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U.S. ENERGY ABUNDANCE: EXPORTS AND THE CHANGING GLOBAL ENERGY LANDSCAPE

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND POWER

OF THE

COMMITTEE ON ENERGY AND COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

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U.S. ENERGY ABUNDANCE: EXPORTS AND THE CHANGING GLOBAL ENERGY LANDSCAPE

TUESDAY, MAY 7, 2013

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:05 a.m., in room 2123, Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Present: Representatives Whitfield, Scalise, Hall, Shimkus, Pitts, Terry, Burgess, Latta, Cassidy, Olson, McKinley, Gardner, Pompeo, Kinzinger, Griffith, Barton, Johnson, Upton (ex officio), Rush, McNerney, Tonko, Engel, Green, Capps, Doyle, Barrow, Matsui, Castor, and Waxman (ex officio).

Staff Present: Nick Abraham, Legislative Clerk; Charlotte Baker, Press Secretary; Matt Bravo, Professional Staff Member; Allison Busbee, Policy Coordinator, Energy & Power; Tom Hassenboehler, Chief Counsel, Energy & Power; Jason Knox, Counsel, Energy & Power; Ben Lieberman, Counsel, Energy & Power; Nick Magallanes, Policy Coordinator, CMT; Brandon Mooney, Professional Staff Member; Mary Neumayr, Senior Energy Counsel; Chris Sarley, Policy Coordinator, Environment & Economy; Jeff Baran, Minority Senior Counsel; Alison Cassady, Minority Senior Professional Staff Member; and Caitlin Haberman, Minority Policy Analyst.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. I would like to call this hearing to order this morning. Today we are going to have a hearing on the U.S. energy abundance, exports and changing global energy landscape. And at this time I would like to recognize myself for 5 minutes for an opening statement. And I will be introducing members of the panel, but I will probably yield a few seconds to my friend from Ohio, Mr. Johnson, to introduce one member of the panel from his district.

But this is an exciting day, a very important hearing. And we do thank the witnesses for being here with us today. We look forward to your testimony. All of you have had unique experiences in this area, and we know that your testimony will be quite valuable.

America's growing energy production is a game changer, and today's hearing, entitled "U.S. Energy Abundance: Exports and

Changing Energy Landscape," explores the geopolitical benefits of the U.S. becoming a world leader in energy production and exports.

As we have discussed in previous hearings, America's energy abundance is creating employment opportunities and growth at a time when little else in the economy is going as well, and that alone is enough reason to support domestic energy production. But while this energy abundance is a source of jobs at home, it can also be a force for good and competition around the world, and it is this potential that we hope to address today.

Until a few years ago most of us assumed that the U.S. was well past its peak in terms of domestic energy production and that we would become increasingly dependent on imports, particularly oil imports from OPEC nations. Many feared the same thing was happening with natural gas, and some even worried about an emerging OPEC-like natural gas cartel dominated by Russia and Iran. This committee held many hearings discussing the grave geopolitical consequences of global energy markets dominated by nations that do not necessarily share our values and who are not shy about using energy exports to exert leverage over other countries.

But now the tables are turning, thanks to American innovations in hydraulic fracking and directional drilling that is expanding the supply of domestic oil and natural gas. Instead of being beholden to energy exporting nations, we are fast becoming one ourselves.

Perhaps nowhere is the reversal more stark than with natural gas. Debates about natural gas used to center around whether to permit facilities to import supplies of liquid natural gas from abroad to help make up for dwindling domestic production. But now these would be import terminals are being reproposed as export terminals. The reason for this reversal is that domestic natural gas production is now rising so fast that there is more than enough to meet domestic demand affordably and export the surplus to nations that need it, such as Japan and Great Britain. By taking advantage of these expert opportunities we can help our own economy and at the same time strengthen our ties with key allies.

I might add that the benefits of energy exports also apply to coal, and I would like to draw your attention to a May 1st Wall Street Journal article that chronicles how U.S. coal exports to Eastern Europe are helping to displace Russian natural gas and neutralize Russian influence. And even Bulgaria was able to get a 20 percent reduction in price for natural gas its buying from Russia because of additional coal that they are using.

Not only should we be focused of course on natural gas and oil and coal, but we need also to focus on pipelines, port facilities, and other infrastructure investments necessary to make full use of our energy abundance.

So this is a vitally important hearing, and as I said, we are going to look forward to your testimony because we are at a threshold of a great opportunity in this Nation to be energy independent.

[The prepared statement of Mr. Whitfield follows:]

PREPARED STATEMENT OF HON. ED WHITFIELD

America's growing energy production is a real game changer, and today's hearing, entitled "U.S. Energy Abundance: Exports and the Changing Energy Landscape,"

explores the geopolitical benefits of the U.S. becoming a world leader in energy production and exports.

As we have discussed in previous hearings, America's energy abundance is creating employment opportunities and growth at a time when little else in the economy is going as well—and that alone is enough reason to support domestic energy production. But while this energy abundance is a source of jobs at home, it can also be a force for good around the world—and it is this potential that we will address today.

Until a few years ago, most of us assumed that the U.S. was well past its peak in terms of domestic energy production and that we would become increasingly dependent on imports, particularly oil imports from OPEC nations. Many feared the same thing was happening with natural gas, and some even worried about an emerging OPEC-like natural gas cartel dominated by Russia and Iran. This committee held many hearings discussing the grave geopolitical consequences of global energy markets dominated by nations that do not share our values and who are not shy about using energy exports to exert leverage over others.

But now the tables are turning, thanks to American innovations in hydraulic fracturing and directional drilling that is expanding the supply of domestic oil and natural gas. Instead of being beholden to energy exporting nations, we are fast becoming one ourselves. Perhaps nowhere is the reversal more stark than with natural gas. Debates about natural gas used to center around whether to permit facilities to import supplies of liquefied natural gas from abroad to help make up for dwindling domestic production. But now, those would-be import terminals are being reproposed as export terminals. The reason for this reversal is that domestic natural gas production is now rising so fast there is more than enough to meet domestic demand affordably and export the surplus to nations that need it such as Japan and Great Britain. By taking advantage of these export opportunities, we can help our own economy and at the same time strengthen our ties with key allies.

I might add that the benefits of energy exports also apply to coal, and I would like to draw your attention to a May 1st Wall Street Journal article that chronicles how U.S. coal exports to Eastern Europe are helping to displace Russian natural gas and neutralize Russian influence. Countries like Bulgaria and Poland that used to be under Russia's thumb are now gaining a measure of autonomy thanks in part to American coal. This kind of BTU diplomacy can be repeated throughout the globe, allowing us to strengthen our working relationship with many countries while reducing the influence of troublesome regimes.

Of course, none of this can happen if we shut the door on domestic energy production. For this reason, we need to address the fact that the Obama administration continues to keep most federal lands off-limits to energy leasing and that regulatory efforts may be underway to crack down on hydraulic fracturing. The president likes to say he is for all-of-the-above, but Congress needs to hold him to that.

In addition, we need to allow the pipelines, port facilities, and other infrastructure investments necessary to make full use of our energy abundance. The Obama administration's four-year delay in making a decision on the Keystone XL pipeline project is a warning sign that the infrastructure approval process is badly broken and needs to be fixed.

The benefits of being an energy-exporting nation could also be derailed if we place unnecessary restrictions on these exports. For example, some argue that exports of natural gas will create domestic shortages and serious price spikes in the U.S. But, with resource assessments continuing to be revised upward and studies from the Department of Energy and the Small Business & Entrepreneurship Council touting the net economic benefits that are strongly positive, these fears are becoming more and more unfounded. The real risk is if the U.S. does not take advantage of energy export opportunities. Failure to do so would be a lost opportunity, both economically and geopolitically.

Increased production and trade in American energy benefits both our economy at home and our standing around the world. I look forward to our discussion on how to move forward.

# # #

Mr. WHITFIELD. At this time, I recognize the gentleman from Ohio, Mr. Johnson, for the purpose of an introduction.

Mr. JOHNSON. Thank you, Mr. Chairman. I do consider it a distinct honor. You talk about energy abundance and job creation through domestic energy production, nowhere in the Nation is that

happening any more prevalently than in eastern and southeastern Ohio. We sit on top of the Marcellus and the Utica shale, and so many, many opportunities are coming our way.

No one knows that better than one of our own county commissioners, Mr. Michael Halleck from Columbiana County. Commissioner Halleck is a stalwart believer in accountable, responsible government. He has got a track record that proves that. Every time that I go into Columbiana County to talk about energy production, to meet with oil and gas companies, to talk with business owners who are working hard to create jobs and make ends meet for the residents of our district, you can find Michael Halleck close by. He is engaged. I am very honored to have him with us today. I think you are going to enjoy his testimony.

Mr. Chairman, I yield back. Thank you.

Mr. WHITFIELD. My time has expired. Thank you very much.

At this time, I recognize the gentleman from California for a 5-minute opening statement, Mr. Waxman.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you, Mr. Chairman.

Today's hearing is the subcommittee's first opportunity to focus on liquefied natural gas or LNG exports. I think it is an important topic and I am glad we are having this hearing.

There is no question that a significant energy transition is underway here in the United States. State and Federal renewable energy policies are paying off. We have doubled our capacity to generate renewable electricity from wind and solar just in 4 years. Cheap natural gas is also helping to transform our electricity sector. This market reality is driving a shift away from the use of polluting coal to generate electricity.

These changes are positive developments, and we will hear a lot today about the geopolitical implications of America's energy abundance. We will also talk about the impacts on America's economy, American jobs, and America's balance of trade.

But I want to address a different issue: the relationship between U.S. energy markets and climate change. Climate change is the biggest energy challenge we face as a country. We can't have a conversation about the global consequences of America's energy policy without also having a conversation about climate change.

In November, the International Energy Agency concluded that if the world does not take action to reduce carbon pollution before 2017, then it will be impossible to prevent the worst effects of climate change because of the carbon dioxide emissions that would be locked in by energy infrastructure existing at that time. That means that the energy policy decisions that we make today will have a real and direct impact on whether we can prevent the worst impacts of global climate change in the future.

It is through this lens that we need to examine whether we should export LNG to other countries. LNG export terminals are huge multibillion-dollar infrastructure investments that will last for decades. We should understand the climate impacts before these facilities are built, not after.

I have an open mind about LNG exports. There is a case to be made that exports of LNG may allow other nations to move from coal to natural gas. That could lead to reduced carbon emissions. In addition, a number of studies predict that LNG exports would have generally positive economic effects. There is also a case to be made that free trade in natural gas may help our allies in Europe and Asia who are currently dependent on higher-priced natural gas imports from Russia and the Middle East.

But we also need to consider the impact LNG exports could have on domestic greenhouse gas emissions. Liquefying and transporting natural gas is an energy-intensive process that would generate significant carbon pollution. LNG exports would increase the domestic price of natural gas, which could increase U.S. carbon emissions as a result of a shift back to coal for electricity generation. And methane itself is a potent greenhouse gas. It is 25 times more potent than carbon dioxide in warming the planet. Exports would stimulate more domestic natural gas production, which can emit substantial amounts of methane if not controlled.

As the Department of Energy considers the pending applications to export LNG, I hope they will develop concrete answers so that we can understand the climate impacts of moving in this direction.

I thank the witnesses for being here, and I look forward to there testimony. And I would be pleased to yield a minute that I have left to any member on the Democratic side who wishes to use it.

Mr. Green, I yield back the balance of my time.

Mr. GREEN. I thank my ranking member, and I want to welcome our panel. I appreciate particularly our two former Senators working with you as a House Member years ago.

I come from a district in Houston that actually is a large petrochemical complex, so we are concerned about exporting because we have seen expansion of our chemical industry substantially over the last 2 or 3 years. But I still think there is a possibility we can share with the world some of not only our expertise in drilling, but also our natural gas. In fact, we were on a committee trip, or at least a trip a few weeks ago, and some members on the Republican side were there. The German Chancellor asked if we would be able to export natural gas to Germany, and I know one of my Pennsylvania colleagues said they would like to send Pennsylvania and Ohio gas. I told her we would be glad to send Texas gas, too, but it needs to be done in a reasonable manner.

And, my ranking member, thank you again for yielding to me.

Mr. WHITFIELD. The gentlemen's time has expired. At this time I recognize the chairman of the full committee, Mr. Upton of Michigan, for 5 minutes.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Well, thank you, Mr. Chairman.

Today's hearing continues the subcommittee's look into what is becoming a welcome theme: how American energy abundance is rewriting the playbooks for all levels of energy policy. This new strategy is a reality, resulting from advancements in innovation and technology, has game-changing potential for America's energy fu-

ture with more jobs, lower prices, and, yes, less volatility, as we will hear today, has far-reaching implications abroad as well.

As we learned at our February hearing, U.S. energy resources are vastly abundant and growing, with technology continuing to evolve and new areas of the country becoming centers for exploration and production. It is not just Texas, Alaska, and Louisiana anymore, but places like Illinois, Ohio, Michigan, even California who are in the process of developing or considering developing new oil and gas resources from domestic shale.

This diverse geographic abundance is helping to ease the volatility of the recent past, where prices were becoming increasingly vulnerable to hurricanes and geopolitical turmoil, to create a new North American gas market that is becoming the envy of the world.

America's natural gas movement is creating competitive opportunities domestically for manufacturing and technology, as well as international opportunities to help our allies reduce their reliance on geopolitically unstable regions of the world. And I believe that our abundance means that we can have both new jobs from a renaissance in the energy and manufacturing sectors, along with new diplomatic strength from using these resources to reinforce our ties to important allies and trading partners. Our changing energy landscape will in fact produce both economic growth and real gains.

To think that America in just a short period of time would be at such a strategic advantage to use our natural resources to not only help our country domestically with new jobs in energy and security, but to also influence Russia's ability to wield an energy weapon over its European customers, is truly remarkable. Yet as today's witnesses will tell us, that is exactly what is beginning to happen.

This hearing should also remind us that we must remain steadfast in our support for efforts to maximize use of our energy resources. As American shale production expands from natural gas to oil, we have to embrace our newfound capability to lift and shift the power structure with Venezuela, Russia, and the Middle East back to our favor and strive to avoid needless litigation or bureaucratic delays that threaten this realignment.

We are in the midst of a budding success story about American prosperity, jobs, and national power. We are continuing to produce valuable energy resources safely and responsibly around the country. But the benefits do not stop there, as emissions also continue to decline.

I look forward to the testimony today, including Senators Johnson and Dorgan. You have been good friends and we respect your valuable expertise, and I look forward to that, and would yield to our Republicans on our side.

Mr. Barton.

[The prepared statement of Mr. Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON

Today's hearing continues this subcommittee's look into what is becoming a welcome theme: how American energy abundance is rewriting the playbooks for all levels of energy policy. This new energy reality, resulting from advancements in innovation and technology, has gamechanging potential for America's energy future with more jobs, lower prices, and less volatility—and as we will hear today—has far-reaching implications abroad as well.

As we learned at our February 5th hearing, U.S. energy resources are vastly abundant and growing, with technology continuing to evolve and new areas of the country becoming centers for exploration and production. It's not just Texas, Alaska, and Louisiana anymore—but places like Illinois, Ohio, Michigan, and even California—who are in the process of developing or considering developing new oil and gas resources from domestic shale. This diverse geographic abundance is helping to erase the volatility of the recent past where prices were becoming increasingly vulnerable to hurricanes and geopolitical turmoil to create a new North American gas market that is becoming the envy of the world. America's natural gas boom is creating competitive opportunities domestically for manufacturing and technology as well as international opportunities to help our allies reduce their reliance on geopolitically unstable regions of the world.

And I believe our abundance means we can have both: new jobs from a renaissance in the energy and manufacturing sectors, along with new diplomatic strength from using these resources to reinforce our ties to important allies and trading partners. Our changing energy landscape will produce both economic growth and geopolitical gains.

To think that America, in just a short period of time, would be at such a strategic advantage to use our resources to not only help our country domestically with new jobs and energy security, but to also influence Russia's ability to wield an energy weapon over its European customers is truly remarkable. Yet, as today's witnesses will tell us, that is exactly what is beginning to happen.

This hearing should also remind us that we must remain steadfast in our support for efforts to maximize use of our energy resources. As American shale production expands from natural gas to oil, we must embrace our newfound capability to shift the power structure with Venezuela, Russia, and the Middle East back to our favor and strive to avoid needless litigation or bureaucratic delays that threaten this realignment. We are in the midst of a budding success story about American prosperity, jobs, and national power. We are continuing to produce valuable energy resources, safely and responsibly around the country, but the benefits don't stop there as emissions also continue to decline.

I welcome our entire esteemed panel to this hearing, including Senators Johnston and Dorgan. Your extensive backgrounds and contributions to this discussion are incredibly valuable. Increased production and trade in American energy benefits both our economy at home and our standing around the world. The energy landscape is changing, and we will all be better for it. I look forward to our discussion on how to move forward.

# # #

OPENING STATEMENT OF HON. JOE BARTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. BARTON. Thank you, Mr. Chairman. And thanks to Chairman Whitfield for holding this hearing. It is good to see Senator Johnson and Senator Dorgan. I worked with them in the past, and it is good to see you here at the witness table.

This is an important hearing. I don't think it is a secret that I am a supporter of free markets and a robust American energy policy. Currently our oil and gas sector is creating about 9 million jobs a year and sending in taxes more than $30 billion to the Federal Treasury every year.

We have the blessing of the Lord on our side in the United States that the latest estimates, although it is difficult to estimate, we think over 2,000 trillion feet of natural gas resides beneath our lands in the United States, 2,000 trillion feet. Because of past laws, we give the Department of Energy the right to make a decision on exports and natural gas, if it is not to a country where we already have a free trade agreement. There are currently 19 of those applications pending, one has been approved. It would be my hope that several more are approved in the near future.

If you believe in free markets this is a win-win. You only make an agreement if it benefits the seller and it benefits the buyer. In this case the seller is the American economy and the jobs that are created in America. And the winner overseas is the increased economic prosperity because they get natural gas from the United States that is orders of magnitude less expensive than it is from any other supplier.

So, Mr. Chairman, this is a good hearing, and I look forward to the witnesses and then asking them questions. And with that I would yield back to the chairman.

[The prepared statement of Mr. Barton follows:]

PREPARED STATEMENT OF HON. JOE BARTON

Thank you, Chairman Whitfield, for holding this hearing to examine the national security and foreign policy implications of our abundant energy resources. America's energy revolution—the massive increase in oil and gas production from shale formations—has shifted the geopolitical framework governing foreign diplomacy. The positive effects are being felt both in the U.S. and abroad, and this is just the beginning.

The increase in oil and gas development is strengthening our economy here at home by supporting nearly 9 million jobs and sending more than 30 billion dollars to the Federal Treasury every year. It is the bright spot in an otherwise gloomy economy.

The growth in domestic production also means we are importing less, freeing up supplies of natural gas and oil around the world, weakening the grip of state-owned energy companies like Russia's Gazprom, which once held sway over European natural gas markets.Allowing exports of American natural gas, and possibly even oil, would further enhance our power and influence—strengthening our relationships with allies and weakening the control of adversaries such as Iran.

I support American energy exports because I support free markets and free trade. The fundamental principle of free markets is that both sides to transactions benefit. We keep jobs here at home—our businesses can continue to innovate and grow. Our allies around the world benefit because they can diversify their supply and decrease their reliance on OPEC nations. Together, we benefit knowing the safety and security of our energy supply will not be subject to the whims of adversaries seeking to use energy as a political weapon.

I want to thank the witnesses for appearing before us today to allow us to better understand what may be possible in this new era of energy.

Thank you, I yield back.

Mr. WHITFIELD. The gentleman's time has expired. At this time I recognize the gentleman from Illinois, Mr. Rush, for a 5-minute opening statement.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. RUSH. I want to thank you, Mr. Chairman, and I want to join with my colleagues in welcoming our expert witnesses, particularly our former Senators, Senator Johnston and Senator Dorgan.

Mr. Chairman, with the technological advances in the area of energy production and the prevalence of shale oil and gas due to hydraulic fracturing, or fracking, today's hearing is both timely and very necessary. Not long ago experts predicted that the U.S. would be forced to rely on increased natural gas imports in order to meet our energy demands. However, today we are seeing a boom in domestic production of oil and natural gas due to fracking and horizontal drilling. And now we must consider whether the U.S. should become a net exporter of natural gas, and, if so, over what period of time.

Between 1990 and 2012, Mr. Chairman, natural gas production in the U.S. increased by 34 percent, and the EIA projects that under existing policies natural gas production will rise by an additional 39 percent by the year 2040. In fact, in a National Journal article dated April 30th, 2013, entitled "The U.S. Has Much, Much More Gas and Oil Than We Thought," it was noted that the U.S. has double the amount of oil and 3 times the amount of natural gas than previously thought stored deep under the States of North Dakota, South Dakota, and Montana. And this was according to new data that was released by the Obama administration.

The article went on to note that in just the Bakken and Three Forks plays alone the U.S. Geological Survey estimated that there are 7.4 billion barrels of recoverable oil and 6.7 trillion cubic feet of natural gas waiting to be tapped. While the EIA predicts that under existing policies U.S. Total natural gas consumption will increase from 24.4 trillion cubic feet in 2011 to 29.5 trillion cubic feet in 2040, the agency also notes that as domestic production outpaces consumption the U.S. could become a net exporter of natural gas by the year 2020. In fact, Mr. Chairman, President Obama reiterated this fact personally this past weekend during the development forum in Costa Rica where he indicated that he may be close to making a decision on whether or not the U.S. should become a net exporter of natural gas.

In an E&E article published yesterday, on May 6th, entitled, quote, "Obama Says U.S. Likely to Be a Gas Exporter By 2020," end of quote, President Obama is quoted discussing this very same issue. He said, and I quote, "Because of the extraordinary advances in technology that we have made in the U.S., we are likely to be a net natural gas exporter as soon as 2020. I have got to make a decision," he says, "an executive decision broadly about whether or not we export liquefied natural gas at all," end of quote.

So, Mr. Chairman, as this discussion of potentially exporting LNG heats up, I join with my colleagues in commending you for convening today's hearing where we will both be able to learn more from our distinguished panel on both the benefits and potential negative impacts of this pertinent issue as it relates to the economy, to jobs, to manufacturing, and to the U.S. trade balance, as well as the impact on climate change. More importantly, Mr. Chairman, I look forward to hearing how LNG exports would impact the pocketbooks of ordinary consumers so that American families are not subjected to adverse consequences, those that are intended and those that are unintended. Mr. Chairman, I look forward to this hearing, and I yield back the balance of my time.

Mr. WHITFIELD. Thank you very much Mr. Rush.

And that concludes the opening statements today. So now we get to listen to the opening statements of our distinguished panel. And at this time I would like to introduce the panel members. First, on my left, Senator Bennett Johnston, who is from the great State of Louisiana and had a distinguished career in the U.S. Senate. And one of the many areas that he was certainly involved in was in energy. He is now the chairman of Johnston & Associates.

And, Senator, we are glad to have you here with us today and we look forward to your testimony.

We have Senator Byron Dorgan from the great State of North Dakota. He also had a distinguished career in the U.S. Senate and certainly is a well-versed public policy person on energy issues. And we look forward to his testimony as well. And he is, by the way, also the co-chair of the Bipartisan Policy Center, that recently came out with a document about the energy needs of America and directions that we should be moving.

We have Mr. James Bradbury, who is a senior associate, Climate and Energy Program, at the World Resources Institute.

And we appreciate your being with us.

We have Mr. Michael Breen, who is the executive director for the Truman National Security Project. We have Mr. Mike Halleck, who has already been introduced by Bill Johnson, but Mr. Halleck's the President of the Columbiana County Board of Commissioners and certainly has worked a lot on energy issues. And we have Ms. Amy Jaffe, who is the executive director for energy and sustainability, UC Davis Graduate School of Management.

So thank you very much for joining us today.

And at this time I am going to recognize each one of you for 5 minutes, and there is a little box on the table and the red light will come on when your time is up. So you can just be aware of that. And at this time I recognize Senator Johnston for 5 minutes for his opening statement.

STATEMENTS OF HONORABLE J. BENNETT JOHNSTON, CHAIRMAN, JOHNSTON & ASSOCIATES; HONORABLE BYRON DORGAN, CO-CHAIR, BIPARTISAN POLICY CENTER; JAMES BRADBURY, SENIOR ASSOCIATE, CLIMATE AND ENERGY PROGRAM, WORLD RESOURCES INSTITUTE; MICHAEL BREEN, EXECUTIVE DIRECTOR, TRUMAN NATIONAL SECURITY PROJECT; MIKE HALLECK, PRESIDENT, COLUMBIANA COUNTY BOARD OF COMMISSIONERS; AND AMY JAFFE, EXECUTIVE DIRECTOR, ENERGY & SUSTAINABILITY, UC DAVIS GRADUATE SCHOOL OF MANAGEMENT

STATEMENT OF J. BENNETT JOHNSTON

Mr. JOHNSTON. Thank you, Mr. Chairman, Ranking Member Rush, ladies and gentlemen of the committee. The Department of Energy says we have 100 years of natural gas. They say that by 2020 supply will go up by 40 percent, while demand will go up only 20 percent. The amount of natural gas seems to be growing every week. Just last week The Washington Post reported that Williston Basin has 3 times as much natural gas as they thought. They also said, by the way, that China has 50 percent more natural gas than the United States has.

Now, DOE commissioned to study by the Cambridge Energy Research Associates, a definitive study, which indicates that we can safely export natural gas without any untoward effect on the price—no price spikes, no difficulty in terms of supply.

Now, that question is traversed, is argued against by some of the chemical companies, principally Dow Chemical, who says, if you have unfettered exports, then that is going to lead to supply disruptions, price spikes, and other difficulties. So the issue I would like to speak about today is the question of how to allocate this

huge beneficence of natural gas in the United States. Is it by regulation or is it by the free market?

Now, people in the market will point out that it takes 5 to 7 years and $10 billion to $20 billion to have an export terminal, with the trains and the ships and the D gas facilities on the other end. And don't ever think that all of those who put up a few hundred dollars to apply for their permit are going to be able to make it to the finish line.

In my judgment, and my experience has been that the market is the best way to do that allocation. Let me give you my experience with markets because it is pretty extensive. My first subcommittee was Production and Stabilization of the Banking Committee. We had jurisdiction of President Nixon's wage and price controls. We had hearings that indicated that it was a disaster—shortages, dislocations, supply disruptions—and I think our hearings had a lot to do with making the case to suspend those wage and price controls.

Then the Federal Power Commission—some of you remember the Federal Power Commission—was regulating the price of natural gas in order to protect consumers. The problem was they set the price so low that they dried up the supply. In the cold winter of 1976–1977 hundreds of thousands of employees in the Midwest were out of work because there was no natural gas, the regulators didn't know how to regulate. So in that cold winter we passed in 5 days the emergency natural gas bill—5 days we passed that bill.

And we came along the next year with the Natural Gas Policy Act. I think one or two of you were here in this room for that year-and-a-half conference committee. What we did is deregulate the price of natural gas by degrees between 1978 and January the 1st, 1985. It was the most controversial bill you can imagine. All three networks— we only had three networks at that time—they were here, and, oh, my gosh, you know, the regulator said it is going to ruin things, the price is going to shoot through the roof, the supply is going to dry up. Guess what? Come January the 1st, 1985, the supply was adequate, the price actually went down, and we proved, absolutely proved that the free market works in commodities and particularly in natural gas.

Then we had the Fuel Use Act of 1978 where they prevented natural gas from being burned under boilers, and that turned out to be a disaster, the Congress didn't know how to allocate the highest and best use of natural gas. And just in case you think that since I left the Senate that the regulators are doing any better job, just look at electric cars. The President says we are going to have a million electric cars in a couple of years. We have got less than 100,000 now.

And how about ethanol? We are supposed to have 36 billion gallons of ethanol, over half of that cellulosic ethanol. Right now, according to their estimates, we should be having 500 million gallons of cellulosic ethanol. You know how many we have got? Less than a million gallons, less than 1/500, and the prospects are not any better.

So the question is, does anyone really believe that the Department of Energy years in advance, 5 to 7 years in advance, can really accurately predict supply and demand and predict who is going

to be able to come up with billions of dollars and make decades-long supply and demand offtake agreements? They can't do it.

You know, markets are dynamic. There are many factors which are working which change by the month, some change daily, labor rates, interest rates, diesel cost, steel, pipeline capacity, NIMBY risk, regulatory risk, capital availability, technology changes. All of those things are working rapidly. And the way to allocate those, that great beneficence of natural gas, is to let the market do it because it can react faster than the regulators can react.

Thank you, Mr. Chairman.

Mr. WHITFIELD. Thank you, Senator Johnston.

[The prepared statement of Mr. Johnston follows:]

Testimony of The Honorable J. Bennett Johnston
before the Subcommittee on Energy and Power
of the U. S. House Committee on Energy and Commerce

"U.S. Energy Abundance:
Exports and the Changing Global Energy Landscape"

May 7, 2013

Chairman Whitfield , Ranking Member Rush, and Members of the Subcommittee,

Thank you for the opportunity to present my views on natural gas exports and the role of the government in regulating natural gas and natural gas exports.

The Department of Energy in its latest annual report projected a 100-year supply of natural gas with, by 2040, a growth in natural gas production of 40% and a growth in consumption of only 20%. And the current trend in supplies is up! Just last Wednesday (May 1), The Washington Post reported that the Williston Basin contains three times as much gas as previously reported and China has 50% more shale gas than the United States. A study commissioned by DOE concluded that exports of natural gas would not appreciably increase the price.

Leading the opposition to LNG exports are prominent members of the chemical industry. They argue that unfettered exports can cause demand shock and price volatility, which can smother America's chemical industry rebirth.

The petroleum industry counters that LNG facilities require $10-$40 billion to complete and 5-7 years to finance, build and permit. On top of that, the exporter must have secured a multi-decade supply of natural gas and a firm contract on the receiving end to purchase the LNG. These factors along with very healthy competition from foreign exporters will prevent an export-driven price spike. Moreover, DOE sponsored

studies support the conclusion that exports provide the demand incentive to increase production of natural gas. Much of America's best dry gas supply, such as the Haynesville Shale in my state of Louisiana, lies undeveloped for lack of demand.

Thus the issue is the one Adam Smith identified more than two centuries ago in "The Wealth of Nations": How best to procure that balance between supply and demand that produces prosperity. Is it through government regulation or by the free market?

My years in the U.S. Senate (1972-97) spanned a period rich with experimentation in the efforts of government to regulate price and supply. My first chairmanship was of the Production and Stabilization Subcommittee of the Banking Committee, which had jurisdiction over President Nixon's 1971 wage-and-price controls. Our hearings exposed the shortages, dislocations and distortions that the scheme produced. This disastrous experiment in central planning was soon abandoned and should stand as a reminder of the dangers of regulatory overreach.

My 24 years on the Senate Energy Committee also involved dealing with the government's efforts to regulate price and supply. In the early 1970s, the Federal Power Commission sought to protect consumers by regulating the price of natural gas. Instead of hitting a price "sweet spot," the effort produced massive shortages.

In the record cold winter of 1976-77, hundreds of thousands of workers in the Midwest were laid off for lack of natural gas to power manufacturing plants and other companies. The crisis was such that it took just five days for Congress to introduce and pass the Emergency Natural Gas Act of 1977 authorizing President Jimmy Carter to suspend antitrust laws in the industry to address a shortage in supply. Five days!

The epic fight for the deregulation of natural gas was the most controversial issue of the day. A round-the-clock filibuster with senators sleeping on cots in the cloakroom was finally overcome. The resulting Natural Gas Policy Act of 1978 increased the price of gas in stages until full deregulation on Jan. 1, 1985. The regulatory community predicted a terrible price explosion on this date with a calamity for consumers. Instead, the nation experienced lower prices and an adequate supply.

During this time, Congress also sought to prevent this valuable commodity from being wasted, and it passed the Fuel Use Act of 1978 preventing natural gas from being burned for electricity generation. The law did not cause an emergency but it became clear that electric generation was frequently the best use of the gas. The folly of this attempt at resource allocation was soon evident and repeal ensued.

And if you believe that the government's ability to estimate supply and demand has improved since I left office, I refer you to two recent instances indicating that you'd be mistaken. In 2007, Congress predicted there would be 500 million gallons of cellulosic ethanol for commercial use in the United States. In fact, there was less than one million gallons. The fuel is simply not commercially available in the United States.

And in 2011, the President set a goal of one million electric cars on the road by 2015. To date, only 87,000 electric and hybrid cars have been sold. This number would have to increase 10-fold to reach the Administration's goal. It's a cinch that Fisker Motors won't supply the deficit. An April report from the Congressional Research Service acknowledges, "Electric vehicles are still in their infancy, and there is a gap between the Administration's goal of having 1 million electric vehicles on the road by 2015 and consumer demand for such vehicles."

That brings us back to today's calls for top-down control of the LNG market. Does anyone really think that Congress or the Department of Energy, years in advance, can predict supply and demand or determine which of the 20 applicants can procure the billions of dollars and decades-long contracts necessary to build an LNG export facility?

The free market might not always lead to everyone's definition of the sweet spot, but experience has shown that it is a better allocator and regulator than bureaucrats and politicians. We should heed the admonition of Adam Smith that demand begets supply: Allow the free market to allocate the nation's newfound energy bounty.

Again, thank you for the opportunity to testify before you today. I would, of course, be happy to answer any of your questions.

Mr. WHITFIELD. And, Senator Dorgan, you are recognized for 5 minutes.

STATEMENT OF BYRON DORGAN

Mr. DORGAN. Mr. Chairman, thank you very much.

I am here on behalf of the Bipartisan Policy Center. Senator Trent Lott and I co-chaired, along with two others, a major study on energy and have produced this document. This is the executive summary. I would encourage all of you to get it. It is an unbelievably important source book. And we are hoping that the House and the Senate will hold a hearing on this because we have tried to create what we think could represent bipartisan opportunities for policy changes in the area of energy.

I left the House, by the way, in 1992, went to the Senate, spent my next 18 years there. The last time I was in this room in 2007 as an energy conferee, and at that point FERC had said we were running out of natural gas, 2007. So times changes a bit. That is only 6 years ago, 5 ½ years ago. We were running out of natural gas. An old Indian chief once said that the success of a rain dance depends a lot on timing. Well, timing is everything, and timing here with respect to where we were in 2007 versus now is unbelievably interesting. So let me talk about four major ways that the energy circumstances have changed on the planet.

First of all, U.S. supply. We are producing more, a lot more oil and gas, but also producing more renewable energy. And the oil and gas that comes from innovation in combining horizontal drilling with hydraulic fracturing. So that is all good news. We are producing more, that is good news for our country, and not just more fossil, we are producing more renewable, which is good news for our country.

Efficiency, which is the fifth fuel. A lot of people don't understand how much efficiency has contributed to where we are as a country. And so that is very important, and there are major U.S. benefits as a result of this.

Second significant issue, we add 200,000 people to the planet every single day. We added Dallas, Texas, net to the planet every week. We are headed towards 9 billion people. They are going to want to have refrigerators, washing machines, and air conditioners. They are going to want to drive cars as well that are going to need to stop at a fuel station once or twice a week—or let's hope once every 2 weeks. My point is the growing demand as a result of increased population will continue.

So number one, we are producing more, that is good for our country. Number two, there is going to be substantial growth in demand on the planet.

Number three, you can't come to the intersection of discussing energy without understanding that you have to be concerned about the climate and climate change issues. It is clear to me that the wide consensus will be, is and will be in the future that we need a lower carbon future. That is going to play a role. Deny, as some will, energy policy is linked to environmental issues.

And number four, you can't discuss all this without understanding there remains an oil cartel on this planet that sets inter-

national pricing. We need to understand that because that plays a role in our lives as well.

Now, let me talk about the Bipartisan Policy Center's report. The major issues there are diverse sources. We say, yes, this is great news on oil and gas, it is transformative for our country in lots of ways, good for us. We believe we should continue producing. I offered the amendment in the 2009 bill that didn't get to the floor of the Senate to open up the eastern Gulf. I mean, we should continue producing. But diverse sources means also continue to push renewables as well.

And we also talk about improving productivity. That means transmission, CAFE, transportation fuels, all of those areas. We talk about innovation. Innovation is critically important for our country. We must innovate to succeed.

And then finally governance. We have 20 Federal agencies that have some part of the energy policy. I mean, how do you have an orchestra without a band director? And yet we have 20 different agencies that play a role in energy policy.

So we have put together a set of 50 recommendations. And, again, I hope very much both the House and the Senate will hold hearings on these sets of recommendations on energy policy. It describes how on a bipartisan basis we can make progress in a Congress that seems unbelievably gridlocked. We had an advisor group of 20 people, CEOs from every part of the political spectrum, public policy groups and corporations and so on, as we created this document.

Now let me talk at the end of this with respect to the issue of exports. The export of natural gas, it seems to me, will be continuing to play a significant role. What we decided is we believe the market should make the decision about the exports of natural gas. And I know some are worried, well, if we export natural gas we are going to see increases in domestic prices. Look, we have already doubled our exports of natural gas to both Canada and Mexico. A lot of people don't know that. We are piping natural gas to both of our neighbors and have doubled that since 2007.

I think it is far more likely that domestic prices will affect exports than it is that exports will affect domestic prices. And so we decided in this report that the market should make the judgment about the exports of natural gas.

So, Mr. Chairman, again, I am going to ask the Bipartisan Policy Center if we might provide—I think I just gave the last copy I had to Bennett Johnston, this is the full copy—but I would love to have all of you have a copy of this. It is an unbelievably good source book for virtually all areas of energy with 50 recommendations that I think could advance the bipartisan interest of this country and this Congress.

Mr. WHITFIELD. Thank you Senator Dorgan.

I know many of us have copies of it but we would be happy for you all to supply it to the committee so we can make sure everyone has it.

[The prepared statement of Mr. Dorgan follows:]

Testimony of Byron Dorgan on
U.S. Energy Abundance: Exports and the Changing Global Energy Landscape

Hearing of the House Subcommittee on Energy and Power
May 7, 2013

Good morning. My name is Byron Dorgan. I served in the Senate, representing the people of North Dakota, from 1992 to 2011 and in the House, from 1981 to 1992. I thank members of the Subcommittee for the opportunity to return today to discuss America's rapidly changing energy situation and the issue of energy exports in particular. I am speaking to you today in my current position as a Senior Fellow of the Bipartisan Policy Center (BPC), a non-profit group dedicated to developing and advocating bipartisan solutions to some our nation's most important challenges. At BPC I recently co-chaired an 18-month long project—called the Strategic Energy Policy Initiative—that aimed to assess our nation's current energy strengths and weaknesses and make comprehensive policy recommendations. The project was guided by a 20-member board that included leading energy experts from the private, public, and non-profit sectors. Much of my testimony today draws from the report we issued in February of this year, titled "*America's Energy Resurgence: Sustaining Success, Confronting Challenges.*"[1]

[1] A copy of the report is included with this testimony; it can also be accessed at www.bipartisanpolicy.org.

The central "good news" finding from BPC's Strategic Energy Policy Initiative is that the United States enters the 21st century in a position of energy strength. Domestic oil, natural gas, and renewable energy production are up, while energy imports are down; new energy development is driving a jobs boom in many parts of the country; and lower energy costs are helping the U.S. manufacturing sector recover. Many of these recent positive developments are linked to the advent of improved drilling technologies that have made it economical to access vast new reserves of hydrocarbons.

Just as important, our nation has made enormous gains in energy efficiency over the last 50 years. In fact, adjusting for economic growth and inflation, the United States has cut its energy needs by more than 50 percent since 1973, and this trend shows no signs of slowing. Put simply, the energy we've saved by becoming more efficient over the last 40 years exceeds all the new resources we've added to our portfolio of energy supplies. Thanks to this combination of positive supply *and* demand trends, our nation is arguably more energy secure than it has been in more than a generation.

Of course, that doesn't mean our nation no longer faces any energy challenges. Many households and businesses still have difficulty meeting their energy needs affordably; the current oil and gas boom comes with environmental challenges; the electric grid faces hurdles in upgrading infrastructure and integrating new renewable sources; public research and development (R&D) in energy is insufficient to maintain an international competitive edge; we still haven't reached consensus as a nation on how to

address the problem of climate change; and our economy remains exposed to instability and volatility in global energy markets.

Given these challenges, we believe the central task of federal energy policy is to build on America's enormous energy strengths to ensure that we can continue to deliver affordable, secure, and reliable energy in an environmentally responsible manner for decades to come. Specifically, my colleagues and I on BPC's Energy Board identified four core objectives for U.S. energy policy:

(1) pursue a diverse portfolio of energy resources;

(2) improve the energy productivity of the U.S. economy;

(3) accelerate innovation and technology improvements across the energy sector; and

(4) improve energy policy governance and accountability.

The specific policy actions we recommend to advance these objectives are detailed in our February report; in brief, they include further efforts to promote the environmentally responsible development of domestic resources including oil, natural gas, and renewables along with continued investment to further improve the energy productivity of the U.S. economy, advance new technologies to preserve a wide menu of energy options for the future (including clean coal and nuclear technologies), diversify fuel

options for the transportation sector, meet future energy-related workforce needs, and strengthen key infrastructure, particularly the U.S. electric grid.

Taken together, we are confident these actions will further improve our nation's energy security, strengthen the U.S. economy, and help us achieve our environmental goals.

The recent boom in domestic energy production, much of it linked to the advent of more sophisticated drilling technologies—such as hydraulic fracturing—that have made it economic to develop unconventional resources such as shale gas, is already spurring new investments and growth opportunities, particularly in industries that can take advantage of lower cost natural gas. It is also generating interest in new export opportunities—which are the focus of today's hearing.

In the last two years, in fact, expectations of liquefied natural gas (LNG) imports have given way to discussions of LNG exports. However, the prospect of greatly expanded LNG exports has also raised serious concerns among a number of analysts and policy makers who remember well the high natural gas prices of the 2000s and who worry that increased exports will drive up domestic natural gas prices. After reviewing several recent studies on the impacts of LNG exports, the BPC Energy Board concluded that domestic gas prices are more likely to drive export levels than exports are likely to determine domestic prices. Indeed, we concluded that LNG exports are likely to have at most a modest impact on domestic natural gas prices—LNG exports will adjust as U.S. prices rise or fall.

Moreover, abundant low-cost supplies abroad (particularly from Qatar) and the significant costs of liquefaction and transport from the United States will constrain U.S. export volumes. As long as state and federal regulators—along with both industry and stakeholders—continue to make strides to mitigate the environmental impacts of shale gas production, we believe the federal government should allow LNG exports.

This recommendation is consistent with a broader observation concerning U.S. export policy more generally: Even where controversy has surrounded a particular type of export, especially those with potential national security implications, the policy solution rarely has been to completely abandon the nation's traditional commitment to free trade. In sum, we conclude that **restricting international trade in fossil fuels is not an effective policy to reduce global greenhouse gas emissions or to advance domestic economic interests, and we recommend against any such restrictions.**

This overarching recommendation also addresses the controversy that has arisen in connection with several proposals to build new bulk commodity export terminals that plan to export coal. Opposition to these proposals has been motivated by a combination of local concerns, including the potential for adverse impacts in terms of traffic, air quality, coal dust, and marine pollution.[i] However, the current rigorous permitting process can provide ample opportunity to identify and address local environmental concerns linked to the construction and operation of new export facilities in the United States.

Some of the opposition to expanded U.S. coal exports, however, is also motivated by a broader set of concerns, notably the concern that it would promote increased coal use in China and other growing markets and in turn lead to an increase in net global emissions of carbon dioxide. (Another concern is global emissions of mercury, which can be transported long distances in the atmosphere.) Recent analyses have come to different conclusions about the net effect of U.S. coal exports on international coal prices and global greenhouse gas emissions.[ii] Given the magnitude of global coal reserves relative to international demand, it is our view that U.S. coal exports would have only a minor influence on the global coal market, and that other countries will fill the gap if U.S. exports are limited. More importantly, as I have already stated, we do not believe that impeding the global trade of fossil fuels is an effective or efficient means of reducing global greenhouse gas emissions.

In sum, we believe that the opportunity to increase U.S. energy exports reflects one of the important economic upsides of our nation's newfound energy abundance. Provided appropriate regulatory protections and policy frameworks are in place to govern domestic energy production, expanded exports will improve the U.S. balance of trade, support local and regional economies, and increase the U.S. presence in global energy markets – and do so without harm to the environment or to U.S. consumers and businesses.

In closing, let me again thank the members of the Subcommittee for the opportunity to testify.

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[i] John Kitzhaber, *Oregon Governor John Kitzhaber to Secretary of the Army, Secretary of the Interior, U.S. Army Corps of Engineers, and Director of Bureau of Land Management*, August 25, 2012. http://media.oregonlive.com/environment_impact/other/4%2025%2012_McHughSalazarCoalLetter%20%282%29.pdf.
[ii] Energy Policy Research Foundation, Inc., *The Economic Value of American Coal Exports*, August 2012, http://eprinc.org/?p=929; Thomas M. Powers, *The Greenhouse Gas Impact of Exporting Coal from the West Coast: An Economic Analysis*, http://www.sightline.org/wp-content/uploads/downloads/2012/02/Coal-Power-White-Paper.pdf.

Mr. WHITFIELD. Mr. Bradbury, you are recognized for 5 minutes.

STATEMENT OF JAMES BRADBURY

Mr. BRADBURY. Thank you and good morning. Thank you for the opportunity to contribute to the deliberations of this subcommittee. My name is James Bradbury. I am a senior associate in the Climate and Energy Program at the World Resources Institute. WRI is a nonprofit, nonpartisan think tank that focuses on the intersection of the environment and socio-economic development.

I am pleased to be here today to offer WRI's perspective on the climate implications of U.S. Liquefied natural gas exports. I encourage this committee to consider not just the economic and geopolitical opportunities of LNG, but also the environmental, and particularly climate-related implications. In my testimony today I want to emphasize a number of points that are often overlooked in this discussion, in particular fugitive methane emissions and the cost-effective solutions available for reducing them today.

LNG exports will lead to an increase in domestic production of shale gas, which will have important environmental implications, including an increase in U.S. greenhouse gas emissions. One major emission source is leaks from natural gas infrastructure. Methane is the primary component of natural gas and a potent greenhouse gas, with a warming effect that is at least 25 times greater than carbon dioxide. These fugitive emissions represent lost product and reduced revenue for companies and governments, with negative consequences for air quality, local environment, and the climate.

In 2011 methane leaks from domestic natural gas infrastructure resulted in more greenhouse gas emissions than all of the direct and indirect emissions from U.S. iron and steel, cement and aluminum manufacturing combined. These upstream emissions, along with emissions associated with the liquefaction, transport, and regasification of LNG, significantly reduce the relevant advantage that exported natural gas would have over coal or oil from a climate perspective. The bottom line is that the projected expansion of domestic oil and gas production increases the risk of higher greenhouse gas emissions if proper protections are not in place.

The impact of LNG exports on global carbon dioxide emissions is expected to be fairly minor. The International Energy Agency estimates that an expanded global market for natural gas would reduce global carbon dioxide emissions by a mere 0.5 of 1 percent by 2035. But these scenarios do not consider associated upstream methane emissions. The U.S. EPA estimated that the scale of leaked methane from global natural gas and oil systems is projected to be 10 times greater than IEA's estimated CO_2 reductions resulting from a future with more abundant natural gas.

Ultimately U.S. policies are needed to reduce these fugitive methane emissions if natural gas and LNG are to be part of the solution to climate change. WRI research has found that such policies are among the most important steps that the U.S. can take today to help meet our greenhouse gas emissions reduction goals.

The good news is that most strategies for cutting leakage are highly cost effective and the EPA's recently finalized rules are already having emissions benefit. But there is more work to be done. By stepping up to address these emissions the United States has

an important opportunity to improve our economic and geopolitical standing by showing leadership in addressing global climate change. We can do this through commonsense policies that promote the development, deployment, and export of low-emissions technologies and practices that will allow for the cleaner production and more efficient end use of natural gas here in the U.S. and internationally.

While there are some benefits to increased natural gas production, there are also risks and associated costs. Further expanding our reliance on fossil energy resources exposes us and our allies to the destabilizing effects of climate change. In its 2010 Quadrennial Defense Review the Department of Defense found that climate change could have significant geopolitical impacts around the world, including weakening fragile governments, food scarcity, spread of disease, and mass migration.

For energy markets to serve the public interest the price of energy must reflect its true cost. Society pays when our health care premiums rise due to the harmful health effects caused by high ozone levels and other air pollution. Taxpayers pick up the tab for climate change when more frequent extreme weather events cause increasing damage to our communities and critical infrastructure.

Yet every day that we take no policy action on climate change we make the policy choice to let climate change run its course. The present course ignores the overwhelming consensus of climate scientists who have been warning for decades that rising greenhouse gas emissions will cause the planet to warm, sea levels to rise, and the weather to become more extreme. It is indisputable that these climate changes are already happening today, in many cases much more quickly than expected. Urgent action is needed.

I would be glad to take questions. Thank you.

Mr. WHITFIELD. Thank you, Mr. Bradbury.

[The prepared statement of Mr. Bradbury follows:]

TESTIMONY OF JAMES BRADBURY

SENIOR ASSOCIATE, CLIMATE AND ENERGY PROGRAM
WORLD RESOURCES INSTITUTE

HEARING BEFORE THE U.S. HOUSE OF REPRESENTATIVES ENERGY AND COMMERCE SUBCOMMITTEE ON ENERGY AND POWER:
"U.S. ENERGY ABUNDANCE:
EXPORTS AND THE CHANGING GLOBAL ENERGY LANDSCAPE"

May 7, 2013

Summary of Key Points:

Liquefied natural gas (LNG) exports present both opportunities and risks. Producing and delivering natural gas to customers is highly energy- and emissions-intensive, particularly when LNG is involved. Research by the World Resources Institute has found that cuts in upstream methane leakage from natural gas systems are among the most important steps the U.S. can take toward meeting our greenhouse gas (GHG) emissions reduction goals by 2020 and beyond.

This testimony focuses on fugitive methane emissions and the many cost-effective solutions available for reducing them. It appears very likely that LNG exports from U.S. terminals would result in increased domestic GHG emissions from both upstream and downstream sources. Policymakers should more actively work to help achieve reductions in GHG emissions from throughout the natural gas value chain, if this valuable fuel and LNG are to be part of the solution to the climate change problem. Taking these actions offer economic, environmental, and geopolitical benefits, both in the U.S. and internationally. To this end, I offer the following policy recommendations:

- Expand applied technology research programs at the U.S. Department of Energy to help reduce the cost of leak-detection and emissions measurement technologies, and to develop new and lower-cost emission reduction strategies.
- Update emissions factors for natural gas systems using robust measurement protocols, public reporting by industry, and independent verification.
- Authorize and appropriate funding for the organization STRONGER (State Review of Oil and Natural Gas Environmental Regulations) to help states with timely development and evaluation of their environmental regulations.
- Support voluntary programs at the U.S. Environmental Protection Agency (EPA), including Natural Gas STAR and other programs which recognize companies that demonstrate a commitment to best practices.
- Support EPA's efforts to provide technical and regulatory assistance to states with expanding oil and natural gas development, including through the Ozone Advance Program.
- Enact policies to support clean energy and address climate change. A clean energy standard or putting a price on carbon would provide clear signals to energy markets that energy providers and users need to recognize the environmental and social costs as well as the direct economic costs of energy resources.

TESTIMONY OF JAMES BRADBURY

SENIOR ASSOCIATE, CLIMATE AND ENERGY PROGRAM
WORLD RESOURCES INSTITUTE

HEARING BEFORE THE U.S. HOUSE OF REPRESENTATIVES ENERGY AND COMMERCE SUBCOMMITTEE ON ENERGY AND POWER: "U.S. ENERGY ABUNDANCE: EXPORTS AND THE CHANGING GLOBAL ENERGY LANDSCAPE"

May 7, 2013

Good morning, and thank you for the opportunity to contribute to the deliberations of this Subcommittee. My name is James Bradbury, and I am a senior associate in the Climate and Energy Program at the World Resources Institute (WRI). WRI is a non-profit, non-partisan think tank that focuses on the intersection of the environment and socio-economic development. We go beyond research to put ideas into action, working globally with governments, business, and civil society to build transformative solutions that protect the earth and improve people's lives. We operate globally because today's problems know no boundaries. We provide innovative paths to a sustainable planet through work that is accurate, fair, and independent.

Summary

I am pleased to be here today to offer WRI's perspective on the climate implications of U.S. liquefied natural gas (LNG) exports. I encourage this committee to weigh a complete consideration of the associated economic and geopolitical opportunities next to the potential risks, neither of which have been fully considered in the public debate. In particular, it appears very likely that LNG exports from U.S. terminals would result in increased domestic greenhouse

gas (GHG) emissions. For example, analysis by the Energy Information Administration (EIA)[1] concluded that any scenario of LNG exports would trigger an increase in domestic carbon dioxide (CO_2) emissions, due to an increase in coal-fired electricity and use of natural gas for the energy-intensive liquefaction process at LNG terminals. The EIA also projected an increase in natural gas production from shale wells. Though not considered in the EIA study, an inevitable consequence would be greater upstream air emissions from natural gas infrastructure – that is, emissions that occur prior to fuel combustion – including fugitive methane, which is a potent global warming pollutant. While LNG exports from the U.S. are widely expected to marginally reduce global CO_2 emissions, modeling to date suggests that the scale of these reductions is less than ten percent of the total levels of global fugitive methane emissions from natural gas and oil systems.

These facts should raise the bar for policymakers and advocates for LNG exports to more actively work to achieve continuous improvement in GHG emissions from all life cycle stages (from extraction to use), if natural gas and LNG are to be part of the solution to our climate change problem. Furthermore, to the extent that substantial LNG exports from the U.S. move forward, our national policy objectives should be broader than simply improving our balance of trade vis-à-vis fossil fuel exports to increase our economic and geopolitical standing. We also have an important – indeed urgent – opportunity to improve our economic and geopolitical standing by showing leadership in addressing global climate change. We can do through policies

[1] See: http://www.fossil.energy.gov/programs/gasregulation/reports/fe_eia_lng.pdf

that promote the development, deployment, and export of low-carbon products and services[2] to help enable global GHG emissions reductions from all sectors, including through technologies and practices that allow the cleaner production and more efficient end-use of natural gas.

Today I will focus in particular on fugitive methane emissions[3] and the cost-effective solutions available for reducing them.[4] The case for policy action is particularly strong considering that recent research shows that climate change is happening faster than expected. In addition, the projected expansion in domestic oil and natural gas production increases the risk of higher GHG emissions if proper protections are not in place.

- Methane is the primary component of natural gas and also a potent greenhouse gas. Methane leaked from natural gas systems (i.e., fugitive methane) represent lost product and reduced revenue for companies and governments, with negative consequences for air quality and the environment.
- Fugitive methane emissions from natural gas systems represent roughly 3 percent of global warming pollution in the U.S. Reductions in methane emissions are urgently needed as part of the broader effort to slow the rate of global temperature rise.
- Although natural gas burns much cleaner than coal or oil, fugitive methane emissions significantly reduce this relative advantage, from a climate standpoint; therefore, cutting

[2] For more information on low-carbon market opportunities, see Jennifer Morgan's testimony, here: http://www.wri.org/publication/testimony-american-energy-security-and-innovation-assessment-of-energy-resources

[3] While this testimony focuses on greenhouse gas emissions – and methane emissions from natural gas systems, in particular – WRI is committed to minimizing the full scope of impacts cause by energy production and use. It is critical for U.S. energy policies to be developed with consideration to a broad range of risks and benefits.

[4] For more detailed analysis and discussion of this topic, see WRI's recent working paper, "Clearing the Air: Reducing Upstream Greenhouse Gas Emissions from U.S. Natural Gas Systems." Available at: http://www.wri.org/publication/clearing-the-air

fugitive emissions from natural gas systems would ensure that the climate impacts of natural gas are much lower than coal or diesel fuel over any time horizon.

- Recent emissions standards from the U.S. Environmental Protection Agency (EPA) will substantially reduce leakage from natural gas systems, but to help slow the rate of global warming pollution and improve air quality, further action by states and federal agencies should directly address fugitive methane from new and existing wells and equipment.
- Fortunately, most strategies for reducing fugitive methane emissions are cost-effective, with payback periods of three years or less. A recent WRI report found that cuts in methane leakage from natural gas systems are among the most important steps the U.S. can take toward meeting our GHG emissions reduction goals.[5]
- The process of liquefaction, transport, and regasification of LNG is highly emissions-intensive, increasing by 15 percent the total life cycle GHG emissions associated with exported U.S. natural gas, compared to natural gas that is produced and consumed domestically. These added upstream emissions also significantly reduce the relative advantage that natural gas would have over higher-emitting fuels, like coal and oil.
- The following policy actions by Congress would help reduce methane emissions as cost-effectively and quickly as possible:
    - Expand applied technology research programs at the U.S. Department of Energy (DOE) to help reduce the cost of leak-detection and emissions measurement technologies, and to develop new and lower-cost emission reduction strategies.

[5] See: "Can the U.S. Get There from Here? Using Existing Federal Laws and State Actions to Reduce Greenhouse Gas Emissions," available at: http://www.wri.org/publication/can-us-get-there-from-here.

  - Update emissions factors for natural gas systems using robust measurement protocols, public reporting by industry, and independent verification.
  - Authorize and appropriate funding for the organization STRONGER (State Review of Oil and Natural Gas Environmental Regulations) to help states with timely development and evaluation of their environmental regulations.
  - Support voluntary programs at EPA, including Natural Gas STAR and other programs which recognize companies that demonstrate a commitment to best practices.
  - Support EPA's efforts to provide technical and regulatory assistance to states with expanding oil and natural gas development, including through the Ozone Advance Program.
- Broader action on policies supporting clean energy and addressing climate change should also be on the table. A clean energy standard or putting a price on carbon would provide clear signals to energy markets that energy providers and users need to recognize the environmental and social costs as well as the direct economic costs of energy resources.

Finally, every day that we take no policy action on climate change, we make the policy choice to let climate change run its course. This ignores the overwhelming consensus of climate scientists who have been warning for decades that rising GHG emissions will cause the planet to warm, sea levels to rise, and weather to become more extreme. It is indisputable that these climate changes are happening today, in many cases much more quickly than expected. Action is urgently needed.

LNG Exports, the Public Interest, and Climate Change

When reviewing grant applications for LNG export authorizations, DOE is required to determine if proposed exports "will not be consistent with the public interest." In making this finding, DOE is considering a range of factors, including economic, energy security, and environmental impacts.[6] The climate change implications of LNG exports touches on each of these factors and therefore deserves more careful consideration by Congress and DOE.

The January 2012 study by EIA included a useful but limited assessment of the climate change implications of LNG exports, while the NERA Economic Consulting report (December 2012) was more narrowly focused on macroeconomic considerations.[7] This testimony focuses particular attention to how LNG exports – and increased production of natural gas more broadly – could affect domestic and international GHG emissions, which is clearly a question of relevance to the public interest.

There is no doubt that our climate is already changing in ways that are increasingly risky, difficult to manage, and harmful to public health and the environment.[8] Recent science assessments – including by the U.S. National Academy of Sciences and the U.S. Global Change Research Program[9] – agree that GHG emissions are very likely causing higher global temperatures, rising sea levels, and more frequent extreme weather events. National science

[6] See: http://www.fossil.energy.gov/programs/gasregulation/LNGStudy.html
[7] Both reports are available here: http://www.fossil.energy.gov/programs/gasregulation/LNGStudy.html
[8] National Academies, Committee on Climate Choices, Final Report, 2011. http://dels.nas.edu/Report/America-Climate-Choices-2011/12781
[9] http://ncadac.globalchange.gov/download/NCAJan11-2013-publicreviewdraft-fulldraft.pdf

academies from over a dozen countries, including the U.S., have expressly urged governments to take urgent action to curb these harmful emissions.[10]

The current U.S. commitment to the international community is to reduce GHG emissions below 2005 levels by 17 percent in 2020 and 83 percent in 2050.[11] While a shift in electric generation to natural gas from coal has played a significant role in recent reductions in U.S. carbon dioxide emissions, this market-driven trend in the power sector has reversed somewhat in recent months, as natural gas prices have been increasing.[12] Furthermore, GHG emissions from all major sources will need to be addressed for the U.S. to help achieve climate stabilization at 2° Celsius, which the international community has agreed to be an appropriate and relatively safe target. A recent report by the World Bank[13] found that the world is on track for at least a 4° Celsius increase in global temperatures, which would be extremely damaging to global development goals and be "marked by extreme heat-waves, declining global food stocks, loss of ecosystems and biodiversity, and life-threatening sea level rise." However, the World Bank also concluded that there is still time to enact policies that would help avoid this outcome.

[10] G8+5 Academies' joint statement: Climate change and the transformation of energy technologies for a low carbon future. http://www.nationalacademies.org/includes/G8+5energy-climate09.pdf
[11] See: http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/unitedstatescphaccord_app.1.pdf
[12] See: http://insights.wri.org/news/2013/03/new-data-reveals-rising-coal-use
[13] See: http://climatechange.worldbank.org/content/climate-change-report-warns-dramatically-warmer-world-century

Concerns about the environmental impacts of shale gas development

Natural gas production in the United States has increased rapidly in recent years, growing by 23 percent from 2007 to 2012.[14] This development has significantly changed projections of the future energy mix in the U.S. The shale gas phenomenon has also helped reduce energy prices, directly and indirectly supporting growth for many sectors of the U.S. economy, including manufacturing. The EIA projects that the United States will begin exporting LNG within 5 years and that the country will be a net natural gas exporter by the year 2020.[15]

Shale gas development has also triggered divisive debates over the near- and long-term environmental implications of developing and using these resources, including concerns about water resources, air quality, and land and community impacts.[16] Like all forms of energy, including conventional natural gas, there are public health and environmental risks associated with shale gas development. Chief among public concerns are drinking water contamination resulting from improper wastewater management, chemical spills, and underground methane migration into groundwater. There are also concerns regarding air emissions, and land-related impacts including habitat fragmentation and soil erosion. Other common concerns involve community impacts related to industrial development and extensive truck traffic. In 2011, the Secretary of Energy Advisory Board's Natural Gas Subcommittee warned[17] that "disciplined attention must be devoted to reducing the environmental impact" of shale gas development in the

[14] See: http://www.eia.gov/forecasts/aeo/index.cfm
[15] ibid
[16] For more detailed discussions of the broader environmental impacts of natural gas development, see: http://www.gao.gov/products/GAO-12-732; and http://www.rff.org/Documents/RFF-Rpt-PathwaystoDialogue_FullReport.pdf
[17] http://www.shalegas.energy.gov/resources/111811_final_report.pdf

face of its expected continued rapid growth, with as many as 100,000 more wells expected over the next few decades.

Of particular concern are the air emissions and climate change implications of shale gas development, including fugitive methane emissions, which reduce the net climate benefits of using lower-carbon natural gas as a substitute for coal and oil for electricity generation and transportation, respectively. Other air emissions from the natural gas sector include CO_2, volatile organic compounds (VOCs, which are chemicals that contribute to ground-level ozone and smog), and hazardous air pollutants (HAPs). In 2012, EPA finalized air pollution standards for VOCs and HAPs from the oil and natural gas sector. These rules will improve air quality and have the co-benefit of reducing methane emissions. As discussed below (see p. 18, "Progress is Being Made but There is More Work to Be Done"), these standards should be complemented by additional actions to further reduce methane emissions, which will help slow the rate of global temperature rise in the coming decades.

From the standpoint of CO_2 emissions, shale gas development and lower natural gas prices have contributed to recent emissions reductions in the U.S. However, GHG emissions are projected to rise, and market forces and voluntary actions alone will not enable an effective response to climate change. Thus broad policy action will be needed. For example, analysis by the International Energy Agency (IEA)[18] found that a significant global increase in use of natural gas over the coming decades could have some net climate benefits compared to scenarios in which oil and coal play more prominent roles. However, the IEA's "Golden Rules Case" scenario

[18] International Energy Agency, "Golden Rules for a Golden Age of Gas." Available at: http://www.worldenergyoutlook.org/media/weowebsite/2012/goldenrules/weo2012_goldenrulesreport.pdf

would result in CO_2 concentrations in the atmosphere of 650 parts per million (ppm) and a global temperature rise of 3.5° Celsius, almost twice the internationally accepted 2° Celsius target. Economic modeling conducted by researchers at MIT[19] and Resources for the Future[20] have also found that while greater use of natural gas may offer some climate benefits, climate and energy policies will be needed to reduce CO_2 emissions by anywhere near our 83 percent target by mid-century. While natural gas will likely play an essential bridging role in this transition, this will require both reducing the upstream GHGs produced during the extraction process, and — if gas-fired power plants are to be a part of a longer-term energy future — using carbon capture and storage (CCS) technology.

Why Focus on Methane Emissions?

Though methane accounted for only 10 percent of the U.S. greenhouse gas emissions inventory in 2010 (Figure 1),[21] it represents one of the most important opportunities for reducing GHG emissions in the U.S.[22] In addition to the scale and cost-effectiveness of the reduction opportunities, climate research scientists have concluded that cutting methane emissions in the near term could slow the rate of global temperature rise over the next several decades.[23]

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[19] See: http://globalchange.mit.edu/research/publications/2229

[20] See: http://www.rff.org/RFF/Documents/RFF-IB-09-11.pdf

[21] Note: all GHG inventory numbers referred to in this testimony were adjusted to reflect a more current global warming potential (GWP) for methane of 25 (IPCC 2007). This is necessary because when EPA converts methane to carbon dioxide equivalents they use an out-of-date GWP for methane of 21 (IPCC 1995), for the sake of consistency with UNFCCC reporting guidelines.

[22] See: "Can the U.S. Get There from Here? Using Existing Federal Laws and State Actions to Reduce Greenhouse Gas Emissions," available at: http://www.wri.org/publication/can-us-get-there-from-here.

[23] National Research Council, 2011. "Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia," ISBN: 0-309-15177-5, 298 pages. http://www.nap.edu/catalog/12877.html

Rising methane concentrations in the atmosphere have a potent, near-term warming effect because this greenhouse gas has a relatively high global warming potential and short atmospheric lifetime (IPCC 2007). Global warming potential (GWP) is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide. Key factors affecting the GWP of any given gas include its average atmospheric lifetime and the ability of that molecule to trap heat. By mass, the same amount of methane emissions is 25 times more potent than carbon dioxide emissions over a 100-year time horizon (IPCC 2007). In the 20-year time frame, studies estimate that methane's GWP is at least 72 times greater than that of carbon dioxide.

Scientists at the National Research Council of the U.S. National Academy of Sciences have concluded that global CO_2 emissions need to be reduced in the coming decades by at least 80 percent to stabilize atmospheric CO_2 concentrations and thereby avoid the worst impacts of global climate change.[24] However, given the slow pace of progress in the U.S. in this regard, it is valuable and important for policymakers to consider cost-effective mitigation strategies – such as cutting methane emissions – that would have a disproportionate short-term impact.

How Emissions-Intensive is U.S. Natural Gas?

EPA estimates that total emissions from the development, transmission, and use of natural gas in the U.S. made up roughly a quarter of the total U.S. GHG inventory in 2011.[25] While natural gas emits about half as much carbon dioxide as coal at the point of combustion, the picture is more

[24] Ibid.
[25] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011 (April 2013). http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

complicated from a life cycle perspective. Three percent of the U.S. inventory is the result of fugitive methane emissions from natural gas systems[26] – i.e., natural gas lost to the atmosphere through venting and systemic leaks, prior to the point of combustion. To put this in perspective, in 2011, these methane leaks resulted in more GHG emissions[27] than all of the direct and indirect GHG emissions from U.S. iron and steel, cement, and aluminum manufacturing combined.[28]

EPA's 2013 GHG inventory implies a methane leakage rate of less than 2 percent of total natural gas production. Meanwhile, recent research[29] has shown that at less than a 3 percent leakage rate, natural gas produces fewer GHG emissions than coal over any time horizon. Additionally, reducing the methane leakage rate to below 1 percent would ensure that heavy-duty vehicles fueled by natural gas, like buses and long-haul trucks, would provide an immediate climate benefit over similar vehicles fueled by diesel. Thus, reducing total methane leakage to less than 1 percent of natural gas production is a sensible performance standard for the sector; an achievable benchmark that has not yet been reached.

Accurate estimates of the total leakage rate from the natural gas sector require reliable data for a broad range of industry activities and emissions factors associated with those activities. While EPA has recently updated industry activity data, most of the emissions factors rely on assumed emissions factors – as opposed to direct measurements, which are generally rare and often

[26] The GHG inventory estimates 6.9 million metric tons of fugitive methane from natural gas systems in 2011.
[27] This estimate is based on an assumed global warming potential for methane of 25, which is the convention when considering the climate implications of methane compared to carbon dioxide, integrated over a 100-year time frame (IPCC, 2007).
[28] See: http://www.energetics.com/resourcecenter/products/roadmaps/Pages/USManufacturingEnergyUseandGreenhouseGasEmissionsAnalysis.aspx
[29] See: http:// www.pnas.org/content/109/17/6435

outdated. Some recently published research suggests that emissions levels may be higher than EPA estimates; this, coupled with high ground-level ozone levels in Colorado and Texas and rural parts of Utah and Wyoming (i.e., smog that is attributed to shale gas production activities), suggests that the emissions problem may be worse than we think, and certainly subject to regional variations.[30]

With hundreds of thousands of wells and thousands of natural gas producers operating in the U.S., the data quality issue will likely remain an active debate, even as forthcoming data from EPA and other sources in the coming months aims to clarify these questions.[31] In its November 2011 final report, the Secretary of Energy Advisory Board recommended that natural gas companies measure and disclose air emissions from shale wells.[32] Indeed, what remains lacking is a valid system for direct measurement and independent verification of emissions data reported by this sector.[33]

Nevertheless, while uncertainties remain regarding exact methane leakage rates, the weight of evidence suggests that significant leakage occurs during every life cycle stage of U.S. natural gas systems and much more can be done to reduce these emissions cost-effectively. A recent expert

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[30] Recent research based on field measurements of ambient air near natural gas well-fields in Colorado and Utah suggest that more than 4 percent of well production may be leaking into the atmosphere at some production-stage operations. For more discussion of questions regarding the quality and availability of methane emissions data, see Appendix 3 of "Clearing the Air," here: http://www.wri.org/publication/clearing-the-air.

[31] For example, independent researchers at the University of Texas at Austin are teaming up with the Environmental Defense Fund and several industry partners to directly measure methane emissions from several key sources. When results are published in 2013 and 2014, these data will provide valuable points of reference to help inform this important discussion.

[32] See: http://www.shalegas.energy.gov/

[33] Such systems and protocols have been developed for tracking emissions from other sources. For example, see: http://www.epa.gov/etv/vt-ams.html

survey by Resources for the Future[34] identified methane emissions as a "consensus environmental risk" that should be addressed through government and industry actions.

How Will LNG Exports Affect Greenhouse Gas Emissions?

To the extent that it is displacing higher-carbon fuels such as coal and oil, natural gas has the potential to help reduce total greenhouse gas emissions. This is particularly true as long as upstream emissions associated with natural gas are minimized and ideally methane leakage is kept below 1 percent of total production, as discussed above.

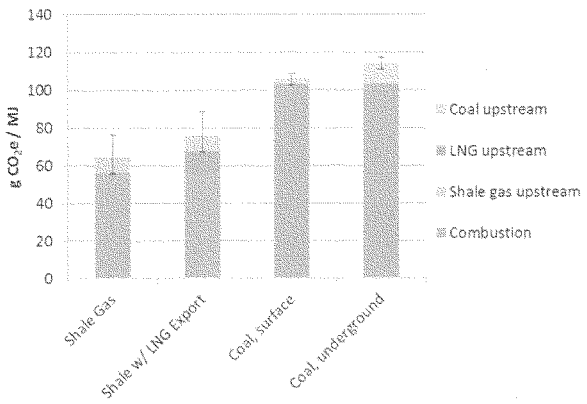
That said, the potential for LNG exports raises three primary concerns from a climate perspective.

1) The first area of concern involves upstream GHG emissions associated with increased onshore natural gas production. EIA projects that LNG exports would result in increased domestic production of natural gas, with roughly three quarters of this from shale sources. As shown in Figure 1, there are significant upstream GHG emissions (both CO_2 and methane) associated with shale gas production in the U.S. Given continued uncertainty around the actual level of methane emissions over the lifetime of both conventional and unconventional gas wells,[35] this projected market response could result in substantially higher levels of GHG emissions from throughout U.S. natural gas systems. The good news is that there are many ways to cost-effectively reduce upstream methane emissions; we encourage government and industry to do more to realize this

[34] See: http://www.rff.org/Documents/RFF-Rpt-PathwaystoDialogue_FullReport.pdf
[35] Most studies estimate that upstream GHG emissions from conventional and unconventional gas sources are roughly comparable, within the margin of error.

opportunity (see p. 20 below, "Further Potential to Reduce Fugitive Methane Emissions").

Figure 1: Estimated Life Cycle Greenhouse Gas Emissions from U.S. Shale Gas, LNG Exports, and Coal



Sources: Bradbury et al. 2013; Weber and Clavin, 2012; NETL, 2012; Burnham et al. 2011

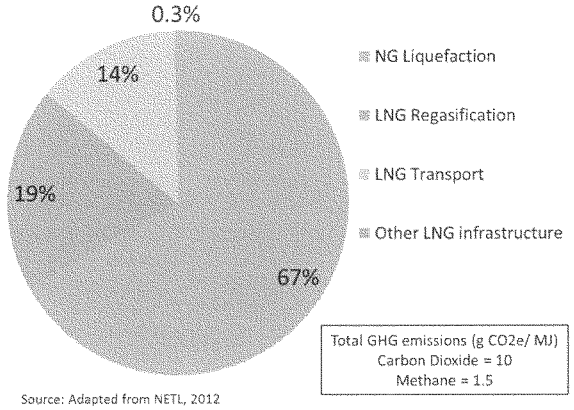
2) The second area of concern is with respect to the liquefaction, transport, and regasification of LNG exports. According to a 2012 Natural Gas Technology Assessment by the National Energy Technology Lab (NETL),[36] these energy- and emissions-intensive processes would add roughly 15 percent[37] to total life cycle GHG emissions associated with U.S. onshore natural gas production (see Figure 1, above, "LNG upstream"). These added upstream emissions significantly reduce the relative advantage that natural gas

[36] NETL (National Energy Technology Laboratory). 2012. Role of Alternative Energy Sources: Natural Gas Technology Assessment. National Energy Technology Laboratory, U.S. Department of Energy. Available at: http://www.netl.doe.gov/energy-analyses/refshelf/PubDetails.aspx?Action=View&PubId=435

[37] Based on data provided in Appendix B of the NETL (2012) report, we calculate 11.5 grams of CO_2 equivalent per megajoule (g CO2e/MJ) of natural gas exported, which we added to estimated life cycle emissions associated with shale gas production, after the recent EPA rule takes effect (8.25 g CO2e/MJ), and typical estimate of final combustion of natural gas (56 g CO2e/MJ).

would have over higher-emitting fuels like coal.[38] The chart below illustrates the relative contributions of each process to total GHGs associated with LNG exports; liquefaction is the most emissions-intensive process, followed by regasification and transport. It is also worth noting that natural gas liquefaction emissions would occur at domestic LNG terminals, adding to total U.S. GHG emissions.

Figure 2: Life Cycle GHG Emissions from LNG Terminals, Transport, and Infrastructure



3) The third area of concern is the indirect domestic and international energy market implications of U.S. LNG exports. EIA's 2012 report to DOE found that LNG exports would raise domestic prices for natural gas, making natural gas relatively less competitive compared to other energy sources in the U.S., resulting in greater use of coal

[38] Note that the data presented in Figure 1 show life cycle emissions estimates for the domestic production of natural gas and coal, with upstream LNG numbers assuming LNG exported from Trinidad and Tobago and imported in Louisiana. Ideally, this figure would offer a direct comparison between life cycle emissions from domestic shale gas production and export versus coal or fuel oil in the country of import. However, such data are not readily available at this time.

and higher levels of GHG emissions under all LNG export scenarios.[39] The global GHG implications of LNG exports from the U.S. is harder to assess, but the basic picture is that more gas would be sold into international markets, which would help reduce carbon dioxide emissions as long as it displaced higher-carbon fuel sources. Given the extensive scale of planned coal-fired power plants around the world[40] and accounting for the prevalence of energy-efficient technologies available for natural gas combustion,[41] this is a reasonable assumption. On the other hand, a greater abundance of lower-priced natural gas in global energy markets (supported by U.S. LNG exports) is also expected to increase total energy use and displace some lower-carbon renewable and nuclear energy sources, which will increase GHG emissions in markets where lower-carbon technologies have become relatively cost-effective. Taking all of these factors into consideration, IEA projections[42, 43] find that greater supplies of natural gas would lead to net annual reductions in global CO_2 emissions of 0.5 percent by 2035.[44] The report concludes that "while a greater role for natural gas in the global energy mix does bring environmental benefits where it substitutes for other fossil fuels, natural gas cannot on its own provide the answer to the challenge of climate change."

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[39] The EIA estimates increases in U.S. CO_2 emissions between 9 and 75 MMt per year, from 2015 to 2035.
[40] See: http://www.wri.org/publication/global-coal-risk-assessment
[41] See: http://www.c2es.org/technology/factsheet/natural-gas
[42] See: http://www.worldenergyoutlook.org/goldenageofgas/
[43] See: http://www.worldenergyoutlook.org/media/weowebsite/2011/WEO2011_GoldenAgeofGasReport.pdf
[44] In their 2011 special report on natural gas, the IEA estimated that the GAS Scenario would lead to 35.3 gigatonnes (Gt) energy-related CO_2 emissions in 2035, with annual reduction of 160 million metric tons (MMt), in that year (compared to their "New Policies Scenario"). In their 2012 special report, the IEA reached a similar conclusion, estimating 184 MMt of annual reductions in global energy-related CO_2 emissions in 2035 with their "Golden Rules Case" (compared to a baseline), with global emissions rising to 36.8 gigatonnes (Gt) in the same year.

In summary, available evidence suggests that LNG exports from the U.S. would marginally reduce global CO_2 emissions, although the scale of these estimated GHG emissions savings is an order of magnitude lower than the total projected levels of global methane emissions from natural gas and oil systems.[45] Meanwhile, it appears very likely that LNG exports from U.S. terminals would result in increased domestic GHG emissions from both upstream and downstream sources.

These expected outcomes should raise the bar for policymakers and industry to more actively work to achieve continuous improvement in GHG emissions from all life cycle stages of natural gas development and use. Our research shows that reducing fugitive methane can be highly cost-effective – beneficial to customers and companies alike – and it is necessary if natural gas and LNG exports are to be part of the solution to our climate change problem, both in the U.S. and internationally.

Progress is Being Made but There is More Work to Be Done

Now for the good news. Increased attention to the air emissions issue has resulted in significant recent progress toward reducing air pollution from natural gas systems.

In April 2012 EPA finalized regulations for New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAP) that primarily target

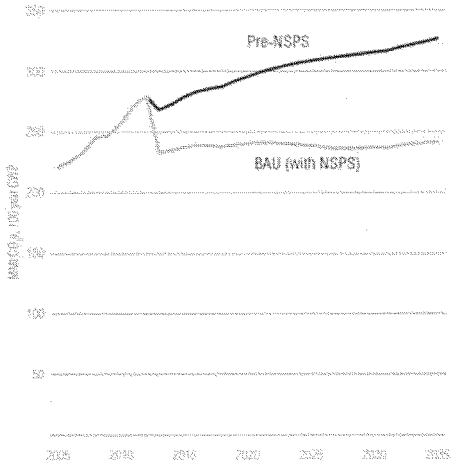
[45] By way of comparison, the EPA estimates that global annual fugitive methane emissions from natural gas and oil systems in 2030 will exceed 2,500 MMT carbon dioxide equivalent (CO_2e), assuming a GWP of 25, over a 100 year time frame (see: http://www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html). The U.S. GHG inventory estimates that fugitive methane emissions from U.S. natural gas systems in 2011 were just over 170 MMT CO2e.

VOCs and air toxics emissions but will have the co-benefit of reducing methane emissions. The new EPA rules require "green completions," which reduce emissions during the flow-back stage of all hydraulic fracturing operations at new and re-stimulated natural gas wells. The rules will also reduce leakage rates for compressors, controllers, and storage tanks.

EPA should be applauded for establishing these public health protections. Minimum federal standards for environmental performance are a necessary and appropriate framework for addressing cross-boundary pollution issues like air emissions. Federal Clean Air Act regulations are generally developed in close consultation with industry and state regulators and are often implemented by states. This framework allows adequate flexibility to enable state policy leadership and continuous improvement in environmental protection over time.

In our recent working paper, WRI estimated that these new rules will reduce methane emissions enough to cut all upstream GHG emissions from natural gas systems (including shale gas) by 13 percent in 2015 and 25 percent by 2035. As can be seen in Figure 3 below, the NSPS/NESHAP rules will make a big difference by helping to avoid a rise in upstream GHG emissions that would otherwise be likely given the projected growth in domestic natural gas production. The figure also shows that upstream carbon dioxide and methane emissions will remain a significant problem without further action.

Figure 3: Upstream GHG Emissions from All Natural Gas Systems, 2006 to 2035



Notes: Upstream GHG emissions before and after application of the EPA NSPS rule, for all natural gas systems
Source: Bradbury et al., 2013 (WRI)

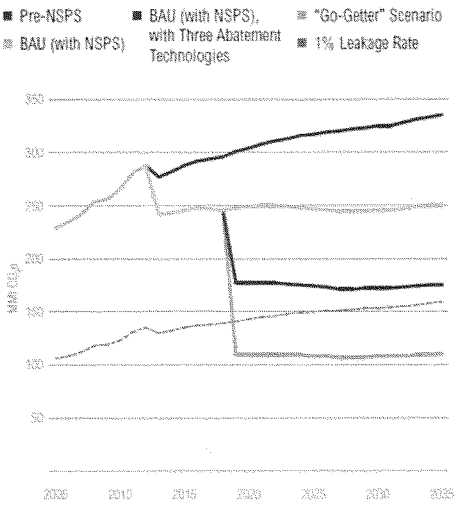
Further Potential to Reduce Fugitive Methane Emissions

WRI estimates that by implementing just three technologies that capture or avoid fugitive methane emissions, upstream methane emissions across all natural gas systems could be cost-effectively cut by up to an additional 30 percent (see Figure 4, below). The technologies include (a) fugitive methane leak monitoring and repair at new and existing well sites, processing plants, and compressor stations; (b) replacing existing high-bleed pneumatic devices with low-bleed equivalents throughout natural gas systems; and (c) use of plunger lift systems[46] at new and existing wells during liquids unloading operations. By our estimation, these three steps would

[46] Note: new data from the most recent EPA emissions inventory suggests that these technologies are much more widely used than previously thought. See: http://insights.wri.org/news/2013/05/5-reasons-why-its-still-important-reduce-fugitive-methane-emissions

bring down the total life cycle leakage rate across all natural gas systems to just above 1 percent of total production. Through adoption of five additional abatement measures that each address smaller emissions sources (i.e., a "Go-Getter" Scenario), the 1 percent goal would be readily achieved. All eight of these technologies could be implemented cost-effectively with payback periods of three years or less.

Figure 4: Upstream GHG Emissions from All Natural Gas Systems; with Additional Abatement Scenarios



Source: Bradbury et al., 2013

Policy Recommendations

New public policies will be needed to reduce methane emissions from both new and existing equipment throughout U.S. natural gas systems. WRI research has found that market conditions alone are not sufficient to compel industry to adequately or quickly adopt available best

practices. To the members of this committee, I recommend the following actions to help EPA and states cost-effectively reduce air emissions from natural gas systems.

Expand applied technology research. Efforts to reduce upstream GHG emissions from natural gas systems could be aided by applied technology research at DOE. Such research should be expanded, with a focus on advancement of technologies to reduce the cost of leak detection, improve emissions measurements, and develop new and lower-cost methane emission reduction strategies.

Update emissions factors for key processes. To help resolve questions regarding the scale of methane emissions from U.S. natural gas infrastructure and operations – and to inform critical domestic and international climate and energy policy decisions – the oil and gas sector should be required to directly measure and report their emissions, with results subject to independent verification and public disclosure.

Assist with environmental regulations. With more funding, the organization STRONGER (State Review of Oil and Natural Gas Environmental Regulations) could provide more states with timely assistance in developing and evaluating environmental regulations, including (but not limited to) those designed to reduce air pollution.

Support best practices. With more funding, EPA could do more through Natural Gas STAR and other programs to recognize companies that demonstrate a commitment to best practices. This program could further encourage voluntary industry actions by maintaining a clearinghouse for

technologies and practices that reduce all types of air emissions from the oil and natural gas sector.[47]

Provide technical and regulatory assistance. Recognizing the central role of state governments in achieving federal National Ambient Air Quality Standards, with more funding EPA could provide targeted technical and regulatory assistance to states with expanding oil and natural gas development. One example of a successful model that could be expanded is EPA's Ozone Advance Program. States concerned about smog and other air quality problems associated with oil and gas development voluntarily engage with this program, resulting in the co-benefit of reduced methane emissions.

Reduce carbon dioxide emissions. Broader action is also needed on policies supporting clean energy and addressing climate change. A clean energy standard or putting a price on carbon would provide clear signals to energy markets that energy providers and users need to recognize the environmental and social costs as well as the direct economic costs of energy resources.

Conclusions

Some advocate for a free-market approach to managing energy production, transmission, and use. While I agree with the general virtues of free markets, I would also caution that there is no free lunch. The National Research Council has identified very significant costs associated with

[47] An example of one existing clearinghouse can be found here: http://cfpub.epa.gov/RBLC/

fossil energy use that are hidden to most U.S. consumers.[48] Society pays when our health-care premiums rise due to harmful health effects caused by high ozone levels and other air pollution; taxpayers pick up the tab for climate change when the frequency and intensity of extreme weather events causes increasing damage to our communities and critical infrastructure.

Others highlight the energy and national security benefits of natural gas exports, which may reduce the political and economic influence of countries that do not share common interests with the U.S. and our allies. While such geopolitical benefits may be realized, LNG exports will do little to help avoid dangerous levels of climate change. We could also improve our geopolitical standing by demonstrating leadership in achieving greenhouse gas emissions reductions, much of which can be accomplished cost-effectively and with net benefits to the economy – starting with the policy actions recommended above. Meanwhile, the more we invest in fossil energy resources and infrastructure while delaying policy actions to significantly reduce GHG pollution, the more we expose ourselves and our allies to the destabilizing effects of climate change. In its 2010 Quadrennial Defense Review, the Department of Defense found that "climate change could have significant geopolitical impacts around the world." The same report concludes that climate change could further weaken fragile governments and contribute to food scarcity, spread of disease, and mass migration. Meanwhile, 30 military installations already face elevated risk from sea-level rise.

[48] NRC (National Research Council). 2010."Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use." Washington, DC: The National Academies Press. Available at: http://www.nap.edu/catalog.php?record_id=12794.

Every day that we take no policy action on climate change, we make the policy choice to let climate change run its course. This ignores the overwhelming consensus of climate scientists who have been warning for decades that rising GHG emissions will cause the planet to warm, sea levels to rise, and weather to become more extreme. It is indisputable that these climate changes are happening today, and in many cases much more quickly than expected. Action is urgently needed.

Mr. WHITFIELD. Mr. Breen, you are recognized for 5 minutes.

STATEMENT OF MICHAEL BREEN

Mr. BREEN. Thank you, Mr. Chairman, Ranking Member Rush, members of the Committee. Thank you for inviting me here today to appear before the committee to discuss the geopolitical and strategic implications of rising U.S. energy production, oil in particular. I serve as the executive director of the Truman National Security Project and Center for National Policy, two organizations dedicated to forging strong, smart, and principled national security policy for America.

As a former Army captain and an Iraq and Afghanistan combat veteran, I am also proud to be one of the leaders of Operation Free. That is a nonpartisan nationwide coalition of more than 5,000 veterans who belive that our dependence on oil poses a clear national security threat to the United States.

To be clear, oil is immensely important to our economy and will remain so for the foreseeable future. Its value goes far beyond its utility as a liquid fuel. Petroleum is a key input in advanced manufacturing, pharmaceuticals, agricultural products, and a host of other applications. Unfortunately, however, a near total dependence on oil as a fuel has eclipsed petroleum's other contributions, which threatens our prosperity and our security.

Our dependence on oil as a single source of transportation fuel poses a clear national security threat. As things now stand, our modern military cannot operate without vast access to vast quantities of it. Our economy is equally dependent. More than 93 percent of our transportation sector is reliant on oil.

Today oil is a vital strategic commodity, a substance without which our national security and prosperity cannot be sustained. Until and unless we develop alternatives, the United States has no choice but to do whatever it takes in order to obtain a sufficient supply of oil. Oil is a fungible product, traded globally, with prices set on a world market. In other words, global supply and global demand set the market and drive the price, not American supply and American demand alone. When it comes to the price at the pump there is no such thing as foreign oil.

Recent technological advancements, such as horizontal drilling and advanced hydraulic fracturing, are promising. They offer the chance to increase domestic production, allowing us to reach supplies of oil that were until recently too expensive or impossible to obtain. These advances have led some to claim that the United States is suddenly capable of producing enough oil domestically to meet our needs. They believe that this will solve our oil-related economic and national security problems.

Yet, even if U.S. oil imports dropped dramatically, geostrategic problems would persist. And though we do not always share the same oil sources as our international partners, our security is put at risk by their volatility. For instance, in December 2011, Iran threatened to close the Strait of Hormuz, a waterway that ships one-fifth of the world's supply of oil. This resulted in global oil prices jumping 2 percent, exceeding $100 a barrel. Words alone were able to drive up the cost of oil in markets from the Gulf to Asia.

Meanwhile, global demand for oil is rising at a breathtaking pace, with no sign of slowing down in the foreseeable future. While American demand has been very high but relatively static for some time, demand in China, India, and the developing world is skyrocketing. According to the Energy Information Administration, America's oil consumption is expected to grow by 11 percent over the next 2 decades. Meanwhile, in that same timespan, China's oil consumption is expected to grow by 80 percent and India's by 96 percent. And by the end of the decade, China alone is expected to sell more than 30 million cars a year. To put that in perspective, last year about 76 million cars were sold worldwide.

It is unrealistic at best to imagine that increasing production can somehow keep up with such dramatically rising demand. Further, because the price of oil is set on a global market, it is subject to events outside of our control or influence. All of us agree, I am sure, that the United States should not be subjected to the whim of hostile or unstable regimes with nationalized oil assets.

The U.S. Currently controls and secures the world's most critical shipping routes. Some contend that, producing more at home, we could relinquish many of those responsibilities. Indeed, a recent RAND study estimated that if the military were to stop defending oil supplies and sea routes from the Persian Gulf to the United States, it would save between 12 and 15 percent of the entire defense budget, more than $90 billion annually.

But imagine if we did disengage from this duty. A number of our adversaries would recognize this is an opportunity and our allies would be faced with serious challenges. Look, for instance, at the Asia-Pacific market. Eighty-five percent of the oil shipped through the Straits of Hormuz today, which supplies one-fifth of all oil traded worldwide, goes toward Asia, not the United States. The oil then transits the Indian Ocean and enters the North Pacific through the Straits of Malacca, a razor-thin chokepoint constantly under threat. According to EIA, if the strait was blocked, nearly half of the world's shipping fleet would be required to reroute. Hostile actors have taken notice. According to documents seized during the raid that killed Osama Bin Laden, Al Qaeda was planning to hijack and destroy oil tankers in the straits.

But more than the security of oil flows is at stake. We have to consider the effect that would occur if the United States pulled out of the Pacific and pulled out of the Indian Ocean and who might step in. China would certainly be willing; few others would be capable of doing so.

So it should be no surprise that our military is leading the world in developing next generation energy technologies. Our single-source dependence on oil threatens our national security. Even dramatic increases in domestic oil production will not free us from the global dynamics of the market or relieve us of our global responsibilities.

Fortunately, more advanced energy technologies are available and increasingly viable. We must support their development and continue to lead the world through innovation. Thank you.

Mr. WHITFIELD. Thank you.

[The prepared statement of Mr. Breen follows:]

Testimony of Mike Breen

Executive Director
Truman National Security Project &
Center for National Policy

House Energy & Commerce Committee
Subcommittee on Energy & Power
May 7, 2013

Mr. Chairman, Ranking Member Rush, members of the Committee, ladies and gentlemen: thank you for inviting me to appear before this Committee today to discuss the geopolitical and strategic implications of rising U.S. energy production.

I serve as the Executive Director of the Truman National Security Project and Center for National Policy, two organizations dedicated to forging strong, smart and principled national security policy for America. As a former Army Captain and an Iraq & Afghanistan combat veteran, I am also proud to be one of the leaders of Operation Free. It is a non-partisan, nationwide coalition of more than five thousand veterans who believe that our dependence on oil poses a clear national security threat to the United States.

To be clear, oil is immensely important to our economy and will remain so for the foreseeable future. Its value goes far beyond its utility as a liquid fuel. Petroleum is a key input in advanced manufacturing, pharmaceuticals, agricultural products, and a host of other applications. Unfortunately, however, our near-total dependence on oil as a fuel has eclipsed petroleum's other contributions, threatening our prosperity and security.

Our dependence on oil as a single source of transportation fuel poses a clear national security threat. As things now stand, our modern military cannot operate without access to vast quantities of it. Our economy is equally dependent, with more than 93% of our transportation sector reliant on oil.[1] Today, oil is a vital strategic commodity, a substance without which our national security and prosperity cannot be sustained. Until and unless we develop alternatives, the United States has no choice but to do whatever it takes in order to obtain a sufficient supply of oil.

Oil is a fungible product, traded globally, with prices set on a world market. In other words, global supply and global demand set the market and drive the price – not American supply and American demand alone.[2] When it comes to the price at the pump, there's no such thing as foreign oil.

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Yet, even if U.S. oil imports dropped dramatically, geostrategic problems would persist. And though we do not always share the same oil sources as our international partners, our security is put at risk by their volatility. For instance, in December 2011, Iran threatened to close the Strait of Hormuz, a waterway that ships one-fifth of the world's supply of oil. This resulted in global oil prices jumping two

percent, exceeding one hundred dollars a barrel.[3] Words alone were able to drive up the cost of oil in markets from the Gulf to Asia.

Meanwhile, global demand for oil is rising at a breathtaking pace, with no sign of slowing down in the foreseeable future. While American demand has been very high but relatively static for some time, demand in China, India and the developing world is skyrocketing. According to the Energy Information Administration, America's oil consumption is expected to grow by 11% over the next two decades.[4] Meanwhile, in that same timespan, China's oil consumption is expected to grow by 80%, and India's by 96%.[5] And by the end of the decade, China alone is expected to sell more than 30 million cars per year.[6] To put that in perspective, last year about 76 million cars were sold worldwide.[7] It is unrealistic at best to imagine that increasing production can somehow keep up with such dramatically rising demand.

Further, because the price of oil is set on a global market, it is subject to events outside of our control or influence. All of us agree, I'm sure, that the United States should not be subjected to the whim of hostile or unstable regimes with nationalized oil assets.

The U.S. currently patrols and secures the world's most critical shipping routes. Some contend that, by producing more at home, we could relinquish many of those responsibilities. Indeed, a recent RAND study estimated that if the military were to stop defending oil supplies and sea routes from the Persian Gulf to the US, it would save between 12 and 15 percent of the entire defense budget – more than $90 billion dollars annually.[8]

But imagine if we did disengage from this duty. A number of our adversaries would recognize this as an opportunity, and our allies would be faced with serious challenges. Look, for instance, at the Asia-Pacific market. 85% of the oil shipped through the Strait of Hormuz today—which supplies one-fifth of all oil traded worldwide—goes toward Asia, not the United States.[9] The oil then transits the Indian Ocean and enters the North Pacific through the Strait of Malacca, a razor-thin chokepoint constantly under threat of piracy, terrorist activity and hijacking. According to the EIA, if the Strait of Malacca was blocked, nearly half of the world's shipping fleet would be required to reroute.[10] Hostile actors have taken notice. According to documents seized during the raid that killed Osama bin Laden, al Qaeda was planning to highjack and destroy oil tankers in the Straits.[11] The documents called for Al Qaeda operatives to practice running tankers aground in shipping chokepoints, severely disrupting global commerce.

But more than the security of oil flows is at stake. The Strait, together with the surrounding South China Sea, is at the center of a complex dispute between China and a number of smaller Asian nations.

Appropriately, the U.S. has taken a strong interest in this dispute, working to prevent China from bullying its smaller neighbors and putting freedom of navigation at risk. Indeed, in 2011, China and Vietnam came dangerously close to open conflict in the South China Sea. If the U.S. pulls out of the Pacific and Indian Ocean, who will step in to fill the void? China, of course, would likely be more than willing. Few others would be capable. India could develop into a true naval power given time, but has so far shown great reluctance to step forward as a provider of regional security. Our partners in Asia, including Japan and South Korea, would risk inflaming tensions with China if they chose to step forward to secure vital sea lanes themselves. In short, an American pull-back would tempt our rivals into even greater military activity while placing our allies at risk.

No matter how much domestic production picks up, the negative consequences of our single-source oil dependence are likely to persist. Today, the Syrian resistance movement is being gunned down with bullets supplied by Putin's oil-rich Russia. American Soldiers and Marines are confronting terrorists in Afghanistan armed with Iranian weapons, purchased with oil money. Our forward operating bases are put in danger every time a fuel convoy is attacked. In every case just mentioned, American national security is significantly threatened.

It should be no surprise that our military is leading the world in developing next generation energy technologies. The Air Force is deploying the world's largest demonstration of vehicle-to-grid technology, using a fleet of electric vehicles to lower the electricity bills of military installations. The Marines are deploying renewable energy platforms on the battlefield. And just this past Friday, at the Truman Project's annual conference, Secretary of the Navy Ray Mabus detailed the Navy's investments in new ways to power ships and aircraft. The Navy has developed advanced biofuels made from sources like algae and camelina, a seed that already grows in 49 states. Like the internet and GPS—two military developed technologies—these advancements are benefitting the American economy today.

Our single-source dependence on oil threatens our national security. Even dramatic increases in domestic oil production will not free us from the global dynamics of this market, or relieve us of our global responsibilities. Fortunately, more advanced energy technologies are available and increasingly viable. We must support their development, and continue to lead the world through innovation.

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[1] "Energy Perspectives: Industrial and transportation sectors lead energy use by sector" U.S. Energy Information Administration. http://www.eia.gov/todayinenergy/detail.cfm?id=9250

[2] "What If We Never Run Out of Oil?" The Atlantic. http://www.theatlantic.com/magazine/archive/2013/05/what-if-we-never-run-out-of-oil/309294/?single_page=true
[3] "Oil jumps over 2% as Iran threatens supplies" CNN. http://money.cnn.com/2011/12/27/markets/oil_iran/index.htm
[4] Energy Information Administration, Office of Energy Markets and End Use, "World Petroleum Consumption, Annual Estimates, 1980-2008"
[5] Ibid.
[6] "New Survey Predicts China Will Add 30 Million New Cars Each Year" CNBC. http://www.cnbc.com/id/46748270
[7] Ibid.
[8] RAND Corporation. "Imported Oil and U.S. National Security." P. 74 (2009)
[9] "World oil transit chokepoints" Energy Information Administration. http://www.eia.gov/countries/regions-topics.cfm?fips=wotc&trk=p3
[10] "World oil transit chokepoints" Energy Information Administration. http://www.eia.gov/countries/regions-topics.cfm?fips=wotc&trk=p3
[11] "Al Qaeda eyed oil tankers as terror targets" CBS News. http://www.cbsnews.com/2100-202_162-20064651.html

Mr. WHITFIELD. Mr. Halleck, you are recognized for 5 minutes.

STATEMENT OF MIKE HALLECK

Mr. HALLECK. Mr. Chairman, Ranking Member Rush, distinguished members of this committee, thank you for the privilege of appearing before you today. Congressman Johnson, thank you go for your kind introduction. My name is Mike Halleck. I am president of the Columbiana County Board of Commissioners. Columbiana County is located in eastern Ohio, bordering Pennsylvania and West Virginia. We are part of the Appalachian region. Our county is comprised of 540 square miles, with a population of about 110,000.

In the past 2 years our county in particular and surrounding counties in general has transcended into an energy-based economy from a manufacturing one. A little more than 2 years ago our county had an unemployment rate of about 16 percent; today it is about half that. Permit me to address our manufacturing base for a moment. Ohio, and especially northeast Ohio, has been a manufacturing power since the industrial revolution. While in recent decades automobiles and steel were major employers, the advancement of technology and to some extent imports have challenged their future.

However the good news is that eastern Ohio is quickly becoming an energy economy, which has enhanced our manufacturing base even more. A few examples would be V&M Steel, a French company that invested $750 million in our region to manufacture pipe for the oil fields and their pipelines. Another would be a billion-dollar cryogenics plant that separates the different gases for shipments. Just in the past week another announcement was made regarding a $300 million pipeline and gas processing plant by NiSource, a division of Columbia Gas.

To put all of this in perspective I will share with you a few of the more compelling statistics associated with this. In a few short years there have been over $7 billion invested in our area. That is about 2.5 times the total value of the real estate as if valued in our county. Over 39,000 jobs created, with projections of 143,000 by 2020; 266,000 by 2035. During 2012 the average wage for manufacturing in Ohio was $55,000, while the wages for the oil and gas industry average was $81,000. The oil and gas industry accounted for $1.5 billion in new tax revenue to the State of Ohio.

To bring a single well online takes about 410 people across 150 different professions. The average well should generate about $1 billion in revenue. A recent study by Penn State that this Marcellus Utica, quote, "play," unquote, was protected to be the largest natural gas find on Earth, second only to the border region of Qatar and Iran, not necessarily a place that we would want to stake our energy future.

Finally, yes, there are billions and soon to be trillions of cubic feet being harvested as we speak, and, yes, there could and already has been a suppression of gas prices. What do we do next? While lower prices are welcome domestically, we should not in my view make the prices so cheap through too much supply that we force the producers to lower production. Better yet, why not pursue exportation to countries that we have open trade with? It would seem

to me that not only would this stabilize price, but give the United States a different standing in the world and make a statement of energy independence.

A recent report by Secretary Chu and the Energy Department seemed to suggest something along this same line of thinking. Several Members of Congress seemed to share the same school of thought in a recent letter to Secretary Chu. And it was refreshing to see the nonpartisan signatures on this letter. After all, energy independence is not and should not be a partisan issue.

While I am certainly not an expert in this field, much less an economist, common sense would tell me that if we are exporting more product abroad there will be a need for more production. Thus more workers would be needed for this production.

Again I thank you for this privilege, and in particular Congressman Johnson for inviting me here today. I would be happy to answer any questions. Thank you.

Mr. WHITFIELD. Thank you, Mr. Halleck.

[The prepared statement of Mr. Halleck follows:]

Testimony: House Energy and Commerce Committee

Tuesday May 7, 2013 @ 10:00 a.m. 2123Rayburn House Office Building

Mr. Chairman and distinguished members of this committee, thank you for the privilege of appearing before you today. My name is Mike Halleck. I am President of the Columbiana County Board of Commissioners. Columbiana County is located in Eastern Ohio bordering Pennsylvania and West Virginia. We are part of the Appalachian region. Our county is comprised of 540 square miles with a population of about 110,000.

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Permit me to address our manufacturing base for a moment. Ohio and especially Northeast Ohio has been a manufacturing power since the industrial revolution. While in recent decades automobile and steel were our major employees, the advancement of technology and to some extent imports have challenged their future.
However the good news is that Eastern Ohio is quickly becoming an energy economy and has enhanced our manufacturing base even more.

A few examples would be *V&M Steel*, a French company that invested 750 million dollars in our region to manufacturer pipe for the oil fields and their pipelines. Another would be a billion dollar cryogenics plant that separates the different gases for shipment. Just in the past week another announcement was made regarding a 300 million dollar pipeline and gas processing plant by *NiSource* a division of *Columbia Gas.*

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statistics associated with this. In a few short years, there have been over 7 billion dollars invested in our area. Over 39,000 jobs created with projections of 143k by 2020 and 266k by 2035. During 2012 the average wage in Ohio was 55k, while the wages for the oil and gas industry average was 81K. The Oil and gas industry accounted for 1.5 billion dollars in new tax revenue to the state of Ohio.

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While I am certainly not an expert in this field, much less an economist, common sense

would tell me that if we are exporting more product abroad, there will be a need for more production, thus more workers needed for this production.

Again, thank you for this privilege and in particular Congressman Johnson for inviting me here today. I will try and answer any questions that you may have.

Respectfully Submitted

Mike Halleck, President Columbiana County Board of Commissioners
Lisbon, Ohio 44432

Mr. WHITFIELD. Ms. Jaffe, you are recognized for 5 minutes.

STATEMENT OF AMY JAFFE

Ms. JAFFE. I want to thank you for this opportunity, and also thank the committee for bringing to the fore the subject of the international implications and U.S. foreign policy implications of U.S. energy exports. I would submit that our discussion on energy exports, in particular on LNG exports, has been too focused, 100 percent on the domestic market consequences, whether that is a job consequence or a price consequence. And I believe that we need to not take these decisions in a vacuum, that the context of U.S. foreign policy needs to be taken into account in the discussion of our export policy for both natural gas and other products.

The context is that for the last 3 decades the United States has had an active foreign policy to promote free trade, open trade, and energy exports in investment. That is important not only to the United States, but to the global economy. Why do we want free trade in energy? As has been mentioned by many of your committee members and by my fellow panelists, we have operating in the global market an effective oil cartel that keeps the price of oil much higher than it would be without those artificial restrictions. And those restrictions are developed through energy trade, so countries like the Middle East and so forth organize to restrict exports of oil or natural gas in a manner to raise the price internationally and they also restrict open investment in oil and gas exploration.

We send our diplomats to countries like Russia, China, and the Middle East to discuss with them having better and more open-access rules for the investment in oil and gas. It is this lack of investment in oil and gas abroad in recent years that has caused us to have the kinds of financial crises that have revolved around sharp increases in energy prices that we saw not only in the 1970s, but also in 1990 when Iraq invaded Kuwait, also more recently in 2007 and 2008 when we saw energy prices for all businesses in our country hurt American consumers, hurt average Americans.

So it is important to have the United States have an open and assertive policy in trade policy globally, that we do not favor, that we promote free trade, that we do not—that we object to restrictions in investments and trade in oil and gas. Because that is our standing foreign policy and an important foreign policy because we don't want other countries that produce a lot of oil in the Middle East and other places to hold and restrict their exports, we cannot ourselves then have a policy where we choose to restrict our exports, because therefore we would move into a world where energy becomes possibly a political weapon or an economic weapon, and that is not in the vital interests of the United States.

The best way to prevent the kind of global imbalances in energy supply that affects our jobs and hurts every American is to have a policy, a foreign policy that promotes trade and open markets. If the United States doesn't have an open-market policy then we cannot advocate it for other countries.

When we consider LNG exports we need to put that export debate in the context of our own free trade agreements. Our free trade agreements have to be meaningful because otherwise why would anybody want to have economic agreements with the United

States and important trade relations. We export natural gas to Mexico. Last year we exported 1.69 bcfd of natural gas to Mexico under the NAFTA agreement. That is an advantage of trade.

We hold a free trade agreement with South Korea. South Korea would desire to buy liquid natural gas from the United States from the new proposed export terminal. We cannot supply natural gas under a free trade agreement with Mexico and turn to South Korea and tell them that we are not going to honor our agreement with them. Once we honor our agreement with South Korea, how are we going to turn to Japan, a country that would like to buy our LNG exports, and tell them even though they have been a staunch ally of the United States for decades, we are going to export our LNG to South Korea under a free trade agreement but we are not going to provide these resources to Japan.

So the best way to protect consumers from the kinds of seasonal problems that could erupt from having exports is to have a mandate for minimum inventories in the United States as they have in Europe and Japan.

Thank you.

Mr. WHITFIELD. Thank you, Ms. Jaffe.

[The prepared statement of Ms. Jaffe follows:]

Testimony of

Amy Myers Jaffe
Executive Director, Energy and Sustainability
Institute of Transportation Studies
Graduate School of Management
University of California, Davis

To the Committee on Energy and Commerce
U.S. House of Representatives
Subcommittee on Energy and Power
"U.S. Energy Abundance: Exports and the Changing Global Energy Landscape"
May 7, 2013

Summary

Foreign policy considerations should be central to the discussion of U.S. oil and natural gas export policy. The United States has several vital interests at stake in the question of energy exports. First and foremost, open trade and investment globally in energy is important to U.S. vital interests. Barriers to energy trade and investment between major oil and gas rich regions and consuming countries can harm the global economy, leave the U.S. and its allies subject to energy blackmail, and create artificial shortages of vital energy supplies. U.S. energy trade in particular can enhance American power and influence by strengthening our ties to important allies and trading partners and allowing us to help our allies in times of market instability while at the same time weakening the petro-power of some of our adversaries such as Iran and Russia Additionally, by improving our balance of trade, energy exports not only give the United States an upper hand with China, which will be more highly dependent on foreign oil imports than we will, but also allow the United States the luxury to augment its strong influence as a donor to global institutions.

Finally, energy exports are an important part of our free trade obligations. The United States already exports natural gas and condensate to Mexico and Canada and has commitments

to free trade with those important neighbors under the North America Free Trade Agreement (NAFTA). The United States has a free trade agreement with South Korea under the Republic of Korea Free Trade Agreement and with Central American states under the Central American Free Trade Agreement (CAFTA).

Testimony

The rapid growth of oil and natural gas production from unconventional shale resources in the United States has reopened the debate on U.S. oil and natural gas export policy. Foreign policy considerations should be central to the discussion of this issue. To date, the debate in the United States regarding U.S. liquefied natural gas (LNG) exports has focused mainly on domestic economic aspects. Today, I will discuss the national security and foreign policy benefits of the United States promoting an open energy trade policy that permits exports of natural gas, condensate, refined petroleum products and possibly under specified conditions, crude oil.

The United States has for many decades been the leading nation in championing open markets and free trade in energy. *Open trade and investment in energy is important to U.S. vital interests* for many reasons. First and foremost, artificial restrictions on energy flows can be a source of international conflict and, in fact, has been a major factor contributing to armed conflict in modern history. Moreover, the United States, by virtue of both its superpower role and its position as the largest oil consuming country, has a direct interest in preventing energy supply from being used as a strategic weapon. Finally, barriers to foreign investment in energy resources in key countries generally contribute to supply constraints, leading to rises in global prices and potentially harming economic growth in major oil consuming countries such as the

United States and its key industrialized trading partners. For these three reasons, the United States should continue to actively support open markets and free trade in energy and to do so, it cannot restrict its own energy exports.

Energy trade can also be used to *strengthen our ties to important allies and trading partners* and thereby enhance American power and influence. For example, U.S. LNG exports from the Gulf coast could be an important strategic back-up role to shaky Russian or Middle East gas supplies, for example, much the way the U.S. served as an oil swing producer back in the 1960s, rendering an Arab oil boycott during the 1967 Arab-Israeli war infeasible. U.S. Asian allies Japan and South Korea are seeking flexible U.S. Gulf coast LNG contracts for reasons of economic and geopolitical leverage. Our ability to serve as a source for critical swing energy supplies enhances our importance to our energy trading partners in other geopolitical and economic spheres and *allows us to help our allies in times of market instability.*[1] It would, for example, constrain Russia's ability to use its energy supplier role as a wedge between the United States and its European allies.

As American shale production expands from natural gas to oil, the geopolitical benefits will mushroom both by *improving U.S. financial strength and by eliminating U.S. vulnerability to economic blackmail.* The upshot of shale oil will be to reverse the course of history and roll back the clock to pre-1973. Oil producing states will no longer be able to use the lever of a possible energy supply cut-off to America to pressure Washington to adjust its foreign policy. If domestic shale oil abundance someday more closely matches shale gas abundance and the U.S. has no imports to replace, then we will have more discretion on when and how to use the

[1] It is easy to imagine the expansion of American power if its natural gas companies could gear up to supply LNG to a European country cut off by Russia, such as happened in the winter of 2006. If the U.S. can become an energy supplier of last resort, its geopolitical importance will rise significantly along with its diplomatic freedom of movement.

Strategic Petroleum Reserve. In such circumstances, a President could consider using the SPR to either loan oil to other countries for geopolitical aims (for example, to *counter the economic blackmail of the "oil weapon"* against an allied country) or to provide extra oil into the market to influence global prices, should they be negatively affecting the wellbeing of the global economy. In this regard, U.S. energy exports will *weaken some of our adversaries such as Iran and Russia.* U.S. shale gas has already played a key role in weakening Russia's ability to wield an energy weapon over its European customers by displacement. By significantly reducing U.S. requirements for imported liquefied natural gas (LNG), rising U.S. shale gas production has increased alternative LNG supplies to Europe in the form of LNG displaced from the U.S. market, *limiting some of Russia's power.* It has also already *curbed Iran's ability to tap energy diplomacy* as a means to strengthen its regional power or to buttress its nuclear aspirations by eliminating the need for Iranian natural gas to potential importing customers by creating surpluses of alternative supplies.

Energy exports also *improve our balance of trade.* The health of the U.S. economy and fate of the U.S. dollar come under pressure when rising oil prices raise our massive oil import bill, worsening the U.S. trade deficit.[2] Such economic pressures are multiplied when we are forced by oil dependence to deepen our military commitments in the Middle East, thereby similarly adding to the U.S. deficit. All this weakens the United States relative to China, which holds a large chunk of U.S. indebtedness and free rides off expensive U.S. naval activities to guarantee the free flow of oil from the Persian Gulf. Over time, shale development will reverse this strategic and economic disadvantage. As the years pass, it may well be the Chinese economy that is more exposed than the United States to Middle East developments. Citibank estimates that

[2] For a detailed discussion of the link between the U.S. dollar and oil prices, see Amy Myers Jaffe and Mahmoud El-Gamal, Oil, Dollars, Debt and Crises: The Global Curse of Black Gold, Cambridge, UK: Cambridge University Press, 2010

rising domestic shale oil and gas production, by reducing oil imports and keeping "petro-dollars" inside the U.S. economy, will reduce the U.S. current account deficit by 1.2 to 2.4 percent of gross domestic product (GDP) from the current value of 3 percent of GDP. Such a development would have implications for the U.S. dollar, potentially helping it appreciate over time. Energy exports would enhance this trend by adding gains to the balance of trade. To the extent that energy exports improve our global financial footing, it will not only *give us an upper hand with China*, which will still be highly dependent on foreign oil imports, but also allow the United States the luxury to regain its strong influence as a donor to global institutions such as the World Bank and United Nations, again enhancing our national power and influence.

Finally, energy exports are an important *part of our free trade obligations* to important neighbors such as Mexico and Canada as well as more distant long-standing allies such as South Korea. U.S. law requires the U.S. Department of Energy (DOE) to review and approve any natural gas exports to countries with which the United States does not have a free trade agreement. Current rule making requires that exports to our free trade partner countries be approved expeditiously. For nations not covered by applicable free trade agreements, the review is supposed to lead to approval unless the project is determined to "not be consistent with the public interest." As a practical matter, the United States is already an exporter of domestic natural gas. The U.S. natural gas exports to Mexico reached 1.69 bcf/d in 2012. Canada has also been a major buyer of U.S. condensates. U.S. pipeline gas exports to Mexico are important to Mexico's economic health and to border relations and therefore it is unlikely the United States would ever consider cutting off Mexico's gas trade with us. South Korea now holds a Free Trade Agreement (FTA) with the United States. South Korea has indicated its desire to import U.S. Gulf coast LNG. Under normal economic conditions, it would not be in the U.S. economic and foreign policy interest to fail to honor our free trade obligations to South Korea while continuing

to honor our obligations to Mexico. By extension, the United States, as an established exporter of natural gas, should not be turning away as close an ally as Japan, which also has expressed an ardent interest in importing U.S. natural gas and currently faces a fuel crisis in the aftermath of the Fukushima nuclear disaster. Several Asian energy importers have made it clear that they would prefer the security and pricing of our multi-producer, competitive liquid market as a source of LNG supply to other alternative exporters. Since U.S. trade with Asia is important to our economic health, on balance it would not be in the U.S. interest to turn down Asian trading partners wanting to expand already massive trade to include natural gas, especially given that a preponderance of analysts have concluded that U.S. shale resources are large enough to minimize the pricing impact of LNG exports from the United States. This logic could also apply to refined petroleum products and condensates, which are already an important part of our current foreign trade.[3]

Thus, I would argue that these many foreign policy considerations must be taken into account in any review on the question of the advisability of U.S. energy exports. We must consider all aspects of the implications of the energy export question on our national security and foreign policy interests. To focus only on the uncertain impact that exports might have on the U.S. manufacturing sector or even on the global energy pricing is foolhardy, given the complexity of interactive forces that will influence prices in the long run. Had the industry now testifying about long-term natural gas prices been able to forecast correctly, they wouldn't have

[3] To protect U.S. consumers against volatility in fuel pricing due to shifting levels of global demand for refined petroleum product and/or natural gas exports, the United States should require producers and refiners to hold reasonable minimum inventories to guard against temporary domestic shortfalls of supply or seasonal volatility. Such minimum product inventory standards are already used successfully in Europe and Japan to enhance energy security and protect domestic markets in the event of an unusual event such as the Fukushima nuclear accident. In fact, the United States was able to weather Hurricane Rita and Katrina partly by borrowing gasoline from required European minimum inventory stockpiles. Shale derived natural gas liquids (NGLS) production are projected to outpace the ability of the U.S. market to absorb incremental output at least until 2018. Thus, exports will be needed to alleviate storage containment problems that could be associated with U.S. shale oil production. Already, natural gas is being flared in certain locations. For more details, see Alan Troner, "Natural Gas Liquids in the Shale Revolution" available at http://bakerinstitute.org/programs/energy-forum

offshored plants earlier in the 2000s when natural gas prices rose temporarily. Rather than second guessing price impacts which remain highly uncertain, we should widen the export debate to consider U.S. global priorities as well as domestic economic concerns.

A Backgrounder on Implications of Energy Exports for U.S. Global Priorities

Exceedingly high oil prices in the 2000s have invited massive investment by private capital in both oil exploration outside of OPEC countries, particularly in unconventional resources in North America, and in alternative sources of energy. At the same time, the financial pressure of oil import bills on major economies has similarly triggered consuming countries to re-regulate energy markets to include targets or incentives for energy efficiency, which are about to take a giant bite out of oil demand gains. In the case of the United States, the combination of both trends has been nothing short of stunning.

The so-called "shale revolution" has unleashed an enormous amount of oil and gas activity in the United States. Shale gas production in the United States has increased from virtually nothing in 2000 to more than 10 billion cubic feet per day (bcfd) in 2010. Gross natural gas output in the U.S. hit 2.5 trillion cubic feet (tcf) this past summer, a record high. Shale gas production could more than quadruple by 2040, accounting for well over 50 percent of total U.S. natural gas production over the next two decades.[4] *Tight oil*, that is unconventional oil from shale structures, is developing at an extraordinarily rapid rate in the United States as well, reaching more than 1.5 million barrels a day (b/d) and end 2012, or 1.6% of global production.

[4] See Kenneth B. Medlock III, Amy Myers Jaffe, and Peter R. Hartley, "Shale Gas and U.S. National Security" (working paper, James A. Baker III Institute for Public Policy, Rice University, Houston, TX, July 2011).

U.S. analysts are now projecting that U.S. oil production could rise significantly over the next decade as increased drilling in shale formations and deep water Gulf of Mexico translates into higher domestic output. Estimates range from an increase on of 3 million to 10 million b/d of oil and natural gas liquids production from shale by 2020, with some analysts projecting that the United States could become an exporter of natural gas liquids over time.[5] Citibank estimates that U.S. deep water production could hit 3.8 million b/d by 2020, up from 1.3 million b/d in 2011. The United States has also mandated a doubling of biofuels production over the same period. While it is unclear whether the rate of drilling in the United States will be sufficient to eliminate completely the need for foreign imports of oil, a combined approach that includes both continued drilling for shale and accelerated time lines for higher U.S. average corporate efficiency standards for vehicles to 54.5 miles per gallons by 2025 could truly leverage the potential to eliminate the roughly 8.5 million b/d of crude oil imported into the U.S. at present. The new car efficiency standard should shed between 4 to 6 million b/d of oil requirements in the next decade or two. Canadian oil sands, which could continue to grow in the years ahead at a steady pace of some 200,000 b/d per year for at least a decade if not two decades should export infrastructure bottlenecks be relieved (an increase of 2-mm b/d in this decade), would add additional flexibility. Thus, continued U.S. dependence on oil imports from Middle East or OPEC looks highly doubtful at this time.

Already, prolific U.S. shale gas resources, which are estimated to be as high as 862 tcf, are dramatically changing the U.S. economic and import outlook, with geopolitical consequences.[6] Shale gas production in the United States has increased from virtually nothing in 2000 to more than 10 billion bcfd in 2010. Gross natural gas output in the U.S. hit 2.5 tcf this

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[5] Michael Levi, "Think Again: The American Energy Boom Foreign" *Policy Magazine* , July/August 2012 http://www.ourenergypolicy.org/wp-content/uploads/2012/08/0_New_14413.pdf
[6] Energy Information Administration Annual Energy Outlook, 2011, http://www.eia.gov/analysis/studies/worldshalegas/

past summer, a record high. Shale gas production could more than quadruple by 2040, accounting for well over 50 percent of total U.S. natural gas production over the next two decades.[7] As Citibank noted in a recent study, the "shale gas revolution drives paradigmatic shifts across sectors" and together with other unconventional resources will transform North America into a "growing hydrocarbon net exporting center, with the lowest natural gas feedstock costs in the world, supporting thriving exports of energy-intensive goods from petrochemicals to steel."[8]

The prospects of rapidly expanding domestic natural gas supplies have led to forecasts of inexpensive natural gas prices for the foreseeable future. In North America, breakeven prices for wells drilled in some of the more prolific shales are currently estimated to be as low as $2 to 3 per thousand cubic feet (Mcf), with a large majority of the resource accessible at below $6. Ten years ago, costs were significantly higher. As firms continue to make cost-reducing innovations, greater quantities of the shale resource will likely become both technically and economically viable. In March 2012, the price of natural gas fell below $2 per Mcf for the first time since 1999.

All this cheap natural gas looks poised to strengthen the U.S. economic and diplomatic position vis a vis China and Russia. U.S. shale gas has already played a key role in weakening Russia's ability to wield an energy weapon over its European customers by displacement. By significantly reducing U.S. requirements for imported liquefied natural gas (LNG), rising U.S. shale gas production has increased alternative LNG supplies to Europe in the form of LNG displaced from the U.S. market. The geopolitical role of U.S. natural gas surpluses in

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[7] See Kenneth B. Medlock III, Amy Myers Jaffe, and Peter R. Hartley, "Shale Gas and U.S. National Security" (working paper, James A. Baker III Institute for Public Policy, Rice University, Houston, TX, July 2011).
[8] Energy 2020: North America, the New Middle East? Citi GPS: Global Perspectives & Solutions, March 20 2012

constraining Russia's ability to use its energy supplier role as a wedge between the U.S. and its European allies[9] could further weaken over time, to the extent that the current Administration stays the course with approvals of U.S. LNG export terminals. U.S. LNG exports from the Gulf coast[10] could be an important strategic back-up role to shaky Russian gas supplies with their potentially political strings attached, much the way the U.S. served as an oil swing producer back in the 1960s, rendering an Arab oil boycott during the 1967 Arab-Israeli war infeasible.[11] U.S. Asian allies Japan and South Korea also are seeking flexible U.S. Gulf coast LNG contracts for reasons of economic and geopolitical leverage.

As American shale production expands from natural gas to oil, the geopolitical fall out will also mushroom both by improving U.S. financial strength and by eliminating U.S. vulnerability to economic blackmail. The upshot of shale oil will be to reverse the course of history and roll back the clock to pre-1973. Oil producing states will no longer be able to use the lever of a possible energy supply cut-off to America to pressure Washington to adjust its foreign policy. There has even been talk that the U.S. could become an oil exporter. The idea of crude exports "should not automatically be taken off the table," U.S. Energy Information Administration director Adam Sieminski told a Washington DC-based conference last summer.[12]

Even if U.S. crude oil exports never come to fruition, a self-sufficient United States will have more flexibility in how it manages the roughly 700 million barrels in the Strategic

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[9] Edward L. Morse and Adam J. Robinson argue in their article, "Growing Pains: Russia's New Muscle" *Aspenia* 32-4, February 2007, p. 110-119, that Moscow has used energy as a means to pull European states away from close alliance with the United States by brief demonstrations that reliability of supply could be subject to geopolitical considerations. Russian energy "diplomacy" is mentioned in EU discussions as a factor in slowing the eastward expansion of NATO to Ukraine and elsewhere.

[10] Many forecasters anticipate U.S. exports of natural gas, and some, including the EIA, anticipate oil exports in the coming decades.

[11] For a detailed account of the U.S. historical swing producer role, see Daniel Yergin's The Prize, New York, New York: Simon and Schuster, 1991, chapter 27 through 28.

[12] Margaret Ryan, "U.S. Crude Exports Could Make Sense Says EIA Head" aolenergy.com June 28, 2012

Petroleum Reserve (SPR). Although many think of the SPR as a wartime stash, it was in fact created to be a tool of statecraft to be used to redress the bargaining imbalance to allow the United States as a major oil importer greater maneuver in its foreign policy and to prevent global economic damage from undue manipulation of oil markets. The size of the SPR was determined by the premise that the U.S. would have to replace some or all of its oil imports during a crisis. But if the U.S. has no imports to replace, then it will have more discretion on when to use the SPR to either loan oil to other countries for geopolitical aims or to provide extra oil into the market to influence global prices, should they be negatively affecting the wellbeing of the global economy. The United States could even decide to sell off some of the SPR to reduce its deficit, given that the average purchase price for the stockpile is $29.76, potentially leaving a lot of room for profit-taking. At a minimum, over time the U.S. will need to review its SPR policy, which already lacks a clear mandate for when a release is triggered.[13]

Politicians and experts alike will undoubtedly point out that if the U.S. becomes an exporter, such exports could put U.S. consumers and industry at risk during times of a supply outage or crisis. But such risks are easily remedied as a recent Citibank report notes. "Citi GPS Energy 2020: Independence Day" argues "...in case of an international emergency or a supply disruption, exports can be curtailed and domestic prices in theory be significantly cushioned from international shocks. Indeed, the government could restrict or even ban exports in times of emergency..." While Citi notes that the latter is an extreme that "would likely violate international trade treaty obligations," it is certainly a safeguard that could be used in extreme circumstances such as time of war. Moreover, any U.S. policy to temporarily end exports would, except in times of war, likely be made in the context of U.S. participation in a global response to

[13] For more discussion about the problems of the SPR trigger mechanism, see Amy Myers Jaffe, America's Real Strategic Petroleum Reserve, at http://www.foreignpolicy.com/articles/2012/08/24/Saudi_Arabia_Strategic_Petroleum_Reserve

supply outages and therefore would be just one element to an organized international response to protect the U.S. economy and those of our allies.

Rising shale and the U.S.-China Rivalry

The U.S. shale boom has other geopolitical benefits as well. Rising American shale oil and gas production will strengthen the U.S. hand relative to China. The health of the U.S. economy and fate of the U.S. dollar come under pressure when rising oil prices raise our massive oil import bill, worsening the U.S. trade deficit.[14] Such economic pressures are multiplied when we are forced by oil dependence to deepen our military commitments in the Middle East, thereby similarly adding to the U.S. deficit. All this weakens the United States relative to China, which holds a large chunk of U.S. indebtedness and free rides off expensive U.S. naval activities to guarantee the free flow of oil from the Persian Gulf. In fact, China may feel it benefits strategically if the U.S. is bogged down in Mideast conflicts, a possible explanation for its support of Iran and Syria. China has emerged as Iran's principal arms suppliers, with transfers including cruise missile and ballistic-missile capabilities.[15] More recently, China seems to be hedging its bets with discussions of ballistic arms sales to Saudi Arabia.[16] The utility of arms sales to various Middle East players is sometimes described in China as "seeking stability" through balance of power but to the extent that such military support forces Washington to wade deeper into conflicts in the Middle East, China can be better assured that the U.S. will be constrained to intervene in China's own Asian backyard. Moreover, costly repeated U.S. military

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[14] For a detailed discussion of the link between the U.S. dollar and oil prices, see Amy Myers Jaffe and Mahmoud El-Gamal, Oil, Dollars, Debt and Crises: The Global Curse of Black Gold, Cambridge, UK: Cambridge University Press, 2010

[15] Ibid

[16] America's Real Strategic Petroleum Reserve, Amy Jaffe, Foreign Policy, August 24, 2012 http://www.foreignpolicy.com/articles/2012/08/24/Saudi_Arabia_Strategic_Petroleum_Reserve

intervention in the region has weakened the U.S. economy considerably by substantially adding to the U.S. deficit and also indirectly through higher costs for oil. Notes John Garver:

> "A strong Iran resistant to U.S. dictates and at odds with the United States would also force Washington to keep large military forces in the region, limiting the ability of the United States to concentrate forces in East Asia, where China's core interests lie. The 9-11 attacks on the United States were a strategic windfall for China, diverting U.S. attention away from China and East Asia toward the Middle East and Islamic World. That the United States bogged itself down in protracted wars in Afghanistan and Iraq was a further blessing for Bejing. If Washington now were to wade deeper into conflict in the Middle East –this time with Iran—the chances for China's successful rise without having to confront the United States would increase. In this regard, it would not benefit China to help the United States coerce Iran into de-nuclearization and corresponding docility."[17]

Over time, shale development will reverse this strategic and economic disadvantage. As the years pass, it may well be the Chinese economy that is more exposed than the U.S. to Middle East developments. Citibank estimates that rising domestic shale oil and gas production, by reducing oil imports and keeping "petro-dollars" inside the U.S. economy, will reduce the U.S. current account deficit by 1.2 to 2.4 percent of gross domestic product (GDP) from the current value of 3 percent of GDP. Such a development would have implications for the U.S. dollar, potentially helping it appreciate over time.

U.S. Energy Exports and Global Energy Governance

Open trade and investment in energy is important to U.S. vital interests. As mentioned above, barriers to energy trade and investment can harm the global economy, leave the U.S. and its allies subject to energy blackmail, and create artificial shortages of vital energy supplies. From the perspective of the United States and its important trade partners in the developed world, global energy trade and investment policy should facilitate the development of natural resources to ensure that supplies can grow in line with demand at fairly stable prices. There is no

[17] John W. Garner, Is China Playing a Dual Game in Iran? Washington Quarterly, Vol. 34, No 1, 2011, p. 75-88

doubt that at least some of the rapid increase in world oil prices during the years 2005-2008 is the result of insufficient investment in oil producing capacity, in large measure due to barriers to open trade and investment in energy resources in the Middle East, Russia and to some extent China.

One of the key barriers to adequate investment in global oil reserves is the concentration of control of the world's largest reserves in the hands of national oil companies. The concentration and control of access to large national reserves by national monopolies eliminates the possibility that local competition of firms will enhance the efficiency of all investors and promote an adequate pace of investment, with private firms taking a role to supplement government investment. In many countries, governments have been under increasing pressure to reallocate revenue generated by the monopoly NOC(s) to cover social investments in education, health, direct food and fuel subsidies to populations, and infrastructure. Some governments have used an increasing portion of NOC revenues to cover federal budget outlays or to repay foreign national debt or to provide social welfare subsidies to the population. As a result, NOCs have diverted resources away from reinvestment in oil exploration and development to meet these more non-commercial goals. In many cases, such as Mexico and Venezuela, this policy has led to sharp declines in oil exports in recent years. In other cases, such as Russia and Kuwait, it has constrained the pace of a potential expansion in oil exports. Thus, the concentration of control in resource development by state monopolies instead of having such development be open to competitive market forces contributes to underinvestment in oil exploration and development, even in the face of global shortages and rising prices.

Another consequence of the concentration of control of resource development by state-controlled NOCs is that it strengthens the monopoly power of OPEC. From the perspective of the larger OPEC oil producers, one advantage of creating the trade and investment barrier of NOC-

control in the first place is precisely that it makes it easier for OPEC member countries to control the pace of investment and the expansion of oil production capacity, thereby strengthening OPEC's control on global oil prices. OPEC can simply reduce investments in future capacity as a means to artificially raise global oil prices for some period of time. OPEC's goals as an oil producer cartel are not in alignment with U.S. economic or strategic interests. It is clearly in the U.S. interest to promote open and free trade in energy in countermand to such OPEC practices to constrain needed oil supplies.

Over the past thirty years, the policy of the United States and international organizations such as the International Monetary Fund and the World Bank has been to promote and encourage the privatization or partial-privatization of state-owned energy firms in many developing countries to ensure a freer flow of energy to the local and global economy and to help countries better align their national balance of payments and foreign debt. The policy, where successful, has had the effect of transforming many of these state firms, such as Petrobras and China's CNOOC, into more aggressive, commercially oriented global competitors. Trade agreements that aim for fair competition and adequate investment in upstream energy sectors are squarely in the U.S. interest and in the commercial interests of U.S. energy firms which are leading globally in technology and investment in oil and gas exploration. As such, emphasis on free trade requires the United States also to keep its borders open for energy exports and investment in our domestic resources by foreign companies. Foreign investment in U.S. domestic resources has contributed to rising U.S. domestic production by injecting additional capital spending into the U.S. market. The U.S. Energy Information Administration (EIA) tallies that 20 percent of the $133.7 billion in investment in U.S. shale plays between 2008 and 1012 included joint ventures by foreign companies. As a large consuming nation, the United States should insist that cross investment be

a critical part of an overall framework that keeps all markets open to global trade and investment, including access to U.S. markets, in non-oil commodities, financial services and other goods.

Energy Independence and a More Assertive U.S. Foreign Policy?

Once the energy equation for the United States shifts in earnest, it is possible that America will return to an even more assertive foreign policy. To the extent that rising domestic energy helps the U.S. regain some of its financial muscle, fiscal and budgetary constraints that now prevent the U.S. to take on too many international endeavors will be removed. That will not only give the U.S. military more sway with the U.S. public when it feels intervention abroad is necessary or even just strategically advantageous. It will diminish the influence of oil-related geopolitical considerations, which currently loom high on the list of factors that inhibit U.S. freedom of movement on the world stage today. Just as French President Nicholas Sarkosy was the head of state able to "speak to power" to energy-rich Russia after Moscow's invasion of Georgia given France's enviable reliance on its own nuclear energy to fuel its economy, the U.S. President and Secretary of State will be more greatly enabled to speak for the global community on matters that impose burdens on major oil exporting states. That could cover any number of topics from human rights and democracy promotion in Bahrain or around the oil-rich Persian Gulf to a global climate deal. The United States will be able to communicate with more confidence and less constraints than when its own oil vulnerabilities need to be taken into account.

But ironically, greater U.S. energy self-sufficiency will have its own built-in disadvantages as well with exactly the same petro-states as its current energy vulnerability serves. Until recently, the U.S. market had been a giant and growing destination for sales of

petroleum and as such, oil producers had to care whether they could access U.S. consumers. Between 1990 and 2000, the growth in U.S. oil demand represented close to 60 percent of the rise in OPEC's traded oil production. The importance of the U.S. market meant that American-led oil sanctions against a country had real and economically biting consequences. For example, Libya's Qadaffi, it is said, turned over his weapons of mass destruction because he considered access to the U.S. market and oil and gas equipment increasingly important to the possibility of an LNG industry. Over time, oil sanctions might be a less effective tool in U.S. statecraft, as more and more production is sold eastward to emerging economies of Asia, which will be less inclined to follow U.S. leadership any way but especially where their energy supplies are concerned. This problem was already apparent in Washington's difficulty to get Asian buy-in to its bid to tighten Iranian oil sanctions this past summer.

As producers look to markets other than the U.S. to sell their oil exports and refined products from refining and petrochemical plants, the United States will also lose some of its prerogative to dictate environmental standards to other countries. In the past, the importance of access to the large and lucrative U.S. energy market meant that environmental specifications dictated in the United States would have to be followed by any seller who might want to send a cargo to America. As the U.S. market becomes more and more self-sufficient, oil exporters may decide it isn't worth the extra expense to invest in equipment to meet U.S. environmental specifications. That could be bad news for the ambitious state of California which is trying to dictate that producers clean up the carbon emissions for their oil production and refining to market to the state. California had hoped that its low carbon fuel standard would impact producers not just in the state but have broader impact on the operations of the global oil industry generally as well. California's low carbon fuel standard will likely still influence Canadian oil sands producers who will want to maintain access to all U.S. markets, but sellers from Nigeria

and the Middle East may be less inclined to worry about U.S. standards if the vast majority of their sales are going to wind up in Europe and Asia.

And while the U.S. will lessen its vulnerability to global oil shocks, it cannot eliminate impacts altogether, given the globalized nature of commodity markets. The U.S. will still have to concern itself with how international oil crises raise oil prices all around the world, including inside the U.S., since U.S.-based consumers will have to pay the same high oil prices as everyone else. Even to the extent that rising energy prices helps the economy of a wider number of U.S. domestic states/regions than in the past -- offsetting some of the employment and output effects of an oil price shock -- the overall U.S. economy will still be negatively affected by global impacts.[18] And the U.S. will still have to worry about what an oil cutoff would mean for its allies and trading partners. Even if the U.S. can weather an oil supply crisis better than most as its own domestic production rises, its economy will still be hard hit by the negative impact on everyone else. Saudi Arabia has learned that lesson the hard way both in 1979 and again in 2008.

When OPEC's Main Target Would be China

As energy efficiency and alternative energy take hold across the industrialized world, oil consumption will continue to fall in the OECD, most notably in the United States, in the years ahead. This trend could potentially limit OPEC's influence over the West over time and shift any burden of OPEC's price setting policies more squarely on emerging Asian countries such as China and India.

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[18] Mine K. Yucel, Economic Opportunities and Vulnerabilities, Presentation to the Council on Foreign Relations, "Understanding the American Oil and Gas Boom" October 18-19,2012

U.S. oil imports are already seeing substantial declines, falling over 4 million b/d since 2007. OPEC sales to the U.S. have already been among the hardest hit, with West African OPEC members like Nigeria and Angola seeing significant drops. In the future, even Venezuela and Middle East producers are thus likely to find themselves challenged in maintaining their foothold in the United States.

As discussed, OPEC's ability to use oil sales as leverage to adversely influence the United States will be greatly reduced. The U.S. National Intelligence Council in its recent four year survey to policy-makers noted that U.S. shale production might dent OPEC's influence over global oil prices. While this might be overstated, clearly OPEC's influence over the U.S. will be reduced. While the U.S. and global economy will still be sensitive to oil price shocks, the United States as a large oil and gas producer and exporter will receive a compensating offset of higher energy sector revenues from any OPEC cutback. The United States will also be able to target its own exports to allied countries in Europe or Japan, should they be threatened with a supply cutoff by OPEC. Instead of being able to target the U.S. and constrain its superpower prerogatives, the impact of OPEC policy changes will fall more squarely in Asia and in particular on China.

By contrast to expectations that U.S. oil demand will continue to fall, projections are that Chinese oil demand will rise by close to 8 million b/d to 19 million b/d by 2040 as the number of cars on the road in China expands exponentially with the country's continued economic growth and development.[19] At present, China roughly 50 percent of China's oil imports come from the Middle East. China's dependence on Middle East oil is expected to continue to expand in the

[19] Kenneth Medlock B. III, Ronald Soligo and James Coan, 2011. "Vehicle Stocks in China: Consequences for Oil Demand." Baker Institute working paper available at http://bakerinstitute.org/publications/EF-pub-RiseOfChinaMedlockSoligoCoan-120211-WEB.pdf

coming decades, forcing it to rely on the U.S. Navy to protect the free flow of oil from the Middle East. As at the same time the U.S. ceases to be a major oil importer, it will almost certainly lower political will in the United States to finance singlehandedly the protection of sea lanes from the Persian Gulf. Such a scenario would almost certainly alter the dynamic of the Sino-U.S. dialogue regarding the Middle East and possibly change American public attitudes regarding Chinese free riding off the United States' expensive commitment to guarantee the free flow of oil from the Persian Gulf to Asia. Moving forward the adverse effect of a disruption in oil supplies and subsequent oil price increases could have a more deleterious impact on China's trade balance as the major user of Middle East oil than it would on the United States' trade deficit, since the U.S. oil import bill will be greatly reduced. That should give Washington more leverage with Beijing to insist on a more constructive dialogue on not only Middle East conflict resolution specifically, but on military matters more generally.

Given China's long term interests in Middle East oil and gas supply and its economic exposure to the fate of the U.S. economy, it remains to be seen if China's present path of providing material and diplomatic support to Iran and into other diplomatic hot spots will continue to make sense as time wears on. Already, Chinese strategists are beginning to worry about U.S. foreign policy shifts, as the U.S. becomes less dependent on imports. And China's "going abroad policy" of foreign direct investment in oil in places like Sudan, Libya, Iran and Venezuela, is increasingly putting its citizens and interests in harm's way. The shortcomings of China's "going abroad" strategy have demonstrated that a strong international presence requires a strong military. Beijing is becoming increasingly dependent on the foreign military security already present in the Middle East due to its growing reliance on Gulf oil. Regardless of nationalistic elements of its public, Chinese leaders must face the fact that the country does not

have the naval resources to become actively involved in defending those producers who are its main crude suppliers. Moreover, it is not clear whether China would want to take on that support role even if it had the adequate resources. Traditionally, China has devoted its military resources to protecting its interests in its own backyard, including the South China Sea and Taiwan Strait, largely relying on U.S. military presence to protect its interests abroad, and particularly in the Middle East.[20]

The good news is that China, now finding itself mired in more energy-related foreign diplomacy than it bargained for, is more inclined to act in concert with other members of the international community. As China becomes a more engaged stakeholder in the international arena, the United States must prepare itself for increased global power sharing. But China's far-flung involvement in unstable regions also means that it may need troops to guard foreign oil and gas installations and naval craft to effect evacuations in emergencies. Even this modest increase in China's foreign military profile will require greater consultation with the United States, first, to avoid potentially dangerous misunderstandings and, second, to create the groundwork for cooperation during possible crises. Down the road, an alternative Chinese response to this situation could be to increase investment in Chinese force projection.

To manage China's oil-and-military link, the United States should fine-tune the messaging of its diplomacy with China to include discussion of a roadmap to elevate communications between the U.S. and Chinese military. The nature of conflicts in the Middle East and Asia calls for a more pro-active, high level strategic dialogue between the U.S. and Chinese militaries. At present, this dialogue is more tactical in nature. Even at the height of the

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[20] "The Vital Triangle," Jon B. Alterman, Ph.D., Director, Middle East Program, Center for Strategic and International Studies, presented at The Woodrow Wilson Center for International Scholars conference on China and the Persian Gulf, July 12, 2010, http://aic-background.conflix.org/images/5/57/Securedownload_%281%29.pdf

Cold War, such consultative lines of communication between top U.S. and Russian military brass was critical to avoiding escalation of conflicts in the Middle East to avoid dire global consequences. The same utility would be beneficial in the Sino-U.S. relationship. Sharply different perspectives on even the vocabulary of "stability" in the Chinese and American cultural lexicon raises risks of unintended misunderstanding that is thwarting better cooperation in the Middle East even when Chinese and American strategic interests are aligned. And where Chinese and American interests are not aligned, the risks of misinterpretation and miscommunication are high with potentially serious consequences.

For OPEC, it remains unclear what geopolitical benefits it would get when its oil weapon would unleashed more pain on Beijing (and maybe someday India) than on the United States. The answer to that question will partly rely on how China's foreign and strategic policy develops over time and whether Middle East oil exporters or Russia will find elements in China's foreign policy that they would like to influence. One could imagine that China's extensive arms sales might become a target of petro-power ire in the future, just as U.S. military aid to Israel had it fall amuck of Arab interests in the 1970s. But China's naval force projection will likely be limited for at least two decades, leaving less to counterbalance through an "energy weapon."

Conclusion

As the United States considers the implications of an improving energy balance, it will be faced with important questions about its priorities for continued global leadership. Regardless of whether the U.S. imports any oil from the Middle East, its responsibilities to police the sea lanes will remain a function of its role as a global superpower. And having more oil will not relieve the U.S. from caring about the impact that a global oil crisis could have on its economy, not only

because prices to consumers will rise everywhere, including in the United States, but also because economic damage from a crisis will harm the U.S. economy indirectly via its substantial trade with other countries who will remain major oil importers. Thus, worries among U.S. allies that an energy independent United States might abandon the Middle East are clearly overstated. But an energy independent United States will indeed be freer to engage in an international agenda of democracy promotion and human rights, which might weaken the relationship the United States has with authoritarian governments in major oil producing states. The consequences of that could still have profound long term impacts on the global oil situation.

As the United States moves to recalibrate its own understanding of its national interests when its own oil importation from outside the Americas shrinks, it will have to think carefully about the consequences of opportunities for changes in foreign policy. The United States could gain striking geopolitical (and economic) benefits from having the flexibility to export of oil and gas to its allies both in normal times and in times of crisis. The large U.S. Strategic Petroleum Reserve could be part and parcel of a new means of engagement on the arena of international energy diplomacy. We have already opted to release the strategic petroleum reserve to take oil price pressures off of a financially struggling Europe during the Libyan crisis and simultaneous start of oil sanctions against Syria. It has never been clear why the U.S. had not done more in the past to eliminate the energy security and global economic risks posed by OPEC. But the United States could soon be in a position to recapture the status it had in the 1960s when the U.S. was able to play a swing producer role to stabilize the oil market, in the face of Middle East conflicts and other geopolitical events.

In addition, the United States will want to increase its diplomatic efforts to engage other major oil importing countries into a dialogue about burden sharing. The United States has

already set this path in motion by promoting joint operations with NATO in Libya and elsewhere in Africa. But a stop in Beijing by senior U.S. military brass might become increasingly necessary as the United States navigates its way to energy independence. U.S.-China relations regarding the Middle East and oil have been plagued by mistrust and rivalry. The challenge for U.S. diplomacy will be how to accommodate legitimate Chinese interests while at the same time countering China's willingness to leverage Middle East conflict to the U.S. disadvantage. A proper analysis of how the energy position of Washington and Beijing will change over time can help policy makers on both sides to map a more cooperative framework where possible and at least to provide a more productive dialogue where differences in interests cannot be resolved.

Mr. WHITFIELD. And thank all of you for your testimony and for taking time to be with us today.

Now we will have a question period and answer, and I will recognize myself for 5 minutes for the first set of questions.

First of all, I am happy to hear that many of you support a free-trade, open-market system on the export and in the entire energy sector. I read your testimony, Senator Johnston, and I was thinking back about all these Federal policies that you referred to, like the Fuel Use Act, the wage and price controls and others, and the unintended consequences that came about as a result of those government policies. And so I was—and Mr. Dorgan talked about—in the publication that they were involved in, he specifically said restricting international trade in fossil fuels is not an effective policy to reduce global greenhouse gas emissions, and I agree with that as well.

Mr. Breen, one question I did want to ask you, you talked a lot about oil policy today, and do you have a position on the export of energy from America, liquid natural gas as an example?

Mr. BREEN. Sure. My position is that there may be some advantages to that. I am 100 percent in favor of the idea of a free market, a global free market in energy. My concern focuses around oil, primarily because the United States is single-source-dependent on oil for transportation.

So the good news on electrical energy production and industrial energy productions is it is diversified. Natural gas is part of it. There are other renewables.

In the case of transportation, 93 percent plus is totally dependent on oil, and so that is why I focused on it. It is——

Mr. WHITFIELD. But on the natural gas, did you say you do or you don't have a position on that?

Mr. BREEN. My position is that it is probably not a bad thing. I think natural gas is a great bridge fuel——

Mr. WHITFIELD. OK.

Mr. BREEN [continuing]. From a climate perspective.

Mr. WHITFIELD. OK.

Mr. BREEN. And certainly Russia's use of it geopolitically is——

Mr. WHITFIELD. Thank you.

Senator Johnston, you talked about, as I had said earlier, about the adverse policies of the government trying to dictate what will and will not be done. I was just curious, can you imagine any sensible way that we can actually try to restrict exports of natural gas that would be an effective government policy?

Mr. JOHNSTON. Mr. Chairman, I have thought a lot about that, and if you made me come up with a policy, I don't know what it would be. I mean, if you did it chronologically as to who first files for the permit, I think there are some 16 permits now pending, that would not make any sense, because, you know, it just costs a couple of hundred dollars, I think, to file one of these things, and it doesn't tell you who has the best application, or who will be able to—you know, you have got to have a decades-long supply agreement, and a decades-long off-take agreement, and many billions of dollars, and that first application just doesn't tell you who is going to be able to do that.

So I don't think there is a way to do it. I think it would be just as disastrous as the Federal Power Commission trying to set the price of natural gas.

Mr. WHITFIELD. Do you have an opinion on that, Senator Dorgan?

Mr. DORGAN. Yes. I generally agree with that. You know, we currently have in law a restriction with respect to the export of oil, as you know.

Mr. WHITFIELD. Right.

Mr. DORGAN. That has been there since the 1970s.

And let me make a point in response to what Mr. Breen said as well. It is the case that the additional production, for example, of oil and natural gas is really good news for our country, really good news, but it is also the case that 70 percent of the use of oil in this country is used in transportation, and 90 percent of transportation fuels are oil-based. And so is that worrisome? Should we be trying to diversify? The answer to that is yes, of course we should.

Mr. WHITFIELD. All right. Thank you.

You know, Mr. Bradbury, you talked about the climate change issue, which certainly is important, but I think here in America we do need to take credit for the steps that we have made to improve our environment. Our CO_2 emissions are down lower than they have been in 20 years. And when you think about the immediate impact, for example, when the Russians stopped the supply of gas into the Ukraine, when they stopped the supply of gas into Bulgaria, and they were without gas for 4 or 5 days, when you think about the immediate impact on the lives of people because they can't get adequate energy sources, and then you compare that to the long-term climate change issue that is out there, trying to balance immediate needs versus long-term needs is something that we all, I think, struggle with.

But you don't even have to comment on that. My time is actually expired, so I will recognize Mr. Rush for 5 minutes.

Mr. RUSH. Thank you, Mr. Chairman.

We have had some interesting testimony and testimony that has touched on LNG exports from a myriad of perspectives. And all these perspectives are quite important, but I would like to hear a little bit more about how exporting LNG impacts the U.S. consumer.

Unlike oil, which is set on—whose prices are set on the global market, natural gas prices are set under a regional scale or a North American and Europe and also in Asia. And today we are paying reasonably low prices for natural gas, less than $4 for a gallon, but when you compare to Europe, they are paying $10 per gallon, and in East Asia it is $12 to $16 per gallon, and experts expect these prices to increase over the coming years. As a matter of fact, the EIA estimates that Henry Hub's spot prices for natural gas will increase by 2.4 percent as producers begin drilling more oil, and especially in more difficult terrain.

So the question that I have is how will this exporting LNG impact the cost of natural gas for America's families and consumers and the manufacturers? Will this impact be significant, and will it be widespread in the various and different sectors of our economy? Will there be an overall gain or loss in manufacturing jobs and

other types of employment if we started exporting LNG? And so the impact on the American consumer is where I center my question. And anyone on the panel. Maybe, Senator Johnston, if you would be so kind to start it out.

Mr. JOHNSTON. Thank you, Mr. Rush.

That is a very key question, and it was the subject of the Cambridge Energy Research Associates' study: What was going to be the effect on consumers? And they examined the question from many different aspects and determined that it would not have an adverse effect on American consumers. The reason is that demand begets supply. The more demand you have, the more supply you have.

Now, in my home State of Louisiana, now, we have got what we call the Haynesville shale, some of the most prolific of the dry shale plays in America, but it is, for the most part, not being developed now because the price is a little bit too low. Now, you don't need a huge price to develop a Haynesville or some of the Texas shales, but you need more than you have got right now.

So what Cambridge said, and what other studies have shown, is that demand will produce more supply, and that the price effects will not be bad, that they will be good for the country.

Mr. DORGAN. There is a Brookings study on that point. There is a Council of Foreign Relations study on that point. And, you know, it is interesting. As we are talking here, one of the most significant oil plays on the face of the planet is in the Bakken in North Dakota. There is a substantial amount of natural gas. Most of it is being flared. I mean, if you fly over that place at night, it looks like another giant American city, because the price of gas at this point is not high enough to suggest to them they want to build the pipelines to gather it. The price of sweet light crude is where they are going to make profit up there, not collecting low-price natural gas. So we are burning a lot of natural gas at this point.

But my point was that there are studies that have been done, three of which I have looked at, that suggest export of natural gas would have rather minimal impact on the U.S. consumer.

Now, on the positive side, of course, it will reduce our trade deficit. There are a series of positive things that will come as a result of it.

Mr. RUSH. Ms. Jaffe.

Ms. JAFFE. So my organizations have studied that issue as well. I would say that over time the natural gas market—we are currently studying that market together with Harvard—the natural gas market is going to look more like the oil market. In other words, the United States will probably not be that isolated a market.

And if we do not export LNG from the United States, what will happen is gas from Canada will be exported through different projects that would be proposed of Canada. So you are going to have natural gas exports from North America one way or the other, and that will affect sort of a global effect on the price where in the end the price in Asia that you cited will come down over time as natural grass projects in Australia and other places come online.

We have a global surplus of natural gas. It will assert itself more and more over time, and I do believe that that would give protection to U.S. consumers.

You know, the oil industry is a cyclical industry, and, as many members of the panel have mentioned, sometimes when the price gets too low, companies stop drilling because they don't have profitability in a particular field, and that causes some volatility for consumers. But overall there is so much natural gas supply that it is hard to foresee we would go back to a condition that we saw several years ago where the price of natural gas in the United States was $10. It would take something very extreme to produce that kind of result.

Mr. WHITFIELD. The gentleman's time has expired.

At this time I recognize the gentlemen from Louisiana Mr. Scalise for 5 minutes.

Mr. SCALISE. Thank you, Mr. Chairman. I appreciate you having this hearing.

We have had a number of hearings in this committee about the new technologies, what technology has done to increase the supply. You know, years ago people thought there were short limits on how much oil we had left, of natural gas, and, of course, with the advancements in technology and then the Deepwater in Louisiana, Senator Johnston knows we have experienced even larger finds of large reserves of fossil fuels with the shale plays, as you mentioned in the Haynesville play. And I have been up there myself and seen just the job creation that it has created, but also the energy independence. And I have toured the Cheniere facility in southwest Louisiana, the first of those 20 facilities that are either looking to export LNG or, as Cheniere is, in the process of doing.

You know, there are so many opportunities for us to become energy independent within 10 years. It is a very realistic possibility if we get the policy right here in Washington. And unfortunately, as our hearings in the past have shown us, the policies have not always matched the goal of having energy independence. You know, for those of us who want an all-of-the-above strategy, which includes wind and solar, but being realistic about their limitations, and understanding the demands of a manufacturing economy, we are going to need to continue advancing the technologies that we have for fossil fuels as well.

I want to start with you, Senator Johnston, and then first thank you for your 24 years of service to the great State of Louisiana and to our country——

Mr. JOHNSTON. Thank you.

Mr. SCALISE [continuing]. For serving in the Senate, and especially for your leadership on the Senate energy committee. You know very well the challenges that we face.

In your testimony you talk about some of the times where the Federal Government gets it wrong. And probably all the times where the Federal Government tries to go and predict, whether it is with renewable fuel standards, and, you know, you cite the 2007 Congress projections that are now so far off that are our refineries are telling us they are hitting the blend wall. You know, you talk about the President's own predictions of I think it was, what, a mil-

lion electric cars on the road by 2015, and today we have 87,000 electric and hybrids.

So the government hasn't really been good at picking winners and losers. In fact, you know, we had the hearings here in this committee about Solyndra and that scandal, and where the government literally came and tried to pick winners and losers, and just ends up picking losers, and the taxpayers foot the bill.

If you can just expand on some of the things you talked about in your testimony about what would be a good strategy, as you cite Adam Smith and Wealth of Nations; and, you know, is government regulation versus a free market approach the right way to go. And, of course, history has a lot of indicators for which way is the better path.

Mr. JOHNSTON. Well, thank you very much, Mr. Scalise.

There are huge opportunities for natural gas and for other fossil fuels around the world. Qatar is a huge producer, Indonesia, Australia. Chevron has a facility in Australia they are spending $81 billion on, and they will be exporting all over.

In addition to that, you know, if the price did get too high, and I mentioned this to Mr. Whitfield, you can use coal to make chemicals. My son and I are involved in a plant in Lake Charles now which will make chemical precursors out of pet coke, which is essentially the same thing as coal. So there are huge opportunities for energy, and the market will sort those out. It is——

Mr. SCALISE. Do you——

Mr. JOHNSTON. You know——

Mr. SCALISE. Do you think it is an achievable goal. When those of us who talk about energy independence within 10 years—again, if we get smart policy, if we get the policy right out of Washington, do you think it is achievable that we can be an energy-independent Nation——

Mr. JOHNSTON. Absolutely.

Mr. SCALISE [continuing]. To secure that future for our country?

Mr. JOHNSTON. Absolutely. You know, they are drilling down in the Gulf of Mexico now below 30,000 feet, and they think there are huge, huge—a huge new undiscovered basin down there.

There are just tremendous opportunities if we just get the regulators out of the way. And, you know, we need regulation for a lot of things, for safety, et cetera, but when you are regulating the supply and demand of commodities, government just can't do that very well. You know——

Mr. SCALISE. Unfortunately the history has shown——

Mr. JOHNSTON [continuing]. On ethanol, they still haven't gotten it right. You know, we have known for years that they weren't producing any cellulosic ethanol, but they are still requiring it, and you would think the regulators would learn at some point.

Mr. SCALISE. We are going to keep pushing them to get there. So I appreciate all of your testimony, but, again, Senator Johnston for your leadership to our State.

And I would be happy to yield back the balance of my time, Mr. Chairman.

Mr. WHITFIELD. Thank you.

At this time I recognize the gentleman from California Mr. McNerney for 5 minutes.

Mr. MCNERNEY. Thank you, Mr. Chairman. Thank you for holding this hearing. I have enjoyed all of your testimony, so it is a great choice of panelists this morning.

I don't think there is really that simple of answers on these questions. We are producing more oil and gas, and that has some real benefits in terms of national security, which was brought out clearly; in terms of prices, which encourages manufacturing in this country, which we need to do. It encourages other benefits, too, employment, and that was brought out by Mr. Halleck.

But there are also some disadvantages: gas leakage into the environment, which is a global warming problem, perhaps more of a problem than the coal production that we are trying—that gas might displace. There is groundwater contamination. But it seems that the disadvantages could be mitigated with high standards for the wells and also with requirements for transparency for fracking and horizontal drilling.

Mr. Bradbury, would you comment on that, please?

Mr. BRADBURY. Sure. Well, thank you, Mr. Congressman, for the question.

Well, absolutely. I think—well, this is one of the good-news stories of the past year with EPA finalizing their New Source Performance Standards for well completions, requiring green completions for all new natural gas wells. Those standards, it would be useful and I think a commonsense measure to have those applied also to natural gas liquids and oil wells with associated gas. To have——

Mr. MCNERNEY. Especially with regard to the leakage.

Mr. BRADBURY. This would address leakage at the well as you are starting the production. You are doing the well, finishing the development, the well completion of the well.

Mr. MCNERNEY. Thank you.

Mr. BRADBURY. And so that is a commonsense standard that could be expanded beyond what is there.

Mr. MCNERNEY. Thank you.

Mr. BRADBURY. But there are also a number of other technologies that could be used——

Mr. MCNERNEY. Thank you, Mr. Bradbury.

Mr. BRADBURY [continuing]. Not just for wells, but across the spectrum.

Mr. MCNERNEY. Senator Johnston, I appreciate your comments about regulation of supply and demand is not necessarily a good place for us to go, but do you agree that we could use higher standards with regard to wells to prevent leakage and to prevent contamination of groundwater? Do think that is a good place for us to go here as a part of our policymaking?

Mr. JOHNSTON. Yes, Mr. McNerney. I think no one cares more or has more to lose than the oil companies, oil and gas companies, about leakage and pollution, and so I think that they are working hard, I really do believe, to have the highest standards.

One of the problems is that some of the smaller producers have yet to adopt the high standards. We need to adopt the highest standards, particularly for fracking, because public support of fracking is very, very important. I think it deserves public support, and I think that they will be able to do it safely. That was the con-

clusion of a study done by John Deutch, and Ernie Moniz was part of that study. They said we need to have the highest safety standards, but we need to produce through fracking.

Mr. MCNERNEY. I think you made an excellent point there, then. Public acceptance is absolutely critical. Based on past performance, there are problems. Communities are going to be reluctant to allow fracking in their areas without the right transparency and assurances that this is a safe process, and I don't feel we are quite there yet.

But I am going to go on to, Mr. Breen, I appreciate what the Truman National Security Project is doing with regard to the implications of our national policies in terms of national security, our national energy policies. How much work has the Truman Project done with regard to the implications of global warming on our national security?

Mr. BREEN. Thank you for the question. It is good to see you.

We have done quite a bit of it, as has, much more importantly, the Pentagon and the intelligence services. The consensus is that this poses a serious national security threat. The Natural Security Advisor Tom Donilon just gave a speech to that effect a couple of weeks back, saying that national security is threatened by climate.

Recently the commander of our forces in the Pacific was asked what his top national security concern was, which I think is an interesting question, given that he is responsible for China, North Korea and a whole host of other issues in the Pacific, and his answer was climate.

If you look at the accelerants of instability and the threats that come from this, with regard to terrorism, but also with regard to mass population migrations, terrorist recruiting, all kinds of issues, it is pretty clear that we are going to be dealing with this. And, as General Zinni likes to say, we can pay down now, and the cost will be in treasure, or we can pay down later, and the cost will be treasure and blood.

Mr. MCNERNEY. OK. I was going to ask, Ms. Jaffe, for your input on that, but I am running out of time, so I will have to yield back at this point. You were shaking your head, so I couldn't resist.

Mr. Chairman, go ahead.

Mr. WHITFIELD. Have you yielded back? OK.

At this time I recognize the gentleman from Texas Mr. Barton for 5 minutes.

Mr. BARTON. Thank you, Mr. Chairman.

I have got a photo on—several photos on my wall down in my office, and one of them has myself and Senator Johnston standing behind the first President Bush at the White House when he signed a bill that repealed the Natural Gas Policy Act.

Mr. JOHNSTON. I have got the same picture on my wall.

Mr. BARTON. Yes. And I was chairman of the conference committee in 2005 that Senator Dorgan was a part of, and we did meet in this room. Both of those bills were bipartisan bills. Both of those bills—the Energy Policy Act in 2005, over half the Senate Democrats voted for it, and a third of the House Democrats voted for it. So for these young folks on the second row here in front of me, there is hope. We might actually burst out in bipartisanship on LNG exports.

I would ask Mr. Bradbury, I listened to your comments, and if I interpret them correctly, my understanding is if we handle this fugitive methane emissions issue, at least your environmental group would support an LNG export bill; is that correct?

Mr. BRADBURY. Well, the World Resources Institute doesn't take a particular position on this specific issue, but certainly by reducing these upstream methane emissions, we could ensure that natural gas is lower-carbon-emitting—or lower-greenhouse-gas-emitting than coal or oil when oil and diesel fuel is used for transportation. If you get——

Mr. BARTON. You know, it wouldn't be the end of the world if the environmental community broke down and actually supported a positive energy-production bill. I mean, if we can meet the environmental standards, I know some of my friends on the Democratic side would be interested in being supportive. Former Chairman Waxman, if I heard him in his opening statement, said he has an open mind. And I know unless the minority leader Mrs. Pelosi has changed her mind, she has been a supporter of natural gas as a fuel. So we really do have some hope here.

I would ask Senator Johnston, on these pending permits what would be wrong with setting some standards, some guidelines for the Department of Energy in terms of environmental protection and perhaps capital reserves, and then approve them all if they meet those standards, and then let the market determine which of them actually gets the contracts to do the exporting? What would be wrong with that approach?

Mr. JOHNSTON. Well, as you know, for onshore facilities, FERC approves those, and they must meet those standards. That does not give them an export permit, but they must get a FERC permit or a NOAA permit for offshore facilities. So that takes care of the safety, and they must have the high standards there.

Now, the law provides that—it is an old law, it hasn't been updated and doesn't have a lot of standards, but it does say that DOE shall approve unless the national interest is against it. In other words, the preference is for approving, and I think that is proper. In other words, I think that the permit should be granted unless the case can be made against it.

Mr. BARTON. See, I don't think we are going to build 19 LNG export facilities. I don't think there is a world market. You are probably going to have one or two on the west coast, and one or two on the east coast, and one or two in the Caribbean, but if you let the market work, the market will sort, in my opinion, those types of things out.

The gentleman that talked so much about oil as a strategic, do you oppose natural gas being used for a transportation fuel, Mr. Breen?

Mr. BREEN. Absolutely not. No. I think in cases where natural gas is viable as a transportation fuel, particular medium and heavy trucking or garbage trucks, things like that, municipal fleets, we should be embracing any opportunity to lower the single-source dependence of our transportation sector on oil. I think that is good.

I think—I am also in favor of other technological approaches as well. I think the more diversity there is in that sector, the better off we are.

Mr. BARTON. OK. And finally, Mr. Halleck, as the person who is living in the real world in Ohio, what is the long-term expectation to the local economy in your area because of the Marcellus drilling activity? Is it positive, negative, short term, or is the expectation that it is going to create a stable employment base for decades to come?

Mr. HALLECK. Well, Congressman, we have been told that it is certainly 20 to 25 years. There have been some that has told us it is as much as 50, but I think conservatively 20 to 25 years. And it has certainly been a game changer in our area. And for the first time in—I was a commissioner back in the 1990s as well—we are not struggling like we used to to balance our budget.

Mr. BARTON. We have the Barnett shale down in my part of Texas, and we think another 50 years. And it is not nearly as big a reserve base as the Marcellus is.

Mr. HALLECK. Yes.

Mr. BARTON. With that, Mr. Chairman, I yield back. Thank you.

Mr. WHITFIELD. At this time I recognize the gentleman from New York Mr. Tonko for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. And welcome to our panelists.

Virtually all of you have addressed the question of whether we should or should not export LNG, and most have testified in favor of the government allowing exports of LNG. Senator Johnston noted that an LNG facility takes some 5 to 7 years to build at an investment cost of some $10 to $40 billion. A facility has to secure those long-term contracts for supplies, obviously, of the gas to export and from customers to sell it to.

I observed that there are markets at all scales, and the interest in exports appears to be driven primarily by a desire to maintain or expand production here in the United States, to ignore or override the signal our national market is providing to the gas-production industry, the low price indicating an excess of demand over supply and the market signal to reduce production.

The other benefits we may achieve nationally by exporting LNG would not drive this debate alone, so I expect we will export LNG. I am wondering whether you have opinions about what the right level of exports might be? How much exporting should we allow and from which areas?

Mr. JOHNSTON. My point really is that the market should determine that. And, you know, there are all of these market signals that are changing day to day. I mentioned some of those: the price of labor, the price of interest rates, diesel, steel, technology, capital availability, regulatory delay, et cetera. All of these are market signals which are changing month to month, day by day, and those are going to restrict the amount of LNG that you can export. And there are also these worldwide competitors: Australia, Indonesia, Qatar. All of these are going to be working simultaneously. And I don't think that any regulators, not this committee, not myself, not anybody, can determine a proper level.

I think the better way to do it is to let the market do it. The market is not perfect, but I think it is better than regulators would be.

Mr. TONKO. Any other one? Any other panelists have an opinion?

Yes, Ms. Jaffe.

Ms. JAFFE. I think that what you are going to find is that, first of all, it takes a long time, as the Congressman said, to build these facilities. And there are some regions that the cost of producing gas is going to be higher or lower than others. So, for example, in northwest Canada, the natural gas there is stranded.

So if we were to choose not to build, not to allow LNG exports from the U.S. Gulf of Mexico, those facilities, the economics would be that that gas would go out in that direction, that would raise the overall prices of North America to the small amount that would happen. So this idea that somehow if we were to block the Gulf Coast, that would help some manufacturer in my State of California and other places, that is not likely to happen, because there will be exports from North America when the market demands it.

But as I mentioned, there is so much natural gas in other places that I really do think that it probably would be a very small amount of exports that will come from the United States.

And if we had an export facility, one of the things that would happen is if I was a producer in another market, and I had a reason to seasonally store my LNG, because the United States has such giant saltstone storage for natural gas, we might find that producers would bring their natural gas here and store it and then have the opportunity to export it at a later date. So we might find that we provide what I call hub services, where the United States would be a focal point for export of natural gas globally in storage. And so we might actually benefit from having our facilities be used in a way that would help the international market, and we might have gas actually flowing here just as a storage facility.

Mr. TONKO. Well, I believe DOE has applications for some 30 facilities. How do they approach this? Do they—should they move forward?

Ms. JAFFE. Let me speak to that. As you know, we have more than a dozen LNG import facilities that were built that are going to be empty for the foreseeable future, maybe for, you know, 20 to 30 years. And obviously if the industry could forecast correctly how many facilities we need for export or import, we wouldn't have all these bankrupt facilities now that are sitting empty for importation.

So I think the fact that companies applied for a license is really pretty insignificant. What you really need to know is that there is one company, Cheniere, that has made a commitment to build a facility, and that facility will likely go.

In the natural gas business, there is something we call the first mover advantage. The first facility that gets built will be the profitable facility, if any facility will be profitable. I might question whether or not even any facility will wind up being profitable over the long term, but the point is if I am first, I am much more likely to make a business out of it than if I am fifth or tenth.

And so people put their licenses in. Thirty people might put their licenses in. Some of it is gaming: I want to get everybody else to be discouraged to do this, because there are so many of us. Right? And then maybe only the first one or two or three will ever get built. And if you think of how many facilities were built here in the United States to import, and how many of them got approved, and

how many of them are going to remain empty, you can think about the fact that those 30 applications are really meaningless.

Mr. TONKO. Mr. Chair, I yield back.

Mr. WHITFIELD. The gentleman's time has expired.

At this time I recognize the gentleman from Texas Mr. Hall for 5 minutes.

Mr. HALL. Thank you, Mr. Chairman.

And I also thank the two Senators there that I worked with for many years, both great leaders. And I enjoyed, Senator Johnston, following you and Lloyd Bentsen. You were simply great. And thank you for coming here today. And to you others, I appreciate the time you put into it and the time you have given us here with your testimony.

Joe, I was with you out there when we went West to sign the last good energy bill that this Congress has passed. And I well remember Bush giving some of us pins, but I well remember him, in good nature, turning to me and saying, Ralph Hall is with us because he likes the coffee on Air Force One. What he didn't know was I had six of his mugs in my briefcase at that time.

But, you know, Senator Dorgan, you are exactly right on your fine energy past, and history and support, and you are right when you say we must understand climate change. And we get a lot of that from the other side, too, and, of course, we should.

And we must understand, though, that we have also spent $34 billion and had very little change, climate change, very little effect on it. I just think that it is obvious that we have an administration that is antienergy. And the environmentalists did say don't drill on little ANWR, it is just 19 million acres there.

And I well remember we had, I think, 22 bills over to the Senate, and we had Senator Frist, I believe, Doctor, was the chairman then at that time. And he thought more like a businessman than he did about energy, in my opinion, because one of those bills got through, and Clinton vetoed it. And the Bushes had a shot at, I think, the other 20. And someone would get up to filibuster it, and the Senator would pull it down because I think he didn't want to waste the Senate's time. I really think he should have burned them down, let those who wanted to filibuster filibuster, and we would have some drilling on ANWR that we don't have now.

They say don't drill on little ANWR, it is just 19 million acres. If we don't want to drill on, what, a couple of thousand acres or a thousand acres there for 60, maybe 50 years of energy, I think we ought to be doing that.

I guess it is obvious that we do have an antienergy administration, and my question to you, I guess, Senator Johnston, is do you believe that our national energy policy is still mistakenly based on the belief that we are somehow in an age of energy scarcity?

Mr. JOHNSTON. You know, I don't really believe in energy scarcity. I think new supplies are pulled up all the time. They are based on technology like fracking. I well remember—you know, it wasn't very many years ago that we had almost not heard of shale gas. George Mitchell, down in your State, old friend of mine, you know, he went in with some DOE money and created that new technology, which has revolutionized America. Bakken oil and the

Bakken shale has revolutionized certainly my colleague's home State.

So I think there is not the scarcity that some talk about. I think we can be energy independent in this country, and I think it is a goal we should pursue.

Mr. HALL. And we talk about free market versus regulation. Of course, that is an easy choice for me, but if I would come down on the side of regulation, I would have some concern about the EPA and their regulation, their lack of science that they take into consideration as they——

Mr. JOHNSTON. Well——

Mr. HALL. They really damaged the energy thrust.

Mr. JOHNSTON. Well, I disagree with the EPA on some things, agree with them on others. Certainly we need the highest environmental standards, which I think we can, consistent with energy independence.

One of the things that neither EPA nor any other agency can do is allocate resources, and that really is the heart of my point today, that government regulatory bodies just can't allocate resources. Let them make safety rules, but don't try to allocate resources.

Mr. HALL. Thank you.

And I will just close with the fact that jobs are hurting us, and they are hurting for 18-, 19-year-olds, and graduates who want jobs and are seeking jobs. There are fewer jobs, and unless we change some things up here, we are not going to have very many employers a year from now. The most important word in the dictionary today other than "prayer" for young people is the world "energy."

And I thank you both, and I thank this panel for your input.

I yield back.

Mr. WHITFIELD. At this time I will recognize the gentleman from California Mr. Waxman for 5 minutes.

Mr. WAXMAN. Thank you very much, Mr. Chairman.

We have heard a lot lately about U.S. carbon dioxide emissions being at their lowest levels since 1994. The implication is that no further action to address climate change is necessary, and that is simply not the case.

As a result of increased renewable energy generation, a shift from coal to natural gas generation, and the economic recession, U.S. emissions have dropped in recent years. But what matters most is whether U.S. emissions are on track to decline in the future by the amount needed to prevent dangerous climate change, and I am not aware of any reputable expert who believes this to be the case.

Scientists tell us that our emissions need to decline by at least 80 percent below 1990 levels by 2050 to avoid a dangerous level of warming. The latest projections by the Energy Information Administration show that U.S. carbon dioxide emissions from fossil fuel combustion actually will be 13 percent higher than 1990 levels in 2040, the last year in EIA's model. There is an enormous gulf between what these emissions will be without additional action and what they need to be to avert catastrophic warming.

Senator Dorgan, you co-chaired a bipartisan panel that issued recommendations for our energy policy. Was there agreement that

climate change is a serious issue and that additional policies will be necessary to reduce greenhouse gas emissions?

Mr. DORGAN. Congressman Waxman, we did at the front end of this report indicate that we felt climate change was an issue that needed attention, it needed policy direction. We did not attempt in this report to create a policy framework for how we might address climate change, but we did indeed say that, well, we are going to cover a lot of energy issues, that climate issues were important and needed to be addressed.

Mr. WAXMAN. Thank you.

We need to think about LNG exports through the lens of climate change. If the U.S. is going to export LNG, if we are going to make long-term, multi-billion-dollar infrastructure investments, it is important for those exports to produce a climate benefit.

Methane emissions from the natural gas industry are a challenge in that regard. Methane is a potent greenhouse gas, and it is crucial that we reduce those emissions.

Mr. Bradbury, are there measures that can be taken to reduce methane emissions from the U.S. natural gas sector using existing technology?

Mr. BRADBURY. Yes. Absolutely, Congressman. There are—in a report we recently published, we identified a total of eight technologies that would cut these upstream greenhouse gas emissions by more than 50 percent. In my testimony includes more detailed analysis of that and through a couple of different scenarios.

Mr. WAXMAN. These measures are cost-effective as well?

Mr. BRADBURY. They are. And all eight that we looked at are definitely cost-effective.

Mr. WAXMAN. How long, Mr. Bradbury, would it take for these measures to generate enough savings to cover the cost of implementing them?

Mr. BRADBURY. The payback period—thank you for the question. The payback period, we found, is up to 3 years at most for each of these measures and technologies, sometimes only a few months. So we are talking about wasted energy in addition to a powerful and potent greenhouse gas, so it is much like energy efficiency, can be very cost-effective.

Mr. WAXMAN. What is a reasonable target for methane leakage? If we took the cost-effective steps you described, would we meet the target?

Mr. BRADBURY. Yes. There are a couple targets you would want to shoot for. For natural gas to be less greenhouse-gas-emissions-intensive than coal, you want your emissions levels to be—your methane leakage levels to be below 3 percent of total production. Right now, according to the recent EPA inventory, we are below 2 percent. So we are in a pretty good zone in that regard.

And a better target, I think, for total leakage would be 1 percent leakage as a portion of total production, which we can get to with these technologies and measures that I mentioned. At the 1 percent leakage point, that is where you are at break even with respect to diesel. If you are going to switch from natural gas to diesel, and you want there to be an immediate—diesel fuel for long-haul trucks, for example, if you want to have an immediate climate benefit.

Mr. WAXMAN. Thank you very much. I appreciate it.

I am obviously looking at this whole question before us from the perspective of climate change, but I know that there is a lot of focus on the exports, and I think Ms. Jaffe, who I am happy to see again, has made a very powerful case. I am open to that issue, I want to think about it. But as usual, you are very astute in your expression of things that we ought to take note of, and I thank you so much for your testimony, and all the other witnesses as well, especially my two former colleagues, who have such a distinguished record in the energy field.

Thank you, Mr. Chairman.

Mr. WHITFIELD. At this time I recognize the gentleman from Illinois Mr. Shimkus for 5 minutes.

Mr. SHIMKUS. Thank you, Mr. Chairman.

I am going to try to get to four questions in 5 minutes, so if I ask it concisely, and I get somewhat a concise response, maybe I can get that done.

I want to start with Mr. Bradbury there. Are you or any of your organization invested in any energy enterprises?

Mr. BRADBURY. No.

Mr. SHIMKUS. Actually have skin in the game——

Mr. BRADBURY. No.

Mr. SHIMKUS [continuing]. To be able to make a financial projection of whether there is a 3-year-to-1 payback on all this stuff? These are just theoretical, right? You are not putting real money into this?

Mr. BRADBURY. No, we are not putting our own money.

Mr. SHIMKUS. OK. That is—thank you.

Senator Dorgan, 2005, I was here, too. It was one of the great energy conferences where we actually debated amendments. I wish we could get back to that era, because it was a great debate in this committee room.

I did look at the executive summary. I didn't read the whole report. You do in the executive summary have a bullet point on transmission, but it kind of—you are really referring to the transmission pipeline for transportation of either natural gas or liquid transportation fuels; is that correct? Or are you talking about the electricity?

Mr. DORGAN. Mostly the electricity when we refer to that, but, you know, when you talk about transmission, you also want to be——

Mr. SHIMKUS. I think it is something we really have to focus on, because what we see going on right now—and I just read an article today about Canada and Maine, and the market will move a product, and it will—there is—it is dislocating other types unless we have a very good policy of incentivizing the building of more pipelines.

Mr. DORGAN. We do have—we have electric transmission problems and issues of stranded energy——

Mr. SHIMKUS. Right.

Mr. DORGAN [continuing]. Because we can't transport to the load centers——

Mr. SHIMKUS. Correct.

Mr. DORGAN [continuing]. Where you get wind or store——

Mr. SHIMKUS. Especially with the green.

Mr. DORGAN. And we also pipeline transmission issues.

Mr. SHIMKUS. Right.

Mr. DORGAN. Although we have built a lot of pipelines in the last 10 years, natural gas pipelines.

Mr. SHIMKUS. Right. There are stories about us—as reverse flowing now natural gas from the plays to maybe the LNG terminals and stranding refined product along the path of the old stranded—I would hope that is something we can look at, and I will look through your report to see. I think it is a big issue. I know of two areas where retailers are now being stranded by their product because of LNG movement.

Mr. JOHNSTON. Let me mention to you on oil, every day in the Bakken in North Dakota, they are transporting 500,000 barrels of oil a day by train; not by pipeline, by train.

Mr. SHIMKUS. Right.

Mr. JOHNSTON. Burlington Northern has——

Mr. SHIMKUS. Well, to address the greenhouse gas issue, what is a better ability if you are worried about this, I am personally not, but would be by pipeline; not by trucks, not by train, but by pipeline. So I would hope the environmental community—and we see what they are doing with Keystone XL, they are not helpful—they would understand that moving commodity products through pipeline is the most efficient, safest way, and actually in the greenhouse gas arena, it is a tremendous savings.

Mr. Halleck, I have got an article here from a local paper, southern Illinois paper, which is where I am from, and I just want a quick response to these two statements I have highlighted in this article.

Some envision the kind of economic boon they have heard about in other States: tens of thousands of workers drilling for oil and gas, local businesses barely keeping up with demand, and many municipal coffers flush with cash.

Is that what you have observed?

Mr. HALLECK. I would concur with that, though, while we are in much better financial——

Mr. SHIMKUS. Yes. This is poor southern Illinois. I represent 33 counties. And so there is—we have got a play coming, and so there is this whole debate, and you have lived it.

The other part that says, others are spooked by stories of housing shortages, towns overrun with strangers, torn-up roads, and claims of polluted water, and worry that drilling would forever alter the serenity, beauty and very character of an area they consider special.

Has that happened to your county?

Mr. HALLECK. That is not really a concern. The technology today is such that we actually have rigs that have been on site, and they are gone in 30 days. So that is no problem.

Mr. SHIMKUS. Great. Thank you.

And if the staff would put up this slide for Ms. Jaffe.

I also chair the Baltic Caucus. And I hope this comes up right. I have a picture here.

So that is a proposed LNG terminal that will go in in Lithuania. Also, I think there is one being proposed for Poland. I deal with

Eastern European issues, democracy movements. I have been very focused in Russia does extort their neighbors through energy.

If we have the ability to export liquefied natural gas, what does that do to two things: the ability of Russia to extort their neighbors, and the ability of the local Eastern European countries and allies, most of all who are NATO now, they are all in the EU, what does it help with their economy?

Ms. JAFFE. Well, I think it is very important. You raised an extremely important point, because, number one, we don't want Russia to use the threat of a cutoff of natural gas to create a wedge between us and our allies in Europe. We want everyone in Europe to feel a strong alliance, economic and otherwise, with the United States and not have to worry about their energy supply being curtailed by Russia.

Secondarily, you can imagine how positive it would be if the Russians threatened to cut off one of our allies in Europe, and an American company could supply them with natural gas through an export terminal from the United States.

Mr. SHIMKUS. You all did great. Thank you very much.

I yield back, Mr. Chairman.

Mr. WHITFIELD. At this time I recognize the gentleman from Texas Mr. Green for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman. And I said in my minute my ranking member gave me, but, again, I want to welcome our two Senators, and appreciate your leadership on energy for many years.

Senator Johnston, my only concern is that the one LNG export facility, Cheniere, it is on the Sabine side of Louisiana instead of on the Texas side, but the company actually is a Houston company, so we have worked together across that Sabine River for many years.

And, Senator Dorgan, it goes without saying, some of the success in the Bakken shale and the report that you just did, and I will have some questions in a minute.

Ms. Jaffe, I want to—we miss you in Houston at the Baker Institute at Rice University, but I know at UC Davis you are much closer to the wine country there, although we still have some Texas wine we are working on.

But I represent one of the largest petrochemical complexes in the world in east Harris County, and I got some pushback a few years ago for supporting LNG exports, because I also represent a lot of folks who work in the fields, whether they be in south Texas or west Texas or anywhere else. But I support the exports, not just from the free-market perspective, because we need the additional incentives for production in certain parts of the country. And producers in south Texas are still producing dry gas, natural gas, simply because they get liquids. And when I drive through south Texas, I see the amount of flaring of the dry gas. It hurts me, because I know those—one, it is bad for the environment, but all those producers would love to be able to have a market for that gas instead of sending it in the air. So our chemical industry and our utility sector want stable, low prices, but we need to ensure that the market will still be there and incentivize it.

Senator Dorgan, you testified that after reviewing several recent studies on the impacts of LNG exports, the Bipartisan Policy Center and Energy Board concluded that domestic gas prices are more likely to drive export levels than exports are likely to determine domestic prices. This is an important point, because I think it is a fear that we have 19 export applicants that could end up constructing export terminals. I just don't see our market allowing 19 of them. But why do you think the domestic gas prices more likely will drive the export levels than exports are likely to drive the domestic prices? Why do you think that is going to happen?

Mr. DORGAN. Well, first of all, I don't think any of us really understand very well the economics of moving liquefied natural gas from our country after recovering it and moving it halfway around the world. I don't think anybody fully understands the economics of it, but I do think that, you know, if natural gas prices were to rise in this country in any significant way, that would have an impact on whether it would be economical to continue that practice.

The studies suggest that there would be an impact, but it is very, very modest. And, you know, just how little we knew 5 years ago about where we are today describes how little we know today about what might or might not happen. All we can do is use an antenna for guidance on what should be the best practices and what should represent the best interests of our country.

Mr. GREEN. Well, and my colleague from Illinois, I was proud to be on the committee, we did the 2005 energy bill, and at that time Congressman Tierney and I actually had an amendment to that bill that federalized importing, because I have a chemical industry, and we were getting our lunch eaten by Rotterdam, and the North Sea gas is cheaper, so we wanted to import it. And now the good example of the Cheniere there in Sabine River, they built an import facility, but now they are investing another $2 billion to build an export facility. So you are right, our crystal ball just doesn't work as well as we would like to it do.

Ms. Jaffe, you mentioned the U.S. Asian allies, Japan and South Korea, are seeking flexible U.S. Gulf Coast LNG contracts for reasons of economic and geopolitical. Can you elaborate on their geopolitical calculation for wanting this LNG, particularly, obviously, Japan, because of their decision to downgrade nuclear, and they are buying that LNG from anybody who can sell it to them? So could you just elaborate on that?

Ms. JAFFE. Yes. I think that it is important in the context of the Arab Spring, and also, of course, in the past history with Russia, that these countries want to be able to buy natural gas from a market where there is a multitude of competitive players so the gas is not controlled by a state monopoly, they don't have to worry about there being a change of power in the country and suddenly their contract isn't honored, or that there is some leverage, geopolitical leverage, that is at—you know, brought to bear in the discussion of supply.

So the great thing about the United States market is that through innovation and competition, we have, you know, dozens and dozens and dozens of companies, and we have a very competitive market. We have what we call natural gas-on-gas pricing; so

in other words, we don't have an artificial price tied to oil or some other commodity.

So by allowing some amount of exports, what it means is countries like Japan or South Korea can ask for a natural gas price tied to a market price and not be subject to sort of artificial constraints, not have to worry about cutoff of supply. It just makes a big difference, makes a more dynamic market.

And I do think that what is going to happen over time, though, you know, one can never have a crystal ball, is that as the United States market is more connected with the global market, then what you are going to see is oil-linked price contracts imposed by a Russia or by a Middle East country will not be able to stay up, because there will be so much supply, and you have a global market, and you will have more flexible competitive markets, more projects will compete into different markets.

We have the industry developing these technologies where they have ships that can be moved from place to place to do production, or to have even a ship that can be a receiving terminal, and we will get to have a very commoditized market in natural gas where countries like Japan will not have to worry about their supply.

Mr. GREEN. Mr. Chairman, I know I am out of time. I had a question for Mr. Bradbury. I would like to submit it.

But I am glad we are at 2 percent leakage on methane, and that is below the 3. Believe me, every producer that I know would love to get down to 1 percent, because they would like to have that methane being sold on the market to somebody instead of releasing it into the air.

So again, thank you, Mr. Chairman.

Mr. WHITFIELD. At this time I recognize the gentlemen from Texas Mr. Olson for 5 minutes.

Mr. OLSON. I thank the chair.

And welcome to our panelists. Special welcome to our two Senators, Senator Johnston, Senator Dorgan; and Ms. Jaffe, who spent some time at the Baker Institute at my alma mater, Rice University, in Houston, Texas.

I am going to focus on the national security implications of LNG exports. Having deployed to the Persian Gulf and the Strait of Hormuz from June of 1994 until November of 1994, I have seen firsthand how important that region is to the global economy and, by extension, U.S. national security.

This new U.S. energy renaissance gives our country a once-in-a-lifetime chance to minimize the direct impacts on our economy from the Persian Gulf and to develop strong diplomatic relations and increase our national security. One way to do that, I think, is exporting LNG.

We have talked about benefits with Japan's recovery from the earthquake, tsunami, South Korea. I want to focus on the world's largest democracy, India. One in six human beings lives in India, over 1 billion people. That is a huge market potential for American companies. And I am blessed to have a consulate from the Indian Government in Houston, Texas, who just reported on board this past fall. I spent 3 hours having lunch with him, 30 minutes talking about their need for U.S. LNG. He said basically to keep their

economy growing, they have to have more sources of oil and gas, because they don't have much domestic sources at all.

They are not getting pipelines built from the west, not going to come through Pakistan. Obviously they don't get along together. To the north, the Himalayas. If you can get a pipeline through the Himalayas, God bless you, 20,000-feet altitude, man, oh, man. That is the eighth wonder of the world. And to the south is a region of the world that is quickly destabilizing, which seems like all terrorists are moving down towards Myanmar, that part of the world. And again they need, they want our gas. So, Ms. Jaffe, could you care to comment on giving India natural gas? Benefits to the United States? Cons?

Ms. JAFFE. I think the point that we really warrant to focus on is that the United States has this ability, which we have never had before, sort of like the opposite of Russia being able to cut people off, right? We might have the ability to supply our allies or to supply other countries. As we become more energy independent, and I really believe the combination of our improving efficiency of automobiles, combined with deep water and combined with the shale play, we are probably going to get to the point where we are not going to be—the imports we are going to have are going to be from Canada, or Saudi Arabia, is going to be bringing oil to the refineries it owns in the United States. And when we get to that point, we are going to have a lot of opportunities. We are going to have the opportunity to step up to the plate and we be the swing producer to the global market like the United States was in the 1960s. So we will have the opportunity if we have an ally that is having an energy problem, we will have the opportunity to offer energy aid through sales of exports. And indeed we might be able to use our Strategic Petroleum Reserve more flexibly if we have an ally that has a supply disruption.

So if you think about it, during Hurricane Rita and Katrina, how did we get past our terrible shortages in Houston and other cities is we were able to borrow gasoline from the emergency stockpile of Europe. And we, the United States, could wind up being in a position to be able to be a key supplier. We will be able to use our energy relationships to strengthen our national power. And when we have a better trade balance it will make us stronger in the global economy, we will be able to stand up to China in a different way because we are going to be an energy exporter when they are an energy importer. They are going to have the energy dependence that we have been talking about for 30 years and we are going to be a major energy supply source.

So we really have a tremendous potential here to get it right. And you are already seeing yourself with improved relationships with India, that they care about the United States from an energy point of view, and that is exactly the opportunity we have in front of us.

Mr. OLSON. Yes, ma'am.

Senators, either one care to comment about that, India LNG benefits for America?

Mr. DORGAN. Make a point: I would not want us to be talking about using SPRO in this country to help an ally.

Mr. OLSON. Oh, yes. This is pure exports.

Ms. JAFFE. Only if we didn't need imports at all. If we don't need any imports then we don't need the international tool. Our imports are not needed (off mike) our domestic production supply all our requirements.

Mr. OLSON. And I am on the negative side of my time, so I yield back the balance.

Mr. WHITFIELD. Thank you very much. At this time I recognize the gentleman from Pennsylvania, Mr. Doyle, for 5 minutes.

Mr. DOYLE. Thank you, Mr. Chairman. And welcome to all our witnesses, especially our two distinguished colleagues from the Senate. We appreciate your testimony.

Mr. Chairman, I have been engaged on this issue for quite some time now and been particularly interested in the role the Federal Government takes in permitting LNG export facilities. And unlike some of my colleagues on this committee, I have actually been pleased with the careful consideration DOE has given to the issue. You know, it wasn't that many years ago when companies were building LNG import facilities, making bets on the need for imported LNG to meet our energy demand. Who would have guessed in less than a decade these same companies would now be petitioning DOE to turn those import facilities into exports facilities? So I don't fault DOE for taking a cautious and careful approach to approving these permits.

By submitting a two-part study on the effects of LNG export on the U.S. economy and reviewing the hundreds of public comments submitted to those studies, DOE has taken the proper action to understand the issue. But that study showed us that in every scenario modeled LNG exports offer a net gain to the U.S. economy. This really shouldn't surprise any of us, the fact that economies gain from allowing trade is not new, but as a guy from Pittsburgh who has witnessed the effects of trade on the local economy I think what we should be concerned with is who gains, how much do they gain, and at what cost to the environment.

And while I remain convinced that LNG exporting should be both allowed and supported by the Federal Government, I don't believe a careless, blanket approval of all pending permits would serve the purpose of the American people.

Let me asked my two distinguished colleagues, you both indicate your support for LNG exporting whether by allowing the free market to act or by opposition to any kind of export ban, and I agree with that. Do you believe, though, that the Department of Energy does have a role to play, a proper role to play in the permitting of LNG export permits as determining it is in the public interest?

Mr. JOHNSTON [off mike]. A preference is to issue the permit, I think that is a proper role and I agree with you they did the proper thing in commissioning the study, the SPRO study which indicated in all of the different scenarios that it is in the national interest of consumers.

Mr. DOYLE. Yes, Senator Dorgan, you agree with that?

Mr. DORGAN. And I think, you know, I think ultimately there will be far fewer facilities built than the numbers that are being tossed around these days.

And let me before I leave here today, Mr. Chairman, have the record show my great restraint as an author of the renewable fuel

standard in 2005, my great restraint sitting next to my friend Senator Johnston without responding to a bit of it.

Mr. JOHNSTON. We don't grow corn in Louisiana.

Mr. DOYLE. And to both my colleagues, you believe DOE currently has the sufficient information to act on these remaining permits?

Mr. JOHNSTON. I believe so.

Mr. DOYLE. Yes. Thank you.

I want to will also ask Mr. Bradbury. First, I want to say welcome back to the committee, Mr. Bradbury, it is a pleasure to see you here. And as some of my colleagues on the committee may recall, Mr. Bradbury was instrumental in developing a mechanism in the Waxman-Markey bill, which later became called the Doyle-Inslee provision, which offered protection for energy-intensive and trade-exposed industries. It seems like you are back here today with some equally impressive work.

While I note my support for LNG exporting, I take seriously the concerns you have raised about methane leakage and life cycle emissions. As you know, EPA just lowered its estimates of methane leaks during natural gas production by almost 20 percent from what they had previously reported. Nonetheless, if concerns about methane leakage remain, it is important, I think, that we address them if we are going to support export of this resource to other countries.

So to that end, Mr. Bradbury, could you please help us understand how the technologies you cite in your testimony work? Can they really significantly reduce fugitive methane emissions while being cost effective and have payback periods of 3 years and less? Could you give us some detail on that? And then secondly, if these technologies help a company retain their product by not letting it escape into the air, why aren't gas companies making the investment in them?

Mr. BRADBURY. Well, thank you for the question. I will do my best to respond as quickly as possible. And to the first question also, I think as a partial response to Mr. Shimkus' question earlier, which is that our projections of payback period for these technologies are actually not theoretical, they are based on published estimates from actual experience with these technologies, which you can find on Natural Gas STAR Web site and other sources as well.

So as I noted earlier in response to Mr. Waxman's question, it really is, this is analogous to energy efficiency. You are not wasting product and so there is a benefit economically over time. More details on these technologies to some extent are in my testimony, but also in a full report, which I would be happy to share with you and discuss afterwards.

A couple technologies I mentioned initially. So green completions I also mentioned earlier, which is very cost effective and now required for gas wells. There is the use of plunger lift systems for liquids unloading, it is essentially to remove liquids from a well so that gas can flow more freely. These systems avoid venting that is unnecessary when you are cleaning these wells up that could be used more widely. And just simple leak detection and repair, so sending people out to these sites to identify the leaks and then re-

pair them. Of course it puts people to work doing that and you can get a good payback as well.

And there is a final point I really would like to emphasize. The reason that companies aren't doing this in some cases, there are a couple of different answers. It is similar to why companies don't always have the most efficient systems in terms of energy efficiency, is there are competing priorities for investment and there is also market structure issues. The production company that owns the gas is often not the same as the service company or midstream company that processes the gas or the pipeline companies through which the gas flows. And FERC has authority over that to set tariffs and rates, but sometimes they are structured so that this is just a pass-through cost. So while it would beneficial for the environment and to consumers to reduce these leaks, it is not necessarily aligned properly through the market structure in terms of business interest.

Thanks for the question, and great to see you again and great to be back. Thanks for your remarks.

Mr. WHITFIELD. The gentleman's time has expired. At this time I recognize the gentlemen from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman. And I, too, would like to thank the rest of our distinguished panel for being with us today to talk about this important topic.

Mr. Halleck, you and I come from a region of the State of Ohio and a region of America where people are struggling. Unemployment is still excessively high. Many Americans struggle to provide their children with the clothes and supplies that they need to go to school. The average median income is well below the national average. Double-digit unemployment through much of our region. What is happening in oil and gas in Ohio is a big deal to the people that live there.

In your testimony you talked about the astounding blessing that gas production, oil and gas production has meant to our county. Can you illustrate for us a little bit about what this transformation has been? What was it like prior to oil and gas development?

Mr. HALLECK. Well, Congressman, what brought me initially some 30 years ago to Ohio, formerly I was in the clothing business. And I have watched the steel mills in our area, the automobile industry, I have watched a lot of things over the past 30 years, some through automation, but importation, just an overall decline in the economy in that part of our State. And there is really nothing to replace that. Someone asked me the other day about, what do you know about oil and gas, and I said really not much other than what I watched on the Beverly Hillbillies growing up. And I say with all due respect to our constituents, there is actually some of that today that is going on.

I have been told we have over 200 new millionaires just in the county I represent. It is conservative by nature so you wouldn't always know that, but I can just tell by looking at the percentage that our general fund budget in terms of our sales tax, property taxes, and others has drastically improved. But it has been a game changer and it has given opportunity certainly to those that aren't only about I think 8, 10 percent of our communities went on to higher education. And this gives these folks that would lean more

towards vocational training some, really some $100,000-a-year jobs that normally they would never have.

Mr. JOHNSON. Sure. Let's talk a little bit about LNG exports. As you know, I have been a staunch supporter of LNG exports as well. We live in a manufacturing corridor. You talked about the steel mills. Manufacturing is an industry that is very important to the economy of our region. Can you talk a little bit about how important you think it is that we open up the lines for exporting liquid natural gas?

Mr. HALLECK. Well, if the estimates, and I am sure a lot of the reports have been maybe overly optimistic, but even if they are just optimistic, they are overwhelming in terms of the supply that we would have. In fact, Senator Johnston and I were talking earlier, in my humble opinion it would seem to me that if—we were talking about flaring—if we get to the point where natural gas is too cheap, then, for lack of a better term, they would turn off the spigot. I think it not only would stabilize prices, but certainly give us a sense of energy independence.

Mr. JOHNSON. Do you see increased exporting of liquid natural gas as a threat to a manufacturing resurgence in Ohio or do you think it would help?

Mr. HALLECK. No, I think it would help. I don't see it as a threat.

Mr. JOHNSON. Great. Great.

We often hear from Hollywood and from opponents of oil and gas development that the only people that are benefiting from the oil and gas boon in places like eastern and southeastern Ohio is some CEO of a distant oil and gas corporation. How widespread has the benefit been? You talked about the new crop of millionaires that have been created, can you expand on that a little bit?

Mr. HALLECK. Well, it is certainly a trickle-down affect. Just in our county the other day we asked, there was a parcel of property that we own, or the county, I should say, and they wanted to use because it was close by a small stream for water. Just in a 2-week period it brought in almost $40,000. Now, that would not be a lot of money in Los Angeles, but that would be a lot of money in Lisbon, Ohio. That is just one small example.

If you look at the farm equipment, because we are an agricultural community, which is not taxed, there has been literally tens of millions of dollars through the royalties that have been spent on people that were leasing land. So it is far reaching, and it is a trickle down certainly.

Mr. JOHNSON. Well, thank you very much.

Mr. Chairman, thanks for letting me participate and I yield back.

Mr. WHITFIELD. The chair recognizes the gentleman from New York, Mr. Engel, for 5 minutes.

Mr. ENGEL. Thank you very much, Mr. Chairman.

Several years ago I founded the Oil and National Security Caucus, and one of the reasons I have an open mind about all of this is that I think that we cannot really be free with our policies as long as we rely on foreign oil. And so anything that can ramp up production of domestic resources for energy is something that I think we should look at, albeit there are some safety concerns, there are some environmental concerns. But I think it is something that we need to look at.

So I have been focused on North American energy independence, and the increase in natural gas supplies obviously are a boon to this possibility. Can someone speak, I want to piggyback on the exporting of LNG, will we hurt our long-term energy security? Can someone speak to the long-term impact of exporting LNG? I know there is a rush to say that we should export it, but, you know, I am wondering should we not try to keep more for domestic purposes.

Ms. JAFFE. I think the one thing you need to bear in mind, because of course markets change, and I know there is a concern, first people are telling us we don't have enough resource and then suddenly we have this hugely abundant supply. I think the point is that nothing is irreversible. So we can allow LNG exports, they can bring a benefit to our trade balance and our international stature. And if some later date 30 years from now or 20 years from now we find that that policy no longer fits we might have different circumstances, we can revisit it. I don't see that it is necessarily going to be a threat to our energy security.

There is a lot of opinion about how much resource we have. I do believe that the resource is so extensive that we probably could export a substantial amount from several terminals and have it actually not affect prices all that much except maybe occasionally seasonally. And I think that one of the impacts, I mean the reason that a Japan or an India or a South Korea are lining up to buy these exports is because they actually see a price advantage. In other words, they are paying very high-priced oil-linked prices for natural gas. If they could at least have our market integrated, we have what we call gas-on-gas pricing, then they could move the market to a more competitive footing where natural gas prices would trade based on natural gas prices and not based on instability in the Middle East.

There is great advantages to having all the oil globally in the system move to natural gas. Japan is burning crude oil and oil for both electricity, and also China uses oil in their petrochemical industry. Just for both environmental reasons and for strategic reasons we would want to see the world moving more away from oil in those industries and even maybe in transportation to natural gas because it is so much more plentiful and so less controlled by artificial forces like Russia or OPEC.

So I think that it is important at this time when we have the luxury of having abundance to make a statement as the United States that we favor free trade, we are going to honor our free trade agreements, we export natural gas to Mexico. I don't think we can turn around and tell South Korea, that we also have a free trade agreement with, but somehow we are not going to provide them with the same opportunities.

So I think that we really have to look at the balance of our strategic and foreign policy and understand that at least in the immediate term chances are these exports are not going to affect domestic consumers, right? And, you know, again I want to emphasize this is sort of a topic for another time. When we export refined products in this country we are going to export LNG. The way to ensure that consumers are not harmed in a case where we have a sudden seasonal change in temperature or we have a sudden refin-

ery accident and there is a disruption, the way to do that is to ensure that we have minimum inventory standards for companies operating in this country, which they have in Europe and they have in Asia. We can say that you have to hold a certain number of days of your customer supply. And the reason we have volatile prices in this country is that we don't do that, even though if we did we would not have to worry about the impact on consumer prices of being part of a global market.

Mr. ENGEL. Well, thank you. I had another question but I guess all my time is used. I just want to welcome back our colleagues Mr. Dorgan, Mr. Johnston.

Good to see both of you. Thank you all.

Mr. WHITFIELD. Thank you, Mr. Engel.

And thank the witnesses once again. We genuinely appreciate your being here with us to talk about this important subject matter. And I want to ask unanimous consent that we enter into the record a letter from Congressman Michael Turner on this issue, the mayor of Youngstown, Ohio, and the Cato Institute. And the record will remain open for 10 days for any additional submissions.

[The information appears at the conclusion of the hearing.]

Mr. WHITFIELD. Do you have a comment, Mr. Rush?

So with that, today's hearing is concluded, and we look forward to working with all of you as we move forward. Thank you.

[Whereupon, at 12:30 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

MICHAEL R. TURNER
Third District, Ohio

COMMITTEE ON ARMED SERVICES
CHAIRMAN
SUBCOMMITTEE ON
TACTICAL AIR AND LAND FORCES

COMMITTEE ON OVERSIGHT AND
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May 7, 2013

House Committee on Energy and Commerce
Subcommittee on Energy and Power
"U.S. Energy Abundance: Exports and the Changing Global Energy Landscape"
Statement for the Record
The Honorable Michael R. Turner

Chairman Whitfield, Ranking Member Rush, and Members of the subcommittee, thank you for the opportunity to submit a statement for the record for this important hearing.

Helping our allies diversify their energy resources is important to strengthening our strategic partnerships and bolstering security. That is why I authored H.R. 580, the Expedited LNG for American Allies Act, which seeks to help bolster our alliances, reduce the trade deficit and boost job growth right here at home. Specifically, the bill streamlines the regulatory process to export natural gas to NATO countries, Japan and possibly others. H.R. 580, the House companion measure to Senator John Barrasso's (R-WY) S. 192, is an updated version of legislation from the 112th Congress introduced by Senator Richard Lugar (R-IN) and myself.

Over the last several years, exploration and development of U.S. natural gas, particularly shale gas, has increased significantly. The United States is one the largest producers of natural gas in the world, and according to the U.S. Energy Information Administration (EIA), has nearly a 100-year supply. In fact, last week, the Department of the Interior announced that there is three times the amount of shale gas in North Dakota, South Dakota and Montana than previously estimated.

As a result of increased production, the price of U.S. natural gas has fallen, making it competitive in the global market place. This presents significant opportunities to export U.S. natural gas and create American jobs. A recent Department of Energy-commissioned report found that increasing exports of natural gas would have positive economic benefits for our country. In my home state of Ohio, exploration and development in the Utica Shale would have a $5 billion economic impact and create or support nearly 66,000 jobs in Ohio by 2014.

As energy security continues to play an important role in global relationships and dialogue, increased U.S. natural gas production also stands to benefit our strategic allies abroad. In my role as Chairman of the U.S. Delegation to the NATO Parliamentary Assembly, many foreign leaders and officials have expressed to me the need to diversify energy resources away from one source or from unstable regions. Several of the largest natural gas importers are also NATO members with strong national security ties to the United States.

In recent years, various disputes have caused several European countries to experience natural gas supply disruptions from Russia, the largest supplier of natural gas to Europe. Turkey relies on 20 percent of its natural gas from Iran. Earlier this year, Islamist militants attacked a natural gas facility in Algeria, which is the third largest exporter of natural gas to Europe.

Japan, a strategic ally in Asia and already the world's largest importer of natural gas, may need to seek greater imports of natural gas as a result of its 2011 nuclear plant disaster. Japan already relies on 42 percent of its natural gas from Russia, the Middle East and North Africa. According to recent press reports, Japan is negotiating with Russia to import more natural gas.

Increasing natural gas exports would not only help reduce our trade deficit and create jobs for American workers, but also help our key allies diversify their energy resources, bolster their energy and national security, and strengthen our strategic alliances.

There have been several studies examining the geopolitical impact of exporting U.S. natural gas. A recent report by the Brookings Institute entitled "Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas" states:

> *"The risk of high reliance on Russian gas has been a principal driver of European energy policy in recent decades. Among central and eastern European states, particularly those formerly aligned with the Soviet Union such as Poland, Hungary, and the Czech Republic, the issue of reliance on imports of Russian gas is a primary energy security concern and has inspired energy policies aimed at diversification of fuel sources for power generation. From the U.S. perspective such Russian influence in the affairs of these democratic nations is an impediment to efforts at political and economic reform. The market power of Gazprom, Russia's state-owned gas monopoly is evident in these countries."*
>
> *"...the addition of a large, market-based producer will indirectly serve to increase gas supply diversity to Europe, thereby providing European consumers with increased flexibility and market power."*

On our key partnerships in Asia, the Brookings Institute report states:

> *"Increased LNG exports will provide similar assistance to strategic U.S. allies in the Pacific Basin."*
>
> *"...the ability of the United States to provide a degree of increased energy security and pricing relief to LNG importers in the region will be an important economic and strategic asset."*

A study by Deloitte entitled "Exporting the American Renaissance – Global Impacts of LNG Exports from the United States" states:

> *"Maintaining market share and oil-indexed prices are major concerns for Russia."*

> *"Russia has jealously guarded its European market share through control of its pipeline transit capacities. By restricting access to its pipelines, Russia is able to prevent supplies from other countries...from reaching lucrative European markets and competing with Russian supplies."*

> *"U.S. LNG exports will likely apply greater pressure on Russia and other gas exporters to transition to competitively set prices."*

The surplus of U.S. natural gas production is already having an impact on global natural gas markets. Natural gas previously destined for the United States, but no longer needed as a result of increased production, was diverted to other markets. In 2012, nearly half of natural gas supplied to Europe was purchased under spot contracts. A recent article in the Wall Street Journal entitled "In Reversal, Neighbors Squeeze Russia's Gazprom Over Natural Gas Prices" states:

> *"In Europe, where Gazprom once had a reputation for hardball tactics and dictating prices, customers are tapping new sources. Booming shale-gas production in the U.S. has freed up vast quantities of other fuel from around the world, including American coal no longer needed at home. With that new leverage, Gazprom's European customers have squeezed billions of dollars in discounts from the company, and they are pressing for more."*

Under section 3 of the Natural Gas Act, companies seeking to export natural gas must receive permits from the Department of Energy, which determines if such exports are in the public interest. Export permits to countries with which the United States has a Free Trade Agreement (FTA) are automatically approved. For non-FTA countries, there is a regulatory process to determine if such exports are in the public interest.

In general when it comes to exporting U.S. goods, we often talk about barriers in other countries our U.S. producers must overcome to sell their products overseas. In this case, we have, in fact, placed regulatory barriers on ourselves to sell natural gas to consumers willing and eager to buy.

There are currently 20 applications before the Department of Energy from companies seeking approval to export natural gas to non-FTA countries. As the Department of Energy evaluates these applications, I hope it takes into consideration not only the domestic economic benefits, but also the opportunities to strengthen our strategic partnerships with key allies and bolster our national security.

At the same time, I believe we can do more to help our allies diversify their energy resources while creating job opportunities right here at home. My bill, H.R. 580, the Expedited LNG for American Allies Act, would make approval of export licenses to NATO countries and Japan automatic. The measure also creates a process that allows the addition of other foreign countries to this list if the Secretary of State, in consultation with the Secretary of Defense, determines that it would be in our national security interests.

Mr. Chairman, exporting U.S. natural gas presents opportunities to create American jobs while helping to bolster our strategic alliances. Thank you again for the opportunity to submit a statement for the record. I look forward to continuing to work with you on this important issue.

CITY OF YOUNGSTOWN
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May 3, 2013

Chairman Ed Whitfield
Subcommittee on Energy and Power
Rayburn House Office Building

Re: U.S. Energy Abundance: Exports and the Changing Global Energy Landscape

Dear Chairman Whitfield,

Regrettably, I am unable to attend today's hearing. However, I do wish to express my support for the Department of Energy moving expeditiously to approve the construction of new liquefied natural gas (LNG) export terminals to allow US produced natural gas to reach additional export markets.

As stated in my previous letter, I have witnessed personally the direct and indirect jobs created by natural gas production in the Youngstown region, jobs that are critical for our local and state economies. It has already created more than 38,000 jobs in Ohio, and is expected to create more than 143,000 by 2025, strengthening our economics and improving the tax base. As mayor of a city with a shrinking tax base, these jobs are critical to sustaining the basic services that our citizens deserve, such as police and fire safety. Concurrently, sustainable natural gas prices will benefit the domestic manufacturing sector and continue to maintain affordable home energy prices and support our transportation needs.

Thank you for your consideration of my views and for the opportunity to comment on this important matter. I urge your support for an expedited approval process for LNG export which will provide critical support for an industry that stands to benefit workers and consumers in the Youngstown region, throughout Ohio, and across the country.

Humbly Submitted,

Charles P. Sammarone,
Mayor

May 6, 2013

Chairman Ed Whitfield
Subcommittee on Energy and Power
House Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Whitfield,

Please find the attached Cato Institute paper submitted for inclusion in the record for the May 7, 2013 hearing of the U.S. House Energy & Power subcommittee on "U.S. Energy Abundance: Exports and the Changing Global Energy Landscape". I am an adjunct scholar with Cato and an international trade attorney who has worked and written extensively on global energy and trade policy. My latest paper, "License to Drill: The Case for Modernizing America's Crude Oil and Natural Gas Export Licensing Systems," explains how the United States' current natural gas export licensing system, as well as a similar system for crude oil, does not reflect the realities of the modern American energy market and raises serious economic and policy concerns. In particular, the systems contradict longstanding U.S. policy towards energy exports and export restrictions, appear to violate U.S. obligations under the World Trade Organization agreements, and could subject U.S. exporters of downstream products to anti-subsidy duties in key foreign markets.

As most of the current debate surrounding LNG exports has centered on the short-term approval of pending export licenses, I hope that my paper will prompt Members of Congress to consider a broader overhaul of the problematic system under which those applications were filed. Such reforms would not only help to stabilize the U.S. energy market, benefit the U.S. economy and resolve numerous policy concerns, but also let the free market, not the whims of Executive Branch regulators, determine the future of American and global energy trade.

Best regards,

Scott Lincicome

HERBERT A. STIEFEL CENTER FOR TRADE POLICY STUDIES

Free Trade Bulletin

No. 50 • February 21, 2013

License to Drill: The Case for Modernizing America's Crude Oil and Natural Gas Export Licensing Systems

by Scott Lincicome

Introduction

Revolutionary extraction technologies have helped increase the supply of fossil fuels in the United States, driving down prices, spurring economic activity, and potentially reversing the longtime status of the United States as a net energy importer to a significant exporter. Impeding that transition are outdated federal regulations—in particular discretionary export licensing systems for natural gas and crude oil—that restrict exports, distort domestic energy prices, deter investment, and encourage graft. They also subvert some of the Obama administration stated policy objectives and could run afoul of U.S. international trade obligations.

Despite the potential economic windfall, opposition to exporting natural gas and crude oil has materialized among certain domestic consuming industries and environmental groups, causing the administration to delay any approvals on pending export-license applications. But there are compelling reasons to approve those applications and to overhaul our disjointed, anachronistic, export license systems to properly reflect the new energy landscape. This paper describes those reasons and provides a basic roadmap for reform.

The New American Energy Landscape

Fossil-fuel extraction technologies, such as hydraulic fracturing ("fracking") and horizontal drilling have revolutionized the U.S. energy market. According to the U.S. Energy Information Administration, domestic production of crude oil and natural gas has skyrocketed in recent years and is projected to stay at relatively high levels for decades, even assuming existing state and federal restrictions on production and transport.[1] As summarized by economist Mark Perry, "U.S. oil production reached a 15-year high in 2012 with a yearly increase that was the largest in history, net oil imports fell to a 21-year low, and U.S. energy self-sufficiency rose to a 22-year high last year."[2]

The production spike has driven down domestic gas and oil prices, creating a significant gap between U.S. and international market prices. As shown in the chart, natural gas prices in Japan, the world's largest liquid natural gas (LNG) consumer, were more than five times higher than U.S. prices in 2012, and European prices were three to four times higher.

The increase in domestic energy supplies and resulting decline in prices has been a boon to downstream industries, such as electricity generators and petrochemical producers that rely on fossil fuels for energy or feedstock. According to the Boston Consulting Group, low energy prices have contributed, and will continue to contribute, to an American "manufacturing renaissance" in terms of domestic employment and export competitiveness in these sectors.[3]

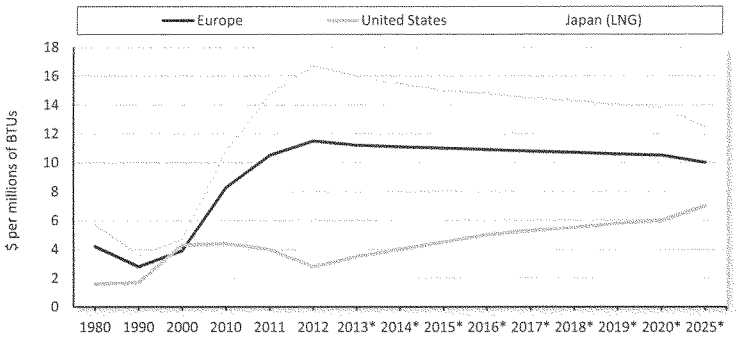
The resulting price differentials have U.S. energy producers positioned to become a global exporting powerhouse, and could reverse the United States's historic position as a net energy importer. According to a November 2012 report by the International Energy Agency, the United States could become a net exporter of natural gas by 2020 and will be "almost self-sufficient in energy, in net terms, by 2035."[4] That same report estimates that the United States will become the world's largest oil producer by around 2020, causing North America to emerge as a net oil exporter by 2035.[5]

Fossil Fuel Export Restrictions and Pending Applications

It would be difficult for those market projections to materialize under the current regulatory environment. In particular, natural gas and crude oil exports continue to be governed by licensing systems adopted when the United States was a net energy importer and dependent on fossil

Scott Lincicome is an adjunct scholar with the Cato Institute and an international trade attorney with White & Case, LLP. The views expressed are his own.

Figure 1
Natural Gas Prices 1980–2025 (projected)



Source: World Bank, "Commodity Price Forecast Update," January 15, 2013, http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1304428586133/Price_Forecast.pdf.

fuels for energy production—a picture far different from the production, price, and trade realities that exist today.

The U.S. government regulates natural gas imports and exports under the Natural Gas Act of 1938 and its amendments. Under the current law, all natural gas exports must be authorized by the Department of Energy (DOE), and authorization will be granted unless exportation "will not be consistent with the public interest." Exports to free-trade-agreement (FTA) partner countries are deemed to be consistent with the public interest, and DOE must therefore grant license applications "without modification or delay" when the customer is in a country that is an FTA partner.

Exports to non-FTA partners are presumed to be in the public interest, but this presumption can be rebutted with evidence that the exports would be inconsistent with the public interest. Neither U.S. law nor agency practice establishes binding, objective criteria that DOE must apply when determining whether an export license application meets the public-interest requirement. Moreover, DOE has explained repeatedly that, while it has developed various criteria for evaluating an application, the agency retains complete discretion when deciding whether to grant a license. For example, in a December 2012 letter to U.S. Senator Ron Wyden (D-OR), DOE listed the criteria that it applies: (i) domestic need for the natural gas proposed for export; (ii) adequacy of domestic natural gas supply; (iii) U.S. energy security; (iv) impact on the U.S. economy (GDP), consumers, and industry, including impact on domestic natural gas prices; (v) job creation; (vi) U.S. balance of trade; (vii) international considerations; and (viii) environmental considerations. DOE reiterated, however, that the listed criteria "are not exclusive" and that "other issues" may be considered.[6]

To date, DOE has granted one long-term application to export domestically produced LNG to non-FTA countries—for Sabine Pass Liquefaction, LLC, in 2011. Sixteen other natural gas export license applications, dating back to 2010, remain pending.[7] After the Sabine Pass approval, DOE undertook a two-part study to evaluate the cumulative economic impact of LNG exports. The Energy Information Administration (EIA) conducted the first part of the study, which examined the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several export scenarios.[8] The second part of the study, conducted by the private economic consulting firm NERA and originally due before the November 2012 election, was issued on December 5, 2012.[9] The NERA report assessed the potential macroeconomic impact of LNG exports. Neither the EIA report nor the NERA report examines the national security implications of potential gas export transactions.

Both reports have been placed in all 16 pending export license dockets. The DOE solicited, and has received, initial public comments on the study. Reply comments are due by February 25, 2013. The agency stated that it will only begin to make final decisions regarding the pending export applications when it has evaluated both the study and all comments. At that time, applications will be evaluated in the order of priority announced by DOE earlier this year.[10]

The federal government regulates exports of domestically produced crude oil pursuant to the Energy Policy and Conservation Act of 1975, which instituted an export licensing system intended to address "short supply" conditions in the United States. Under the current system, all U.S. exports of crude oil require a license from the Bureau

of Industry and Security (BIS), an agency within the Department of Commerce.

The approval of crude oil export license applications by BIS will depend on whether the transaction meets certain listed criteria. According to the Export Administration Regulations (EAR) on short-supply controls, approval standards are divided among two categories of crude oil exports: (i) presumption of approval, and (ii) approval only in the "national interest."[11] For the first category, BIS will approve export applications that satisfy one of several discrete conditions, including "exports to Canada for consumption or use therein."

For the second category, BIS will review applications on a case-by-case basis and "generally will approve such applications if BIS determines that the proposed export is consistent with the national interest and the purposes of the Energy Policy and Conservation Act [EPCA]." The agency retains discretion to approve or reject these applications, although the EAR notes that two types of exports "will be among those that BIS will determine to be in the national interest and consistent with the purposes of EPCA": (i) those with equivalent crude oil or other petroleum product imports, made under contracts that may be terminated if U.S. petroleum supplies are interrupted or seriously threatened, and where the applicant can demonstrate that, for compelling economic or technological reasons beyond his control, the crude oil "cannot reasonably be marketed in the United States"; or (ii) those involving temporary exports or exchanges that are consistent with various statutory exceptions.

According to an April 2012 Congressional Research Service report, few crude oil export license applications have been granted under the "national interest" exception, and none since 2000.[12] The *Financial Times* reported in October 2012 that six companies have applied for export licenses for shipments to Canada and other countries. The BIS has not yet announced its decision on these applications, and the proceedings are confidential.[13] Thus, similar to the export licensing system for natural gas, BIS has discretion to consider license applications for most crude oil exports under the "national interest" rule, and several pending applications have been delayed for months.

Policy Concerns Raised by the Current Licensing Systems

U.S. export licensing restrictions on natural gas and crude oil raise significant economic, legal and political concerns.

The current export restrictions create a host of economic problems. First, by depressing domestic prices and subjecting export approval to government discretion, the U.S. licensing systems retard domestic energy production, discourage investment in the oil and gas sectors, and destabilize the domestic energy market. Artificially low prices prevent producers from achieving a sustainable rate of return on the massive up-front costs required to drill and extract oil and gas, and investors lack any assurances under the discretionary licensing systems that domestic prices will not collapse when output increases. In fact, recent low domestic gas prices caused many U.S. energy companies to sell assets and shutter new projects.[14] These same concerns affect the domestic crude oil market[15] and have led the IEA to warn that the current export restrictions have put the "American oil boom" at risk.[16]

According to the EIA report commissioned by DOE, increased natural gas exports would lead to higher prices followed by increased domestic production.[17] But prices are not expected to skyrocket, and consumers will continue to benefit from hypercompetitive fuel and feedstock supplies. Independent reports from the Brookings Institution and Deloitte project that permitting gas exports would lead to a small and gradual increase in domestic natural gas prices.[18] Such predictability and consistency is good for the industry and the overall stability of the U.S. energy market—it would prevent boom and bust cycles of high/low prices and high/low production that hurt the U.S. economy and prevent companies from implementing long-term investment, production, and hiring strategies. The current situation—in which oil and gas export decisions are left the whims of federal regulators—has the opposite effect.

Second, restricting U.S. gas and oil exports could hurt the U.S. economy. Recent studies indicate that U.S. natural gas producers could earn up to $3 billion per year from exports.[19] The Sabine Pass liquefaction facility—the lone DOE approval, thus far—is projected to create 30,000 to 50,000 new American jobs.

The export benefits would not be limited to energy producers, however. The NERA report found that LNG exports, even in unlimited quantities, would produce gains in real household income.

Beyond the economic problems, both export licensing systems raise serious concerns under global trade rules. First, the U.S. export licensing regimes for natural gas and crude oil likely violate U.S. obligations under the General Agreement on Tariffs and Trade (GATT). Under GATT Article XI:1, WTO Members are generally prohibited from imposing quantitative restrictions on imports and exports. Under Article XI and related WTO jurisprudence, "discretionary" licensing systems (i.e., those in which the administering authority has the freedom to grant or deny a license) and systems in which applications are delayed for several months constitute impermissible restrictions on export quantities.[20] On the other hand, licensing systems in which approval is automatic and relatively quick (e.g., five days) have been found to be lawful.[21]

Based on these standards, both the U.S. natural gas and crude oil licensing systems appear to violate GATT Article XI:1.[22] Each system provides the administering agency (DOE or BIS) with the discretion to grant or deny an export license based on subjective and nonbinding criteria (the "public interest" or "national interest" standards). Moreover, the pending export license applications have been delayed for several months (and, in a few cases, years). Both of these facts support findings of GATT violations.

One or both licensing systems might theoretically be defended under the national security exception of GATT Article XXI, which permits Members to impose WTO-inconsistent measures "which it considers necessary for

the protection of its essential security interests . . . taken in time of . . . emergency in international relations." No panel has ever ruled on the national security exception, but the standard is subjective: the text refers to a measure which the WTO Member considers "essential" for its security interests. Thus, a WTO panel might defer to a Member's definition of what constitutes an "essential" security interest.

Given that crude oil exports are regulated under the same apparatus, and by the same agency (BIS), as other goods regulated for express national security purposes, the U.S. government might be able to successfully invoke GATT Article XXI to defend the system from allegations of WTO-inconsistency. However, it is unclear whether the U.S. government would want to establish international legal precedent on "essential" security measures for a relatively obscure export restriction that has been in place since 1975 (i.e., during periods that were arguably not times of "emergency in international relations").

These same limitations could apply to the 1930s-origin natural gas licensing system, as could several others. For example, the laws that govern the export of products that could have national security concerns do not appear to apply to natural gas. Gas exports are regulated by DOE, rather than BIS (which, as noted above, typically handles national-security-related export controls). Finally, economic, not security, issues appear to drive the "public interest" standard and DOE's application of it. Only one of the public-interest criteria (U.S. "energy security") could be considered to relate to national security, but the available legislative history of the original 1938 Act and the subsequent amendments do not indicate that the export licensing system was implemented for national security purposes.[23] Also, both the reports informing DOE's decisions on the pending LNG export applications address only economic matters. Thus, the U.S. government could be even more hesitant to claim that the natural gas system is "essential" to the country's national security.[24]

Second, restrictive export licensing systems also raise potential concerns under global anti-subsidy disciplines. There is limited WTO jurisprudence on whether an "export restraint" that lowers domestic input prices for downstream manufacturers constitutes a "subsidy" as defined by the WTO Agreement on Subsidies and Countervailing Measures. The WTO Panel in *U.S.–Export Restraints* found that certain export measures did not meet the WTO's precise definition.[25] However, the panel's ruling was specific to the measures at issue and was not appealed to the WTO Appellate Body, whose rulings have more precedential value. No other disputes have addressed this issue.

Moreover, the Panel ruling has not stopped national governments from imposing anti-subsidy measures (called "countervailing duties" or "CVDs") on downstream exports due to export restrictions on various upstream inputs. Most notably, the Department of Commerce has stated repeatedly that export restrictions are a type of "indirect subsidy."[26] And DOC continues to treat them as such in new CVD investigations.[27] Furthermore, the European Commission in January 2013 recommended the imposition of anti-subsidy duties on Chinese exports of organic coated steel, finding that the Chinese government provided the subsidies "mainly through export restrictions that artificially lower prices of rolled steel for domestic manufacturers."[28]

Thus, the crude oil and natural gas licensing systems might not only raise legal problems for the U.S. government, but could subject certain energy-intensive U.S exporters to anti-subsidy duties that negate the competitive price advantages created by the licensing systems.

Current policy is also at odds with other Obama administration policies. First, the restrictive export licensing systems undermine the National Export Initiative (NEI) and its goal of doubling U.S. exports between 2009 and 2014. Second, the administration's reticence with respect to fossil fuel exports stands in stark contrast to its full-throated advocacy of other energy exports, particularly renewables like biofuels and solar panels. Indeed, the September 2010 White House report setting forth the NEI's priority recommendations calls for increased government support for renewable and nuclear energy exports—but never mentions oil or natural gas.[29] A November 2012 follow-up report lauds the U.S. government's efforts to achieve these objectives, yet continues to ignore American fossil fuels, despite the massive increases in production and export potential that occurred between 2010 and 2012.[30] Furthermore, increased fossil-fuel exports could actually spur domestic production of renewable energy through higher oil and gas prices. According to the EIA, the role of renewables in electricity generation would be "greater in a higher-gas-price environment."[31]

Third, the use of export restrictions to benefit downstream industries contradicts longstanding U.S. policy with respect to export restraints and illegal subsidies. The Commerce Department repeatedly has imposed anti-subsidy duties on imports due to countervail subsidies resulting from foreign export restrictions on upstream inputs. The administration's embrace of similar restrictions would not only be hypocritical, but would also expose U.S. exports of energy-intensive products (e.g., fertilizer) to "copycat" duties in key foreign markets.[32]

Fourth, the U.S. government has long opposed restrictive and opaque export licensing systems in WTO negotiations and dispute settlement. For example, in *China–Raw Materials* (DS394), the U.S. government challenged China's "non-automatic" export licensing systems for various raw materials as impermissible restrictions on exportation in violation of GATT Article XI.[33] In March 2009, the United States and several other countries submitted a proposal to the WTO Negotiating Group on Market Access calling for increased disciplines on Members' use of export licensing.[34] The current U.S. export licensing regulations for oil and gas contradict these positions and undermine laudable efforts to rein in such restrictions globally.

Conclusion

If the president really wants to develop America's vast energy resources, grow the U.S. economy, restore some coherence to U.S. trade and energy policy, and avoid potentially embarrassing trade conflicts, he should order the immediate approval of all pending license applications

and then pursue, with Congress, an overhaul of our archaic licensing systems. Specifically, the White House and Congress should take the following steps to improve and modernize U.S. energy trade policy:

- First, DOE and BIS should immediately approve the pending export-license applications for natural gas and crude oil, and approve all future applications on a transparent, expedited basis. Such actions would bolster investment, production, and employment in the oil and gas sector, benefit the overall U.S. economy, avoid the myriad policy and legal problems raised by the current system, and gain a rare moment of bipartisan praise from Congress and the general public. Although some people question whether natural gas exports will benefit the U.S. economy in the long-term, clearly the people best situated to make that determination are those risking billions of dollars of their own money, not heavily lobbied government officials in Washington, D.C. Moreover, rejecting or delaying the pending applications could further undermine public support for our political system, as the government would likely be seen as subsidizing certain politically connected producers or coddling environmentalists at the expense of upstream energy producers, their workers, and the U.S. economy more broadly.
- Second, the White House should work with Congress this year to consolidate and overhaul the U.S. export licensing regime for energy products. All energy exports—fossil fuels, renewables, nuclear, etc.—should be regulated by a single agency and subject to a transparent licensing system whereby applications are automatically approved within a finite period, unless the agency can demonstrate a tangible and immediate national security risk. These changes would create a more stable and secure domestic energy market and get the federal government out of the business of picking winners and losers therein. They also would conform U.S. trade policy to today's energy and economic realities and to global trade and subsidy rules.

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20. ATT Panel Report, "India—Quantitative Restrictions," para. 5.130; "Japan—Trade in Semiconductors," para. 118.
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22. The licensing systems' preferential treatment for Canada (in

the case of crude oil) or all FTA partners (in the case of natural gas) also could violate the Most Favoured Nation (MFN) Principle of GATT Article I:1 because it discriminates against products destined for certain countries. However, this discrimination could be defended under GATT Article XXIV, which permits Members to grant preferential (and otherwise WTO-inconsistent) treatment to FTA partners.

23. See, for example, H.R. Rep. No. 74-2651, at 1 (May 13, 1936); S. Rep. No. 75-1162, at 2 (August 9, 1937).

24. For various reasons, the licensing systems would probably not qualify for the other GATT exceptions listed in Article XX. For example, "conservation" measures under Article XX(g) require comparable domestic restrictions on production and consumption, and "short supply" measures under Article XX(j) must be temporary. Both systems arguably fail to meet either requirement. Moreover, the United States might have difficulty demonstrating, as required by the chapeau of Article XX for all exceptions, that the licensing systems are not "a disguised restriction on international trade."

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May 28, 2013

Mr. James Bradbury
Senior Associate
Climate and Energy Program
World Resources Institute
10 G Street, N.E., Suite 800
Washington, D.C. 20002

Dear Mr. Bradbury:

Thank you for appearing before the Subcommittee on Energy and Power on Tuesday, May 7, 2013, to testify at the hearing entitled "U.S. Energy Abundance: Exports and the Changing Global Energy Landscape."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

To facilitate the printing of the hearing record, please respond to these questions by the close of business on Tuesday, June 11, 2013. Your responses should be e-mailed to the Legislative Clerk in Word format at Nick.Abraham@mail.house.gov and mailed to Nick Abraham, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, D.C. 20515.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby L. Rush, Ranking Member,
Subcommittee on Energy and Power

Attachment

For the record, and in response to the following questions from the Honorable Gene Green.

Q: Mr. Bradbury, I appreciate your concern for addressing climate change. I too believe this is something that the Congress should work on. However, are you advocating that restricting international trade in fossil fuels is an effective policy to reduce global greenhouse gas emissions? Or are you just advocating for the use of green well completion technology?

In response to the first question: The World Resources Institute does not take a formal position on the question of liquefied natural gas (LNG) exports or related trade. My testimony was intended to inform members of the committee regarding the implications of LNG exports, from the climate perspective. In particular, the construction and use of LNG export terminals would very likely lead to a net increase in greenhouse gas (GHG) emissions from the U.S.

In response to the second question: Given that LNG exports would likely cause a net increase in domestic GHG emissions, WRI recommends policy actions that would help to avoid this expected outcome through cost-effective strategies to help reduce fugitive emissions from natural gas systems. To this end, "green completions" are one example of a technology that could be used more widely than current law requires. For example, new federal rules that require the use of green completions at natural gas wells could be expanded to also require the use of this technology at oil wells. Additionally, to help enable further reductions in GHG emissions – including methane emissions from all stages of the natural gas life cycle – my testimony included six specific policy recommendations for consideration by the Subcommittee.

My testimony also offered the following suggestion:

"We [the United States] also have an important – indeed urgent – opportunity to improve our economic and geopolitical standing by showing leadership in addressing global climate change. We can do this through policies that promote the development, deployment, and export of low-carbon products and services to help enable global GHG emissions reductions from all sectors, including through technologies and practices that allow for the cleaner production and more efficient end-use of natural gas."

For more detailed information regarding the second question, I refer you to a recently published WRI working paper on this topic, "Clearing the Air: Reducing Upstream Greenhouse Gas Emissions from U.S. Natural Gas Systems" (available at: http://www.wri.org/publication/clearing-the-air)

Very best regards,

James

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May 28, 2013

Ms. Amy Jaffe
Executive Director of Energy and Sustainability
UC Davis Graduate School of Management
3411 Gallagher Hall
One Shields Avenue
Davis, CA 95616

Dear Ms. Jaffe:

Thank you for appearing before the Subcommittee on Energy and Power on Tuesday, May 7, 2013, to testify at the hearing entitled "U.S. Energy Abundance: Exports and the Changing Global Energy Landscape."

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Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby L. Rush, Ranking Member,
Subcommittee on Energy and Power

Attachment

Supplement to Testimony
By Amy Myers Jaffe, Executive Director, Energy and Sustainability
University of California Davis
Graduate School of Management
Institute of Transportation Studies
U.S. House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy and Power
June 11, 2013

Are climate and energy security goals mutually exclusive? C02 emissions have fallen 12% since 2005- the beginning of the shale revolution- and are the lowest since 1994. Do you believe the growth of natural gas had anything to do with that?

The largest variable impacting trends in U.S. CO2 emissions overall in the United States since 2005 has been lower economic activity due to the recession. The improvement in automotive fuel efficiency and a decline in the vehicles miles traveled by Americans was another major contributor to the trend of lower greenhouse gas emissions in the United States. The transportation sector represents 34% of all U.S. CO2 emissions, making it an important sector for climate friendly policy.

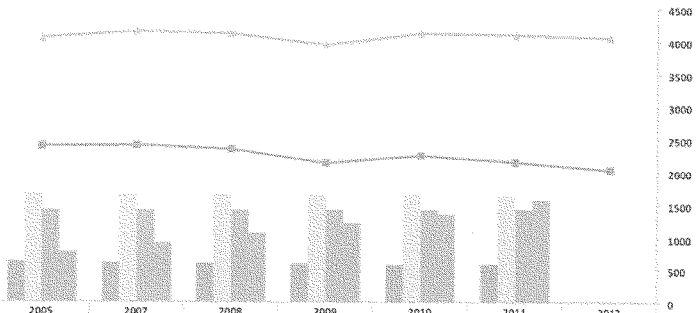
The growth of natural gas as a fuel for electricity generation, however, did contribute somewhat to a lowering of overall CO2 emissions in the U.S. which on average saw an increase in GDP between 2005 and today.

During the period between 2005 and 2012, U.S. electricity production remained flat to lower largely due to increased efficiency and to a lesser extent due to lower economic activity for part of the time period in question. During this same time frame, CO2 emissions from the sector fell substantially, with the U.S. electric sector reducing its carbon intensity by 15%. In the five year period from 2007 to 2011, overall electricity generation fell from 2,412 million metric tons in 2007 to 2,158 in 2011.

Many inefficient coal-fired and natural gas-fired facilities have been closed in the United States since 2005, while there has been a dramatic gain in the amount of renewable energy generation added across the country. From 2005 to today there have been 12 hydro- and 801 non-hydro- renewable power plants installed, while over 30 coal plants have been shuttered. Some 370 TWh of electricity produced by coal and petroleum TWh was eliminated over the period, while 252 natural gas-fired TWh and 232 hydro-powered TWh were added. Thus, both renewable energy and natural gas have contributed to the lowering of CO2 emissions in the U.S. electricity sector. This rise in natural gas use reflects both

utilities substituting low-priced natural gas for coal as well as the use of natural gas to back up renewable power during intermittency lows. Natural gas plants generally have a higher efficiency compared to the oil-fired and coal-fired plants that were closed over the period in question. Figure A shows the change in electricity generation by fuel.

Figure A

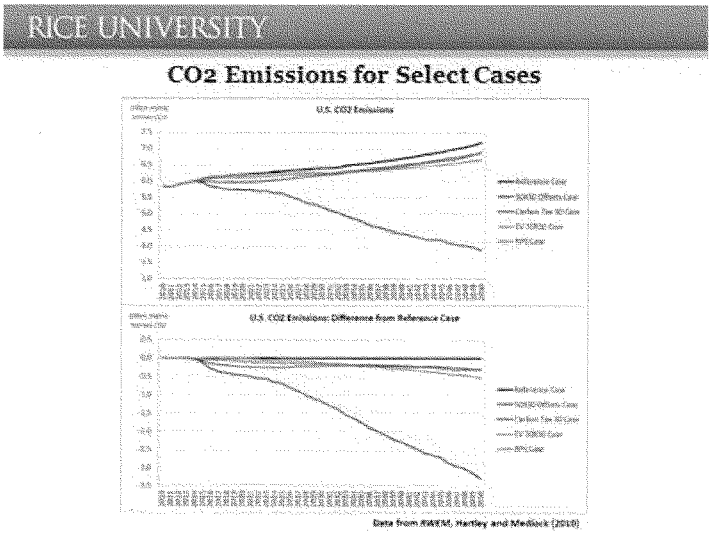


	2005	2007	2008	2009	2010	2011	2012
Coal Plants	619	606	598	593	580	589	
Natural Gas Plants	1,664	1,659	1,655	1,652	1,657	1,646	
Hydro Plants	1,422	1,424	1,423	1,427	1,432	1,434	
Non-hydro Plants	781	929	1,076	1,219	1,355	1,582	
TCO2eq	2,402.10	2,412.80	2,360.90	2,146.40	2,259.20	2,158.00	2039.195
GWh	4055.423	4156.745	4119.388	3950.331	4125.06	4100.656	4054.485

Worldwide, coal is responsible for about 40 to 45 % of energy related CO2 emissions. Natural gas combined cycle plants emit about 50 % CO2 emissions of a typical coal plant and perhaps even more savings compared to older steam turbine coal plants. Gas-fired peaking plants, because of their operational flexibility, are also the generation of choice to supplement intermittent power generated by wind, solar and other renewable sources.

A 2010 study by the Baker Institute at Rice University showed that while strong competition by natural gas to coal would ease an increase in greenhouse gases (GHGs) in the United States between now and 2030. The study also found that the imposition of a national renewable portfolio standard would contribute to a small reduction (4%) in GHGs in the U.S. by 2050 but could lead to higher electricity prices than a business as usual natural gas pathway where natural gas demand would increase by 40% by 2040 (see Figure B below)

Figure B



At present, California's Low Carbon Fuel Standard (LCSF) gives natural gas vehicles a pollution credit compared to oil-powered vehicles. A push to promote renewable natural gas (biogas)[1] could also provide support for natural gas fueling infrastructure and vehicles in the state. But environmental groups have raised concerns about methane leakage that takes place throughout the natural gas supply chain. Oil companies say that green completions are enabling companies to limit methane emissions from production activities to 2 percent or lower in most instances but initial studies are showing that some 10% to 15% of drillers are not using the most advanced procedures to limit venting of CO2 from shale gas operations. At leakage rates below 2%, natural gas offers a carbon emissions improvements over other fossil fuels. Studies to determine the leakage rates in urban distribution and delivery systems are being undertaken in several locations including Boston and New York City and preliminary data shows a highly variable range of ambient methane concentrations, requiring further analysis to determine the sources.

The controversy over methane leakage derives from the fact that methane is a more potent global warming gas than CO2. The intensity depends on the time horizon under consideration because methane is shorter lived than CO2. For example, over a 20-year period, methane is 70 times more potent than CO2. Over a 100-year horizon (the usual period for comparison) methane is only 20 times more potent than CO2.

Fugitive emissions of methane happen throughout the supply chain of natural gas, oil and coal. There are involuntary leaks, and voluntary venting and flaring of methane.

Finally, it is worth mentioning than greenhouse gas emissions are a global concern, and there are ways in which a reduction in the use of carbon intensive fuel in the United States through higher natural gas use and fuel substitution can actually increase the rest of the world carbon emissions based on a "rebound effect": growth in domestic shale gas use, if not coupled with the possibility of US natural gas exports, will make more oil and coal available in international markets, dropping the prices of those commodities and incentivizing use, which could result in an overall net incremental gain in global GHG emissions, according to ongoing research by the Institute of Transportation Studies (ITS) at University of California Davis. The ITS Davis research shows that U.S. LNG exports might indeed be more carbon friendly than an export ban which could encourage higher oil and coal use in other parts of the globe by displacement (see Figure C).

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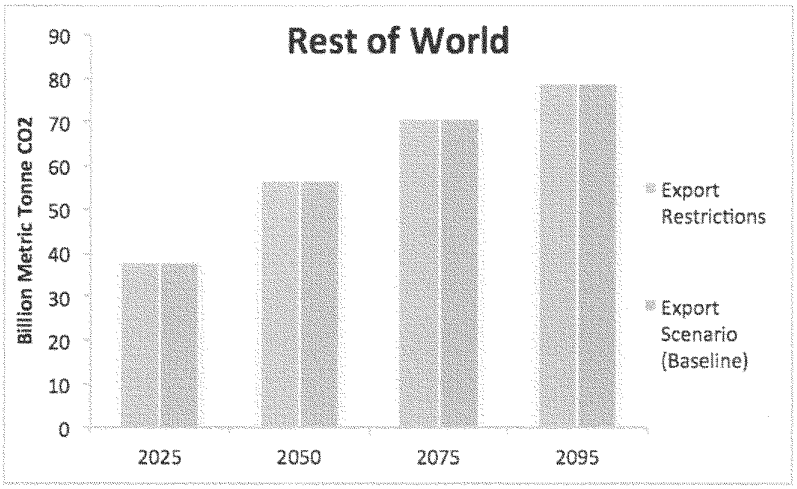
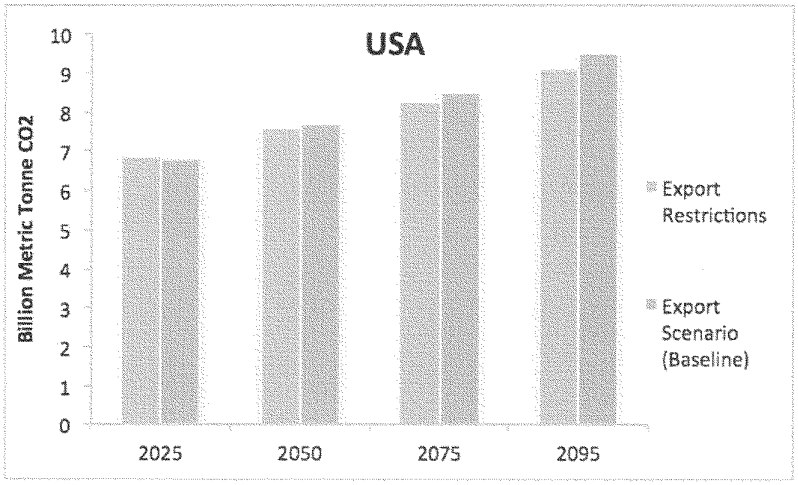
[1] The California Biomass Collaborative, a University of California Davis led public-private partnership for the promotion of California biomass industries, estimates that 32.5 million BDT of in-state biomass feedstocks could be available for conversion to useful energy. In particular, estimates for methane production from landfill gas are 55 BCF/year, 4.8 BCF/yr for waste water biogas, and 14.6 BCF/yr for biogas from manure sources. Similar biomass resources are located in states that border California or along routes for the transmission of natural gas to the state from major producing states. We estimate that the methane potential from landfill gas in the Western states outside of California is 105 BCF/yr based on existing and candidate landfills identified by the U.S. Environmental Protection Agency.

Figure C


Rest of World
Billion Metric Tonne CO2
90
80
70
60
50
40
30
20
10
0
2025
2050
2075
2095
Export Restrictions
Export Scenario (Baseline)


USA
Billion Metric Tonne CO2
10
9
8
7
6
5
4
3
2
1
0
2025
2050
2075
2095
Export Restrictions
Export Scenario (Baseline)