/10/2010[47]	Santos	GLNG	2014	15	oil linked	711 Bcf over 15 years	Wallumbilla

In a notice to shareholders regarding stock value, WestSide Corporation Limited (listed as the first seller in Exhibit 14 above) disclosed a number of details on its long-term gas price contracts. WestSide said it signed a 20-year natural gas sale contract with GLNG to purchase gas starting in 2015. The shareholder disclosure stated that the sales agreement provided WestSide with production flexibility to match the Meridian Field deliverability with available funding, supplying GLNG with up to 62 MMcfd over 20 years. The 20-year agreement was based on oil-indexed market prices referenced to the Japan Customs-cleared Crude (JCC) oil prices in U.S. dollars. The contract prices are roughly three times higher than prices WestSide currently receives. The exhibit below shows estimated prices under the contract at different JCC oil prices.[48]

[40] Santos, 2014, "GLNG sign purchase agreement with Meridian joint venture." Available at: http://www.asx.com.au/asxpdf/20140327/pdf/42nmzqdfl3br44.pdf.

[41] Origin Energy, 2013, "Origin announces new agreement to sell gas to GLNG." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1539.

[42] Origin Energy, 2013, "Origin announces gas supply agreement with QGC." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1535.

[43] Origin Energy, 2013, "Origin secures 432 PJ of natural gas from ESSO/BHPB to boost its portfolio to meet customer demand." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1516.

[44] Beach Energy, 2013, Beach signs major gas sales agreement with Origin Energy." Available at: http://www.beachenergy.com.au/IRM/Company/ShowPage.aspx/PDFs/2934-16785602/BeachsignsmajorgassalesagreementwithOriginEnergy.

[45] The Australian, 2012, "Origin Energy secures record gas price." Available at: http://www.theaustralian.com.au/business/mining-energy/origin-energy-secures-record-gas-price/story-e6frg9df-1226541447947#.

[46] Origin Energy, 2012, "Origin announces major gas sales agreement with GLNG." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1386.

[47] Santos, 2012, "Santos to supply 750PJ of portfolio gas to GLNG." Available at: http://www.santos.com/Archive/NewsDetail.aspx?p=121&id=1230.

[48] WestSide Corporation Limited. "WestSide Targets Statement" (p. 6). WestSide, 16 May 2014: Brisbane, Qld.

Exhibit 15: Estimate of Gas Price under GLNG Gas Supply Agreement from 2017

JCC Oil Price (US$/bbl)	$100.00	$110.00	$120.00
Gas Price (US$/GJ)	$7.95	$8.60	$9.24
Gas Price (A$/GJ)	$8.59	$9.28	$9.98

Source: WestSide Corporation Limited. "WestSide Targets Statement." (p. 6). WestSide, 16 May 2014: Brisbane, Qld.

3.4.3 Contract Price Drivers

Eastern Australia's natural gas contract prices have historically been low compared to other OECD countries due to the large accessible gas reserves and competition from low priced coal. Gas contracts in eastern Australia have historically been priced at a premium to the cost of gas production—typically between $3.00 and $4.00. Drivers of the increase in the long-term natural gas contract price include the following factors:

- *Tight demand and supply conditions*: As discussed in Section 2.2, demand for gas in eastern Australia is expected to increase at unprecedented rates. It is a significant challenge for the LNG export projects, and the industry more broadly, to develop gas fields, processing and transportation facilities to meet such large increases in demand in such a relatively short period of time.

- *Limited supply options*: The LNG export participants are currently large sellers of gas in the domestic market. However, over the next three years, they will transition from sellers to buyers in the domestic market. As shown in Exhibit 16, LNG export participants hold a large share of the 2P CBM reserves, once their focus turns to the production of LNG there will be less wholesale participants that are capable of supplying long-term wholesale transactions.[49]

Exhibit 16: LNG Export Share of CBM Reserves

LNG Export Project	Gas Reserve Classification		
	Quantity of 2P Reserves (Bcf)	Quantity of 3P Reserves (Bcf)	Quantity of 2C Resource (Bcf)
Arrow Energy	8,999	13,242	2,390
APLNG	12,373	15,140	3,626
GLNG	5,096	6,467	1,553
QCLNG	9,788	17,892	12,986
Total LNG projects	**36,255**	**52,741**	**20,554**
% of Total CBM reserves	86%	81%	68%

Source: RLMS, 31 December 2012.

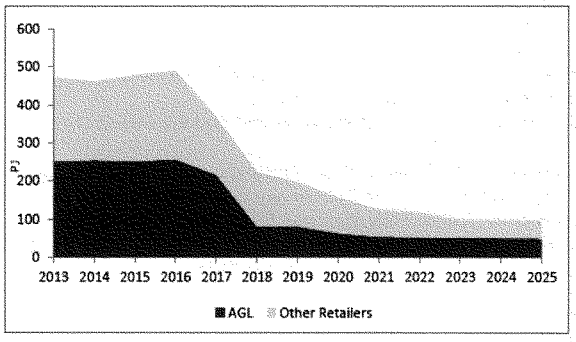
- *Restrictions on CBM developments*: The development of CBM gas fields in New South Wales (NSW) and Victoria, that could provide much needed supply to the domestic market, has been

[49] There are three classes of resources in the SPE Petroleum Resources Management System (PRMS) : Reserves, Contingent Resources, and Prospective Resources. Reserves are those quantities that meet the requirements for commerciality. They have no commercial or technical risk. Estimates of recoverable quantities are designated on the basis of risk are 1P (Proved), 2P (Proved plus Probable), and 3P (Proved plus Probable plus Possible) reserves. Contingent resources are those quantities that are estimated to be potentially recoverable from known accumulations but which are not currently considered commercial. The equivalent categories, based upon degree of risk, for projects with Contingent Resources are 1C, 2C, and 3C. Prospective Resources are even less certain and can have both commercial risk and technical risk (chance of discovery).

impacted by state government regulations. The NSW Government introduced the Strategic Regional Land Use Policy[50] in 2012 which places new regulations on mining and coal seam gas industries, including an exclusion zone around residential and strategic agricultural land across the State. In 2012, the Victorian government imposed a moratorium on hydraulic fracturing and coal seam gas exploration which will remain in place until at least July 2015. The moratorium affects the development of onshore unconventional gas reserves in the Gippsland Basin. In April 2014, the government commenced community consultation on possible onshore gas development in Victoria.[51]

- *Re-contracting period*: A large portion of gas supply contracts will come to an end by 2018 coinciding with the start-up period of the LNG export projects and a period of high demand for contracted supplies. Industry groups in eastern Australia have voiced concerns about increased contract prices[52] and the challenge faced by their members as they re-contract their gas supplies.

Exhibit 17: Eastern Australia Contracted Supply[53]



- *Competition from LNG exporters for long-term supply*: As shown in Exhibit 14, LNG exporters have recently been the main buyers on long-term domestic gas supply. It is believed that this is to ensure they have sufficient production and processing capacity in the near-term and adequate reserves to meet the long-term export obligations.

  As shown in Exhibit 18 below, gas required by GLNG to meet their contracted LNG sales exceeds their reserves. GLNG has entered into third party agreements to shore up the feedstock requirements of its LNG export project. As listed in Exhibit 14, GLNG has contracted for supply of up to 1,611 Bcf from third party providers. In addition QQC contracted for supply of up to 28.4 Bcf

[50] New South Wales Government, 2013, "Strategic Regional Land Use." Available at: http://www.nsw.gov.au/initiative/strategic-regional-land-use.

[51] Victorian Government, 2014, "Natural Gas Community Information: Current status of onshore natural gas in Victoria." Available at: http://naturalgasinfo.vic.gov.au/__data/assets/pdf_file/0017/92321/6746-eer-current-status-factsheet-3.pdf.

[52] ABC News, 2014, "Gas exports, price boom threaten 100,000 Australian jobs: manufacturers." Available at: http://www.abc.net.au/news/2014-03-27/gas-boom-threatens-australian-manufacturing-jobs/5349822.

[53] Source: AGL Merchant Energy Presentation May 2013. Available at: http://www.agl.com.au/about-agl/media-centre/article-list/2013/may/merchant-energy-presentation-may-2013.

of gas during 2014 and 2015 to increase its supply portfolio as it expands its own LNG production capacity.

Exhibit 18: Gas Requirements and Reserves by LNG Export Project (Bcf)

Project Name	Capacity	Annual Gas Demand at Full Capacity	Sales	Annual Gas Required to Meet Sales	Total Gas Required to Meet Sales	Total 2P Reserves	Reserves Long / Short
APLNG	438.3	512	418.82	489	9,782	12,408	2,626
GLNG	379.86	444	340.9	398	7,962	5,096	-2,866
QCLNG	413.95	483	413.95	483	9,668	9,788	119

Source: RLMS, 31 December 2012.

- *LNG netback price*: LNG export projects have recently been the main buyers of domestic gas supplies. It is believed that the LNG netback price, the LNG sales price in Asia less all transportation and processing costs, is being used as a benchmark for the pricing of domestic gas contracts in Australia. This netback price has the following main components:
  - LNG sales price: The long-term LNG transaction price in Asia that is linked to the oil price. The Japanese Customs-cleared Crude (JCC) contract is commonly used as the reference price in Asia for LNG transactions. A factor (or slope) for the conversion of the oil price to the LNG price is negotiated by the contract parties.
  - LNG shipping cost: The cost of LNG tankers required to transport LNG from Gladstone to Asia.
  - Liquefaction cost: The construction and operational cost of liquefaction facilities.
  - Transportation to the LNG plant: The delivery location of a domestic gas deal influences the netback price as the theoretical alternative for the seller is to transport that gas to Gladstone for use as LNG feedstock. The greater the distance from Gladstone the lower the netback price because of the higher theoretical transportation cost to Gladstone.

Such netback pricing is characteristic of LNG commercial arrangements where the source of LNG has substantial stranded gas resources—i.e., limited local markets for domestic gas and LNG is the only way to monetize the resource. By contrast, LNG export pricing in the United States has been based on domestic gas prices, such as Henry Hub, and not netbacks from the Asian or European markets. The reason for this is the size and liquidity of the U.S. domestic market and the ready availability of supply from many producing sources in the United States and Canada and large demand from domestic consumers. The price of gas in the United States and Canada is set in the domestic market, not the overseas markets. Exporters of LNG from North America must enter this domestic market to secure supply for export.

3.5 Gas Supply Cost and Performance Challenges

Gas supply costs are expected to increase in eastern Australia because of higher production costs associated with CBM, shale gas, and tight gas resources, higher pipeline and processing costs associated with new gas fields, and higher input costs that are impacting mining and resource projects across Australia.

While Australia has potentially large shale and tight gas reserves, the cost of extracting this gas (or wellhead cost) is higher than in the United States and higher than current CBM production. A study by

the Australian Council of Learned Academies (ACOLA) [54] reported that the cost of drilling and completion of a shale gas well in Australia (between $11 million to $12 million) is considerably higher than the United States ($3.5 million to $5 million). The cost of extracting shale gas resources is also estimated to be significantly higher than current CBM production in eastern Australia. In a report by consulting firm SKM[55] for ACOLA, the initial cost of shale gas production is estimated to be in the range of $6 to $9 per MMBtu compared $3 to $6 per MMBtu for CBM due to the higher drilling costs (well depth of 2,000 to 3,000 meters for shales compared to 500 to 1,000 meters for CBM), production profile, and the higher material and water requirements for the hydraulic fracking of shale wells.

Australia's coal seam gas producers have had problems in terms of well quality, and drilling and related costs. The big projects including the Santos Gladstone project, Origin Energy/ConocoPhillips' Australia Pacific LNG, and BG Group's Queensland Curtis Island project are relying primarily on CBM for gas supply. Operators plan to drill tens of thousands of CBM wells in coming decades to supply the plants. The producers indicate that a large fraction of the CBM wells have high initial rates in the range of 2–4 MMcfd or greater.[56,57] Most of the wells require de-watering, which creates additional costs and has environmental considerations for water disposal.

It is now apparent that while the "sweet spot" wells are generally meeting expectations, other areas are not. In addition, there is reported to be more variability from well to well than anticipated, even in some of the better areas. Because of the lower well quality, Santos increased the number of required wells for its Gladstone project relative to their initial environmental impact statement. In a February, 2014 presentation, Santos stated that it anticipated the requirement of drilling 200 to 300 new CBM wells per year, apparently for the life of the Gladstone project to maintain deliverability. At a reported cost of around $1.35 million per well (reportedly down 30 percent from 2010 costs), this would equate to additional, previously unanticipated capex of $1.2 to $1.6 billion through 2018. Over 20 years, the additional wells for just this project would total 4,000 to 6,000.

It has been estimated that reliance upon CBM for the three planned LNG projects could result in the drilling of up to 40,000 wells, in contrast to the 18,650 wells originally planned in the environmental impact statements. In addition to increased costs, this increased level of activity is meeting with strong resistance from environmental groups.

Given the difficulties with CBM well quality and costs, LNG developers have been purchasing gas from third parties with reserves in other areas such as the Cooper Basin, to provide a portion of future gas production volumes. The Cooper Basin produces conventional gas and has shale gas potential, for which activity is still in the initial stages.

The combination of the above factors impacting reserves and deliverability may result in significantly lower levels of near-term LNG export than were initially anticipated.

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[54] Australian Council of Learned Academies, 2013, "Engineering Energy: Unconventional Gas Production, A study of shale gas in Australia." Available at: http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-6.

[55] SKM, 2013, "Unconventional Gas in Australia – Infrastructure Needs." Available at: http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-6.

[56] Santos, 2014, "Macquarie Australia Conference." Available at: http://www.santos.com/library/080514_Macquarie_Australia_Conference_Presentation.pdf;

[57] Origin, 2014, "Origin-APLNG Operational Review and Asset Visit." Available at: http://www.originenergy.com.au/files/APLNG_Site_Tour_Combined_Presentations.pdf.

A 2014 report by MDQ Consulting[58] discussed the reserve positions that have been established for each of the major Australian export projects. The author concluded that all three projects are short on "2P" reserves and that the Gladstone project is in the worst reserve situation, especially when considering other reserve categories. The report discusses gas reserve purchase by Gladstone to secure supply from other basins to supplement their CBM reserves.

Project development and construction costs have increased significantly in Australia following an extended growth period in the mining and resource sectors. Some of the most notable examples of increased costs have been observed in the construction of LNG export projects with Chevron's Gorgon project now budgeted to cost $54 billion,[59] up from an original budget of $37 billion, and the QCLNG project which has had an increase in budget of 33 percent to $20.4 billion.[60] The increase in costs at these projects has been attributed to exchange rate movements, higher labor and input costs, increased regulatory hurdles, and delays. With seven LNG export projects currently under construction, competition for skilled labor and equipment is likely to result in higher costs for new gas developments in eastern Australia for the foreseeable future.

Another challenge for the development of domestic reserves in Australia has been management of environmental impacts, particularly of the CBM development that has sparked concern from environmental, agricultural, and community groups. Much of the CBM is located in prime agricultural areas and the impacts on land use have caused tension with farming that has been reported in the media. CBM in Queensland is particularly wet, requiring significant de-watering. The wetness is due to the co-location of subterranean aquifers, such that the drilling is said to put pressure on groundwater resources. Moreover, the de-watering has led to fears of untreated production water at the surface; alleged damage to, and contamination of underground aquifers by hydraulic fracturing; damage to wildlife habitat in sensitive areas; and contamination of surface water resources in drinking water catchments. Some communities feel that CBM development does not fit with the character or objectives of the area, such as wine-producing and tourist regions, and results in adverse health impacts.[61]

Environmental regulation in Australia primarily falls under state oversight. New South Wales has put strict restrictions on CBM development, but has little production. Most of the production is in Queensland, where the government has implemented a comprehensive governance framework to oversee CBM development. The legal framework requires thorough assessment of proposed projects; protects the Great Artesian Basin, local water supplies, and strategic cropping land; requires fair compensation for landholders; sets safety and sustainability standards for CBM operations; and has established a strict compliance and enforcement regime. The industry is also required to support local businesses, train

[58] MDQ Consulting, 2014, "NSW Wholesale Gas Market Report." Available at: http://www.ipart.nsw.gov.au/files/2086952c-5a8f-4aab-b716-a2d5009ff909/Report_-_MDQ_Consulting_NSW_Wholesale_Gas_Market_Report_-_February_2014.pdf.

[59] ABC, 2013, "Chevron reveals second Gorgon gas project cost blowout." Available at: http://www.abc.net.au/news/2013-12-12/gorgon-gas-project-cost-blowout/5151982.

[60] The Australian, 2013, "Triple whammy sparks $5bn blowout for BG's Gladstone project." Available at: http://www.theaustralian.com.au/business/companies/triple-whammy-sparks-5bn-blowout-for-bgs-gladstone-project/story-fn91v9q3-1226346265187#.

[61] The Coal Seam Gas Debate, Parliament of Australia, retrieved July 11, 2014 from http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/GasDebate.

workers for new skills and invest in physical and social infrastructure such as roads housing and community services.[62]

Thus a number of factors have contributed to the slower development and higher cost of CBM for LNG in eastern Australia. These higher costs and lower rates of production have led LNG developers to enter into the broader market to secure supplies from other sources in order to meet their LNG delivery obligations.

3.6 Potential New Gas Supplies in Response to High Contract Prices

Some commentators have speculated that contract prices could rise as high as AU$18/GJ[63] if LNG export projects are not able to meet LNG sales contracts with their own gas. In the event that a LNG export project is not able to produce sufficient gas then it could purchase third party domestic gas supplies or purchase spot LNG to ensure it meets its sales contract. In theory, and to the extent that its liquefaction and transportation costs are sunk, it may be more economical for the LNG export project to purchase gas at a price higher than the LNG netback price. However, if domestic contract prices rise above the long run LNG netback price, mostly due to other "suppliers" providing the required shortfall in gas, then it is likely to trigger an increase in supply to the domestic market. Some new sources of supply could include:

- Supply diversion: Arrow Energy has had plans to develop a LNG facility in Gladstone Harbor using CBM supplies. Arrow controls 20 percent of Australia's CBM resources (see Exhibit 15). Rather than develop its own project, Arrow is considering selling its supplies to the other LNG projects or into the domestic market. The *Australian Financial Review* reported that it understood Arrow Energy was in negotiation with the three other LNG export projects in March 2014.[64]

- Shale production: High prices stimulate the development of new gas production facilities. Shale gas is in the early stages of development in Australia, and more exploration and appraisal activity is required to prove the reserves required to justify investment and development of the resources. As discussed in text box below, the increased contract prices have already sparked substantial investment in exploration for unconventional gas in Australia.

- Power generators selling gas into market: Some power plants have already committed to selling their gas supplies rather than generating electricity. There is likely to be further scope for switching to gas sales from gas power plants. This switch may include even the most efficient power stations, as they respond to periods of high gas prices.

[62] Queensland Government, Regulatory Framework for CSG-LNG Development, retrieved July 11, 2014 from http://www.business.qld.gov.au/industry/csg-lng-industry/regulatory-framework-csg-lng.

[63] The Australian, 2014, "LNG demand to force spike in gas prices." Available at: http://www.theaustralian.com.au/business/mining-energy/lng-demand-to-force-spike-in-gas-prices/story-e6frg9df-1226847417206#.

[64] Australian Financial Review, 2014, "Gas sale seen as favoured option from Arrow talks." Available at: http://www.afr.com/p/opinion/gas_sale_seen_as_favoured_option_OCumhgzwy7XGk30IpA1uIL.

Increasing Exploration Investment Due to High Natural Gas Prices

The recent increase in contract prices in eastern Australia has triggered investment of over a billion dollars (USD) in the exploration and appraisal of shale and tight gas resources in Australia. Some of the recent investments are summarized below.

May 2, 2014, Falcon Oil & Gas – Origin Energy, Sasol

Falcon Oil & Gas entered into farm-out agreements with Origin Energy and Sasol[65] covering exploration permits in the Beetaloo Basin located in the Northern Territory. Under the agreements, Origin and Sasol will earn 35 percent interest in the exploration permits for a cash investment ($19 million) and a commitment to fully fund the cost of the exploration activities. The exploration and appraisal program will be carried out in three stages over the next five years with a budget of up to $154 million.

March 25, 2014, Strike Energy – Orica

Strike Energy, an oil and gas company, entered into a second agreement with Orica, an Australian explosives and chemicals maker, to supply an additional 95 Bcf of gas.[66] The parties entered into an initial deal in 2013 for Orica to make $48 million of pre-payments against a 20-year agreement to supply up to 142 Bcf of gas. The pre-payments are providing Strike with the funding required to develop its unconventional gas resources in the Cooper Basin. The innovative deal provides Orica with affordable long-term gas supply at a time of rising contract prices in eastern Australia.

March 10, 2014, Drillsearch – BG Group (through QGC)

Drillsearch, a junior oil and gas company, announced an expansion and extension of its agreement with BG Group (through QGC) for the exploration of shale and tight gas in the Cooper-Eromanga Basin.[67]

Under the original agreement, struck in July 2011, the parties agreed to a three stage exploration and production program of shale and tight gas resources. A commitment was made to invest $120m over five years with $84m of the first $93m to be funded by BG Group. Under the new agreement, the remaining funding has been brought forward and the exploration activity has been expanded and extended.

February 24, 2014, Senex – Origin Energy

Senex, a junior oil and gas company, announced farm-out agreements with Origin Energy covering petroleum exploration licenses in the Cooper-Eromanga Basin.[68] Under the agreements, up to $235 million will be invested to evaluate tight gas sands. The work program involves drilling at least 15 wells and other exploratory activities. Senex sought the partnership with Origin Energy to accelerate the commercialization of the potential large unconventional gas reserves.

February 25, 2013, Beach – Chevron

Beach Energy, a junior oil and gas company, announced a farm-out agreement with Chevron[69] covering exploration licenses in the Cooper-Eromanga Basin in South Australia and Queensland. Under the agreement, Beach Energy will transfer up to 60 percent of its ownership in the exploration licenses in return for payments of up to $350m by Chevron over two stages. The agreement will help to fund the exploration and appraisal program being carried out by Beach Energy.

[65] Falcon Oil and Gas, 2014, "Transformational Farm-out of Beetaloo Unconventional Acreage, Northern Territory, Australia." Available at: http://www.asx.com.au/asxpdf/20140502/pdf/42pdl2f1lxl7m3.pdf.

[66] Strike Energy, 2014, "Southern Cooper Basin Gas Project Update." Available at: http://www.strikeenergy.com.au/images/stories/pdf/20140325_Orica%20Gas%20Sales%20Agreement.pdf.

[67] Drillsearch Energy Limited, 2014, Drillsearch and QGC agree new terms over Cooper Basin acreage." Available at: http://www.asx.com.au/asxpdf/20140310/pdf/42n8j3knd4tkj0.pdf.

[68] Senex Energy Limited, 2014, "Senex and Origin Energy agree Cooper Basin gas farm-out." Available at: http://www.senexenergy.com.au/uploads/contentFiles/files/2014_02_24%20Senex%20and%20Origin%20agree%20Cooper%20Basin%20gas%20farm-out.pdf.

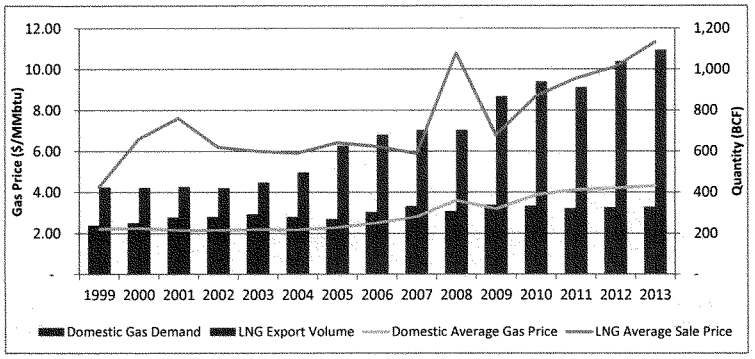
[69] Beach Energy, 2013, "Beach Farm-out of Exploration Acreage in Nappamerri Trough to Chevron." Available at: http://www.beachenergy.com.au/IRM/Company/ShowPage.aspx/PDFs/2865-26815295/BeachfarmoutofexplorationacreagetoChevron.

3.7 Contract Prices in Western Australia

Gas has historically been purchased by the North West Shelf JV under long-term supply contracts. These contracts are thought to expire starting in 2015. Like eastern Australia, there is limited transparency of contract prices in WA.

Exhibit 19 shows the historical average domestic contract price and the average LNG export price. The domestic contract price is heavily influenced by the weighting of lower priced long-term contracts and as such is not representative of prevailing market prices. However, the diagram does provide a good summary of the historical contract prices and the current gas purchase costs in the state.

Exhibit 19: Western Australia LNG Export and Domestic Gas Prices (USD)



Source: Government of Western Australia Department of Mines and Petroleum.

Average gas prices in Western Australia were less than $2.50/MMbtu until 2006 when increased demand from a strong mining sector and higher production costs put upward pressure on domestic contract prices. Short-term gas supplies traded up to $17/MMBtu in July 2008 following the Varanus Island incident which cut domestic supply.[70] The average LNG export price almost doubled between 2007 and 2008, and the domestic gas price increased during the same year.

In 2011, a Western Australian government inquiry into domestic gas prices found that prevailing contract prices had been reported to be in a range of approximately $5.45 to $9.10/MMBtu.[71] The increase in prices sparked new investment in domestic-market-only production facilities, including the Reindeer and Macedon gas fields in the Carnarvon Basin.

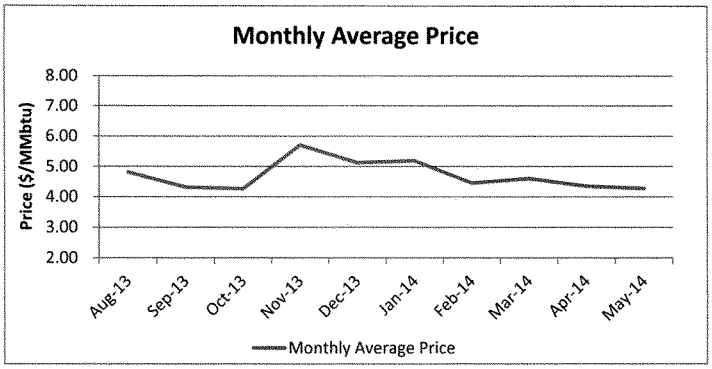
Unlike eastern Australia, there are no regulated spot markets operating in Western Australia. A small number of brokers provide short-term transaction matching, nomination, and contract management services to gas users in the state. GasTrading, a broker established in 2007, publishes aggregated details of trades it matches to support price transparency for the industry. The quantity of transactions matched by the broker has averaged around 9.5 MMcf per day over the past two years, and GasTrading

[70] Australian Energy Regulator, 2010, "State of the energy market." Available at: http://www.aer.gov.au/node/6313.

[71] Economics and Industry Standing Committee, 2011, "Inquiry into Domestic Gas Prices."

reported a fall in the monthly average price from over $6/MMbtu in 2012 to around $4/MMbtu in May 2014. Exhibit 20 shows the average spot prices over the past ten months.

Exhibit 20: Average Spot Price in Western Australia (USD)



Source: GasTrading, http://www.gastrading.com.au/.

The diagram shows that despite strong LNG spot prices in Asia, the domestic spot prices have softened. This softening reflects an easing in demand growth that had been observed in Western Australia.

A retail gas market operates across distribution networks in the south-west of the state, providing customer transfer and metering services and facilitating competition between suppliers in the retail market.

4 Summary Comparison of the United States and Australia

As Exhibit 21 shows, there are major differences between Australia and the United States in terms of natural gas markets. Australian domestic gas market is divided into three markets, which are small, and gas production is driven by LNG exports. In contrast, the United States is part of an integrated North American gas market, and the country's LNG exports are expected to become a small fraction of the much larger market. Australian LNG exports are expected to more than double the total production from 2012, whereas the total LNG exports out of the United States (assuming all of the non-FTA conditionally approved export projects come to fruition), will only be 12 percent of the 2012 production. Therefore, the potential impact of LNG projects in the United States is very small in comparison to the significant potential impacts that LNG exports will have on Australia.

Exhibit 21: Comparison of Natural Gas in U.S. and Australia

Criteria	Unit	U.S.	Australia
2012 GDP	Trillion current US$	$16.2	$1.5
2012 Population	Million people	313.9	22.7
2012 Total Supply (Dry Production + Imports)	Bcf	27,195	2,096
2012 Domestic Consumption	Bcf	25,533	1,045
2013 LNG Export	Bcf	0	1,050
Near-term LNG Export (2013 LNG export + LNG capacity under construction)	Bcf per year	803 (Sabine Pass, 2.2 Bcfd)	4,680
Forecasted LNG Export	Bcf per year	2,570 (per EIA AEO for 2025), 3,840 (assuming all 10.52 Bcfd of non-FTA DOE conditionally approved projects are in place)	4,680 (excluding Arrow LNG), 4,911 (including Arrow LNG)
Forecasted LNG Export as % of 2012 Total Supply	%	9.5%–12.4%	223%–236%
Pipelines	Miles	305,000	15,000
Number of Major Trading Locations	No.	58	5
Producing Gas Wells (2013)	No.	483,000	3,900 (CBM only)
Currently Active Rigs (2014)	No.	1,860	20
Market Structure		Highly integrated, price discovery and transparency, close regulation of pipelines, multiple contract options	Unconnected markets, loose pipeline regulation, no price discovery or transparency, long-term contracts

Source: EIA, World Bank, Baker Hughes, BREE Energy Statistics.

Another source of the differences between Australia and the United States is the lack of transparency in Australian gas prices. The vast majority of gas is traded under long-term contracts (10 to 20 years) under which the pricing terms are confidential. At the same time, there is no liquid wholesale market that can provide any price discovery for longer-term deals. These arrangements are understandable in a small market, where producers must have guaranteed gas off-takers to support drilling programs. This pattern is further reinforced by a pipeline network that is not highly interconnected and that itself operates under long-term service agreements at negotiated rates. There is no regulatory oversight for tariffs, nor are tariffs publicly available in most cases. Gas prices in long-term contracts are thought to be tied largely to.

production costs to provide a market guarantee for producers. Much of what is known about gas prices outside the short-term spot trading markets in Australia is by anecdote.

By contrast, in the United States even the long-term contracts, where they exist, tend to be two to five years in duration, and prices are indexed to liquid trading points. The much larger North American market provides producers ready access to multiple buyers, thus prices reported at trading locations represent real opportunity costs. Moreover, U.S. pricing reflects two kinds of trading: the pure daily spot market for gas and the first of the month gas price market, for volumes delivered ratably over the subsequent month. However, the details of gas contracts in the United States are generally confidential. Buyers may be paying premia or discounts to stated indices for a variety of reasons (firm delivery obligations for example) and pricing in bilateral contracts is most certainly undisclosed. That said, the substance of gas pricing in North America is widely reported and parties have a sense of the market.

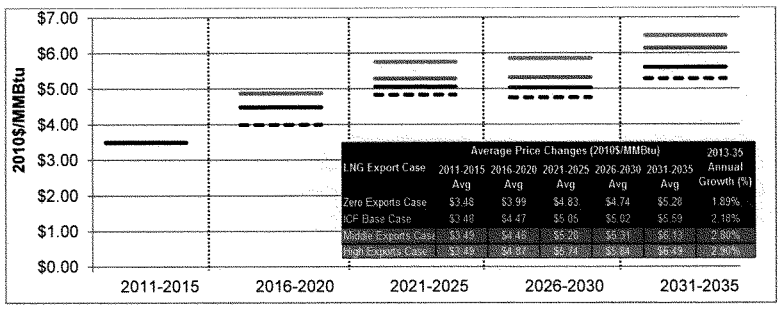
ICF accepts that new Australian contract gas prices have risen and can be expected to stay high in the near future. This appears to be the case for several reasons. LNG developers who have their own gas supply have been having difficulty ensuring that the supplies are sufficient to meet the exports. This difficulty is for primarily technical reasons having to do with production costs and well performance as noted above. LNG developers have gone outside their own production to line up alternative sources of supply from other producers. The same producers that have been supporting domestic production have an opportunity to sell gas at LNG netback pricing, which is considerably higher than domestic prices. Therefore, domestic gas consumers who are looking to renew supply contracts are likely to face a tough market where they are competing for gas with LNG developers. (This is a phenomenon of the eastern Australia market.) The production of gas in eastern Australia is dependent on (CBM). Access to other sources of gas is limited as pipeline infrastructure lacks interconnectivity with other Australian markets.

In the United States, we can expect LNG exporters to seek out long-term supply arrangements that guarantee access to sufficient quantities of gas to meet export obligations. We have seen in the market that these exporters are willing to offer premiums to Henry Hub prices.[72] However, because of the size and the interconnectivity of the U.S. market, competing buyers can turn to other sources of supply, or to other producers. The liquidity of the market will ensure access for both suppliers and buyers. While gas prices will increase slightly with the higher demand for LNG exports, relative to a No LNG Exports Case, access to gas will not be affected. ICF's previous analysis for the API demonstrated that the impact of LNG exports on natural gas prices is modest. With the addition of 4 Bcfd of LNG exports by 2035 in the Gulf Coast, Henry Hub prices were projected to average $5.60/MMBtu over 2031–35, while 16 Bcfd of LNG exports were projected to increase Henry Hub prices to average $6.50/MMBtu over 2031–35 period, compared with $5.28/MMbtu when exports are not allowed. These price increases are of a much smaller magnitude than the forecasts for Australia, which are expected to increase to LNG netback prices. Exhibit 22 shows five-year averages for natural gas prices at Henry Hub (i.e., the main U.S. natural gas pricing hub) for each of the cases assessed, with "ICF Base Case" representing an LNG export case of 4 Bcfd, "Middle Exports Case" comprising exports of 8 Bcfd, and the "High Exports Case" of 16 Bcfd.

[72] ICF knowledge gained through working with a number of private sector LNG clients.

Exhibit 22: Henry Hub Natural Gas Price (USD) Changes

4, 8, and 16 Bcfd Cases Relative to Zero Exports Case



LNG Export Case	Average Price Changes (2010$/MMBtu) 2011-2015 Avg	2016-2020 Avg	2021-2025 Avg	2026-2030 Avg	2031-2035 Avg	2013-35 Annual Growth (%)
Zero Exports Case	$3.48	$3.99	$4.83	$4.74	$5.28	1.89%
ICF Base Case	$3.48	$4.47	$5.05	$5.02	$5.59	2.18%
Middle Exports Case	$3.49	$4.48	$5.28	$5.31	$5.13	2.80%
High Exports Case	$3.49	$4.97	$5.74	$5.74	$5.49	2.94%

Source: ICF International. "U.S. LNG Exports: Impacts on Energy Markets and the Economy." The American Petroleum Institute (API), 15 May 2013: Washington, D.C. Available at: http://www.api.org/~/media/Files/Policy/LNG-Exports/API-LNG-Export-Report-by-ICF.pdf.

The three export cases averaged between $0.32/MMBtu and $1.02/MMBtu between 2016 and 2035 at Henry Hub, as shown in Exhibit 23. However, all cases showed an average price increase of roughly $0.10/MMBtu for every one Bcfd in LNG exports.

Exhibit 23: Wholesale Natural Gas Price Changes

4, 8, and 16 Bcfd Cases Relative to Zero Exports Case

Case	Natural Gas at Henry Hub (2016-2035 Avg)
ICF Base Case	
Avg Price Increase ($/MMBtu)	$0.32
Avg Price Increase/Bcfd ($/MMBtu)	$0.10
Middle Exports Case	
Avg Price Increase ($/MMBtu)	$0.59
Avg Price Increase/Bcfd ($/MMBtu)	$0.11
High Exports Case	
Avg Price Increase ($/MMBtu)	$1.02
Avg Price Increase/Bcfd ($/MMBtu)	$0.10

Source: ICF estimates.

Another way that the U.S. differs from Australia is that a large portion of U.S. onshore drilling activity is oriented toward drilling oil wells and gas wells that produce substantial amounts of lease condensate and natural gas plant liquids. In 2013 78 percent of the annual average Hughes rig count was for liquids-directed drilling. In contrast, eastern Australian drilling is almost completely directed to CBM and other types of gas with very little liquids content. Thus, much of the U.S. drilling activity is incentivized by crude oil and related liquids prices for lease condensate and natural gas plant liquids (ethane, propane, butanes, and pentanes plus).

On the one hand, this emphasis on liquids-directed drilling in the U.S. helps support natural gas production volumes by providing revenue for the approximately 22 percent of gas production that comes from oil wells (classified as associated-dissolved gas) and about 46 percent of the non-associated gas volumes that are processed (along with most of the associated-dissolved gas) to remove NGLs. On the

other hand, now that much of the U.S. drilling activity is directed toward liquids, gas-orientated drilling must compete with liquids-directed drilling for investment dollars and for drilling and completion equipment, materials, and services.

These considerations of competition for investment dollars and resources to drill wells were factored into the ICF analysis of LNG exports performed for API when we estimated the impacts on U.S. natural gas prices of various LNG export volumes. This was part of what we referred to as the "drilling activity price effect" which accounts for (a) competition for investment dollars, (b) the higher prices needed to accommodate short-term factor cost increases that usually accompany increased drilling activity, and (c) the price effects of the delay between when price signals change (due to higher demand) and when drilling activity and wellhead deliverability respond to accommodate that demand. We modeled the domestic gas supply response to greater demand from LNG exports as requiring a greater price increase than might be estimated by simply "moving up the long-run gas supply curve" instantaneously and at constant factor costs.

We expect that continued high oil prices and a geographically widespread and rich domestic resource base for tight oil and wet gas will mean that liquids-directed drilling will continue at a high rate even as U.S. LNG export projects come online and require more (mostly) gas-directed drilling. However, the amount of additional drilling needed will be manageable in that each one bcfd of LNG exports will require about fifty (50) additional rigs during deliverability ramp-up (that is, a period of roughly 12 months in which producers can drill enough wells to add sufficient natural gas productive capacity to rebalance the market). In addition, a one-bcfd LNG export project will then require nine (9) rigs on a sustained basis over the remainder of the export project to replace each year's produced reserves. The nine (9) rigs needed over the long-term for one bcfd of exports represents about 0.5 percent of the 1,762 rigs operating, on average, in 2013. The High LNG Export Case examined by ICF of 16 bcfd would require a sustained increase in the number of rigs of 144 additional, equivalent to 8.0 percent of the 2013 U.S. rig count. Such an increase in activity is well within historical fluctuations (U.S. rig counts have ranged from 900 to 2,000 since 2003) and can be achieved within the wellhead price increases projected in the ICF study.

Another important point of contrast is that the overall economy and population of the United States is much larger than that of Australia. The U.S. Gross Domestic Product is 10.8 times that of Australia and the U.S. population is 13.8 times the size. Australia has a relatively small population base with low levels of unemployment, particularly in construction and high-skilled sectors. During the 2009 recession, the unemployment rate in Australia rose only to 5.8 percent, whereas the unemployment rate was around 10 percent in the U.S. In 2010 and 2011, the Australian unemployment rate fell to about 5.2 percent, whereas it remained around 9 percent in the United States. Since 2012, the unemployment rate in Australia has been slowly rising from about 5 percent to 6 percent (as of June 2014), and in the U.S., the unemployment rate has decreased from above 8 percent to just above 6 percent (as of June 2014). Australia has about 11.5 million employed persons, in contrast to about 146 million in the United States.[73] Currently, Australian wages in manufacturing are about $29/hour, compared to $19/hour in the United States.[74] In certain industries, labor shortages have been acute with reports of some offshore

[73] Available at: http://www.tradingeconomics.com/.

[74] Numbers are in USD, assuming 0.94 USD for 1 AUD and that Australian week is 40 hours. Available at: http://www.tradingeconomics.com/united-states/wages-in-manufacturing and http://www.tradingeconomics.com/australia/wages-in-manufacturing.

welders earning $400,000 per year in Australian dollars.[75] This has led to cost increases in LNG export projects (both upstream and downstream segments and in both western and eastern Australia) and has slowed development of new gas supplies.

The U.S. labor and other markets are much larger and better able to meet incremental demands for labor, equipment, and materials. However, like any free market, U.S. labor markets are subject to supply and demand factors that can affect wages and other prices. The U.S. Gulf Coast is now in the midst of a building boom caused, to a large degree, by increasing production of U.S. natural gas, natural gas liquids, and crude oil. There are a large number of $100+ million USD projects underway and some projects that represent investments well in excess of $10 billion USD. These include planned modifications and new builds of ethylene crackers and other petrochemical plants; petroleum refineries; LNG liquefaction plants; pipelines and shipping terminals for crude oil, natural gas liquids, and natural gas; and power plants.

Recent predictions, indicate that total construction craft labor demand in the U.S. Gulf Coast would increase from 66,000 workers in 2013 to a peak of 86,000 to 93,000 workers in the period from 2015 through 2017 to support these construction projects.[76] The greatest degree in tightness is expected for welders, electricians, pipefitters, millwrights, and crane operators. Wages for these crafts ranged from $19.00-$20.50/hour in 2005 but rose to $24.50-$27.00/hour during the post-Katrina/Rita rebuilding years, and then were flat as the U.S. economy struggled from 2008 to 2011. The start of the current building boom caused these wages to go up again to $28.00-$31.00/hour by 2013 and expectations are that increases may continue at the rate of 7.5 percent per year through 2017.[77]

Such labor tightness will affect upstream and midstream developments in the U.S. Gulf Coast and are part of the expected "drilling activity price effect" discussed above. However, these upstream cost-push effects on natural gas prices are being mitigated by the geographic dispersion of increased activity that extends far beyond the U.S. Gulf Coast. Further price mitigation is being caused by continued technological improvements in drilling efficiency (number of rig days needed per well) and well productivity (reserves produced over the life of each well), as well as "subsidization" of dry gas production by the growth in liquids-directed drilling.

The higher U.S. Gulf Coast wages among construction crafts is also expected to affect the cost and feasible timing of LNG plant construction on the U.S. Gulf Coast. This is one of the factors (along with the limited size of the available international LNG market among credit-worthy buyers) that we expect will limit the number of LNG plants that can realistically be built in the next few years; and, the demand volume for U.S. domestic natural gas as an LNG feedstock. We believe that higher wages and construction costs are some of the factors that are part of the decision-making process of U.S. LNG developers and their creditors. Further, these risk assessment efforts can be expected to provide a degree of "self-regulation" that challenge and reject non-economic projects.

[75] Downstream Today July 23, 2014, http://www.downstreamtoday.com/news/article.aspx?a_id=43824

[76] Mike Kotara, Zachary Holdings before the Gulf Coast Power Association, February 6, 2014.

[77] Ibid.

5 Conclusions

Australia is seeing a large expansion of LNG export facilities in both the traditional export region of the northwestern part of the country (where offshore-based production for LNG has been established for 20 years), as well as new projects drawing on the CBM developments in the east. The demand for labor, materials, and resources has been large for an economy the size of Australia, and this has contributed to increases in the cost of LNG plant construction and other construction around the country. The timing of gas resource development to meet the anticipated LNG demand in eastern Australia—the locus of the controversy—has been stressed by the large scale of development and is further complicated by unforeseen technical difficulties in developing the CBM, which is the source of new supply in eastern Australia. CBM development in eastern Australia has also been affected by environmental concerns related to water disposal and drilling, and fracking moratoria that are in place in some areas. Production costs have been higher than expected and producers are challenged to meet their obligations to the exporters as well as to local markets.

At the same time that liquefaction plant owners are developing and purchasing gas resources to supply their facilities, many domestic supply contracts are expiring and are up for renewal. With the stresses on production and attendant uncertainties, producers appear to be reluctant to commit to new long-term contracts at less than the full opportunity cost of meeting their long-term LNG contract requirements. Thus, it does appear that long-term gas prices supporting power generation and industrial customers have risen from around $3 to $4 per MMBtu to perhaps between $7 and $9 per MMBtu. Although this may very well be a near-term phenomenon until production stabilizes and a new gas supply/demand balance reasserts itself, the difficulty in procuring supplies and high prices are of concern to gas consumers in eastern Australia.

These events in Australian natural gas markets, particularly those in eastern Australia, have been cited by U.S. critics to limit U.S. exports of LNG. The critics assert that U.S. gas consumers will see the same sharp increases in prices if a substantial number of U.S. LNG projects are approved and enter operation. This report presents information on the Australian gas market and shows that the Australian experience is very unlikely to be replicated in the U.S. context due the major differences between the two gas markets.

Size of gas market: The first and most important difference is that the U.S. gas market is much larger than that of Australia. In terms of domestic gas production, the United States is 12.7 times as large as Australia (24.06 Tcf vs. 1.90 Tcf per year) and in terms of the domestic gas consumption, U.S. consumption is about 24 times as large as Australia's (25.53 Tcf vs. 1.045 Tcf per year). The larger North American gas market (i.e., adding Canada and Mexico to the United States) is about 31 Tcf.

Regional interconnections: The second and closely related difference is that regional markets in Australia are not adequately interconnected to each other by pipeline and so demand increases can have big price effects. In the United States the markets are very much interconnected and the impacts of demand increases can be spread out over a much larger market area. Moreover, the United States trades gas through pipelines with Canada and Mexico making the effective market size even larger. The United States has approximately 305,000 miles of gas pipelines compared to 15,000 in Australia. The U.S. network is 20.3 times larger than Australia's.

Diversified resource base: A third difference is that the United States has a much more diversified natural gas resource base to supply gas for liquefaction. The supply sources in eastern Australia for the LNG

projects are new CBM development projects, which have not performed as well as expected. This means that more gas wells and higher capital expenditures will be needed to achieve target production rates. The United States has a much more diverse set of supply options, and shale plays have performed better than expected.

Large upstream infrastructure: Another difference is that there are many more gas producers in the United States, more mature unconventional gas technical knowhow, and much larger drilling and well services infrastructure to support additional gas supplies to meet increased demand from LNG and other sectors. For a recent week in 2014, the Hughes rig count for the United States stood at 1,860 while in Australia it was just 20—a factor 93.0 times different.

More settled environmental regulatory regime: Another difference is CBM development in eastern Australia has also been hampered by environmental concerns related to water disposal, and drilling moratoria that are in place in some areas.

Natural gas market structure: In contrast to Australia's market structure that relies on negotiated long-term contracts with nontransparent, fixed, and oil-linked prices, U.S. gas markets have much more transparent pricing, which is largely linked to spot indices that react to supply and demand changes by re-equilibrating prices over a large, integrated, three-country market.

Larger overall economy and population: The final major difference to note is that the overall economy and population of the United States is much bigger than that of Australia. The U.S. Gross Domestic Product is 10.8 times that of Australia and the U.S. population is 13.8 times as large. Australia has a relatively small population base with low levels of unemployment, especially in construction and high-skilled sectors. The U.S. labor market is much larger and is better able to meet incremental demands for labor, equipment, and materials with manageable cost increases.

Because of these and other differences in market characteristics of Australia in general, and eastern Australia in particular, the large movements seen in eastern Australian long-term contract prices related to LNG exports are not expected to occur in the United States. Instead it is expected that U.S. gas supplies will grow along with new demands from U.S. liquefaction plants and that the U.S. gas market will experience modest price increases and losses of non-LNG loads.

6 Bibliography

ABC News, 2014, "Gas exports, price boom threaten 100,000 Australian jobs: manufacturers." Available at: http://www.abc.net.au/news/2014-03-27/gas-boom-threatens-australian-manufacturing-jobs/5349822

AEMO, 2010, "Significant Price Event Report Gas Day: 22 November 2008." Available at: http://www.aemo.com.au/Gas/Resources/Reports-and-Documents/~/media/Files/Other/reports/gas/1150-0003%20pdf.ashx

---. 2014, "Gas Supply Hub." Available at: http://www.aemo.com.au/Gas/Market-Data/Gas-Supply-Hub-Market-Data.

---. 2014, "Short Term Trading Market." Available at: http://www.aemo.com.au/Gas/Market-Data/Short-Term-Trading-Market-Data.

AER, 2011, "N.T. Gas Access arrangement proposal for the Amadeus Gas Pipeline." Available at: http://www.aer.gov.au/node/4760.

---. 2014, "State of the energy market 2013." Available at: http://www.aer.gov.au/node/23147.

AGL Merchant Energy Presentation May 2013. Available at: http://www.agl.com.au/about-agl/media-centre/article-list/2013/may/merchant-energy-presentation-may-2013.

APA Group, 2011, "Amadeus Gas Pipeline Access Arrangement Information." Available at: http://www.aer.gov.au/node/4760.

---. 2013, "APA to further expand VIC NSW interconnect." Available at: http://www.apa.com.au/investor-centre/news/asxmedia-releases/2013/apa-to-further-expand-vic-nsw-interconnect.aspx.

The Australian, 2012, "Origin Energy secures record gas price." Available at: http://www.theaustralian.com.au/business/mining-energy/origin-energy-secures-record-gas-price/story-e6frg9df-1226541447947#.

---. 2013, "Triple whammy sparks $5bn blowout for BG's Gladstone project." Available at: http://www.theaustralian.com.au/business/companies/triple-whammy-sparks-5bn-blowout-for-bgs-gladstone-project/story-fn91v9q3-1226346265187#.

---. 2014, "LNG demand to force spike in gas prices." Available at: http://www.theaustralian.com.au/business/mining-energy/lng-demand-to-force-spike-in-gas-prices/story-e6frg9df-1226847417206#.

Australian Bureau of Resources and Energy Economics, 2012, "Australian Gas Resource Assessment 2012." Available at: http://www.ga.gov.au/webtemp/image_cache/GA21116.pdf.

---. 2013, "Gas Market Report." Available at: http://www.bree.gov.au/publications/gas-market-report

Australian Council of Learned Academies, 2013, "Engineering Energy: Unconventional Gas Production, A study of shale gas in Australia." Available at: http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-6.

Australian Energy Regulator, 2010, "State of the energy market." Available at: http://www.aer.gov.au/node/6313.

---. 2014, "State of the energy market 2013." Available at: http://www.aer.gov.au/node/23147.

Australian Financial Review, 2014, "Gas sale seen as favoured option from Arrow talks." Available at: http://www.afr.com/p/opinion/gas_sale_seen_as_favoured_option_OCumhgzwy7XGk30IpA1ulL.

Beach Energy, 2013, "Beach Farm-out of Exploration Acreage in Nappamerri Trough to Chevron." Available at:http://www.beachenergy.com.au/IRM/Company/ShowPage.aspx/PDFs/2865-26815295/BeachfarmoutofexplorationacreagetoChevron.

---. 2013, Beach signs major gas sales agreement with Origin Energy." Available at:

http://www.beachenergy.com.au/IRM/Company/ShowPage.aspx/PDFs/2934-16785602/BeachsignsmajorgassalesagreementwithOriginEnergy

BP. "Statistical Review of World Energy 2014." Available at: http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy.html.

Chambers, Matt. "LNG demand to force spike in gas prices." The Australian, 07 March 2014. Available at: http://www.metgasco.com.au/industry-news/lng-demand-force-spike-gas-prices-2.

Department of Industry, 2014, "Eastern Australian Domestic Gas Market Study." Available at: http://www.industry.gov.au/Energy/EnergyMarkets/Pages/GasMarketDevelopment.aspx.

Diss, Kathryn and Lannin, Sue. "Chevron reveals second Gorgon gas project cost blowout." ABC News, 12 December 2013. Available at: http://www.abc.net.au/news/2013-12-12/gorgon-gas-project-cost-blowout/5151982.

Drillsearch Energy Limited, 2014, Drillsearch and QGC agree new terms over Cooper Basin acreage." Available at: http://www.asx.com.au/asxpdf/20140310/pdf/42n8j3knd4tkj0.pdf.

Economics and Industry Standing Committee, 2011, "Inquiry into Domestic Gas Prices." Available at: http://www.parliament.wa.gov.au/parliament/commit.nsf/(WebInquiries)/D72F5652A629F96D48257831003E984A?opendocument.

Falcon Oil and Gas, 2014, "Transformational Farm-out of Beetaloo Unconventional Acreage, Northern Territory, Australia." Available at: http://www.asx.com.au/asxpdf/20140502/pdf/42pdl2f1lxl7m3.pdf.

Fazzino, James. "Australian nitrogen fertilizer CEO confirms unfettered LNG exports have tripled natural gas prices." Industrial Energy Consumers of America, 15 April 2014: Washington, DC. Available at: http://www.ieca-us.com/wp-content/uploads/04.15.14_Australia-Congressional-Communication_Incitec-Pivot.pdf.

GasTrading. Available at: http://www.gastrading.com.au/.

Government of Western Australia Department of Mines and Petroleum. "Resource Data Files." Available at: http://www.dmp.wa.gov.au/1521.aspx.

Howes, Paul. "High costs due to energy, not labor." Financial Review, 04 March 2014. Available at: http://www.afr.com/p/opinion/high_costs_due_to_energy_not_labour_fNuuZKaA8DXgSt4ZE9Y69N.

Hoy, Greg. "Gas exports, price boom threaten 100,000 Australian jobs: manufacturers." ABC News, 27 March 2014. Available at: http://www.abc.net.au/news/2014-03-27/gas-boom-threatens-australian-manufacturing-jobs/5349822.

ICF International. "U.S. LNG Exports: Impacts on Energy Markets and the Economy." ICF, 15 May 2013: Fairfax, VA. Available at: http://www.api.org/~/media/Files/Policy/LNG-Exports/API-LNG-Export-Report-by-ICF.pdf.

Independent Pricing & Regulatory Tribunal (IPART). "Review of regulated retail prices and charges for electricity: From 1 July 2013 to 30 June 2016." IPART, June 2013: NSW. Available at: http://www.ipart.nsw.gov.au/Home/Industries/Electricity/Reviews/Retail_Pricing/Review_of_regulated_electricity_retail_prices_2013_to_2016/17_Jun_2013_-_Final_Report/Final_Report_-_Review_of_Regulated_Retail_Prices_for_Electricity_-_From_1_July_2013_to_30_June_2016.

Industrial Energy Consumers of America (IECA). "The Australia LNG export story should sound as a warning to U.S. policymakers." IECA, 15 April 2014: Washington, DC. Available at: http://www.ieca-us.com/wp-content/uploads/03.28.14_Australia-Congressional-Communication-2.pdf.

International Gas Union. "World LNG Report – 2014 Edition." IGU, 2014. Available at: http://www.igu.org/sites/default/files/node-page-field_file/IGU%20-%20World%20LNG%20Report%20-%202014%20Edition.pdf.

MDQ Consulting, 2014, "NSW Wholesale Gas Market Report." Available at: http://www.ipart.nsw.gov.au/files/2086952c-5a8f-4aab-b716-a2d5009ff909/Report_-_MDQ_Consulting_NSW_Wholesale_Gas_Market_Report_-_February_2014.pdf.

New South Wales Government, 2013, "Strategic Regional Land Use." Available at: http://www.nsw.gov.au/initiative/strategic-regional-land-use.

Origin Energy, 2013, "Origin announces gas supply agreement with QGC." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1535.

---. 2012, "Origin announces major gas sales agreement with GLNG." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1386.

---. 2013, "Origin announces new agreement to sell gas to GLNG." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1539.

---. 2013, "Origin secures 432 PJ of natural gas from ESSO/BHPB to boost its portfolio to meet customer demand." Available at: http://www.originenergy.com.au/news/article/asxmedia-releases/1516.

---. 2014, "Origin-APLNG Operational Review and Asset Visit." Available at: http://www.originenergy.com.au/files/APLNG_Site_Tour_Combined_Presentations.pdf.

Santos, 2014, "GLNG sign purchase agreement with Meridian joint venture." Available at: http://www.asx.com.au/asxpdf/20140327/pdf/42nmzqdfl3br44.pdf.

---. 2012, "Santos to supply 750PJ of portfolio gas to GLNG." Available at: http://www.santos.com/Archive/NewsDetail.aspx?p=121&id=1230.

---. 2014, "Macquarie Australia Conference." Available at: http://www.santos.com/library/080514_Macquarie_Australia_Conference_Presentation.pdf.

Senex Energy Limited, 2014, "Senex and Origin Energy agree Cooper Basin gas farm-out." Available at: http://www.senexenergy.com.au/uploads/contentFiles/files/2014_02_24%20Senex%20and%20Origin%20agree%20Cooper%20Basin%20gas%20farm-out.pdf.

SKM, 2013, "Unconventional Gas in Australia – Infrastructure Needs." Available at: http://www.acola.org.au/index.php/projects/securing-australia-s-future/project-6.

Strike Energy, 2014, "Southern Cooper Basin Gas Project Update." Available at: http://www.strikeenergy.com.au/images/stories/pdf/20140325_Orica%20Gas%20Sales%20Agreement.pdf.

U.S. Department of Energy (DOE). "U.S. Dry Natural Gas Production." DOE, 28 May 2014: Washington, DC. Available at: http://www.eia.gov/dnav/ng/hist/n9070us2a.htm.

---. "Long Term Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of June 11, 2014)." U.S. DOE: Washington, DC. Available at: http://energy.gov/sites/prod/files/2014/06/f16/Summary%20of%20LNG%20Export %20Applications.pdf.

U.S. Energy Information Administration. "Natural Gas Consumption by End Use." U.S. EIA, June 17, 2014: Washington, DC. Available at: http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.

---. International Statistics page for Australia. Available at: http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=3&aid=6&cid=AS,&syid=2010&eyid=2014&unit=TCF.

Victorian Government, 2014, "Natural Gas Community Information: Current status of onshore natural gas in Victoria." Available at: http://naturalgasinfo.vic.gov.au/__data/assets/pdf_file/0017/92321/6746-eer-current-status-factsheet-3.pdf.

WA IMO GSOO, 2014. Available at: http://www.imowa.com.au/publications-and-reporting/gas-statement-of-opportunities.

Wells, Rachel. "Families going without food and medicine to pay the bills." The Sydney

Morning Herald, 26 March 2013. Available at: http://www.smh.com.au/national/families-going-without-food-and-medicine-to-pay-the-bills-20130325-2gq2e.html.

WestSide Corporation Limited. "WestSide Targets Statement." WestSide, 16 May 2014: Brisbane, Qld.

Wood, Tony and Carter, Lucy. "Getting gas right: Australia's energy challenge." IGU. Available at: http://grattan.edu.au/static/files/assets/ba24a4e0/189_getting_gas_right_report.pdf.

Appendix A – Australian Gas Resource Base

Conventional Gas

The conventional gas assessment is presented in Exhibit 24, and it totals 157 Tcf (plus 10 Tcf of inferred resources). Most of the remaining resources (as shown by the size of the circles on the map) are found in the Carnarvon, Browse, and Bonaparte Basins, which comprise the Northwest Shelf region. The Northwest Shelf is the site of current LNG exports and facilities as shown in Exhibit 25 as yellow dots.

Coal Seam Methane

The coal seam methane resource base is shown in Exhibit 26 and Exhibit 27. Recoverable resources, including the inferred resources, total 204 Tcf. Exhibit 28 shows that almost all of the coal seam methane is located on the eastern coastal region. This is dominated by the Surat and Bowen Basins in Queensland. Coal seam methane development forms the basis for planned LNG export projects in the eastern part of the country. These include Australia Pacific LNG, Gladstone LNG, Queensland Curtis LNG, Arrow Energy LNG, and Fisherman's Landing. Operators are ramping up production in anticipation of LNG exports.

Shale Gas

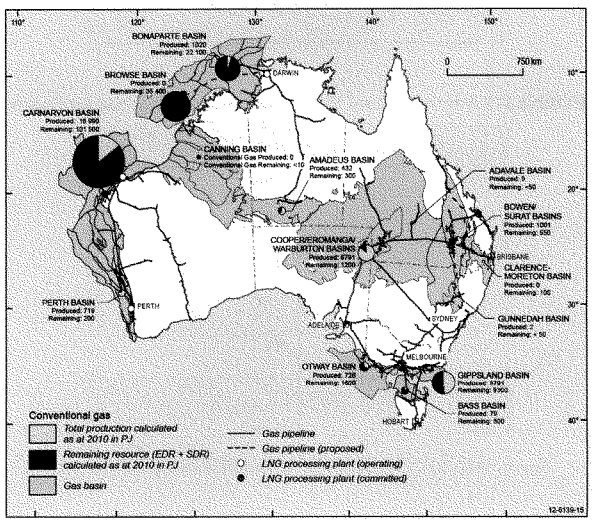
The 398 Tcf of assessed shale gas is based upon the 2011 EIA world assessment and includes resources in the Cooper, Maryborough, Perth, and Canning Basins (see Exhibit 28), with most of the resources in the Canning Basin. In 2013, EIA assessed the resources at 437 Tcf as summarized in Exhibit 29. The EIA studies are generalized and do not include detailed geologic work. The Australian government is working with the USGS to assess the shale gas resource.

Exhibit 24: Conventional Gas Resources by Basin – Excludes Inferred

	Economically Demonstrated (Tcf)	Sub-Economic Demonstrated (Tcf)	Total (Tcf)
Carnarvon	68	24	92
Browse	16	16	32
Bonaparte	9	11	20
Gippsland	6	2	8
Other	4	1	5
Total	103	54	157

Source: BREE (2012) "Australian Gas Resource Assessment," ICF May, 2014.

Exhibit 25: Conventional Resource Distribution



Source: BREE (2012) "Australian Gas Resource Assessment."

Exhibit 26: Coal Seam Methane Recoverable Gas Resources

Category	Tcf
Demonstrated	93
Economically Demonstrated (EDR)	33
Sub-Economic Demonstrated (SDR)	60
Inferred	111
Total	204

CSG demonstrated as of January, 2012. CSG 2P and 2C resources used for EDR and SDR respectively.

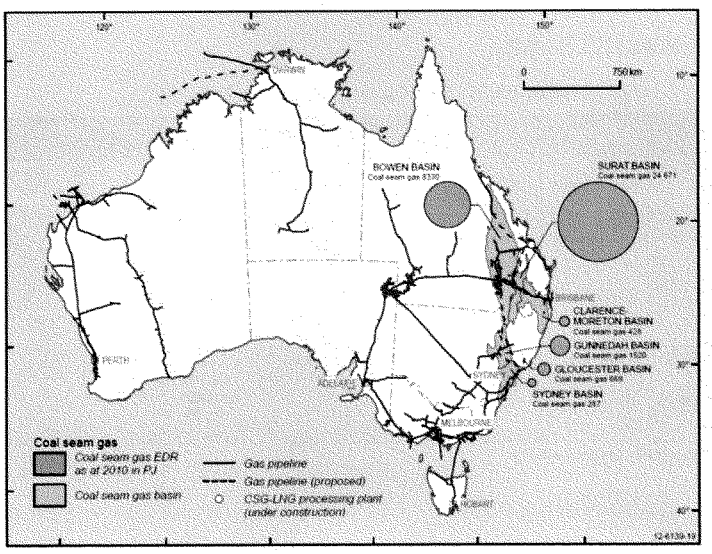
Original sources: Queensland DEEDI (2011, 2012); Australian Energy Market Operator AEMO (2011); Geoscience Australia

Exhibit 27: Australia Coal Seam Methane Resources by Basin

Basin	Bcf
Bowen	7,573
Surat	22,428
Clarence Moreton	389
Gunnedah	1,382
Gloucester	608
Sydney	261
Total	32,641

Source: BREE (2012) "Australian Gas Resource Assessment," ICF May, 2014.

Exhibit 28: Location of Australian Coal Seam Gas Resources – 2P Resources



Source: BREE (2012) "Australian Gas Resource Assessment."

Exhibit 29: 2013 EIA Australia Shale Gas Assessment (Tcf Recoverable Gas)

Basin	Tcf
Cooper	93
Maryborough	19
Perth	33
Canning	235
Georgina	13
Beetaloo	44
Total	437

Appendix B – Australian LNG Project Details

Eastern Australia LNG Projects

Exhibit 30: East Coast LNG Export Projects

Project Name	Status	Ownership	Capacity	Contracted Sales	Commencement Date
Queensland Curtis LNG (QCLNG)	under construction	BG Group (73.75%) CNOOC (25%) Tokyo Gas (1.25%)	8.5 mt/pa (2 trains)	8.5 mt/pa	Train 1 by end of 2014, Train 2 6 months later
Gladstone LNG (GLNG)	under construction	Santos (30%) PETRONAS (27.5%) Total (27.5%) KOGAS (15%)	7.8 mt/pa (2 trains)	7 mt/pa	Train 1 H1 2015, train 2 12 months later
Australia Pacific LNG (APLNG)	under construction	Origin Energy (37.5%) ConocoPhillips (37.5%) Sinopec (25%)	9 mt/pa (2 x 4.5 mt/pa trains)	8.6 mt/pa	Train 1 H2 2015, train 2 H1 2016
Arrow LNG (ALNG)	proposed	Shell (50%) PetroChina (50%)	8 mt/pa (2 trains)	Likely that JV partners would receipt some, if not all, of the production.	2017+

Source: BREE, project / company websites.

Western and Northern Australia

Exhibit 31: North and West LNG Export Projects

Project Name	Gas Basin / Location	Status	Ownership	Capacity (mtpa)	Commencement Date
North West Shelf (NWS)	Carnarvon (WA)	Existing	Woodside (16.6%), BHP Billiton (16.6%), BP (16.6%), Chevron (16.6%), Japan Australia LNG (16.6%) and Shell (16.6%)	16.3 (5 trains)	1984 – supply to WA 1989 – LNG Train 1 1989 – LNG Train 2 1992 – LNG Train 3 2004 – LNG Train 4 2008 – LNG Train 5
Pluto	Carnarvon (WA)	Under construction	Woodside (90%), Tokyo Gas (5%) and Kansai Electric (5%)	4.3 (1 train)	2012
Gorgon	Carnarvon (WA)	Under construction	Chevron (47.3%), ExxonMobil (25%), Shell (25%), Osaka Gas (1.25%), Tokyo Gas (1%) and Chubu Electric Power (0.417%)	15.6 (3 trains)	2015
Wheatstone	Carnarvon (WA)	Under construction	Chevron (64.14%), Apache (13%), KUFPEC (7%), Shell (6.4%) and Kyushu Electric Power Company (1.46%)	8.9 (2 trains)	2016
Prelude Floating LNG	Browse (WA)	Under construction	Shell (100%)	3.6 (1 train)	2017
Darwin LNG	Timor Sea (NT)	Existing	ConocoPhillips (56.7%), Santos (10.6%), INPEX (10.5%), Eni (12%), TEPCO (6.7%) and Tokyo Gas (3.4%)	3.7 (1 train)	2006
Ichthys	Browse (NT)	Under construction	Inpex Holdings (66%), Total (30%), Tokyo Gas (1.5%), Osaka Gas (1.2%), Chubu Electric (0.7%) and Toho Gas (0.4%)	8.4 (2 trains)	2017

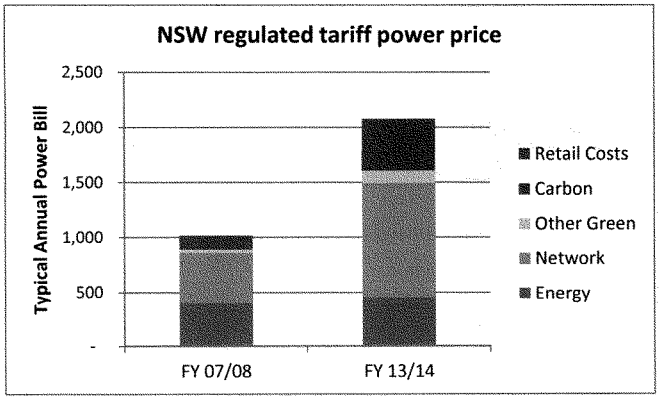
Source: BREE, project / company websites.

Appendix C – Increase in Electricity Prices in Eastern Australia

Australia has experienced a significant increase in retail power prices. The increase in retail power prices are unrelated to the increase in gas contract prices that have also been observed by Australian consumers.

An example of the power price increases in Australia is the NSW regulated retail tariff. Residential and small business customers in NSW can sign a market contract with one of a number of electricity retailers, or be supplied under the regulated tariff by a standard retailer. The Independent Pricing and Regulatory Tribunal (IPART) is responsible for regulating retail electricity prices in NSW. The tariff price approved for 2013/14, while only a 1.7% increase from the previous year, is double the price approved for 2007/08. As illustrated in Exhibit 32, the main driver of this increase is the change in network costs.

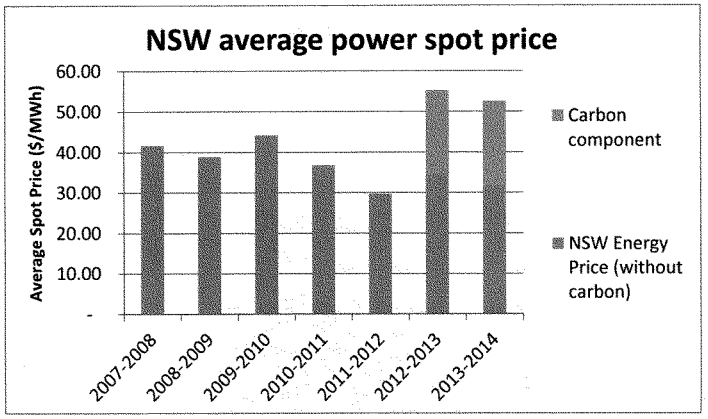
Exhibit 32: Comparison of Typical NSW Power Bills



Source IPART June 2013.

The increase in retail power prices is contrary to the subdued wholesale market prices. Exhibit 33 shows that if the effects of the carbon tax are ignored, wholesale power prices in NSW have been stable over the same period that the retail price has doubled. An expansion of renewable energy capacity and a fall in demand across the National Electricity Market (NEM) have been the main contributors to the subdued wholesale power prices.

Exhibit 33: NSW Average Power Spot Prices



January 28, 2015

US Senate Energy and Natural Resources Committee
304 Dirksen Senate Building
Washington, DC

RE: LNG Permitting Certainty and Transparency Act (S. 33)

Dear Chairwoman Murkowski and Ranking Member Cantwell:

I am writing on behalf of JAX Chamber to applaud your bi-partisan efforts to create regulatory certainty with the LNG Permitting Certainty and Transparency Act (S. 33). We have a goal to create business conditions for Northeast Florida to emerge as a Global Transportation and Energy Hub of Excellence, and S. 33 will allow for this to happen. Providing business with a process that is consistent, predictable and repeatable (CPR initiative) is an approach that has worked in Florida, allowing the private sector to confidently invest in the future of our state and country.

This nation is experiencing an energy renaissance which aligns good business practice, environmental stewardship and national security interests in an unprecedented manner toward a sustainable future. We must take a comprehensive approach to this once in a generation opportunity by capitalizing on emerging trends in markets such as natural gas and green business practices, while balancing the future of all fossil fuels and advocating for smart regulation.

In natural gas, Northeast Florida's business community is leading the charge, investing with market-driven projects that include:

- The first ever use of LNG to fuel a container vessel. Sea Star Shipping Line (TOTE) will do so next fall – right here in Jacksonville.
- Crowley Marine is also converting its fleet to use LNG as a marine fuel and is now shipping LNG in ISO containers to the Caribbean markets.
- Two liquefaction plants near JAXPORT are in the works, an example of the export opportunities to the Caribbean and other potential markets.
- UPS has built an LNG truck fueling facility at its distribution hub in Jacksonville, and Clean Energy has done the same along I-10.
- Champion Brands Distributors will open the region's first publicly assessable CNG fueling facility by the end of 2014.
- St. Johns County and the Jacksonville Transportation Authority have entered into contracts to have publicly accessible CNG facilities constructed in the region, and JTA is also converting more than 100 buses to CNG over the next five years.

- JEA continues to develop natural gas as a significant part of their energy generation portfolio.
- The USCG is very active in the LNG space and at the center of developing regulations to address the use of LNG in a marine environment.
- Kinder Morgan has announced plans to build the Magnolia Pipeline, a $1 billion infrastructure project that will connect Northeast Florida to the existing Plantation Interstate Transmission facility. This will make refined petroleum products available which will increase the energy security of our region.

Our approach is to develop an Energy Sector Business Plan that will be updated annually and provide a clear path to Northeast Florida as a Global Energy Hub of Excellence. The LNG Permitting Certainty and Transparency Act (S. 33) is the type of dialogue that is needed amongst our leaders to ensure this energy renaissance continues.

Thank you for allowing us to add our voice to this extremely important conversation. On behalf of the JAX Chamber membership, thank for your hard work and once again, your bi-partisan cooperation.

Sincerely,

Daniel Davis,

President and CEO

JAX Chamber