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U.S. CRUDE OIL EXPORT POLICY

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

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U.S. CRUDE OIL EXPORT POLICY

Thursday, March 19, 2015

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

The Committee met, pursuant to notice, at 10:06 a.m. in room SD–366, Dirksen Senate Office Building, Hon. Lisa Murkowski, chairman of the Committee, presiding.

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

The CHAIRMAN. Calling to order the Energy Committee meeting this morning. Welcome to members of the Committee. Welcome to our panelists and to those who have come to listen and hear the discussion on U.S. crude oil export policy.

It's good to have the discussion in front of this Committee. Clearly a very timely topic.

More than a year has passed since January of '14 when this Committee, then under Chairman Wyden, held its first hearing in over a full decade on crude oil exports. Since then the Congress has held an additional five hearings. That's moving right along here which is good to know.

Our hearing this morning is the seventh now that we have held in just over a year. This represents substantial progress on the education front. When I first had an opportunity to bring up the issue of oil exports and the need to reexamine our policy here in this country with the current export ban, it felt like I was a pretty lonely voice out in the wilderness. But I made a very clear effort, initially, to say that this was going to be about education. This was not about moving a legislation through that was not thoughtful and considered, but really this was about an education and an awareness effort. And we've seen just that.

We've seen analysis from the Government Accountability Office, from the Brookings Institution, the Heritage Foundation, the Council on Foreign Relations, the Center for Strategic and International Studies, the Cato Institute, the Aspen Institute, the Center for American Progress, the Congressional Budget Office, Columbia University Center on Global Energy Policy, Resources for the Future, Center for a New American Security, Peterson Institute for International Economics, ICF International, IHS, NEARA and even more beyond that.

The vast majority of this analysis ends up in the same place, and I think it's important that we understand that. But we hear the other side.

The U.S. Energy Information Administration has also published three reports as part of the "dynamic and ongoing analysis" that I requested last year and is due to release some final pieces very soon.

When I mentioned last year that 2014 would be the year of the report, it seems clear to me that it was exactly that. That these various institutions, these thought leaders engaged in that willingly and with a certain amount of energy which was good.

But the year of the report is coming to an end. While I continue to believe that the Administration retains extensive authority explicitly delegated to it by previous Congresses in statute, it is also appropriate for us to consider our legislative options. So just stay tuned here.

Before I turn to Ranking Member Cantwell, I would like to introduce into the record a statement that we received from Michele Flournoy, who is the former Under Secretary for Policy at the Department of Defense under President Obama from 2009 to 2012. Our schedule, unfortunately, did not permit her attendance, but there is one brief quotation from what, I think, is a very important statement. She states the following, "Lifting oil export restrictions will yield a variety of security dividends to the United States. Market conditions merit such a step and security dividends will not be fully realized without it." She goes further into her statement to speak about the significant security benefits associated with lifting oil export restrictions and our flexibility then as a nation to impose energy sanctions into the future.

Again, I will submit her statement in full as part of this Committee record.

[The information referred to follows:]

CONGRESSIONAL STATEMENT

Senate Energy and Natural Resources Committee
Hearing on United States Crude Export Policy
Michèle Flournoy, CEO and Co-Founder
Center for a New American Security

Center for a New American Security

March 19, 2015
U.S. Senate Committee on Energy and Natural Resources
United States Crude Export Policy
Michèle Flournoy
CEO and Co-Founder, Center for a New American Security

The unconventional energy revolution in the United States over the last several years has brought about a new era of energy abundance in our country. Crude oil production has increased significantly, from 5 million barrels per day in 2008 to over 9 million barrels per day today. In 2013, the United States surpassed Saudi Arabia to become the largest producer of liquid fuels, including oil and refined petroleum products, in the world. Remarkably, after decades of concern about the scarcity of American energy, our nation has seen a reversal of heavy and growing energy import reliance, to become a major exporter of refined petroleum products and a powerhouse in the production of energy-intensive petrochemicals and industrial manufacturing. Our nation is also on the cusp of exporting Liquefied Natural Gas.

The United States, however, is not a major exporter of crude oil. This is not for lack of potential and available supplies. Rather, it is due to laws that restrict the export of this commodity and that were put in place in response to the OPEC oil embargo of the 1970s. Crude oil export restrictions create distortions in the domestic oil market and pose a risk to U.S. oil production growth. They stifle economic growth and also hamper the ability of U.S. foreign policy and national security leaders to seize strategic benefits presented by the energy revolution.

Lifting oil export restrictions will yield a variety of security dividends to the United States. These include stoking U.S. oil production growth, which will strengthen the U.S. economy and better support the ability of our nation to play a strong leadership role on international security and economic affairs. Stimulating U.S. oil production growth also expands energy security by increasing global oil supply from a stable producer, via maritime transit routes free from the threat of conflict. Lifting the oil export ban also sends the right signal to international trading partners that the United States supports free trade, a regulatory decision in keeping with our WTO commitments and that will support the ability of the United States to win a trade dispute with another nation that may withhold its natural resources from the market. Shunning protectionism is the right message to send at time when U.S. negotiators are pursuing major free trade agreements with Atlantic and Pacific partners.

Another significant security benefit associated with lifting oil export restrictions is the greater flexibility this will provide to impose energy sanctions in the future. Sanctions are a critical national security tool that has a place alongside force projection and diplomatic activities in many of the major security challenges that confront the United States today, including illicit Iranian nuclear enrichment and Russia's

destabilization of Eastern Ukraine. But imposing sanctions that take oil off the market is a viable policy only if there is adequate alternative oil supply. The United States should encourage new supplies of oil to enter the market if it wants to sustain and enhance the ability to use oil sanctions in the future. Lifting the ban on U.S. oil export will help to accomplish just this by stimulating additional oil supplies.

Our closest allies, including those in Europe and Northeast Asia, would welcome—and have asked for—the unrestricted export of U.S. crude oil. It will offer them energy security benefits by expanding the diversity of their oil supply pool and contributing to more efficient global oil markets. This is good for their economic growth. The United States is stronger and more secure when our allies are energy secure and economically vital. We are also stronger when we have lucrative and mutually beneficial energy trade with allies. Policymakers in the United States should embrace these various benefits to our allies and ourselves and liberalize our crude export rules. Market conditions merit such a step, and security dividends will not be fully realized without it.

destabilization of Eastern Ukraine. But imposing sanctions that take oil off the market is a viable policy only if there is adequate alternative oil supply. The United States should encourage new supplies of oil to enter the market if it wants to sustain and enhance the ability to use oil sanctions in the future. Lifting the ban on U.S. oil export will help to accomplish just this by stimulating additional oil supplies.

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CONGRESSIONAL STATEMENT

Senate Energy and Natural Resources Committee
Hearing on United States Crude Export Policy
Michèle Flournoy, CEO and Co-Founder
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Center for a New American Security

Michèle Flournoy
CEO and Co-Founder, Center for a New American Security

Michèle Flournoy is Co-Founder and Chief Executive Officer of the Center for a New American Security (CNAS).

She served as the Under Secretary of Defense for Policy from February 2009 to February 2012. She was the principal adviser to the Secretary of Defense in the formulation of national security and defense policy, oversight of military plans and operations, and in National Security Council deliberations. She led the development of DoD's 2012 Strategic Guidance and represented the Department in dozens of foreign engagements, in the media and before Congress.

Prior to confirmation, Ms. Flournoy co-led President Obama's transition team at DoD.

In January 2007, Ms. Flournoy co-founded CNAS, a non-partisan think tank dedicated to developing strong, pragmatic and principled national security policies. She served as CNAS' President until 2009.

Previously, she was senior adviser at the Center for Strategic and International Studies for several years and, prior to that, a distinguished research professor at the Institute for National Strategic Studies at the National Defense University (NDU).

In the mid-1990s, she served as Principal Deputy Assistant Secretary of Defense for Strategy and Threat Reduction and Deputy Assistant Secretary of Defense for Strategy. She has received several awards from the Secretary of Defense and the Chairman of the Joint Chiefs of Staff.

Ms. Flournoy is a member of the President's Intelligence Advisory Board, the Defense Policy Board, the DCIA's External Advisory Board, the Council on Foreign Relations, and the Aspen Strategy Group, and a Senior Fellow at Harvard's Belfer Center for Science and International Affairs. She serves on the boards of The Mitre Corporation, Rolls Royce North America, Amida Technology Solutions, The Mission Continues, and CARE, and is a Senior Advisor at the Boston Consulting Group.

Ms. Flournoy earned a bachelor's degree in social studies from Harvard University and a master's degree in international relations from Balliol College, Oxford University, where she was a Newton-Tatum scholar.

The CHAIRMAN. The national security side of the equation will be, I think, a very extremely important part of this conversation going forward. I look forward to comments from our witnesses as you present this morning, not only in this area, but on other aspects of this policy consideration that we have in front of us.

Again, I thank you all for being here. I look forward to your testimony.

I will turn to Ranking Member Cantwell and then we'll have an opportunity for each of you to present your statements and we will turn to questions for each of you.

With that, Senator Cantwell.

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

Senator CANTWELL. Thank you, Madam Chair. I too, want to welcome the witnesses and thank you for holding this hearing.

This Committee last held a hearing on crude oil exports 14 months ago. At that hearing many of my colleagues noted the historic nature of the subject.

The U.S. Congress banned the export of crude oil in 1975 after oil exporting nations had used their export capacity as an economic weapon which caused serious damage to the U.S. and to the global economy.

Since that time there has never been a reason to revisit the ban. For decades we, in Congress, have debated the best ways to deal with our country's ever increasing dependence on imported foreign oil. Within the last decade we actually started to see that situation reverse as we started consuming less, producing more and importing less.

Three major policy changes came together to change the U.S. Energy Security paradigm. We started using our transportation fuel more efficiently by increasing fuel efficiency requirements. We started to break the oil sector's monopoly on gas tanks by replacing ten percent of our transportation fuel with ethanol and bio diesel and promoting electrification of vehicles. And our long term investments in the government-funded basic research on oil and gas production started to pay off.

It's the combination of all three of these policy measures that has brought us here today because not only are we now producing more oil than we ever anticipated, thanks to the good work of the Department of Energy and Sandia National Laboratory and the public and private sector partnerships it has created, but we've also stopped consuming more and more oil every year.

Between 1982 and 2007 gasoline consumption in the United States grew every single year. It appears now that 2007 was the peak year for gasoline consumption. In 2007 we used 391,000,000 gallons of gasoline in this country. In 2014 we used only 374,000,000.

If you count every year from 2008 through 2014 Americans have saved 119,000,000 gallons compared to 2007.

Assuming three dollars per gallon, that's $356 million that Americans spent on something other than gasoline between 2008 and 2014.

I think it's important for us to recognize that we have had success on both the supply side and the demand side of the equation in terms of reducing our dependence on imported oil. Now the oil industry is asking to repeal the export ban.

As our oil industry producers produce more at home but our consumption stays relatively flat, our industry wants to sell American oil into the foreign markets where it can get a higher price. But let's be clear about this. The United States is and will remain a net oil importer.

As we talk about whether we should export oil, we need to keep in mind that for every barrel of oil we export we will be importing even more.

The question before us today is whether this policy change will be in the interest of the American people. As policy makers our obligation is not to any particular industry nor to any particular economic theory. Our responsibility is to decide what policies provide the greatest good to the greatest number of people.

As we consider these questions of whether this export ban is still the right policy for America, I think we should think about three variables.

First, price. Economic effects of oil and gas prices ripple through our economy. Lower oil prices act like a tax cut for the vast majority of Americans. No one wants to see the price at the pump go up, not in my State of Washington or I'm sure throughout the country.

In a published poll this week by Allstate in the National Journal Heartland Monitor, 79 percent of Americans said the current price drop has made a difference in their financial situation. The same percentage of respondents said they are using what they save at the pump daily for other necessities or paying down debt.

I would rather have Americans get their own fiscal house in order verses more at the pump for their transportation needs.

Second, safety. The oil is moving around our country in ways that we never anticipated, even just five years ago. Oil production has increased faster than the infrastructure needed to transport it in the safest ways.

My state currently has tens of thousands of barreled oil traveling through every major population center of our state. And I want to be clear about this. We currently do not have the regulations on the books to safely transport this product. I am going to be working for further measures to make sure that we do get those standards in place.

Third, energy security. No one consumes oil. We consume gasoline, diesel and other products that are made from oil. If we are sending oil abroad while some regions of our country then have to import gasoline, diesel and home heating oil, that were refined someplace else are we exporting our energy security and that we've all worked so hard on?

These are some of the issues that I think we need to consider today.

In a poll conducted in 2014 Hart Research found that 69 percent of Americans are opposed to lifting the export ban. Other polls find that the public is largely opposed. Labor unions, including the AFL–CIO and steel workers, are opposed. And I guarantee you if

we start talking about lifting the Jones Act as a requirement there will be many more that are opposed.

In addition, my home state independent refiner, U.S. Oil in Tacoma, is also against lifting the ban.

So we have a variety of opinions from people, public opinion, as well as from a variety of sources.

I will just leave us with one quote that, I think, is a reminder about this debate from Teddy Roosevelt in his Administration Papers on Conservation of Minerals in 1909. Teddy Roosevelt's Administration found, "The greatest waste of petroleum has been in exporting crude petroleum and petroleum products to foreign countries. The necessity for it has been due to the sudden increase of production due to the discovery and immediate development of large fields and only by this means has it been possible for the producers to continue to obtain a constant market for petroleum where ever produced. This immediate purchase of product has meant a gain of millions of dollars to the producers."

I think the same observation is relevant today, and I hope that as we're considering this we'll take into consideration the policy impacts to all of our economy.

Again, I thank the witnesses for being here today, and thank you, Madam Chair, for calling this hearing.

The CHAIRMAN. Thank you, Senator Cantwell.

We will now go to our panelists. I will introduce each of you. We will start from my right here and go down the line.

We first have Mr. Carlos Pascual, who is a Fellow at the Center on Global Energy Policy at Columbia University and the Senior Vice President at IHS. Welcome to the Committee.

Following Mr. Pascual this morning will be Mr. Ryan Lance. Mr. Lance, thank you for agreeing to be before the Committee. He is the Chairman and the CEO of ConocoPhillips. Welcome.

Next to Mr. Lance is Elizabeth Rosenberg, the Senior Fellow and Director for Energy, Economics and American Security at the Center for a New American Security. Thank you, and welcome back to the Committee.

And Mr. Charles Drevna, we have opportunity to see Mr. Drevna before the Committee every now and again. He is the President of the American Fuel and Petrochemical Manufacturers. Good to have you back.

At the end we have Mr. Jeff Warmann, who is the CEO of Monroe Energy. Welcome also to the Committee.

With that, Mr. Pascual, if you would like to lead off with your five minutes. Your full testimony will be incorporated as part of the record. We'd ask you to try to adhere to the five minutes so we all have an opportunity to ask questions of you as well.

Proceed.

STATEMENT OF CARLOS PASCUAL, FELLOW, CENTER ON GLOBAL ENERGY POLICY, COLUMBIA UNIVERSITY, SENIOR VICE PRESIDENT, IHS

Mr. PASCUAL. Thank you very much, Chairman Murkowski, Ranking Member Cantwell and members of the Committee. I appreciate the opportunity to testify before you on the topic of crude oil exports from the United States.

I want to address why eliminating the export ban on crude oil will create jobs, raise incomes, stimulate economic growth, lower gasoline prices and strengthen our national security and American influence in the world.

I appear before you in my capacity as Senior Vice President for IHS. Just this week IHS issued an exhaustive new study on crude oil exports. I previously served as the Coordinator for International Energy Affairs and Special Envoy on Energy at the State Department. I'm associated with Columbia University as a Fellow at the Center on Global Energy Policy.

Over the past year as Energy Envoy for the United States, I engaged in some of the toughest challenges at the intersection of energy and geopolitics from negotiating the implementation of energy sanctions of Iran to addressing the energy risks to Ukraine and Europe from Russia's violation of Ukraine's national sovereignty. From my experience I have seen that lifting the export ban would increase U.S. credibility and leverage in convincing international partners to adopt policies that mirror U.S. interests on Iran, Russia, free trade and even the environment.

The ban on crude oil exports is an anachronism that grew out of a period of scarcity in the 1970s. The United States now has the fastest growing oil economy in the world. Since 2008 the U.S. crude oil output increased by 81 percent. This increase exceeds the combined production gains from the rest of the world. The conditions that justify the crude oil export ban in 1973 no longer apply.

This new crude production, however, does not consistently match the processing capabilities of Gulf Coast refineries. Not all products can be produced to a finished state for sale. In some cases refinery capacity is reduced. To use light, tight oil many Gulf Coast refiners require a price discount that deters investment and oil production.

The dramatic fall in oil prices since November makes this issue even more urgent. Over the past 30 days U.S. light crude oil has sold in the range of $45 a barrel compared to about $55 a barrel for the global price of Brent. That $10 difference will be crucial in determining the viability or not of many new investments in U.S. oil and gas production. The effects will be felt on jobs, the budgets of many states and in the supply chains that traverse non oil producing states as well.

IHS estimated in 2014 that eliminating this price discount through exports would incentivize nearly $750 billion more in investment from 2016 to 2030, an increase in oil production by 1.2 million barrels a day.

The IHS report released this week, "Unleashing the Supply Chain," documents these benefits across the economy from 2016 to 2030. $86 billion in additional GDP. About 400,000 new jobs annually. 25 percent higher pay for workers in the energy industry supply chain. An additional $158 per household and $1.3 trillion in federal, state and municipal revenue from corporate and personal taxes.

These benefits include sectors that cut across transportation, steel, professional and financial services across most of the United States.

The diesel engines, for example, driving the drilling rigs and hydraulic fracturing equipment are largely manufactured in the industrial heartland of Illinois, Indiana, Wisconsin and Michigan.

Oil development in North Dakota relies on companies that provide banking and financial and insurance services in Chicago, New York, Dallas, San Francisco and Boston.

Ohio, Michigan and Pennsylvania have large capital equipment manufacturing sectors which are supported by local materials and component suppliers.

In Washington State the technology and manufacturing sectors are expected to grow rapidly.

Perhaps surprisingly for some, the benefits also extend to lower gasoline prices allowing the export of U.S. light—tight, light oil would increase the supply of light crudes that establish the international Brent price benchmark pushing U.S. gasoline prices down by eight cents per gallon under our conservative assumptions between 2016 and 2030.

The benefits for national security are extensive as well and let me cite a few examples.

First, maintaining the export ban increasingly undercuts U.S. credibility and its three decades endeavor to persuade other nations to permit free flows of energy trade and not constrain trade in strategic commodities with political restrictions and resource nationalism.

The United States, for instance, has launched numerous complaints in the GATT and WTO against China exactly because of these kinds of restrictions on natural resources. It would be against our interest to see Russia use such precedence today to curtail gas supplies to Europe.

Second, the United States and all energy consumers benefit most when energy supply is diversified. As the U.S. has increased natural gas production by 35 percent since 2009, we have reduced our imports allowing about 75 billion cubic meters of gas once intended for the United States to be redirected globally, especially to Europe. Those changes created competition with Russia's Gazprom to lower natural gas prices and create an internal gas market in Europe that has supplied gas to Ukraine through those flows. If we eliminate the crude oil export ban, the United States would similarly signal that it is committed to a globally competitive oil market that reduces and neutralizes regional dominance.

Third, there are times when energy must be used as an instrument in foreign policy. In 2012 the United States and Europe imposed sanctions on Iran's oil exports, and we asked China, India, Turkey, Japan, Korea and other major importers to act with us. As the person coordinating these negotiations I can assure the Committee, as a lead U.S. negotiator, that the U.S. negotiating position would have been far stronger if we were not protecting U.S. oil export restrictions when we are asking others to risk higher oil prices for international security.

Finally, resource nationalism will be front and center.

The CHAIRMAN. Mr. Pascual, we're going to have to ask you to tie it up, please. Thank you.

Mr. PASCUAL. Okay. Will be front and center in debate over climate change where again, one of the critical issues will be what

kind of sacrifices our country is willing to make to reduce carbon emissions. We will have much greater credibility if we are able to say that we do not have our own restrictions.

With free trade, the U.S. benefits from higher prices for light tight oil, stronger domestic production incentives and the stream of economic and national security benefits are outlined in the testimony. Still Gulf Coast refiners can import and refine heavier crudes with stronger commercial results.

I appreciate, Madam Chairman, your leadership and that of this Committee to assess this issue. The benefits that come with ending the crude oil export ban justify your efforts.

Thank you for this opportunity to testify before your Committee, and I welcome the opportunity to respond to your questions.

[The prepared statement of Mr. Pascual follows:]

U.S. Senate Committee on Energy and Natural Resources

U.S. Crude Oil Export Policy

Carlos Pascual
Senior Vice President, IHS

March 19, 2015

Chairman Murkowski, Ranking Member Cantwell, and members of the Committee, I appreciate the opportunity to testify before you on the topic of crude oil exports from the United States. Arguments around exporting crude oil are often visceral rather than grounded on careful research. Just this week, IHS issued a new study based on hard data and shrewd analysis. I want to explain why eliminating the export ban on crude oil will create jobs, increase household incomes, stimulate economic growth, contribute to government revenues, offer consumers lower gasoline prices, and strengthen our national security and American influence in the world.

I appear before you in my capacity as Senior Vice President for IHS. IHS is a global consultancy that specializes in energy, capital-intensive industries, data and analysis with a worldwide presence. I previously served as the Coordinator for International Energy Affairs and Special Envoy on Energy at the State Department. I am associated with Columbia University as a Fellow at the Center on Global Energy Policy. My work through IHS and at Columbia University has involved me in two landmark studies on crude oil exports.

Over the past years, I have been engaged in some of the toughest challenges at the intersection of energy and geopolitics – from negotiating the implementation of the energy sanctions imposed on Iran, to addressing the energy risks to Ukraine and Europe from Russia's violation of Ukraine's national sovereignty. From my experience, I have seen that lifting the export ban would increase U.S. leverage in convincing international partners to adopt policies that mirror U.S. interests on Iran, Russia, free trade, and even the environment. This experience deeply informs my understanding of the impact – and the signal – that comes from this new opportunity of U.S. energy exports.

Moreover, maintaining the ban increasingly undercuts U.S. credibility in its three-decades endeavor to persuade other nations to permit free flows of energy trade and not constrain trade in strategic commodities with political restrictions and resource nationalism. The United States, for instance, has launched numerous complaints under the WTO against China exactly because of these kinds of restrictions on natural resources that China imposes.

The dramatic fall in oil prices since November makes this issue even more urgent. Over the 30 days, U.S. WTI light crude oil has sold at an average price of $49.82, compared to $59.48 for the global Brent price. That $9.66 difference will be crucial in determining the viability or non-viability of new investment in U.S. oil and gas production. The effects will be felt on jobs, the budgets of many states, and in the supply chains that traverse non oil-producing states as well.

It is rare that policy options arise in the energy world that offer such overwhelming, unmitigated benefits as allowing American producers to export crude oil to international markets. The IHS report

released this week, *Unleashing the Supply Chain,*[1] documents the benefits across the economy from 2016-2030:

- $86 billion in additional GDP,
- about 400,000 new jobs annually,
- 25% higher pay for workers in the energy industry supply chain – an additional $158 per household, and
- $1.3 trillion in federal, state and municipal revenue from corporate and personal taxes.

The benefits accrue across most of the United States, not just oil producing states. States like Illinois, Washington State, Massachusetts, and Michigan – with little or no oil production -- also benefit substantially in terms of economic activity and jobs, owing to the interconnected nature of U.S. supply chains. The report affirms earlier research that eliminating the export ban would reduce gasoline prices by 8 cents per gallon.

Roots of the Problem

The ban on crude oil exports is an anachronism that grew out of a period of scarcity in the 1970s when the United States imposed price controls on oil and banned the export of oil in order to support the price controls. In the wake of the 1973 Arab oil embargo, the Emergency Petroleum Allocation Act of 1973 allowed President Nixon to set price controls and allocate oil to end users in the United States. The Energy Policy and Conservation Act of 1975 prohibited the export of crude oil and natural gas produced in the United States, with some exceptions. The U.S. system of price controls on oil was abolished in 1981, as was, a few months later, the ban on the export of oil products. However, illogically, the ban on crude oil exports was retained even though the rationale provided by price controls had disappeared. The United States now has the fastest growing oil economy in the world. Since 2008, American entrepreneurship has increased U.S. crude oil output by 81% -- 4.1 million B/D principally of light tight oil, such as Eagle Ford in south Texas, Bakken in North Dakota and West Texas Intermediate (WTI). This increase is the fastest in U.S. history and exceeds the combined production gains from the rest of the world. The commercial and technical reasons for this increase in production are well documented, including the May 2014 IHS report, called *U.S. Crude Oil Export Decision*. The conditions that justified the crude oil export ban in 1973 no longer apply.

More importantly, continuation of this ban hurts American consumers, causes an unnecessary drag on American productivity, and does not let the United States exploit fully the national security benefits from our energy resurgence. The reasons are intertwined with the nature of the American refinery system and the price discounts that American producers must take in order to sell their products competitively to refineries, particularly along the Gulf Coast, which holds over half of the nation's total refining capacity. Over $85 billion has been spent in the past quarter century to reconfigure these refineries to process heavy oil imported from countries like Venezuela, Mexico and Canada. The United States contains the largest refining capacity of any country in the world, with 139 operating refineries with a combined crude oil distillation capacity of about 18 million B/D. The US refining system is characterized not only by the number and size of refineries but also by a high number of world-class, high-complexity, full conversion refineries with a substantial degree of petrochemical and specialty products integration.

[1] The study *Unleashing the Supply Chain* is available at www.ihs.com/crudeoilsupplychain.

In this complex refining system, if the crude quality varies enough, the yields from the crude oil no longer match the processing capabilities of the refinery, and not all products can be produced to a finished state for sale or in some cases the throughput capacity of the refinery is reduced. In the Gulf region, most refineries are configured to process heavy crude oil. When using light tight oil, Gulf refineries operate inefficiently. Unfinished products are produced, which have a lower value because they require further processing to be upgraded into gasoline, jet and diesel fuels. In some cases the crude quality mismatch is large enough that a refinery will have to reduce the crude oil throughput to process additional volumes of light tight oil. As a result, there are limits to how much of the new, domestically produced light tight oil the refining system can efficiently and effectively process. To use light tight oil, many Gulf Coast refiners require a price discount, which is evidenced today in the difference between the international crude oil benchmark (Brent) and the US benchmark (WTI) that has ranged from $7-12 per barrel for the past month.

Allowing crude oil exports would allow light tight oil (i.e., WTI) to sell at higher world prices. In *U.S. Crude Oil Export Decision,* IHS estimates that eliminating the WTI discount would incentivize nearly $750 billion more in investment from 2016 to 2030—and increase oil production by 1.2 million B/D. Eliminating the crude oil ban proves even more important when oil prices are low. For example, if Brent crude (the international standard) trades in the range of $55/barrel and WTI trades in the United States at around $45/barrel, many companies will be on the margins of their new well investment breakeven point. In such a case, a small price change can have a major impact on supply because it can make or break the profitability of a significant share of tight oil producers. Crude oil production thus drops even more sharply when prices are low and producers must take further price cuts to sell to domestic refiners if they cannot export. A $3 per barrel change in a $50 per barrel price environment can have the same effect as a $10 change in a $100 per barrel environment, the study finds.

Investment Drives Economic Benefits

The critical change driven by lifting the crude oil export ban is that it offers a greater incentive for producers to invest in oil production. That investment drives higher production, and it reverberates throughout the economy, starting with the supply chain for the energy industry.

From 2008–13, while U.S. GDP growth averaged 1.2% per year, economic output in the oil and gas industry grew four times faster, at 4.7%. Over the same period, total U.S. employment declined by 0.1%, while oil and gas industry employment grew 4.3% per year. More broadly, the revolution in the production of "unconventional" oil and gas has been one of the major contributors to the U.S. economic recovery, estimated by IHS to have added nearly 1% to U.S. GDP annually, on average, over the past six years – accounting for nearly 40% of overall GDP growth in that time.

Crude oil production depends on an extensive supply chain. The supply chain is the extended network of companies providing the labor, commodities, technology, and information required to extract oil and deliver it to the midstream (transportation and logistics) and downstream (processing and marketing) sectors. For example, the diesel engines driving drilling rigs and hydraulic fracturing equipment are largely manufactured in the industrial heartland of Illinois, Indiana, Wisconsin, and Michigan. Many states — New York, Florida, Illinois, and Massachusetts, for example—with modest or negligible oil production sectors have strong manufacturing or service sectors supplying the oil industry in producing states.

The companies in this diverse and far-reaching supply chain contribute to employment and to every U.S. state's economy—not just oil-producing states. The U.S. oil revival has increased demand for industrial equipment and machinery, construction and well services, information technology, materials, logistics, and professional, and financial and other services and has spurred research and development investment across numerous industries. Investment in crude production has a far-reaching impact on jobs, with about 10% of the total employment impact flowing directly to producers and another 30% into the supply chain. The remaining 60% derive from the broader impact of workers' increased income and spending due to higher levels of crude oil activity. In other words, for every job created in the oil and gas extraction sector, three jobs are created in the supply chain and another six jobs in the broader economy. In a similar fashion, contributions to Gross Domestic Product (GDP) also multiply: every dollar of GDP created in the oil and gas sector generates two dollars in the supply chain.

Unleashing the Supply Chain considered both a Base Case and a Potential Case scenario in assessing the impacts of increased investment. The Base Case takes a conservative perspective and assumes production from already well-defined fields, as well as limited new technology developments. The Potential Case allows for new field developments and moderate drilling and technology improvements. The study examined the impacts directly on the supply chain and on the wider U.S. economy:

Employment: Higher upstream capital spending and production increase U.S. employment. Supply chain jobs represent, on average, 30% of the increase in total U.S. crude oil export-related employment in 2016-30, or about 124,000 jobs on average in the Base Case, and 240,000 jobs in the Potential Case, if the export ban is lifted. Across the entire U.S. economy and not just the supply chain, increased investment would create 400,000 jobs in the Base Case during this period. Employment contributions are spread across the entire supply chain, but are most prominent in sectors that support oil and natural gas operations and in the construction sector. For example, construction activity and related support services at well sites require engineering, construction machinery, sand, concrete, engineered equipment and fabricated metal to build the necessary infrastructure.

Income: Wages earned in these supply chain jobs are considerably higher than the average U.S. wage. IHS estimates that labor income for the oil export supply chain will increase under a free trade policy by over $21 billion per year during the 2016-30 period in the Base Case and by over $39 billion per year in the Potential Case. In the Base Case, lifting the export ban would increase incomes by $57 billion annually across the entire U.S. economy. This export-led labor income contribution is particularly notable when US wage growth remains sluggish, at about 2% annually, and even lower in the construction sector as wages remain flat due to a slow rebound in US housing starts. On an annual basis, lifting the crude export ban translates to a wage increase of $158 per year for each household in the Base Case and $285 in the Potential Case, on average, in the 2016-30 period.

GDP: A large supply network serving upstream operators creates a multiplier effect by drawing value from the manufacturing and raw materials sectors that produce the finished goods supporting upstream activities. In the Base Case, the U.S. crude oil will contribute, on average, an additional $26 billion per year to GDP from the supply chain, and $86 billion per year to the economy as a whole over the 2016-30period under a free trade policy. The Potential Case contribution to annual GDP of export-related supply chain is $47 billion. To put these contributions to GDP into perspective with other US industries, the base case contribution of $26 billion is equivalent to the total 2013 value-added contribution of dairy products manufacturers in the United States.

Revenues: The cumulative economy-wide impact on government revenue from federal, state and local tax receipts would be $1.3 trillion from 2016-2030 in the Base Case and almost $2.8 trillion in the Potential Case. Total government revenues generated by crude oil export-related supply chain activity will roughly double, from $7 billion in 2016 to over $13.6 billion in 2020 in the Base Case and from $10 billion in 2016 to over $25 billion in 2020 in the Potential Case. To place these revenue totals in context, the president's budget in fiscal year 2014 provided $71.2 billion in discretionary funding for the Department of Education—and the additional government revenue from lifting the export ban could fund nearly 10% of this budget. Over the entire 2016-30 forecast period, lifting the trade restrictions will generate government revenue through the supply chain in excess of $428 billion in the Base Case—enough to fund the president's fiscal year 2015 budget for the Department of the Interior.

Benefits Across the Country

Eliminating the ban on the export of crude oil will have far-reaching consequences for the U.S. economy and within virtually every state. The effects of this policy change will go beyond crude oil exploration and development and will include manufacturing and service-related sectors present in every region. Some industries that stand to benefit—transportation, steel, professional and financial services—are dispersed across many states. Large and diverse state economies such as California, Texas, Illinois and New York benefit by virtue of their ability to fulfill supply-chain requirements. Other states, such as Ohio, Michigan and Pennsylvania, have large capital equipment manufacturing sectors, which are supported by their local materials and components suppliers.

Sourcing supplies for crude oil development reaches states that do not have an oil play within their borders. Capital spending may be incurred at an oil production site, but the machinery and equipment, engineering services, materials, and other expenditures may occur in other locations far from production. For example, oil development in North Dakota relies on companies that provide banking, financial, and insurance services in Chicago and New York City as well as professional services firms that might be located in Dallas, San Francisco and Boston.

The oil-producing states of California and Texas are expected to reap the largest benefits from a free trade crude oil export policy, together accounting for about 25% of total supply chain employment and labor income contributions and 23% of the government revenue contributions over the 2016- 30 period in both the Base and Potential Cases.

Washington, Massachusetts and other states that do not produce crude oil still rank high in employment, labor income, and value-added economic contributions under free trade. In terms of labor income, Washington and Massachusetts contribute nearly 7% of the free trade's impact on the U.S. supply chain in both the Base and Potential Cases. The supply chain accounts for nearly 50% of the overall economic impact of a free trade policy in several oil-producing and non-producing states. In Washington State, for example, the technology and manufacturing sectors are expected to grow rapidly in both the Base and Potential Cases, and its supply chain contribution to GDP is expected to comprise 47% of the state's total impact from higher crude oil exports over the 2016-30 period. Even a state like Illinois, a small oil-producing state with a diverse set of supplier industries, will derive 58% and 54% of the total value added impacts from the supply chain in the Base and Potential Cases, respectively.

New York State has a diversified economy with a strong financial sector and many mature manufacturing industries that are expected to benefit from removing the crude oil export ban. In the long-term (2016-30), supply chain activity under free trade is expected to contribute an additional $2.1

billion on average per year to value added in the Base Case, while the average in the Potential Case exceeds $4 billion per year. New York's state and local governments are also expected to benefit: between 2016 and 2030, the cumulative impact on government revenue in the Base Case will exceed $37 billion and will reach almost $81 billion in the Potential Case.

Benefits at the Pump

It may be assumed that liberalizing crude oil export trade will raise U.S. gasoline prices. But this would be a mistaken assumption, as crude and gasoline pricing data do not support such a conclusion. Rather, the data make clear that international market prices—and not domestic crude prices—have more influence on U.S. gasoline prices. Gasoline and other refined products are not subject to the same trade restrictions as crude, and both imports (to the East Coast) and exports (from the Gulf Coast) routinely are freely traded. This free trade and movement of refined products create price linkages among markets both inside the United States and between the United States and foreign markets (such as Europe). These product price linkages have remained firmly in place despite significant changes in the price of the crude refined within the domestic market.

Gasoline's tie to international crude through the free trade of refined products is based on changes in the global Brent price. Restrictions on the export of U.S. crude, as explained earlier, allow refiners to extract a discount on WTI, yet gasoline is priced based on higher international Brent crude prices. Allowing the export of U.S. light tight oil would increase the supply of light crudes that establish the international Brent price benchmark. As new crude supply is added to the global market, the international price of crude will fall, putting downward pressure on US gasoline prices. In *U.S. Crude Oil Export Decision,* IHS assesses that the shift of the U.S. crude market to free trade will reduce gasoline prices paid by US consumers by an estimated 8 cents per gallon (Base Case) and 12 cents per gallon (Potential Case) from 2016-2030. At the same time, free export of U.S. crude oil would actually increase domestic crude prices, which will rise to meet higher international price levels, generating additional U.S. output and adding to international crude supply.

Strengthening our National Security and America's Position in the World

America's energy revolution has already made the United States more secure by making energy supplies more accessible and reliable for American industry and consumers. The United States has reduced oil imports from 60% of total supply in 2005 to 27% in 2014. The majority of U.S. imports are sourced in North America. Today, the United States can worry less about oil supply interruptions affecting the ability of the U.S. economy to function. The United States is still tied to global markets through price. Instability and disruption of oil markets, key producing states, and transit routes still affect oil and U.S. gasoline prices and economic growth. Nonetheless, American energy entrepreneurship has reduced U.S. economic vulnerability to external physical disruptions in oil markets. Eliminating the crude oil export ban helps the United States expand and consolidate these national security benefits.

The first critical issue is restoring incentives to investment at a time of low prices. Investment drove the American energy revolution. Low oil prices have already forced cuts in North American capital expenditures in the oil and gas sector on the scale of around 35%. The United States has an interest in retaining the investment and innovation in energy production that underpins its newfound energy security. To do that, American oil producers need access to the widest potential markets for their products, offering the highest price incentives for production. If the United States wants to protect and

consolidate its gains in energy security, acting now to remove the export ban on oil is perhaps the most concrete action that policymakers and legislators could take.

Second, the United States has an opportunity to partner with Canada and Mexico to make North America a new foundation for global energy security. On November 27, 2014, OPEC demonstrated that, today, it cannot act as a block to adjust production and affect energy prices. Instead, Saudi Arabia, Kuwait and UAE decided to protect their global market share in oil, and to rely on market forces to rebalance supply and demand and drive out high cost producers.[2] North America can contribute to filling the space left by OPEC to help shape global oil market conditions that drive stable and sustained economic growth. The U.S. Energy Information Administration has projected that the United States, in a high case scenario, could increase crude production from current levels of 9.3 million B/D to 13.3 million B/D in 2020. The National Energy Board of Canada's high forecast estimates that Canada could increase its production from 3.6 million B/D in 2015 to 4.3 million B/D in 2020. Mexico is in the midst of a major energy reform that will attract investment to the hydrocarbon's sector and help it recapture its productive potential. North America will not act like an oil cartel. Rather, it represents three democratic and market-oriented states establishing a reliable base of production that will set standards in international conduct and transparency in energy development and trade that can influence the global industry. To achieve this new foundation, the United States must be an exporter.

Third, the United States and all energy consumers and producers benefit most when energy markets operate on the basis of competition and are not tied to special relationships or regional monopolies that give individual actors undue political leverage over their customers. Already we have seen the benefits of competition in natural gas trade, even before the United States has had the capacity to export natural gas. As the U.S. has increased gas production by 35% since 2009, we have also reduced imports, allowing about 75 bcm of gas once intended for import to the United States to be redirected globally. Europe has taken advantage of this market opportunity to diversify gas sources, while at the same time investing in gas import infrastructure and restructuring market rules to make them more competitive. Those changes created competition with Russia's Gazprom that has lowered natural gas prices for European consumers and created a vibrant internal gas market in Europe that has even supplied gas to Ukraine through "reverse flows." The lesson is clear – a competitive environment provides checks on potentially dominant regional players. Already there is much greater competition in oil markets than natural gas because of cheaper and more widespread transit infrastructure. The United States has a direct interest in contributing supplies to this competitive international oil market, as it signals to producers and consumers that the largest world's largest producer of petroleum liquid fuels is fully committed to a globally competitive oil market that neutralizes regional political power drawn through regional market dominance.

Fourth, the United States benefits most from a global oil market where all major producers allow global markets to drive resource availability. From our own history, the Arab Oil Embargo of 1973 perhaps most dramatically illustrates the economic pain created when major producers take commodities off the market.

The United States should not continue to perpetuate an example through our own resource nationalism that can encourage similar action from others – on oil, gas, or any other mineral or commodity. A January 2015 Columbia University Study on *Navigating the U.S. Oil Export Debate* documents U.S. cases that have been won against China under the General Agreement on Tariffs and Trade and the World Trade Organization regarding Chinese export restrictions, first on bauxite, coke, fluorspar, magnesium,

[2] IHS, *Oil Change: A World Without OPEC as We Knew It* (February 2015)

manganese, silicon, carbide, silicon metal, yellow phosphorus, and zinc – and then in a later case on rare earth resources. The United States argued that these were critical inputs into steel and other manufacturing processes. Under provisions that apply as well to crude oil export restrictions, the WTO ruled that exceptions to the WTO rules for conservation of exhaustible natural resources or to relieve critical domestic shortages did not apply. It is in both the trade and international security interests of that United States to maintain the strongest foundations to defend against resource nationalism that can drive countries to impose selective embargoes on commodities critical to international commerce. It would be against our interest to see Russia use such precedents today to curtail gas supplies to Europe. In a world where resources and manufacturing inputs are sourced globally, maintaining the crude export ban precedent undermines the very competitive and global nature of American economic interests.

Fifth, there are times when energy must be used as an instrument in foreign policy, but that is usually to no effect unless a core group of countries is willing to act together. In 2012, the United States and Europe imposed sanctions on Iran's oil exports. To make those sanctions effective, the United States engaged China, India, Turkey, Japan, Korea and other major importers to curtail imports and diversify sources. Increased supplies out of Saudi Arabia and Iraq, and the emergence of the U.S. tight oil revolution (which reduced U.S. imports) radically facilitated the market conditions to make it possible to encourage countries to diversify. As the person coordinating the teams on these negotiations, I can assure the Committee that the U.S. negotiating position would have been far stronger if we were not protecting U.S. oil export restrictions in the name of our consumer interests, when we were asking others to risk higher oil prices for the sake of international security.

Finally, we should recognize clearly that issues of resource nationalism and consumer populism will be front and center in the largest debate on geopolitics and energy that the world may face in the next decade: the debate over climate change. In December in Paris, the Conference of the Parties will convene once again with all 196 parties to the UN Framework Convention on Climate Change. That meeting will proceed on a new track – where member countries must propose national plans (formally called "Intended Nationally Determined Contributions") to reduce CO2 emissions. There will be an intense global debate on whether nations are acting boldly enough to avoid an emissions path that would trigger the worst impacts of climate change. The issues at the center of this debate will be around energy sources, costs, and how energy is produced and used to create jobs and drive economic growth. With China emerging as the world's largest energy consumer and largest emitter of CO2, and with almost all the future growth of energy demand in non-OECD countries, the climate challenge cannot be solved without the full participation of these countries. Each country will have incentives to claim special interests, ranging from consumer concerns over phasing out fuel subsidies to the price competitiveness of investments in coal generation versus lower carbon fuels. For the United States to participate credibly in this forum, argue against special national interests, and leverage credible participation from non-OECD countries, the United States should move beyond its own laws that confer special domestic privileges. There is no better time to end the crude oil export ban, since in today's market it also benefits American consumers, workers, and economic growth.

Concluding Reflections

On any energy policy it is critical to consider the downsides, and there are risks to consider in ending the crude oil import ban. The risk most feared is increasing the domestic price of gasoline. The two IHS studies cited in this testimony, the Columbia University study, and a number of others all argue on firm economic grounds that this risk is misplaced. The price of gasoline should decrease.

Some will argue that the United States is better off refining its light tight oil to capture the value added benefits. *Unleashing the Supply Chain* makes clear that the U.S. economy benefits far more from the $750 billion that would be invested due to stronger producer incentives than inefficiently processing light tight oil, and from the reverberations that these investments would have through the supply chain and economy-wide. Moreover, the U.S. refining system is already demonstrating the limits of its ability to handle the light crude. The United States is better off selling light tight oil at a global market price rather than at a domestic discount for the reasons outlined earlier, and instead importing heavier crude oil as needed to meet the configuration requirements of Gulf coast refiners to produce a full product slate. In other words, with free trade the U.S. benefits from a higher purchase price for light tight oil, stronger domestic production incentives, and the stream of economic and national security benefits outlined in this testimony – and Gulf coast refiners can import and refine heavier crude with stronger commercial results. What refiners would lose is the large price discount between WTI and Brent crudes. They would still get a cost advantage over refiners outside the United States who would pay another $2-$5 per barrel to transit LTO imported from the United States. U.S. refiners will continue to have a global competitive advantage coming from inexpensive natural gas, the largest operating cost input in the refining process.

Timing is indeed sensitive when one considers both national security and economic benefits from the resurgence of American oil and gas production. Low oil prices today are affecting capital expenditures around the world, which will affect U.S, and global production in the next 18 months. For the U.S. to create the incentives to recapture or sustain the dynamism, innovation and security inherent in its energy revolution, it should give its American energy producers the widest market to sell their products. Market scale, price and prospects will fundamentally drive investment and production – the factors that underpin the American energy revolution. Price is especially sensitive in the current low cost environment, as it will determine whether significant parts of the North American industry will remain competitive. Moreover, in today's global environment where energy has vast geopolitical ramifications, the United States is strongest positioned when it can advocate for global competition and free trade in commodities – and say without any reservation when we call on friends and allies to make sacrifices on issues such as sanctions or subsidies, that we ourselves have not protected our own legacy interests.

Ending the crude oil export ban will not be simple politically. Most likely the price of gasoline will rise before the 2016 general election – whether because of increased global demand, new country risks, and unpredictable supply disruptions. Any price increase, however, will not be the result of lifting the export ban. On the contrary, increasing U.S. output will help to offset disruptions elsewhere.

I appreciate, Mr. Chairman, your leadership and that of this Committee to take on this issue, knowing that is politically charged. The benefits that come with ending the crude oil export ban justify your efforts. Thank you for this opportunity to testify before your committee. I welcome the chance to respond to your questions.

The CHAIRMAN. Thank you, Mr. Pascual. Mr. Lance.

STATEMENT OF RYAN LANCE, CHAIRMAN AND CEO, CONOCOPHILLIPS

Mr. LANCE. Thank you, Madam Chairman Murkowski, Ranking Member Cantwell and Committee members. I appreciate the opportunity to give you my perspectives on the need for oil exports. These perspectives are based on 35 years of experience in the industry.

I started working in the drilling rigs in Montana. My family owned a wheat farm there. I put myself through college and obtained a petroleum engineering degree.

When I graduated I went to work on Alaska's North Slope, for 14 years. I'd like to think I made sour dough status, but it depends on who you ask. Then from there to California and since then throughout the U.S. and around the world.

I've seen industry booms and busts. I've seen projects that worked and ones that didn't, but I've never seen anything quite like this energy renaissance we're going through today.

Today our country has access to a vast oil and gas resource base. Production and reserves are rising from unconventional sources like shale, and they're exceeding our expectations.

Consumers are saving at the utility meter and also at the gas pump.

Oil and gas now supports 9.8 million U.S. jobs, and 40 percent of the U.S. GDP growth in recent years came from our industry.

After decades of declining production our national fortunes are truly changing. This energy renaissance has benefitted our country both domestically and geopolitically. We really have shifted the oil market's center of gravity away from unstable sources. Even as President Obama said, "America is number one in oil and gas."

We have a bright energy future. That's a new concept for us. We did it through American-made technology and ingenuity, but there is a problem. We're producing more oil than our refineries can process economically.

With any other energy commodity we just export some to the global markets. We do that with refined products today including gasoline. In fact we had record exports of U.S. refined products last year. But crude oil is the only energy product banned for export and that needs to change.

Most production from unconventional sources is tight oil. It doesn't match our refineries that were built for heavy oil. To take more light oil the refineries have to run inefficiently or at lower rates.

They could install new condensate splitters to process more light oil, but that could cost, on average, $400 million per refinery. Getting air permits, we think, is a problem. Meanwhile, refineries already face big investments to meet tougher gasoline standards. So they probably can't expand as much as is needed. Instead to protect their economics refiners generally pay less for the oil.

The world oil futures today sells around $53 a barrel, with American oil selling for $43. That's a $9 to $10 discount, and that's been typically running $5 to $10. This is having an impact on American producers, particularly in this low price environment we find ourselves today.

It disadvantages us against our competitor overseas, and every dollar discount is a dollar less invested in American production. Also, some of these light oil projects are uneconomic at prices below $70 a barrel and most of them are uneconomic at $40 a barrel.

But we expect our light oil production to continue growing. And by 2020 our output capacity could be two million barrels a day over the capacity to refine it. Either that or our projects will be uneconomic due to low prices.

So we need oil exports. Exports could incentivize three million barrels a day of new production, on average 400,000 to 800,000 new jobs per year. We'd gain $86 to $170 billion in annual GDP. The trade balance would improve by $67 million annually, and as Carlos has said government would gain $1.3 trillion of additional royalty and tax revenue through 2030. And consumers will gain lower gasoline prices.

Our exports would expand world oil supplies. That would drive gasoline prices down and the savings would be at least 7 to 12 cents per gallon. But even with exports U.S. refiners will still have all the light oil they need. They will still have an advantage over our competitors elsewhere, and that's due to shipping costs.

So in closing, nature has blessed America with a huge new resource. Let's make the most of it. We need crude oil exports.

Thank you, and I'll look forward to your questions.

[The prepared statement of Mr. Lance follows:]

ConocoPhillips

Before the Committee on Energy and Natural Resources
United States Senate
Hearing on U.S. Crude Oil Export Policy
Testimony of Ryan Lance
Chairman and Chief Executive Officer

March 19, 2015

Madam Chairman Murkowski, Ranking Member Cantwell and members of the Committee, my name is Ryan Lance and I am chairman and chief executive officer of ConocoPhillips. Thank you for the opportunity to appear before the committee today. It is an honor to be here.

I am speaking to you today on behalf of ConocoPhillips. Just shy of three years ago, our company became engaged solely in the upstream oil and gas business after spinning out our refining and chemicals businesses. We are now one of several hundred companies in the United States that make up a vital industry of independent exploration and production (E&P) companies. While you probably know the name ConocoPhillips, the vast majority of independent E&P companies are not widely known. Yet, these companies, as well as related service, supply and support businesses, play an important role in our nation. ConocoPhillips alone employs more than 19,000 people worldwide, with the majority here at home. Last year, we invested more than $7.5 billion in the United States. As big as these numbers sound, they are but a fraction of the total employment and investment impact our industry provides across our nation.

The reason I am here is to offer my perspective on our nation's crude oil export policy. And the reason we are all here is because this topic is at the center of a unique and historic set of circumstances that – if embraced – have the potential to transform our nation's energy outlook. Consider this: 1) in just a few short years, U.S. ingenuity and technical prowess have unlocked a vast, sustainable resource base of crude oil and natural gas; 2) we have in place a vibrant producer industry that provides significant economic stimulus to our nation; 3) we have a resurgence of U.S. manufacturing interests across our country based on access to affordable energy, and; 4) we have a fragile geopolitical climate that threatens U.S. interests globally. These are the current realities. Yet, the potential of our nation to capture the benefit of these realities is undermined by a policy that was enacted for a far different reality more than 40 years ago. That policy is the ban on crude oil exports.

Forty years ago, our policymakers were prudent, swift and deliberate about addressing the reality of that time by putting several measures in place to protect U.S. consumers. Now, we have an opportunity to be equally prudent, swift and deliberate about addressing the reality of today, which calls for a clear and urgent need to remove the ban on crude oil exports. It is time to let American oil trade freely on the global market, just as other U.S. energy commodities are traded in the global economy. Our industry has transformed the domestic energy business in less than a generation. We now have a compelling opportunity to change policy to benefit future generations.

I commend this committee and Madam Chairman Murkowski for your commitment to exploring the implications of such a policy change. I believe the analyses and the facts show that lifting the ban on crude oil exports will benefit our economy, American consumers and domestic production. I am pleased that lifting the export ban has received support in both parties, from all regions of the United States, and has been endorsed by virtually all the independent economic studies that have been conducted. Again, I want to thank all of you for your time and interest today.

The New Energy Era

I started in this industry 35 years ago working on drilling rigs and in production operations to put myself through college in Montana and earn my petroleum engineering degree. I have since had the opportunity to work on projects throughout the United States and around the world. Like many of my colleagues in our industry, young and old, I have weathered industry upturns and downturns, and seen energy shortages as well as surpluses. But I have never witnessed anything more remarkable than what is occurring today with domestic oil and natural gas supply in the United States.

The terms "game-changer," "revolution," "renaissance," "transformational" and "generational opportunity" are commonly used to describe the emergence of our nation's vast unconventional resources as a viable, durable and abundant supply source. Every one of these terms is an accurate way to describe the situation that is underway in our nation today. Over the past few years, the U.S. oil industry has succeeded in shifting the energy market's center of gravity away from unstable areas of the world, toward North America. And by the way, the independent companies (not "big oil") inspired and drove this renaissance.

By any measure, our nation has been on a transformational journey – one that must continue if America is to fully realize our energy potential. The task ahead is to fully understand today's realities and to make the appropriate policy decisions for these realities. In doing so, we can all play a part in sustaining this energy transformation, enhancing our energy security, and spurring economic benefit for our nation and for the American consumer.

The Crude Oil Export Ban Should be Repealed

As you would expect, oil producers have analyzed the implications of lifting the ban on crude oil exports. More importantly, a number of other nonpartisan, agency and think tank organizations

have also studied this issue and the potential impacts on American consumers. It is clear that exporting "made in the USA" oil will benefit consumers. There is compelling evidence that lifting the ban will help reduce gasoline prices, while also protecting and creating jobs, and spurring economic stimulus across our nation. And, the studies also note that lifting the ban will provide our government with significant revenue.

It is time to lift the export ban.

Key Points Supporting Repeal

There are several key points that are central to the case for lifting the ban on crude oil exports:

- A new era of U.S. energy abundance – There is no longer any question about whether or not the United States has enough oil and natural gas to meet domestic needs. The unconventional resources are real, they are abundant and they are here for the long term. Our long-held fear of impending energy shortages or concerns that future generations won't have enough energy is a holdover from a bygone era. A decade ago, when natural gas prices were above $10 per thousand standard cubic feet, we could not conceive of a day when we might be exporting natural gas. Now that day is here and natural gas prices are less than $3 per thousand standard cubic feet. This is because of actions industry took to develop our abundant natural gas resources. These actions have benefitted consumers and our nation. The same can be true for crude oil.
- Exports would help consumers save at the gasoline pump – Studies by the Brookings Institute, IHS Inc., Columbia University, Rice University, ICF, Resources for the Future and the Federal Reserve Bank of Dallas have all found that exporting American crude oil will increase global oil supply and lower gasoline prices. This seems counterintuitive, but here's the crux of the issue: U.S. gasoline prices, excluding taxes, are determined by global gasoline prices, which in turn track the global crude oil pricing trends. The entry of new oil supplies into the global market, such as from U.S. exports, would likely put downward pressure on gasoline prices. These points have been confirmed in recent studies by the Energy Information Administration (EIA), the Government Accountability Office (GAO) and the Congressional Budget Office (CBO). The IHS study shows that lower fuel prices would result in $265 billion in U.S. consumer savings annually between 2016 and 2030.
- Jobs would be protected and created – Repealing the crude oil export ban is vital to the health of the domestic E&P business and will incentivize ongoing investment by industry. By removing obstacles to investment, we can help protect jobs in this current low-price environment and create significant numbers of new jobs in the future. Another recent IHS study shows that 394,000 – 859,000 additional jobs could be created annually between 2016 and 2030 in the national economy as a result of the repeal. Importantly, as much as 24 percent of the new jobs would be in states with no oil production.
- Crude oil exports would grow the U.S. economy – Export sales of crude oil would stimulate demand for domestic production, thus increasing the economic contributions accruing to the United States from the energy renaissance. Studies show that U.S. GDP could increase on

average by $86 to $170 billion annually between 2016 and 2030 and government revenue could increase by $1.3 trillion annually.

- Crude oil exports would strengthen the U.S. standing in the world – U.S. crude oil would find a ready market among purchasers seeking reliable supplies and enable our overseas allies to diversify their energy supplies, thereby strengthening U.S. commercial and geopolitical influence.
- Advanced technology and innovation are key drivers – The U.S. energy renaissance is a result of leading-edge technology that was originated, tested and perfected here at home, largely by the independent E&P companies. And the technology and expertise we have developed here for hydraulic fracturing and horizontal drilling are now being used worldwide.
- Not all oil is the same – The light oil we are producing today from unconventional resources is very different from other types of oil. It is lighter in gravity, contains a different mix of hydrocarbon compounds and yields a different mix of products. Thus, it requires different refining processes and equipment than many of our U.S. refineries are currently equipped to handle. Because of this, the U.S. needs to export light oil and continue importing heavier oil that those refineries are built to process.
- Rising U.S. crude oil production exceeds our domestic refining capacity – The rapid growth of U.S. crude oil production, particularly light oil from unconventional resources, has overwhelmed the current refining capacity for this crude type. In order to process it, many refineries either need to run inefficiently and require a steep price discount to do so or they need to make significant investments in new equipment. Neither of these options is feasible. In the absence of a market, U.S. light crude will be trapped, will decline in value and the economic merits for investment will also diminish.
- American crude oil sells for less than global crude oil – The crude oil export ban, combined with the previously described mismatch of light oil with the needs of refineries, is discounting the value of an American product. American oil currently sells for $5 to $10 per barrel less than global oil. Every dollar subtracted from the price of American crude oil compared to the global price is a dollar that isn't reinvested in our country. More importantly, this discount is a particular threat in today's low-price environment. At current global prices of $50 per barrel, a $3 change can have the same impact as a $10 change in a $100 per barrel price. A wide discount between U.S. light crude prices and global crude prices has a disproportionately negative impact on U.S. producers. We are already seeing this in the market today. Projects are not economic, producers are cutting back dramatically on spending, and we are experiencing a significant negative impact on jobs, as well as local and state economies.
- Removing the crude oil export ban would resolve the refining bottleneck – The easiest, most efficient and immediate solution to the refining challenge would be to allow producers to sell their crude oil into the export market, as can currently be done with other energy commodities such as refined petroleum products, natural gas and natural gas condensates.
- Alaskan North Slope (ANS) oil represents the appropriate approach to crude oil export policy – In assessing the need for U.S. crude oil exports, policymakers need only look to the example of oil produced on Alaska's North Slope. Typically sent to market on the West Coast, ANS was exempted from the export ban in 1996, allowing exports to Asia. The Government

Accountability Office found no resulting increases in gasoline prices for West Coast consumers.

- In lifting the ban, the federal government would still retain the discretion to reverse policy at any time. This point needs no further explanation.

The points described above, taken individually and in their entirety, make a compelling case for removing the ban on crude oil exports. The restrictions imposed by the Energy Policy and Conservation Act of 1975 are no longer good policy for our nation in this new era of domestic oil abundance and geopolitical uncertainty. I strongly advocate for removing the restriction.

A New Era of U.S. Energy Abundance

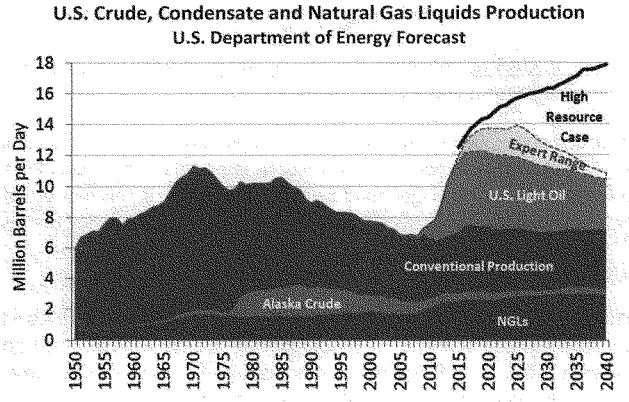
Many of you may remember how different the energy situation was in the 1970s when the crude oil export ban was enacted. We had supply shortages, a crippling oil embargo and long lines for gasoline. In some areas, factories and schools closed on cold days due to a lack of energy to heat their buildings. Remember odd-even license plates?

As a nation, we watched, seemingly helpless, as our dependence on imported energy increased. Government responded with prudent policies intended to protect consumers. These policies sought to keep our resources "at home," create a mechanism for stockpiling reserves for national security and enact fuel standards that would reduce our dependency on refined products over time. Many of these policies were and still are appropriate. For example, gasoline consumption is down and we have a robust Strategic Petroleum Reserve infrastructure system. Yet, as time passed, our production of oil and gas declined – until recently. Of all the policies enacted in response to the 1970s oil crisis, the crude oil export ban stands in stark contrast to today's reality. We do not have a supply shortage here at home. We should not be compelled to protect a resource that is abundant, especially when in doing so we disadvantage our domestic industry and our nation.

U.S. crude oil and associated liquids production, after peaking in 1970 at about 11 million barrels per day (MMBD), fell for more than 30 years, bottoming at 7 MMBD in 2008. But in the few short years since, driven principally by production from unconventional resources, U.S. liquids production has rebounded above 11 MMBD – and continues to grow.[1] The EIA predicts that by 2020, U.S. production could reach 12 MMBD, and by 2040 in their high-resource scenario it could reach 18 MMBD, as the chart on the top of page 6 illustrates.[2]

[1] U.S. Energy Information Administration (history from Monthly Energy Review, February 2015, Table 3.1, p.45 at http://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf.

[2] *Id.*; Forecast from Annual Energy Outlook 2014, (Reference and High Resource Case). Expert Range from various industry analysts.



Domestic crude oil reserves have increased nearly 75 percent since 2008 to nearly 33.4 billion barrels in 2013,[3] according to the U.S. Energy Information Administration (EIA), and are approaching an all-time record. Further, EIA recently reported that U.S. crude oil inventories are at levels not seen in 80 years.[4] Imports of crude oil and refined products, after peaking in 2005, had declined 28 percent by 2013,[5] with the decline continuing today.

Additionally, the United States now has nearly a century's supply of natural gas.[6] Marketed production during 2014 was a record 27.3 trillion cubic feet, up 44 percent since 2005.[7] Imports of liquefied natural gas (LNG) have almost ended, and major exports will begin next year. However, nearly 20 percent of U.S. natural gas production is "associated gas" produced by oil

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[3] U.S. Energy Information Administration, *Crude Oil Proved Reserves, Reserve Changes, & Production* (Dec. 4, 2014) at http://www.eia.gov/dnav/pet/pet_crd_pres_dcu_NUS_a.htm (last visited Mar. 16, 2015).

[4] U.S. Energy Information Administration, *Weekly Petroleum Status Report,* (Feb. 27, 2015) – "At 448.9 million barrels, U.S. crude oil inventories are at the highest level for this time of year in at least the last 80 years," at http://www.eia.gov/petroleum/supply/weekly/pdf/highlights.pdf (last visited Mar. 16, 2015).

[5] U.S. Energy Information Administration, *U.S. Imports of Crude Oil and Petroleum Productions,* (Feb. 27, 2015) at http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mttimus1&f=a (last visited Mar. 16, 2015).

[6] U.S. Energy Information Administration, Table 2. *Technically recoverable shale oil and shale gas unproved resources in the context of total world resources* (June 2013) at http://www.eia.gov/analysis/studies/worldshalegas/ (last visited Mar. 16, 2015), Total US Wet Natural Gas resource of 2,431 TCF. Table 5a : *U.S. Natural Gas Supply, Consumption, and Inventories* (Mar. 10, 2015) at http://www.eia.gov/forecasts/steo/tables/?tableNumber=15# (last visited Mar. 16, 2015), 2012 Total Marketed Production equals 69.08 billion cubic feet per day or 25.2 TCF/yr. Years of supply = Technically recoverable Resource of 2431 TCF/Annual production of 25.2 TCF = 96.5 years. 2012 is chosen to approximately match the date of the resource assessment.

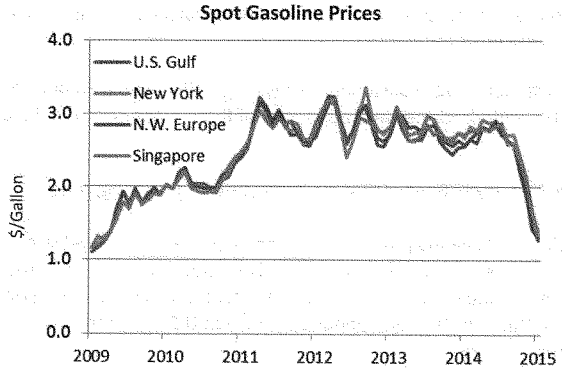
[7] U.S. Energy Information Administration, Table 5a: U.S. *Natural Gas Supply, Consumption, and Inventories* (Mar. 10, 2015) at http://www.eia.gov/forecasts/steo/tables/?tableNumber=15# (last visited Mar. 16, 2015). For 2014, Total Marketed Production equals 74.68 billion cubic feet per day or 27.3 TCF/yr. (Convert bcfd to TCF - multiply by 365 and divide by 1000).

wells.[8] As the export ban reduces oil drilling and production, it will also reduce natural gas production.

Exports Would Help Consumers Save at the Gasoline Pump

Nearly a dozen economic studies by experts at Brookings Institution, IHS Inc., Columbia University, Rice University, ICF, Resources for the Future and the Federal Reserve Bank of Dallas have concluded that fuel prices at the pump would decrease if crude oil exports are permitted. These conclusions have been affirmed by analysis conducted by the GAO and CBO.

The EIA has confirmed that U.S. gasoline prices, excluding taxes, are determined by global gasoline prices, which tend to rise or fall depending on the global crude oil price.[9] The current discounted U.S. oil price does not translate to lower prices at the gasoline pump. This is reflected in the chart below that shows wholesale gasoline prices in various regions around the world. They all move together. This is true even in the United States despite our discounted crude price.



EIA pointed out that Brent crude prices are more important than WTI crude prices as a determinant of U.S. gasoline prices.[10] The following chart shows that Gulf Coast and New York gasoline prices track the global Brent crude price – not the U.S WTI price. In effect, U.S. refiners are able to buy American crude oil at a discount price, and then sell refined products at prices commensurate with the higher global oil price.[11]

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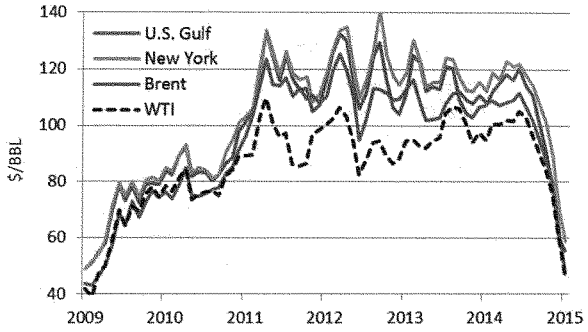
[8] U.S. Energy Information Administration, *Natural Gas Gross Withdrawals and Production* (Feb. 27, 2015), at http://www.eia.gov/dnav/ng/NG_PROD_SUM_DCU_NUS_A.htm (last visited Mar. 16, 2015). For 2013, Gross Withdrawals From Oil Wells / Gross Withdrawals = 18%.

[9] U.S. Energy Information Administration, What Drives U.S. Gasoline Prices, p.3 (Oct.2014) at http://www.eia.gov/analysis/studies/gasoline/pdf/gasolinepricestudy.pdf (last visited Mar. 16, 2015).

[10] *Id.*

[11] Bloomberg Professional Data.

U.S. Gasoline Prices vs. International & Domestics Crude Prices



Adding new crude oil supplies to the global market – through exports – would put corresponding downward pressure on world prices for gasoline and other refined products, and in turn on U.S. fuel prices. [12]

For example, IHS estimated U.S. consumer savings on gasoline would amount to $265 billion over the 2016-2030 period, with estimated savings of 8 cents-per-gallon at the pump annually.[13]

Lifting the Crude Oil Exports Ban is Good for Protecting and Creating Jobs

Allowing crude oil exports would protect jobs when oil prices are low and strengthen U.S. job creation over time. The energy renaissance has already created hundreds of thousands of new jobs, not only in the oil and natural gas industry, but across the country in service, supply and support industries. Our industry now supports 9.8 million U.S. jobs and contributes 8 percent of our gross domestic product.[14]

Job creation has also been outside the traditional producing areas, and in other industries. For example, energy-intensive industries are benefitting from the affordability and abundance of American energy, and are building new manufacturing facilities and attracting investment from overseas – all of which prompt job creation.

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[12] IHS Inc.,U.S. Crude Oil Export Decision: Assessing the Impact of the Export Ban & Free Trade on the U.S. Economy, in IHS ENERGY/ECONOMIC REPORT, pp.1-8, (2014) at https://www.ihs.com/info/0514/crude-oil.html (last visited Mar.16, 2015)[hereinafter *IHS study*]; Michael D. Plante, Economic Letter: *Crude Oil Export Ban Benefits Some..but not all*, DALLASFED, (July 2014) at https://www.dallasfed.org/assets/documents/research/eclett/2014/el1407.pdf (last visited Mar.16, 2015).

[13] IHS Inc.,U.S. Crude Oil Export Decision:Assessing the Impact of the Export Ban & Free Trade on the U.S. Economy, in IHS ENERGY/ECONOMIC REPORT, KF-1 (2014) at https://www.ihs.com/info/0514/crude-oil.html (last visited Mar.16, 2015)[hereinafter IHS study].

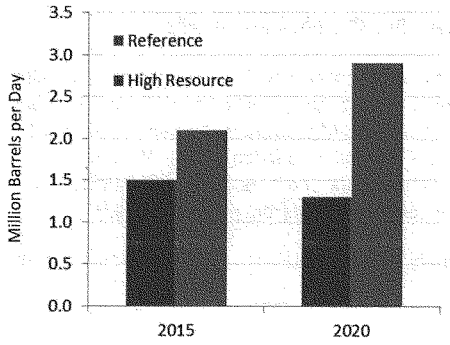
[14] Price Waterhouse Cooper, Economic Impacts of the Oil & Natural Gas Industry on the U.S. Economy in 2011, pp.6-7, (2013) at http://www.api.org/~/media/Files/Policy/Jobs/Economic_impacts_Ong_2011.pdf.

IHS estimates that exports would create additional jobs ranging from 394,000 to 859,000 per year, on average, between 2016 and 2030.[15] Additionally, oil industry jobs tend to provide mean annual wages twice the private-sector average,[16] and offer employee benefits with 50 percent greater value than the *Fortune* 500 average.[17]

Crude Exports Would Grow the U.S. Economy

The economic benefits of repealing the 40-year-old EPCA policy would be far-reaching and significant. On the global market, light oil sells at a premium to heavy oil. So, the U.S. would gain economically by exporting light oil, while continuing to import from neighboring Canada and Mexico, traditional allies and trading partners, the less-expensive heavy oil that our refineries are built to handle.

Incremental U.S. Crude Production from Lifting Export Ban in 2015



In the graph above, the Brookings Institution predicts that ending the oil export ban would encourage an increase in domestic production by up to 3 MMBD.[18] This added production would create jobs throughout the extended oil field supply chain all over America, and yield associated economic stimulation.

IHS found that the benefits to the U.S. economy of increased oil production would far exceed benefits to the industry itself. Every new oil industry production job creates three jobs in the

[15] IHS Inc., Unleashing the Supply Chain, 9 chart(March 2015) www.ihs.com/crudeoilsupplychain [hereinafter *IHS supply chain study*]

[16] *Id.*, at p.5.

[17] TowersWatson BENVAL, independent survey,(2014). BenVal analysis for 2014 reflects data from EBSG membership. Data for the 2014 study is based on 2013 active census data from ESBG members (17 companies, primarily oil and gas).

[18] Brookings Institution, Economic Benefits of Lifting the Crude Oil Export Ban, (2014) at http://www.nera.com/content/dam/nera/publications/2014/NERA_Crude_Oil_Export_Study_Sept_2014_FINAL.pdf (last visited Mar.16,2015).

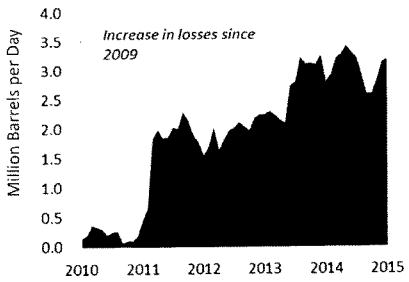
supply chain and another six jobs in the broader economy.[19] Contributions to gross domestic product (GDP) also multiply. Every dollar created in the oil sector generates two dollars in the supply chain. Consequently, IHS projects the following benefits from repealing the crude oil export ban:[20]

- As a result of increased production, the annual GDP gain would be $86 billion to $170 billion;
- Average household labor income would grow;
- The industry's capital investments would rise by $750 billion through 2030;
- The trade balance would improve by $67 billion annually;
- Through 2030, federal, state and local government would gain $1.3 trillion in additional tax and royalty revenue; and
- Since most unconventional shale development has occurred on privately owned land, landowners would gain royalty and leasing income, and local communities would benefit from the resulting economic stimulation.

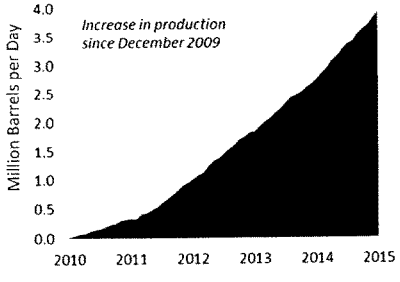
Crude Exports Would Strengthen the U.S. Geopolitically

Repealing the U.S. crude oil export policy would yield significant geopolitical benefits. U.S. light oil growth has already helped stabilize the global oil market. The chart below on the left shows global supply disruptions since 2009. Most were in the Middle East and North Africa. The chart below on the right shows U.S. light oil production growth. We have basically offset the disruptions. The market has been balanced by backing out 3 MMBD of U.S. imports and American consumers have been protected from price volatility.[21]

Growth in Global Supply Disruptions



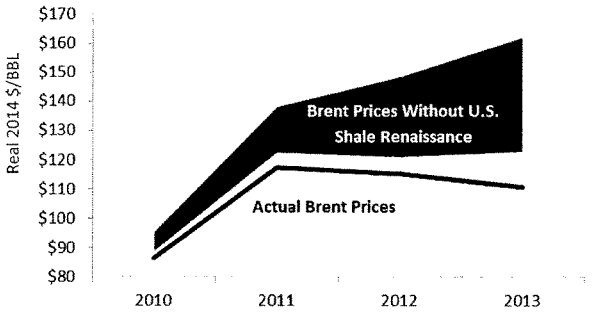
Growth in U.S. Light Oil Production



[19] IHS supply chain study, *supra* note 13, p.5.
[20] *Id.* at App B,p.1; IHS study, *supra* note 10 at KF-2.
[21] U.S. Energy Information Administration, U.S. Imports by Country of Origin (annual),(Feb. 27, 2015) at http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbblpd_a.htm;U.S. Energy Information Administration, U.S. Imports by Country of Origin (monthly),(Feb.27, 2016) at http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbblpd_m.htm (last visited Mar.16, 2015).

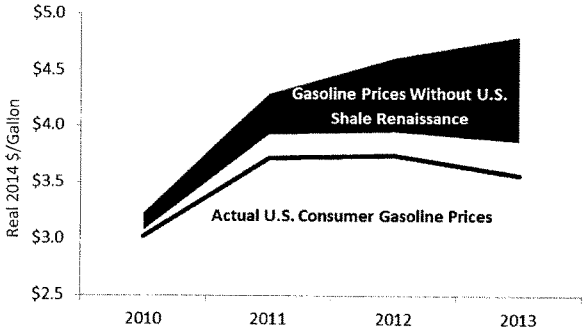
All else being equal, without the U.S. production increase, world oil prices could have been $12 to $40 per barrel higher post-recession, according to ICF International, shown below.[22]

Brent Crude Oil Prices Would Have Been $12 to $40 per Barrel Higher in 2013



Those higher per barrel global crude oil costs would have translated to higher U.S consumer gasoline prices from $0.30 to $0.94 per gallon in 2013, as shown below.

U.S. Consumer Gasoline Prices Would Have Been $0.30 to $0.94 per Gallon Higher in 2013



[22] Institute for Energy Research, *Hydraulic Fracturing Saved Consumers Up to $28 Billion Last Year* (Nov.6,2014), at http://instituteforenergyresearch.org/analysis/hydraulic-fracturing-saved-consumers-248-billion-last-year/ (last visited Mar. 16, 2015).

The ability of rising U.S. production to serve as a stabilizing force in the world market will decline in the future, as U.S. oil imports decline, unless we choose to allow crude oil exports. Such exports could, by making up for production losses elsewhere, help reduce market volatility. Additionally, by helping continue the U.S. production renaissance through creation of new markets, exports would serve to strengthen the economic power that underlies U.S. global influence, while the exports themselves could serve to diversify energy supplies for countries that now rely on less-secure sources.

U.S. producers would continue providing domestic refiners with all the crude oil they are configured to process. Additionally, U.S. refiners would continue enjoying a built-in cost advantage versus their overseas competitors due to the $2 to $6 per barrel shipping cost that overseas refiners would have to pay for U.S. crude oil.

Advanced Technology and Innovation Are Key Drivers of Unconventional Resource Success

The energy renaissance was made possible by a combination of technology and innovation that was developed in the United States, in many cases by smaller independent companies, not "big oil." In fact, the oil and natural gas business is nothing short of a high-tech industry. We use some of the world's most powerful computers to analyze seismic data. We can recover oil and natural gas from virtually any type of rock in any setting. We can steer drill bits down through miles of rock, then extend them horizontally with near-pinpoint accuracy to find oil and natural gas resources. We are an industry of scientists and engineers focused on finding solutions to very complex challenges, while emphasizing safety and environmental protection.

The oil industry and the U.S. government have long known that our nation possessed abundant hydrocarbons in unconventional reservoirs – after all, these were the source rocks for much of our nation's conventional onshore oil and natural gas deposits. But until recently, production from these deposits was rare – the rock wouldn't yield commercial volumes.

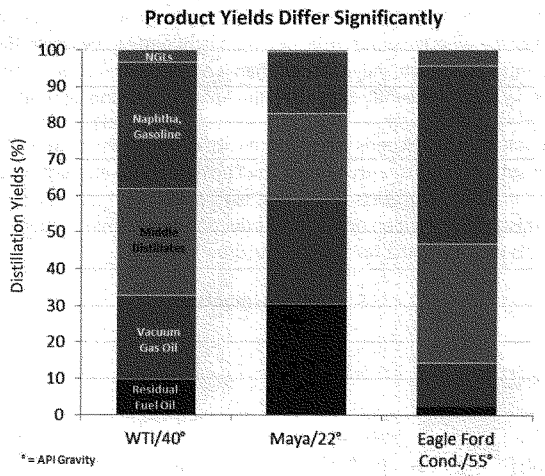
As recently as 10 years ago, you would have been hard pressed to find a story about successful horizontal drilling or hydraulic fracturing, although these technologies were well known to the industry and the Department of Energy (DOE) – having been used safely for decades. It wasn't until the two technologies were used in tandem on an experimental basis during the 1990s that commercial volumes of production were achieved from unconventional reservoirs. By the mid-2000s production of natural gas and later oil from these reservoirs began rising dramatically.

U.S. ingenuity and prowess made this success possible. Our homegrown industry has changed the fortunes of our nation.

Not All Oil is the Same

There are many different varieties and qualities of crude oil. In fact, the oil from any particular field is different from oil from any other field. Refineries are generally configured to process a particular variety or "slate" of crude oils. They do not operate as efficiently when required to run crude oils outside their design parameters.

Oil from unconventional reservoirs is typically known as "light oil." This generally means it is higher in gravity, contains a different mix of hydrocarbon compounds, yields more naphtha and gasoline than heavier oil, and contains less residual oil. Thus, light oils require different refining processes and equipment than heavier crude slates. The chart below indicates the product yields from oil ranging from light (Eagle Ford Condensate) to heavy (Maya).



One of the more compelling reasons to repeal the ban on crude oil exports is because our domestic refineries are currently constrained on the level of U.S. light crude they can efficiently process, as described in the next point.

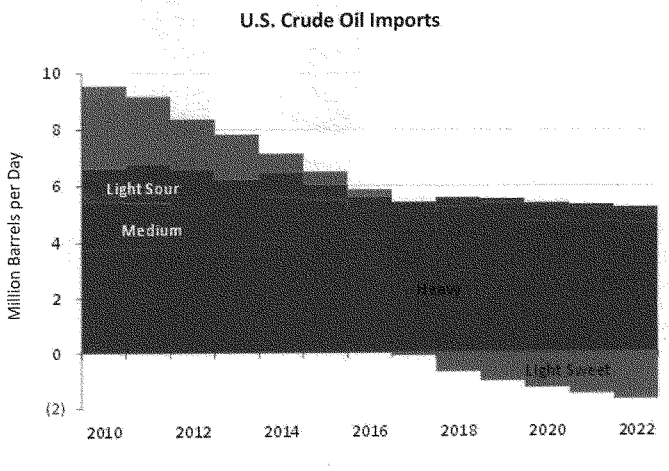
Rising U.S. Crude Oil Production Exceeds Our Domestic Refining Capacity

Processing additional volumes of light oil within the current refining configuration would require a steep domestic crude price discount to compensate the refinery for operating in an inefficient manner. That discount would deter investment in new light oil supply. The condensate and light oil recovered from unconventional reservoirs is generally not a good match for U.S. Gulf Coast refineries that were designed and equipped years ago to run heavy oil from Venezuela and Mexico, or Midwest refineries configured for heavy oil from Canada. In fact, the U.S. refining industry possesses 62% of the world's coking capacity – the process used to refine heavy oil.[23]

[23] Bloomberg Professional Service, Global Refinery Data.

U.S. refiners could accommodate more U.S. light oil by making major investments in new equipment. However, that would cost an estimated $400 million per facility,[24] at a time when refiners are already making major investments to meet more stringent gasoline specifications. Additionally, obtaining air permits for new refining units would add time and cost to the process, and opposition could come from environmental groups and local communities. Therefore, notwithstanding our strong support for refinery capacity expansions, refiners may not be able to make the investments to modify crude slates to the extent needed. Importantly, despite a significant crude oil price differential between light and heavy crude slates over the past five years – at times at a much wider spread than we see today – refiners have not made the investments needed to significantly expand their capacity to refine light oil.

U.S. light oil production already exceeds refining capacity during seasonal maintenance turnarounds, with resulting surpluses growing.[25] The current record amounts of oil in storage reflect this structural inability to process all the domestic production that is available. It is estimated that the mismatch between potential production and refining capacity could reach 1.5 to 2 million barrels per day in the foreseeable future.[26]



As the chart above illustrates, light oil imports and oil imports overall continue to decline, while imports of heavy oil continue to grow in the future. The heavy oil better matches the U.S. refining configuration.

[24] Turner, Mason and Co., North American Crude Oil Supply &Demand Study: High Production Case (internally conducted for ConocoPhillips) (Nov. 2013).
[25] *Id.*
[26] *Id.*

American Crude Oil Sells for Less Than Global Crude Oil

American crude oil currently sells for $5 to $10 less per barrel in the U.S. market than oil produced elsewhere sells for in the global oil market.[27] This is despite the fact that the benchmark crude oils – West Texas Intermediate (WTI) in the United States and Brent in the global market – are both light, sweet crude oils of similar quality. This differential (or spread) emerged in 2011, as U.S. production of oil from unconventional sources soared.

The reason for the current difference in price is that U.S. refiners purchase oil at a discount to offset the cost associated with processing light oil in refineries not designed for this crude slate, as described above. The discount serves as an incentive for refiners to process more light crude oil, while adversely impacting the investment economics for producers. U.S. producers are faced with the untenable choice of adding to the growing surplus that may soon exceed storage capacity – and further reduce the domestic price – or curtailing domestic production and investments.

Exports are particularly needed in an environment of low oil prices because differences of a few dollars have substantial impact on upstream investments. For example, a $3 change in a $50 per barrel price environment has the same effect as a $10 change in a $100 price environment, according to IHS.[28]

Many unconventional resource development projects are uneconomic below $70 per barrel, and the highest quality unconventional plays are uneconomic at $40 per barrel or lower. At recent prices, drilling activity cannot be sustained, the domestic industry is dramatically reducing investment, and job losses are growing every day. Suddenly, the industry that helped lead the U.S. economic revival since 2009, generating 40 percent of U.S. GDP growth, is in sharp decline.[29] Even worse, from a competitive standpoint, the discount for U.S. light oil puts domestic producers at a disadvantage compared to producers in other countries.

Removing the Crude Oil Export Ban Would Resolve the Refinery Bottleneck

Fortunately, there is a solution – U.S. crude oil exports. Due to the Energy Policy and Conservation Act (EPCA) of 1975,[30] crude oil remains the only energy commodity subject to an export ban. Given that America's unconventional resource renaissance has fundamentally changed the global energy landscape, this policy must be repealed if the United States is to fully realize the tremendous benefits offered by this new supply source. The time is now. Even as U.S. oil production is rising, U.S. oil demand is flat as a result of mandated use of renewable fuel, and more efficient cars and trucks.

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[27] Changing Crude Oil Markets: Allowing Exports Could Reduce Consumer Fuel Prices, & the Size of the Strategic Reserves Should be Reexamined, GAO-14-807, pp.6-8 at http://oilexports.com/wp-content/uploads/2014/11/666274.pdf (last visited Mar. 16 2015).

[28] IHS supply chain study, *supra* note 13, at p.17.

[29] *Id.* at p. 4.

[30] Energy Policy Conservation Act 1975, Pub. L. No. 94-163.

There is another important factor that is critical to this conversation. As members of this committee are fully aware, there are no restrictions on the export of refined petroleum products, such as gasoline, diesel fuel and home heating oil. In fact, in 2014, as recently noted by the Commerce Department, refined petroleum products exports hit a new record, accounting for nearly 10 percent ($146 billion) of the total value of all products exported from the U.S.[31]

We recognize that exports are beneficial to the overall economy. Indeed, U.S. exports of all products and services yield approximately one-seventh of the U.S. GDP. Given the lack of refinery capacity to economically accommodate growing domestic light oil production, we believe that, from a policy standpoint, crude oil should be treated in a similar manner as the products that are made from it.

There has recently been some movement in the right direction. The Administration, through a recent Commerce Department clarification of policy, will allow exports of processed condensate. However, this only applies to a small percentage of U.S. oil production as condensate is not produced from all wells. So, it will not provide the magnitude of relief the industry needs, and condensate exports will not produce the level of national economic growth that would be realized from lifting the crude oil export ban.

Alaskan North Slope Oil Represents the Appropriate and Right Approach to Export Policy

There is also historical, empirical evidence that crude oil exports will not lead to gasoline price increases. In the mid-1990s, Congress and President Clinton ended the ban on exports of oil from the Alaska North Slope, resulting in exports to Asia. Previously, all Alaskan oil had been shipped to refiners on the West Coast.

Despite the resulting exports, a U.S. Government Accountability Office study[32] stated that, "GAO analyzed three important petroleum products used by consumers, which accounted for about 80 percent of the products produced by West Coast refiners, and found no significant increases in prices."

We Should End the Crude Oil Export Restrictions

In closing, I believe this testimony lays out a compelling case for lifting the decades-old ban on U.S. crude oil exports. The unique circumstances that exist at this time create a window of opportunity for policymakers to act prudently, swiftly and deliberately to end the ban on exports. Our nation has the resources, the industry capability and know-how and clear economic drivers to allow exports without negatively impacting consumers. Policymakers have an opportunity to be on the right side of today's industry, economic and geopolitical reality and bring greater prosperity to our nation.

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[31] U.S. Commerce Department, Annual Trade Highlights,(2014) at http://www.census.gov/foreign-trade/statistics/highlights/annual.html (last visited Mar. 16, 2015).

[32] Alaskan North Slope Oil: Limited Effects of Lifting Export Ban on Oil & Shipping Industries & Consumers, GAO RCED-99-191 p.8, at http://www.gao.gov/products/GAO/RCED-99-191 (last visited Mar.16,2015).

Thank you for giving ConocoPhillips and me the opportunity to share our perspective on U.S. crude oil exports. I commend the committee for its willingness to examine this complex issue, and to judge it on its considerable merits – increased domestic production, job preservation and creation, lower gasoline prices for consumers, U.S. economic stimulation and enhanced geopolitical influence.

With the leadership of this committee, and working with the Administration, we have an opportunity to not only keep the U.S. energy renaissance momentum going, but also to help ensure that Americans can realize all the potential benefits it has to offer.

The ban on U.S. crude oil exports should be removed.

Thank you. I look forward to your questions.

END

The CHAIRMAN. Thank you, Mr. Lance. We appreciate you being here. Ms. Rosenberg, welcome.

STATEMENT OF ELIZABETH ROSENBERG, SENIOR FELLOW AND DIRECTOR, ENERGY, ECONOMICS AND SECURITY PROGRAM, CENTER FOR A NEW AMERICAN SECURITY

Ms. ROSENBERG. Thank you. Chair Murkowski, Ranking Member Cantwell and members of the Committee, thank you for the opportunity to testify today on the issue of U.S. crude oil export policy.

Recent dramatic increases in U.S. energy production have reshaped our oil industry in some of the ways that my fellow panelists have just described, our industrial output and many of our global trading relationships. This oil boom has improved our GDP and our balance of trade, and it has meaningfully advanced our energy and national security. These benefits, however, will be clipped if policy makers do not change the 1970s era crude export policies that prevent U.S. oil from moving to markets overseas.

In today's abundant oil market supply conditions with a problematic mismatch between the increasing new volumes of domestic light oil and a refining industry geared towards heavier oil. Export restrictions don't make sense. They prevent U.S. producers from accessing international buyers able to process more light crude and who will pay international benchmark prices. This depresses domestic prices and distorts the market and in turn, this constraints the growth potential for domestic producers and the domestic economy more broadly.

Only a subset of American refiners benefit from the depressed domestic oil prices, and these refiners do not pass on cost savings to consumers as gasoline prices are largely determined by global Brent benchmarks. Removing the oil exports ban will alleviate market distortions and it will improve productivity, efficiency and economic growth.

One of the key economic benefits associated with lifting the ban is the stimulus this will provide for energy production growth which a variety of studies suggest will decrease domestic refined product prices and expand the GDP, strengthening our economy. The engine of our national security strengthens the United States to lead on international, economic, strategic and defense matters.

In addition to benefitting U.S. interests at home, lifting the ban will support our foreign partners and our interests abroad. More U.S. crude shipped overseas will diversify the global supply pool and allow our trading counterparts abroad to achieve a more optimized mix of imported energy commodities. This will enhance their market efficiencies, lower costs for consumers and enhance economic growth. These factors make the United States a more important trading partner for economies abroad which will in turn expand U.S. soft power leverage in the conduct of our foreign affairs.

Additionally, lifting the export restrictions will set the right antiprotectionist tone on trade. At a dynamic time in global energy markets and at a critical point in trade negotiations with our Atlantic and Pacific partners, the United States should affirm a commitment to free trade in energy and the expectation that trading partners will similarly adopt similar commitments.

Additionally, open energy trade is in line with our WTO commitments and will be indispensible in winning potential future natural resource trading disputes.

Another important benefit of lifting the oil export ban is the contribution it will make to U.S. and international energy security. When more of the global oil supply pool comes from stable producers, the overall market is more stable. U.S. crude will be shipped via fewer maritime hot spots or choke points such as the Straits of Malacca and Hormuz and the South and East China Seas.

Particularly in times of market crisis the unrestricted ability of U.S. producers to export will make them more responsive to market signals and better able to quickly adapt. This contributes to market conditions that can quickly resolve and possibly even deter actions by foreign producers to use oil as a strategic weapon. Lifting the export ban will also give the United States more flexibility to sustain and expand energy sanctions in the future.

Allies of the United States, many of whom reluctantly participated in energy sanctions in the past, may prove unwilling to participate in further sanctions unless the United States makes a serious proactive effort to stimulate alternative oil supplies which will help to keep the market balanced and minimize price spikes. If the United States cannot convince allies to join on energy sanctions against adversaries in the future, the threat of new sanctions will not be credible and their effect will not be forceful.

Washington has a unique window of opportunity to harvest dividends from abundant domestic energy. Policy makers should lift the oil export ban to promote economic growth and allow the United States to reap the geopolitical advantages of having a larger and more flexible role in the global oil market.

Thank you and I look forward to your questions.

[The prepared statement of Ms. Rosenberg follows:]

CONGRESSIONAL TESTIMONY

United States Crude Export Policy
Prepared Statement of Elizabeth Rosenberg

Center for a New American Security

March 19, 2015
Testimony before the U.S. Senate Committee on Energy and Natural Resources
Prepared Statement of Elizabeth Rosenberg
Senior Fellow and Director, Energy, Economics and Security Program
Center for a New American Security

Chair Murkowski, Ranking Member Cantwell and members of the committee, thank you very much for the opportunity to testify today on the issue of U.S. crude oil export policy. I will focus my remarks on the national security and foreign policy implications of exporting domestic crude oil.

Recent dramatic increases in U.S. energy production have reshaped our oil industry, industrial output and many of our global trading relationships. The United States has expanded oil production by 88% since 2008,[1] cut net oil imports by 31% since this time,[2] and according to the International Energy Agency, will account for the greatest source of global oil supply growth through 2020.[3] The energy revolution has improved GDP and balance of trade conditions over the last several years.[4] Additionally, it has helped to stabilize the global energy market during a period of record, sustained supply disruption. By strengthening our global trading position and our economy, the engine of our national security, the energy revolution has meaningfully advanced our security and the ability of the United States to lead on foreign affairs.

Going forward, our remarkably productive, innovative and resilient energy sector can deliver even further benefits to U.S. economic and national security. However, these benefits will be clipped if policymakers do not change antiquated crude export policies that prevent U.S. oil from moving to markets overseas. In a domestic market awash with oil, keeping 1970s-era export restrictions in place discriminates against U.S. producers and threatens investment in new supply, thereby jeopardizing economic, security, and trade gains from the energy boom. Policymakers should lift the oil export ban to bring export policy in line with present market

[1] Energy Information Administration, "Weekly Supply Estimates," http://www.eia.gov/dnav/pet/pet_sum_sndw_dcus_nus_w.htm.
[2] Energy Information Administration, "Weekly Imports & Exports" http://www.eia.gov/dnav/pet/pet_move_wkly_dc_NUS-Z00_mbblpd_w.htm.
[3] Lejla Alic et al., "Oil Medium-Term Market Report 2015: Market Analysis and Forecasts to 2020," (International Energy Agency, 2015), 41.
[4] John W. Larson et al., "America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy Volume 3: A Manufacturing Renaissance- Main Report," (IHS, September 2013).

circumstances, to promote free trade and responsible growth in the sector, and to reap the geopolitical advantages of having a larger and more flexible role in the global oil market.

U.S. Prohibitions on Oil Exports No Longer Make Sense

The current oil export restrictions were established four decades ago on the heels of a series of energy price controls and supply allocations. In light of the Arab OPEC oil embargo of 1973 and subsequent large oil price increases imposed by OPEC countries, the legislatively enacted ban on crude export was intended to promote energy and economic security. Slight modifications have been made to the export prohibitions over time, by both Democratic and Republican presidents, allowing a few exceptions. However in today's abundant oil market supply conditions, with a problematic mismatch between the increasing new volumes of light quality oil produced in the United States and a refining industry geared toward heavier crude, these rules do not make sense.

Export restrictions create barriers for domestic producers trying to sell their oil and distortions in the market. Many domestic producers sell their light quality crude at a discount because of its abundance relative to demand, the unsuitability of processing too much of it at domestic refineries oriented towards heavier crude, and infrastructure bottlenecks that make the journey to market more difficult and expensive. Critically, however, they have to sell their light quality crude at a discount because U.S. producers are restricted from exporting this crude abroad. The export ban prevents them from accessing international buyers better able to process more light crude and who will pay international benchmark prices for this oil. In this situation, domestic oil producers see a check on their profits and growth potential. It is only a subset of the U.S. manufacturing sector that sees beneficial margins from this market distortion. Notably, refiners in this position do not pass on their cost savings to U.S. consumers, as pump prices are largely determined by global benchmarks.[5]

So far, U.S. producers have been able to find a market for their expanding crude volumes by selling to U.S. refineries, or by using the limited exceptions allowed under export restrictions. These include sending oil to Canada, exporting condensate or through narrow swap arrangements. However, the point at which producers may exhaust these options may not be far off, and may already be occurring at certain times of the year in certain circumstances, such as periods of refinery maintenance when demand for oil diminishes. Historically high levels of crude building up in inventories makes the outlook for domestic oil market saturation even more

[5] Energy Information Administration, "What Drives U.S. Gasoline Prices?" (Energy Information Administration, October 2014), 7.

concerning. With limited relief valves for the abundant crude in the U.S. market, it also hems in the potential for domestic producers to achieve the 600,000 or more barrel per day increase in production this year anticipated by the U.S. Energy Information Administration and other independent analysts.[6]

The present crude export policy that strands light crude in the U.S. market is hardly an optimal arrangement for productivity, efficiency and economic growth. A more beneficial policy for promoting market stability, growth and security is a policy that would encourage efficient, open markets and a larger share of global oil supply from reliable producers, such as the United States. A more permissive, even encouraging, oil export policy would support these goals by allowing U.S. producers to fetch premium prices abroad. Lifting crude export restrictions makes sense even as lower oil prices slow investment and drilling in the United States, and domestic refiners consider expanding their capacity to absorb more light oil. These factors may delay the point at which the U.S. market is totally saturated with crude and the export restrictions stall out domestic oil production growth. However, responsible policy should intervene far before the oil market reaches such dire conditions.

National Security Implications of a New Oil Export Policy

Strengthening our Economy

There are a variety of economic benefits associated with lifting U.S. crude oil export restrictions that will directly benefit our national security. A variety of government and independent studies suggest that lifting the oil export ban would result in an increase in U.S. oil production, a decrease in domestic refined product prices, and growth in GDP. Oil output could rise between 110,000 barrels per day and 2.8 million barrels per day by 2020, according to these studies, with a corresponding bump in economic growth and benefit for the U.S. balance of trade.[7]

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[6] Energy Information Administration, "Short-Term Energy Outlook," (Energy Information Administration, March 10, 2015), http://www.eia.gov/forecasts/steo/report/us_oil.cfm.

[7] On the lower end of the spectrum of estimates for increases in domestic oil production, an industry-commissioned study by consultant ICF International estimated an oil production increase by approximately 110,000 to 500,000 barrels per day by 2020. (Harry Vidas et al., "The Impacts of U.S. Crude Oil Exports on Domestic Crude Production, GDP, Employment, Trade and Consumer Costs," (ICF International, March 2014), 10.) A study by NERA Economic Consulting estimated that oil production would increase by 1.3 million barrels per day to 2.8 million barrels per day by 2020 with the ban lifted in 2015. (Robert Baron et al., "Economic Benefits of Lifting the Crude Oil Export Ban," Prepared for The Brookings Institution, (NERA Economic Consulting, September 2014), 138, 139, 146, and 147.) According to a study by IHS, total U.S. crude oil output is expected to rise between 1.08 and 1.99 million barrels per

Strengthening our economy, including reducing our international indebtedness, strengthens the stature and ability of the United States to lead on international economic, strategic and defense matters. In an era of budget austerity, war fatigue, proliferating security challenges, and the expanding use of economic sanctions, a strong U.S. economy expands policy options from some of the more conventional diplomatic and military choices. It creates an opportunity to hone smarter and more creative tools to advance our national interests in the international arena. Additionally, a more favorable trade balance also liberates the United States to consider international trade policies and international lending that could be constrained, including by some of our key economic partners, such as China, in a scenario of greater U.S. indebtedness.

In addition to providing an economic boost at home, lifting the oil ban will beneficially accrue economic yields to our foreign trading partners. A U.S. energy export policy that allows the free flow of all energy commodities—including crude oil and not just condensate and refined products—will enable U.S. and foreign trading partners to optimize trade in various kinds of energy commodities, depending on seasonal and regional demands. The greater diversity in energy commodity trading relationships will support greater energy market efficiencies, lower costs for consumers, more limited risks and greater economic growth. These factors can make economic planning more dynamic, easier and reliable for policy leaders abroad, and in the United States. Additionally, these factors can make the United States a more important trading partner for more energy consumers abroad, a circumstance which will expand the soft power leverage of the United States in international strategic relationships.

Promoting Open Markets

Lifting the restrictions on export of domestic crude will allow U.S. policy leaders to set the right anti-protectionist tone on trade in the international arena and reap economic and strategic benefits from an open energy market system. At a dynamic time in global energy trade and a critical moment in the evolution of U.S. free trading terms with partners across the Atlantic and the Pacific, U.S. policy leaders have a unique opportunity to send a strong message on a commitment to open markets by lifting restrictions on oil export. In turn, this will affirm the expectation that key trading partners will adopt similar commitments on energy trade. Having more open energy trade is in line with U.S. World Trade Organization commitments, and will be indispensible in winning potential, future natural resource trading disputes that may arise with other countries.

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day by 2020. (Mohsen Bonakdarpour et al., "US Crude Oil Export Decision: Assessing the Impact of the export ban and free trade on the US economy," (IHS, May 2014)).

Making a firm commitment to open energy trade will also help the United States to influence trading policy priorities in other countries, such as those in East Asia. In that region, key decisions will be made over the coming years about the nature of international energy commodity market participation that will have a direct bearing on the U.S. economy. Furthermore, the United States will be more credible in encouraging developing economies, such as China and India, to join Organisation for Economic Co-operation and Development (OECD) economies as proponents of free trade and responsible stakeholders in collective energy crisis management if Washington actively shuns protectionism.

Enhancing Market Stability

By encouraging the expanded production of U.S. crude, a result of lifting the oil export ban, policymakers will be facilitating the greater flow of oil from a reliable, secure producer to the global market. When more of the oil supply pool comes from producers that do not suffer threats from political instability or imminent danger to critical energy infrastructure or supply lanes, the overall market is more stable. Additionally, U.S. crude will be shipped to consumers overseas via fewer maritime hot spots and choke points, such as the Straits of Malacca and Hormuz and the South and East China Seas. Major consumers in East Asia, for example, are highly vulnerable to supply disruptions that could occur in these areas, and are vulnerable to destabilizing conflict in the Middle East, from which a majority of their oil imports derive.[8]

Particularly in times of oil market crisis that originate outside the United States, the unrestricted ability of U.S producers to export oil will make them more responsive to market signals, and better able to quickly adapt to the needs of oil purchasers. This will contribute to market conditions that will more quickly resolve, and possibly even deter, actions by some producers to use oil as a strategic weapon. This in turn will give the United States the ability to use its Strategic Petroleum Reserve in more innovative and proactive ways, including to counteract hostile attempts by foreign producers to manipulate consumers or prices. If policies within reach, such as a loosening of the oil export ban, can lessen the potential for U.S. consumers to be held hostage to coercive market power, they should be very seriously considered and if at all possible, adopted.

Supporting Our Allies

[8] Lejla Alic et al., "Oil Medium-Term Market Report 2015: Market Analysis and Forecasts to 2020," 86.

For our European allies, the presence of more U.S. oil in the market will offer more supply options. This will mean that European consumers look less to Russia, from which they receive roughly 40% of their oil supplies[9] and which has a history of coercive energy supply policies. When Russia has more competition for supplying European oil demands it will have to work harder to play a role in the market. A greater diversity of suppliers to Europe likely will have only modest downward pressure on oil prices, which will mean that Moscow, and other producers, sell for modestly reduced prices and will collect modestly less oil revenue. However it will not be without economic impact for Russia, and will be strategically significant for the United States.

A fundamental pillar in the current U.S. policy regarding Ukraine and Russia's destabilizing role there involves degrading Russia's ability to compete in the global oil market, even while that may cause a moderate economic effect on the U.S. and European economies. A liberalization of U.S. oil export policy will have the effect of reinforcing the pressure on Russia's energy sector and is certainly in line with key U.S. national security goals. It will also constitute an important strategic act of support for allies in Europe, who are more threatened by Russian regional destabilization. When our closest allies are stronger, the United States is more secure and better able to bolster and lead multilateral security initiatives to counter global threats.

For East Asian oil buyers, more U.S. oil supply in the market would give them new opportunities to diversify away from increasingly unstable Gulf and Russian oil supplies. In addition to boosting supply security, such diversification will yield greater market efficiencies and will contribute to lower prices. This will be true for all Asian nations, including both our Treaty Allies in Northeast Asia and China. Policies that confer mutual benefit on the United States and the group of East Asian nations facing off as regional competitors should be priorities for the United States. They may help to deter strategic intra-regional competition by increasing the shared incentives for stable, efficient market activity. Enhancing stability in this neighborhood is directly in line with the United States' policy of rebalance to Asia, and will benefit our country and all others that see their own stability tied to stability of this burgeoning region. Putting in place policies that can contribute, even if modestly, to enhancing regional stability will cultivate the influence of the United States in Asia and beyond.

Expanding Sanctions Leverage

[9] "How Much Europe Depends on Russian Energy," *The New York Times.com*, September 2, 2014http://www.nytimes.com/interactive/2014/03/21/world/europe/how-much-europe-depends-on-russian-energy.html?_r=1.

One of the most important security benefits of lifting the crude export ban is the additional flexibility and leverage it will give to the United States to sustain and expand energy sanctions in the future. Policymakers in the United States have looked increasingly to energy sanctions over the last several years as a policy instrument to isolate and coerce adversaries. Economic sanctions that reduced Iran's oil exports by almost 60% from approximately 2.5 million barrels per day in 2012 to 1.1 million barrels per day now[10] are credited with bringing Iran to the negotiating table over its nuclear enrichment program. The international community would not have been able to sustain these sanctions, and cope with the oil price increases they would have caused, were it not for massive increases in alternative oil supplies. The United States added about 1 million barrels per day annually over the last several years, and Saudi Arabia also turned up production to balance the market.[11] In addition to targeting Iran's energy sector, the United States and the European Union have also imposed sanctions on Russia to handicap its energy sector as part of the broader Ukraine policy strategy.

Notwithstanding the interests of the United States and allies in successful conclusion of nuclear diplomacy with Iran, which would likely involve the eventual return of Iranian oil exports to the market, policymakers will need to enhance their ability to impose tough additional energy sanctions in the future. This is critical as an element of contingency planning on Iran policy and to provide a credible threat that more oil sanctions on Iran are possible if Tehran does not cooperate with the international community. Additionally, a grim outlook on relations with Russia, and the attractiveness of the energy sanctions tool to attack other potential new security problems in the future, means that policymakers should cultivate the ability to potentially deploy energy sanctions in multiple theatres simultaneously.

The failure to prepare for the potential future imposition of more energy sanctions by stimulating alternative oil supplies may render the threat of new sanctions hollow. If adversaries do not believe that the United States and its allies have the economic and political tolerance to cope with a self-imposed oil price increase, which could occur if more sanctions pull more oil off the market, these adversaries may call a bluff. Furthermore, allies of the United States, many of whom have reluctantly gone along with energy sanctions in the past, may prove unwilling to participate in further energy sanctions unless the United States makes a serious effort to stimulate alternative oil supplies. Lifting the U.S. oil export ban will bring online additional U.S. production, and would constitute an important signal to allies, adversaries and market

[10] David S. Cohen, Under Secretary for Terrorism and Financial Intelligence, "Written Testimony of David S. Cohen," Statement to the United States Committee on Foreign Relations, U.S. Senate, January 21, 2015, 5.
[11] Lejla Alic et al., "Oil Medium-Term Market Report 2015: Market Analysis and Forecasts to 2020," 61.

participants alike, that the United States is serious about the threat, or actual use, of forceful energy sanctions.

Conclusion

In a period of tremendous geopolitical uncertainty, and when many questions exist about the future role of the United States as a global energy player and world leader, Washington has a unique window of opportunity to strengthen domestic economic growth, oil market stability, U.S. global leadership and open trade relations. Removing the outdated, discriminatory and detrimental ban on the export of U.S. crude oil will advance these goals. It will deepen trading ties with strategic allies, including those in Europe and Northeast Asia. It will improve the economic position and energy market stability of our nation and partners abroad, and allow the U.S. to more effectively spur and lead multilateral action to counter international security threats. To enhance energy and national security, and to expand our ability to advance targeted foreign policy measures, such as sanctions, in the future, a new national energy policy should actively embrace the lifting of crude export restrictions.

The CHAIRMAN. Thank you. Mr. Drevna, welcome.

STATEMENT OF CHARLES T. DREVNA, PRESIDENT, AMERICAN FUEL AND PETROCHEMICAL MANUFACTURERS

Mr. DREVNA. Madam Chair, Ranking Member Cantwell and members of the Committee, thank you for the opportunity for us to present AFPM's views on the crude export ban.

At the outset I'd like to underscore a couple of items.

First, AFPM does not necessarily oppose the lifting of the crude export ban. We do represent more than 95 percent of the refining capacity here in the country; however, we do believe the free markets allow companies to compete and provide the highest quality goods at the lowest price.

So it's important to frame this discussion in two ways.

First, please, Congress should not narrowly limit the scope of this debate to one issue.

We've been lurching from energy crisis to energy crisis for as long as most of us can probably remember. Now we have an opportunity to change crisis into opportunity. And as a result there are a number of other free market, anti-free market, policies that if left unaddressed, when, if and when, the U.S. lifts the ban on exports, will make U.S. refineries less competitive than our global competitors.

For instance, if we lift the oil export ban without addressing that famous Jones Act it will become more cost effective for a barrel of crude oil to be shipped from Houston to Europe, refined and shipped back to the U.S. East Coast as gasoline than it would be just to ship that barrel of crude from Houston to Philadelphia. This makes no sense and I would love to be at the next town hall where elected officials try to explain that we're selling oil to our competitors cheaper than we sell it to ourselves.

Surely if we're discussing the shedding of the vestiges of the 1970s energy policy we can discuss the shedding of the vestiges of a 1920 shipping policy.

Second, this debate should be grounded in fact. To that point I'd like to describe a survey we released yesterday detailing the dynamic nature of the refining industry and the investments we're making to absorb more light, sweet crude. There have been several studies of the benefits of allowing crude exports, you mentioned a lot of them, that perpetuate a tremendous understanding about U.S. refiner's ability to keep up with increasingly amounts of very light crude oil is being produced.

These studies focused on one part, the supply chain, of the supply chain crude production. And seemed to assume the rest of the chain distribution storage and refining has no dynamic response. We took another route.

We simply asked our members what they are doing and what their plans are in the near term to deal with this new light crude oil. In other words, this survey is not based on modeling or hypothetical scenarios, but on actual refiner's plans.

Bottom line. The refiners plan to increase their use of their light, sweet crude by over 730,000 barrels a day from 2014 through '16. This is more than EIA's projected increase for that time frame.

The survey also pointed out the importance of being able to access the new production. For the refiners getting the crude has been much more of a bigger issue than refining it. If logistics were not an issue, respondents could process 1.5 billion barrels a day more crude in 2016 than they did in 2014 without any further investments than they already have in the works today.

From 2013 through '16 the respondents are investing over $5 billion to use more light, sweet crude. Now to put this is some sort of context. We, the refining sector, do it by $10 billion of capital investment each year. So in one year you can see that, $10 billion. In $5 billion over four years is perhaps about ten percent of their capital program.

The survey asked about the logistic activities to get new production to refineries. Most crude delivery was actually from the Bakken region where, in North Dakota, not surprising since this was a new region never connected to the refining system. But old regions in the Permian and the Eagle Ford areas in Texas also had significant crude delivery activities.

While these old regions had some delivery infrastructure problems, or infrastructure in place I should say, the reinvigorated production required some more infrastructure to get it to refiners. These results underscore, once again, that policies facilitating infrastructure development are vitally important.

Now let me be again clear. We do not—we support free market, and we do not oppose the export, the lifting of the export ban. But let's not be fooled into thinking that the restriction on crude exports is the only barrier to a free market.

Refiners currently struggle with a number of barriers including the Jones Act and that infamous RFS that inhibit an energy policy that is based on truly, on a free market. The debate can't happen in silos. We must take a holistic approach because you can't change one policy without understanding the other, that it will impact other policies. We must consider the unintended consequences.

Thank you very much. And I look forward to your questions.

[The prepared statement of Mr. Drevna follows:]

WRITTEN STATEMENT OF

AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS

AS SUBMITTED TO THE

COMMITTEE ON ENERGY AND NATURAL RESROUCES

United States Senate

on

"United States Crude Export Policy"

March 19, 2015

The American Fuel & Petrochemical Manufacturers (AFPM) is a national trade association representing more than 400 companies that encompass virtually all U.S. refining and petrochemical manufacturing capacity. AFPM appreciates the opportunity to share its views on the ban on crude oil exports. AFPM's testimony will briefly discuss the state of the global energy markets, regulatory environment, and the refining industry's perspective on the potential impacts of policy changes.

Changing Energy Picture

Production

The United States is in the midst of an energy boom that few predicted even a few years ago. For decades, U.S. crude production declined and the national energy conversation was too often characterized by fears of scarcity. In reaction to the 1973 OPEC oil embargo, the United States enacted the Energy and Policy Conservation Act of 1975 (EPCA). As originally enacted, EPCA prohibited the export of both crude oil and petroleum products. Through a series of Executive Orders in the 1980's and 1990's, the ban on petroleum products exports and exports to Canada were both eased or lifted, but there was little reason to have a conversation about exporting U.S. crude that most thought was in permanent decline. More recently, the 2005 Energy Policy Act and the 2007 Energy Independence and Security Act both reflected the scarcity mindset and gave rise to some of the most significant challenges refiners face today.

As we now know; however, innovation and entrepreneurship in the energy sector have reversed that trend, and the mere fact that Congress is holding this hearing is evidence that previous paradigms are no longer relevant. Led by new technology, U.S. crude oil production, particularly in North Dakota and Texas, averaged more than 8.6 million barrels per day (mbpd)

in 2014, an incredible 72 percent increase since production bottomed out at 5 mbpd in 2008. EIA projects that an additional 900,000 bpd of domestic production could come online by 2016. Of course, these projections are also based on assumptions about future conditions. Issues such as prices, geology, regulatory uncertainty, transportation logistics, and technology uncertainties will all impact future production.

When one broadens the lens and considers North America energy production, the picture becomes even brighter. In addition to new production in the U.S., Canada is expected to increase production by 500,000 bpd by 2016 for total new production of 4.2 mbpd. The types of crude are also different, with new Canadian production generally classified as heavy and the vast majority of new U.S. production classified as light. Diversity in crude slates can help ensure that refiners can access different properties to meet demand for different fuel mixes and other products.

Distribution

The energy renaissance is spurring significant changes in U.S. distribution. First and foremost, much of the new production is not connected to the refinery delivery infrastructure that existed prior to this tight oil boom. In many cases, new crude movements represent a reversal of historical flow patterns. As a result, upstream producers, midstream distributors, and refiners are rapidly adapting existing infrastructure while investing in new infrastructure. For example, some pipeline capacity is being adapted by converting natural gas pipelines to crude pipelines. Other pipelines are in planning or construction phases, including the southern leg of Keystone.

However, because our pipeline infrastructure is primarily developed from south to north, moving new supplies east and west has presented a challenge. The industry has responded with significant new investments in rail offloading facilities and terminals at coastal refineries, as well as new and improved tank cars to ensure crude oil can arrive to its destination safely and efficiently. In fact, AFPM members have invested more than $4 billion on new and safer tank cars in just the past few years. As pipeline infrastructure continues to come online, some such as the North Dakota Pipeline Authority expect rail shipments from the Bakken to level off as pipelines and new small refineries are built in the Williston Basin.

The rapidly shifting distribution infrastructure has also changed the competitive positions of our refineries. For instance, historically Gulf Coast refiners ran more imported crude oil and mid-western refiners imported crude by pipeline from the Gulf. Now, mid-continent refiners are gaining access to reliable and affordable Canadian crude and close-by U.S. crude oil. Similarly, several east coast refiners are now sourcing a much higher percentage of their crude oil domestically rather than continuing the same levels of crude imports. Consider that several refineries in and around Philadelphia, PA nearly closed their doors permanently in 2012. However, those refineries were able to start acquiring U.S.-produced crude from the Bakken region and are still operating today, supporting thousands of jobs in Delaware Valley.

Refining

In addition to climbing the list of major crude oil producers, the U.S. is also home to the world's largest and most advanced refining industry. In total, our members produce more than 15 mbpd of finished petroleum products—primarily gasoline and diesel—making the U.S. the world's leader in refinery throughput and accounting for more than 20 percent of global fuel

manufacturing. Since 2009, U.S. refineries have been able to run at very high utilization rates to meet the needs of the domestic market, while also becoming a net exporter of finished petroleum products, led by diesel exports to Europe and South America. The boon in U.S. crude oil production has been a significant factor in keeping U.S. refineries competitive in an increasingly competitive global market.

AFPM is aware there are ongoing questions about whether U.S. refiners are even capable of handling new U.S. production. The questions are driven by a key misconception that the existing refining configurations are ill-suited to absorb more light sweet crude, which is the primary type of crude being produced from tight formations in the Bakken and Eagle Ford. In reality, however, U.S. refiners have plenty of room to accommodate new, domestic supplies of light crude oil, with additional capacity to further grow U.S. production. The refining industry is constantly shifting crude slates to maximize efficiency and to meet consumer demand.

During the 1980s many refineries—particularly along the Gulf Coast—made investments in order to process heavy, high-sulfur crudes from growing production in nearby areas such as Mexico and Venezuela. Similarly, albeit more recently, some mid-continent refiners have added additional capacity to handle heavier oils from Canada. However, these investments do not preclude those refiners from processing additional light crude oil. Refiners typically run different types of crude oil with different qualities through their processing units. In fact, refiners have already started to adapt to increased domestic production by reducing imports, increasing utilization, changing the crude mix, and investing in additional refinery changes.

First, the domestic crude boom has helped reduce U.S. crude oil imports from 66 percent of U.S. refinery inputs in 2007 to about 45 percent of refinery inputs in 2014. When one removes Canadian and Mexican crude imports, the U.S. has reduced crude oil imports from outside North America from 46 percent in 2007 to 23 percent in 2014. Given favorable economics, refineries along the Gulf Coast will continue to reduce imports and invest in equipment to process more light-ends. In fact, this investment is already occurring.

On March 18th, in an attempt to further clarify misconceptions about the ability of refiners to process more light sweet crude, AFPM released a survey of its membership that asked about plans and capabilities to use new crude.[1] Twenty three companies representing 61 percent of U.S. refining capacity voluntarily responded in late. Respondents indicated that, from 2014 through 2016, they plan to increase use of "super light" crude by more than 730,000 barrels per day. Furthermore, if logistics access to the crude oil were not an issue and if economics were favorable, respondents indicated they have the capability to run an additional 800,000 barrels per day of super light crude oil, for a potential total of 1.5 million barrels per day of capacity over 2014 use of this oil. The value of respondents' investments to process additional volumes of domestic light crude oil total more than $5 billion in capital expenditures. It is worth noting that in order to increase certainty of the results, the survey only asked about plans through 2016. The conservative timeline meant other announced and ongoing projects that will not be completed by the end of 2016 were not included. This capacity is more than enough to handle the projected 610,000 bpd of lower 48 domestic crude oil production growth that the Energy Information

[1] The final survey is attached to this testimony as Appendix A.

Administration (EIA) projected in February between 2014 and 2016. And their March projection is even lower, showing a 610,000 bpd increase in lower 48 production. It is important to remember that nearly 40 percent of the industry is NOT accounted for in the survey response, which means total U.S. industry plans and capability to process more U.S. light tight oil crude are even greater than what the survey results indicate.

Some have pointed to recent crude storage levels as evidence that domestic refineries do not want domestic crude. In reality, the storage build-up is a function of a number of factors. First, there is historically a storage build-up in the spring as refineries go through maintenance turn-arounds ahead of summer driving season. Importantly, the crude oil market is also in contango, meaning crude producers can get better prices for future delivery than today on the current spot market. In other words, in many cases it makes more sense for the producer to store the crude oil, possibly for as long as another year, and deliver next spring rather than sell it at a lower price today. These market conditions tend to correct themselves over time.

Over the long-term, if the high-resource cases materialize and the U.S. continues to increase production, a glut of light, high-naphtha crude could occur. However, the precise nature of future production is highly uncertain. One needs to look no further back than the government and industry projections of production in the last decade to show that what we predict today may not reflect reality. AFPM's discussion of this point is simply to dispel the notion that domestic refiners are unable to process more U.S. crude oil in the short term. There are other reasons policymakers may choose to lift the export ban, but current refining capacity should not be one.

As an example of future uncertainty, it is worth noting one of the more significant shifts in the U.S. energy market is the decline in the U.S. demand for gasoline. In particular, the Energy Information Administration's 2014 projection for gasoline demand in 2030 is almost 43 percent lower than what the agency foresaw in its 2007 Annual Energy Outlook. U.S. demand for distillates such as diesel and home heating oil is slated to rise, but distillate represents a much lower share of U.S. fuel consumption than gasoline. The decline in gasoline demand is due to a number of factors, including increased vehicle efficiency and changes in consumer behavior.

As a result, U.S. refineries are increasingly utilizing international markets. For example, U.S. export of distillate to Western Europe and Latin America grew by more than 500 percent between 2000 and 2014. Refined product exports allow U.S. refineries to add value to crude oil and maintain the infrastructure that ensures the U.S. has the ability to produce as much product as it consumes. It also allows the industry to continue supporting millions of jobs and tax revenues. However, international markets are not stagnant and are quickly adapting. Other nations have been expanding their refining capacity and compete with U.S. for global market share. For instance, Saudi Arabia expanded its refining capacity nearly 19 percent between 2012 and 2013. Likewise, Brazil and China have increased refining capacity by 4.6 and 5.6 percent respectively. Much of this investment is being driven by growing demand in non-OECD countries, which account for nearly all the new growth in petroleum product demand. The U.S. is well-positioned to capture international market share provided U.S. policy is structured to allow refineries to effectively compete globally. Unfortunately, U.S. refineries are also the target of increasingly onerous and conflicting regulations.

Regulatory Challenges

The companies operating refineries in the U.S. compete intensely with each other and with global competitors for every gallon sold. It is widely known that consumers make decisions on where to buy gasoline based on as little as one penny per gallon difference. This competition at the corner gas station reverberates up the supply chain. Changing dynamics in the domestic and global markets for crude oil and petroleum products, combined with the regulatory environment, create an increasingly uncertain future for many U.S. refineries.

Leading the list is the Renewable Fuel Standard (RFS), which at its core is the federal government telling consumers that they must use certain types of biofuels in their vehicles. The ethanol volumes mandated by the RFS have risen to the point where they are no longer compatible with existing cars and infrastructure—triggering significant volatility in the market for compliance credits. Those credits, known as Renewable Identification Numbers (RINs) – in the case of corn ethanol these are called D6 RINs - peaked at $1.46 per gallon in 2013 and averaged around $0.50 in 2014. In early March RINs were trading at around $0.72 per gallon. The RFS can limit the supply of gasoline and diesel to the United States based on the amount of renewable fuels consumed in U.S. transportation fuel. In particular, obligated parties can only supply as much gasoline and diesel fuel as they have RINs to meet the RFS obligation that such fuel incurs.

In addition to industry-specific regulations like the RFS, the refining industry also faces government mandated environmental requirements that often conflict with one another. For instance, the proposed ozone NAAQS standard will drive large areas of the country into non-attainment, which will essentially halt any new construction projects and make it harder for refineries to invest in upgrades. A NERA report released just last week estimates that the low

end of the proposed ozone NAAQS standard will increase industrial power costs, reduce refining sector output by 0.8 percent, and cause an average annual loss of 1.4 million job equivalents. Last year, EPA finalized its Tier 3 fuel regulations to reduce the sulfur content in fuel, which will require expensive new equipment that will consume more energy and increase greenhouse gas emissions from refineries. Taken together, the U.S. regulatory environment is virtually unparalleled compared to global competitors, creating a challenge for trade-exposed industries such as refining.

Finally, in addition to reduced demand, increased competition, and environmental regulations, U.S. refiners seeking to ship crude oil between U.S. ports must comply with the Jones Act. The Jones Act, enacted in the wake of World War I, requires shipments moved between U.S. ports to use vessels that are U.S. built and flagged, U.S. majority-owned, and crewed by at least 75 percent U.S. citizens. As a result, it is significantly more expensive to use a Jones Act vessel than it is to ship internationally. In the context of lifting the crude oil export ban, it would be significantly cheaper to ship a barrel of crude from the U.S. gulf coast to Europe, than it would be to simply ship the barrel of crude to an east coast refiner solely because of the Jones Act requirement. European refiners export gasoline to the northeast, competing directly with U.S. refiners in that region. Lifting the export ban without addressing this dynamic would put U.S. refiners at a competitive disadvantage to their European counterparts and seriously hamper the ability of these U.S. manufacturers to compete globally.

Conclusion and Crude Oil Exports in Context

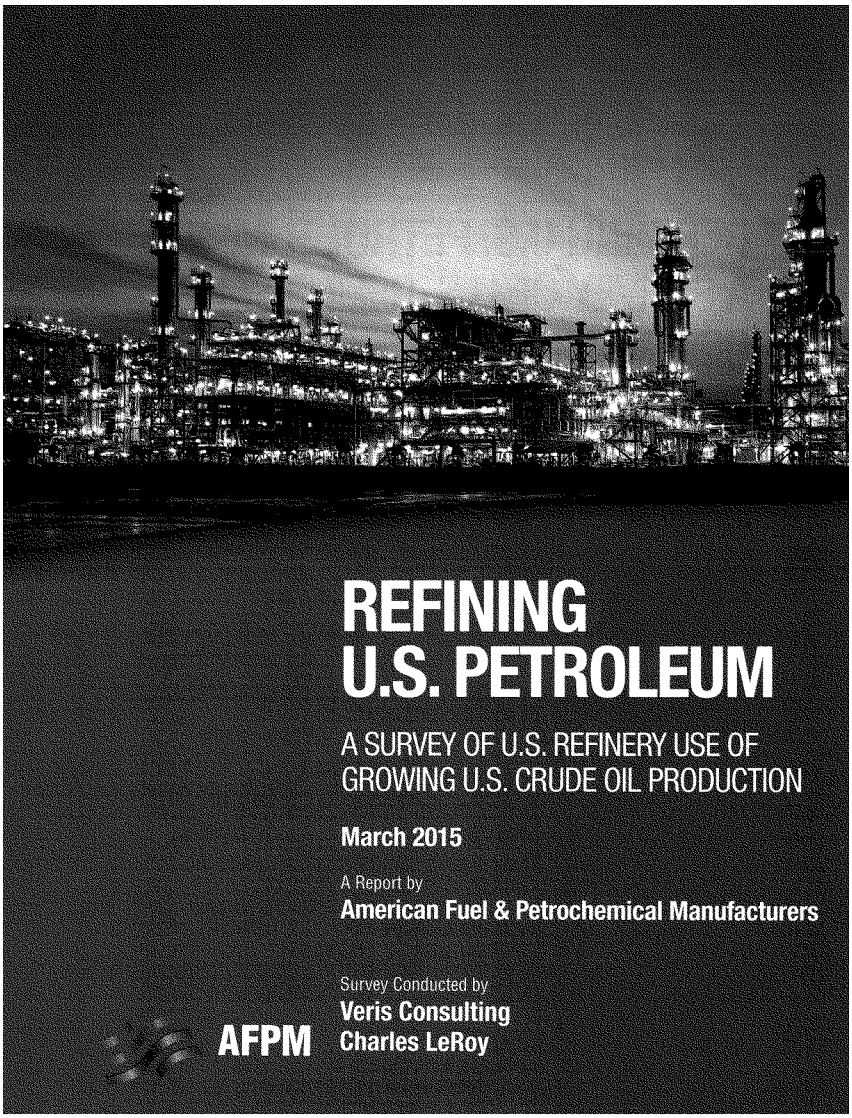
The enormous growth in U.S. crude oil production has naturally led to questions about whether it is time for the U.S. to readdress portions of EPCA, and in particular the crude oil

export ban. AFPM believes that the free market should drive all energy policy, and does not oppose lifting the ban. However, the refining industry also believes that a more holistic energy strategy is needed to ensure all barriers to free and functioning markets are addressed. In particular, allowing the export of crude oil without addressing other policies, including the RFS and the Jones Act, will create disparate regional impacts and could disadvantage some domestic refiners against global competition.

Policymakers should be aware of these issues, seek to mitigate those possibilities, and endeavor to understand the full, fact-based picture as they make decisions of such major import. For example, there is no evidence that the U.S. is currently on the verge of hitting a "refining wall" where it risks shutting in U.S. crude oil production. The refining industry is also investing billions of dollars to handle new domestic production. AFPM's survey is definitive proof of this fact—responses were based on actual decisions being made today, not from the result of an economic model or other hypothetical analysis.

Again, AFPM does not oppose lifting the crude oil export ban, but urges Congress to base decisions on the facts while readdressing a suite of anti-free market policies contemporaneously. Enacting this type of comprehensive energy policy will avoid the mistakes of the past, which have bred a balkanized and conflicting set of priorities and policies that ultimately disadvantage U.S. consumers.

As always, AFPM looks forward to working with the Congress to develop an approach to energy policy that will ensure that domestic refiners are able to compete in the global marketplace and minimize economic disruptions.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Electronic Access

This report is available on AFPM's website in PDF format. It can be found at http://afpm.org/uploadedFiles/Refining-US-Capacity.pdf

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Summary

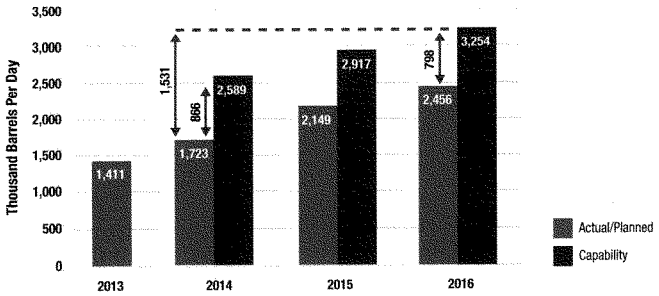
The unexpected and welcomed reversal of declining U.S. crude production since 2008 has benefitted the nation in many ways. Most of the recent U.S. crude oil production growth has come from geological structures called tight oil formations, which contain very light and sweet (low sulfur) quality crude oils. Refiners run many different quality crude oils, and most U.S. refiners have added capability to run heavy sour (high sulfur) quality crude oils. These two facts – increasing light sweet production and refining heavy sour crude processing capability – have created much confusion and misunderstanding about U.S. refiners' capability to use the increasing volumes of light sweet crude being produced and the economics around the issue (Appendix A).

The American Fuel & Petrochemical Manufacturers (AFPM) decided that a simple first step to understanding U.S. refiners' capability to handle growing U.S. supply was to ask its membership about their plans and capabilities for using this new crude. This report highlights the results of the voluntary survey developed by AFPM and administered by a third party. AFPM represents virtually all U.S. refining and petrochemical manufacturing capacity.

The respondents to this survey represent 61 percent of U.S. refining capacity. The highest response rates came from the Gulf Coast, East Coast and Midwest regions where much of the new U.S. production is being used.

The respondent industry subset indicates that from 2014 through 2016, they plan to increase their use of "super light" crude oil by more than 730,000 barrels per day. Super light crude oil (42 to 50° API gravity[1]) is the gravity range of most new U.S. tight oil production. Furthermore, if logistics access to the new crude oil were not an issue and economics supported increased use of this oil, the respondents have the capability - in place or in progress - to run an additional 800,000 barrels

Planned Use of Super Light Crude Oil vs. Capability to Use



Note: Capability represents potential volumes that could be run if economics were favorable, and if delivery of the crude oil were not an issue.

1 API gravity is a measure of the density of oil. The larger the API gravity, the lighter and less dense the petroleum. Light crude oils are defined for this report at 31° API gravity and higher. Heavy crude oils begin at 24° API gravity and lower. Medium weight crude oils are in between.

in 2016. That amount, over and above the 730,000 barrels per day increase in their current plans, means that the respondent subset alone has a capability to refine 1.5 million barrels per day more super light crude oil in 2016 than they processed in 2014.

The survey indicates that the respondent industry subset has more than enough processing capability to absorb all new U.S. super light oil production that the Energy Information Administration (EIA) is projecting through 2016. EIA's February 2015 outlook[2] shows production in the lower 48 states to increase 720,000 barrels per day from 2014 through 2016. This volume contains the tight oil formation production. The federal Gulf of Mexico production is projected to increase another 220,000 barrels per day, but this crude oil is closer to medium sour quality and has properties that make it easier to process than light tight oil.

The survey results representing 61 percent of U.S. capacity emphasize that U.S. refiners are not capacity constrained in the next several years to use the growing super light production from U.S. tight oil formations. The survey respondents will achieve their plans to increase use of this new crude production by continuing to reduce imported light and medium quality crude oils and by investing to better utilize this domestic resource. Under more favorable logistics and economic conditions,[3] respondents have the physical capability to process substantially higher volumes than reflected in their plans. With nearly 40 percent of the refining industry unrepresented in these results, total U.S. industry plans for increasing super light crude oil, as well as physical capability to run more light crude oil, represent volumes even larger than the results of this survey. Inadequate delivery infrastructure has delayed U.S. refinery access to the new production, but significant changes and expansion in this infrastructure have and will continue to occur.

2 EIA's February 2015 Short-Term Energy Outlook.
3 The survey did not define explicit economic requirements for respondents to consider when estimating their full capability to process U.S. light crude oils.

1 Introduction

The unexpected and welcomed achievement of increasing U.S. crude production has benefitted the nation in many ways. These production increases have improved U.S. energy security by allowing U.S. refiners to back out crude imports from distant, less stable areas of the world. U.S. crude imports from areas outside of North America (i.e., Canada and Mexico), declined from 6.7 million barrels per day in 2007 before the large increase in tight oil production to 3.7 million barrels per day in 2014.[4] U.S. share of crude oil supply coming from imports outside of North America dropped from 45 percent in 2007 to 23 percent in 2014.

Most of the U.S. crude oil production increase has come from geological structures called tight oil formations and is very light (high API gravity) and sweet (low sulfur) in quality. Tight oil formations constrain the flow of petroleum, which made them too expensive to produce prior to deployment of advanced drilling and completion processes such as horizontal drilling and hydraulic fracturing.[5] The recent advances in these production technologies have opened significant domestic petroleum resources to economic development.

Refiners process many different quality crude oils, and most U.S. refiners have made investments to add heavy sour (high sulfur) quality crude oils. Two apparently disjointed facts – increasing light sweet production and high percentage of refineries processing heavy sour oil – have created misunderstanding about the capability and economic competitiveness of U.S. refiners using increasing volumes of U.S. light sweet tight oil (Appendix A). This survey emphasizes U.S. refiners' capabilities.

The question of how much U.S. light sweet crude domestic refiners might be able to use with competitive economics in the short term is important information for producers and policymakers. Refining is a critical part of the evolving energy landscape, and good information about refining capabilities is necessary to ensure sound policy decisions. AFPM decided to collect information about U.S. refiners' capability to handle growing U.S. supply by asking its members about their plans and capabilities to use this new crude oil. AFPM members represent virtually all U.S. refining and petrochemical manufacturing capacity.

The survey responses are summarized in this report. The document begins with a brief description of the rapidly changing petroleum environment, and is followed by a chapter describing the survey approach and response rates. The results chapter is divided into the five main areas that were surveyed: actual and planned crude oil use by quality; capability to run increasing crude oil production; changing U.S. refining crude unit yield patterns; logistics paths used to obtain U.S. light crude oil; and investments to increase capability to process U.S. light crude oil.

4 Available EIA data from January through November 2014.
5 "Understanding Tight Oil," Canadian Society for Unconventional Resources.

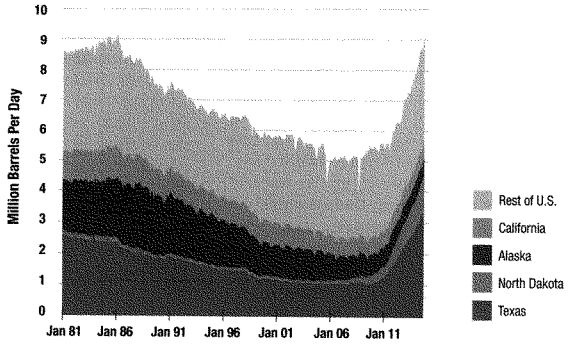
2 Background

The changes in the petroleum sector that have occurred over the past 30 years have been large and profound. A long decline in U.S. production (Figure 1) began in the mid-1980's as fields in areas like Alaska were depleting and restrictions on resource development in federally controlled areas hindered adding replacement volumes. Recently, however, U.S. production has shown a dramatic increase since it bottomed out in 2008 at around 5 million barrels per day, and is expected to average almost 8.7 million barrels per day in 2014 – a 73 percent increase. The increase is even steeper when considering North America overall. Most of that increase has come from tight oil formations located in traditional producing areas like Texas and in new areas like North Dakota. This boom in production was the result of advances in extraction and recovery techniques using horizontal drilling and hydraulic fracturing, which produce economic petroleum flow rates from the low-permeable tight oil formations.

The existing distribution infrastructure to move crude oil to refineries was not designed to handle these new flows. The major refining centers (Figure 2) are far from production areas like North Dakota, and the existing infrastructure in traditional producing areas like Eagle Ford and Permian Basin was not initially able to accommodate the new increase in flows. Production preceded delivery infrastructure changes and stranded crude oil in areas like Cushing, Oklahoma sold at deep discounts to equivalent quality international crude oils until delivery infrastructure expanded to help relieve that bottleneck. Crude price discounts have helped to hasten crude logistics investments and changes.

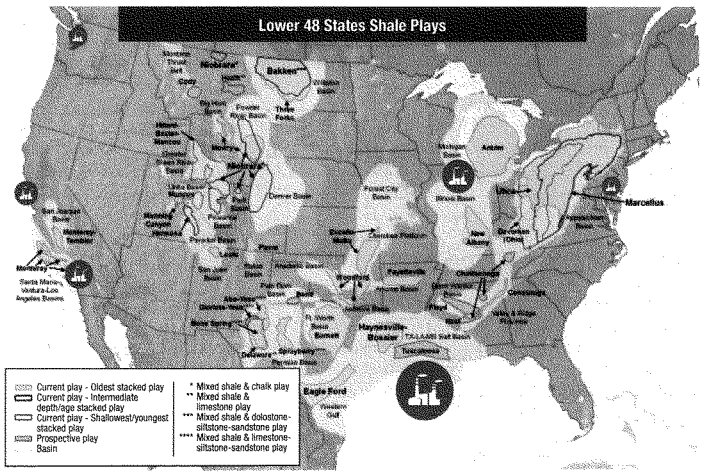
Refiners, along with others, invested in rail unloading facilities, tank cars, pipeline changes and other transport capabilities to gain access to this new crude oil. Pipelines adapted by reversing, expanding, and even changing under-utilized natural gas pipelines to crude oil delivery, moving the new production along existing routes to existing markets. Rail movements expanded offering service where pipelines did not exist. Rail options allowed flexibility in pickup and delivery points, and provided the ability to expand and contract with smaller up-front financial commitments, but

Figure 1 U.S. Regional Crude Oil Production



Source: Energy Information Administration.

Figure 2 Location and Volume of New Production Relative to Refining Required Significant Infrastructure Changes



Source: U.S. Energy Information Administration based on data from various published studies.
Updated: January 8, 2015.

higher operating costs. Inland and coastal waterborne movements of domestic crude oil increased substantially, pulling hard on limited vessel availability. While U.S. refinery access to growing domestic crude production has improved considerably since 2008, logistics are still lagging behind production.

Most of the increase in U.S. crude oil production is light quality oil, with especially strong growth in a very light category ranging from 40-50° API gravity (Figure 3). Prior to U.S. tight oil development, refiners had focused on processing increasing volumes of heavy high sulfur crude oil. In the 1980's, U.S. refiners on the Gulf Coast began to invest to process heavy high sulfur crude oils from growing production in nearby areas such as Mexico and Venezuela as well as other parts of the world. More recently, refiners in the Midwest have been adding capability to process heavy oils emerging from Canada. But, processing heavy crude oil does not physically prevent refiners from processing more volumes of light crude oil. Under the right economic circumstances, more light crude can be used.

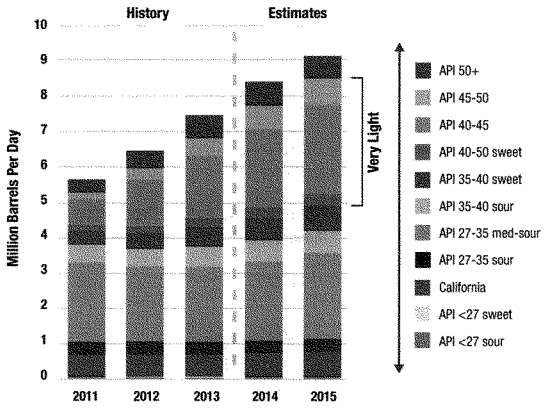
Light & Heavy Crude Oils

Crude oil varies in density or weight over a large range. For convenience, crude oils are frequently discussed as light, medium or heavy quality oils. Light crude oil contains a higher percentage of light weight material (much of which is similar in density and boiling range to gasoline and diesel fuel) than heavy crude oil contains. Heavy crude oil has a lower share of light material and a higher share of heavy, dense material. Heavy crudes typically require more processing steps in order to be turned into useful finished products. Medium density crudes fall in between light and heavy.

Refiners typically process a mix of crude oils with different qualities. Their facilities can operate with varying proportions of light, medium and heavy crude. Besides density, as measured by API gravity, other tight oil characteristics impact refinery processing. For example, the naphtha[6] content in tight oils

6 Naphtha is a stream of material distillated from crude oil that goes into gasoline or petrochemical feedstocks.

Figure 3 U.S. Crude Production Growth is Mainly Very Light (>40°API)



Source: Edited graph from Energy Information Administration; sweet (low sulfur), sour (high sulfur).
See also Energy Information Administration, U.S. Crude Oil Production Forecast: Analysis of Crude Types, May 29, 2014.

is large enough to challenge the existing processing equipment of some refiners. These tight oils also have high paraffin (wax) contents that can impact cold flow diesel fuel properties, potentially requiring some refining changes and/or investments.[7] To date, U.S. refiners have absorbed the increasing U.S. light crude production by:

- Replacing imported light crude of similar quality to U.S. light crude oils;
- Increasing overall refinery utilization (use more of everything including U.S. light crude oils);
- Replacing light high sulfur and medium gravity imports with U.S. very light crude oil; and
- Investing in refinery changes to use more U.S. light crude oil.

As a result, between 2007, prior to the tight oil production surge, and 2013, crude imports dropped by 2.3 million barrels per day (Figure 4). During that period, crude inputs to refineries increased slightly by 0.2 million barrels per day. Light and medium quality crude imports declined the most, and since 2007, super light crude imports (42-50 °API) practically disappeared. Heavy crude oil volumes remained flat during that same period.

While U.S. crude production increased, U.S. demand decreased for finished petroleum products.[8] Gasoline declined mainly due to the recession and increasing vehicle efficiency. EIA has projected gasoline demand to continue to decline long term as light-duty vehicles become more fuel efficient. By contrast, diesel demand is expected to continue to grow long term, since most of this product is used in commercial trucks, which EIA does not project[9] to experience the same degree of

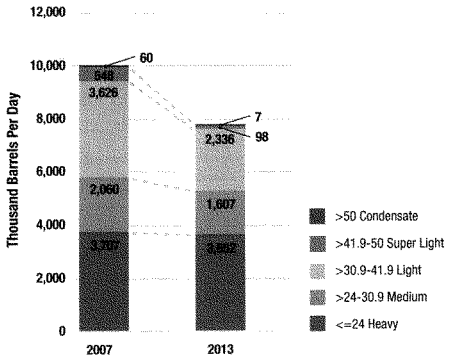
7 "Optimizing Naphtha Complexes in the Tight Oil Boom," UOP LLC, a Honeywell Company, Mary Jo Wier et al, 2014; also see Appendix B listing relevant American Fuel & Petrochemical Manufacturers' technical papers.
8 Finished petroleum products includes biofuel use in gasoline and distillate fuels.
9 Energy Information Administration, 2014 Annual Energy Outlook.

efficiency improvements. International diesel fuel and heating oil demand have grown faster than gasoline and are expected to continue that trend. U.S. refiners have been changing operations and investing in order to increase the yield or proportion of diesel fuel from a barrel of crude oil.

U.S. finished product demand peaked in 2005 at almost 18.7 million barrels per day. By 2013 it dropped to 16.5 million barrels per day — a decline of 12 percent from its peak. The decline in U.S. demand left a surplus of U.S. refining capacity that has been used to export fuel and petrochemical products to the rest of the world. In 2009, the United States went from a net petroleum product importer to a net product exporter. These product exports allowed domestic refiners to run at higher utilization and supply U.S. demand. In 2014, net product exports (finished products plus gasoline components) averaged about 1.7 million barrels per day. Additionally, investments to improve yields and produce more diesel fuels relative to gasoline have helped meet the most pressing international demand needs, while fully supplying U.S. markets.

In summary, as U.S. refiners reduced crude oil imports from overseas, those foreign supplies were freed to be used in foreign refineries to fill demand in other parts of the world. At the same time, U.S. refiners were able to supply more product exports into the world, while fully supplying shrinking U.S. consumption. U.S. refiners' declining need for crude imports and increasing product exports stemming from our growing supply of U.S. crude oil increased world petroleum supply, which put downward pressure on world crude price. These survey results examine U.S. refining capability to use the increasing supply of light tight crude oil over the next few years.

Figure 4 Growing U.S. Production Reduced U.S. Crude Imports



Source: Energy Information Administration.

8

3 Survey Approach and Response

This chapter provides a general description of the information being collected and response rates in order to help the reader interpret the results. A copy of the survey is provided in Appendix C.

3.1 Approach

The purpose of this survey was to explore U.S. refiners' ability to make use of growing U.S. light crude oil production. As such, the questions focus on refiners' use of different crude qualities. The main quality of interest is the density or light/heavy quality measured by API gravity, and many survey questions break down crude information into API gravity categories.

While refiners have been able to use increased U.S. production of light tight oil to date, claims have been made that U.S. refiners are now seriously constrained and cannot use any more of this crude oil.[10] To help clear up this confusion, the survey asked about refiners' plans through 2016. Pushing beyond that time frame would increase response uncertainty. Not only do market conditions change, but capital projects further out in time are much less certain. Most capital projects scheduled to be completed within the next two years are underway or fully committed, and as such, are much more certain.

This conservative time limitation means that the expected increase in the ability to process light sweet crude from projects already underway, but not scheduled for completion until after 2016, are not considered. An example is the Flint Hills' Eagle Ford project[11] on its Corpus Christi, Texas, West Refinery. The West Refinery currently processes about 230,000 barrels per day of crude oil, but the project would both enable the plant to process as much as 10 percent more crude each day and allow the refinery to process 100 percent domestic crude.

The survey was voluntary. AFPM encouraged members to respond, but interest in the topic was the main incentive for participating. The survey was launched on November 5, 2014 via a web survey instrument, and all submissions were received by the first week in December.

AFPM used a third party contractor, Veris Consulting, to collect the data in order to maintain company confidentiality and ensure compliance with antitrust laws. Regional aggregated data is presented only for PADDs 2 and 3 to prevent disclosure of individual respondent data. AFPM also retained an independent refining expert consultant, Charles LeRoy, to work with Veris Consulting to validate and assure data quality. Results were aggregated and provided to AFPM for this report.

3.2 Survey Response

The response rate for this type of voluntary survey was very good. A total of 23 companies provided information on 69 refineries that represented 61 percent of all U.S. refining capacity in 2014. The total capacity reported by the respondents in each year is summarized in Table 1, and the distribution in refinery size is shown in Table 2. In the six years from 2007 to 2013, respondents' capacity grew by an annual average 1.3 percent, and by about 1.2 percent from 2013 through 2016.

10 See Appendix A.
11 "Flint Hills Resources breaks ground on new project at Corpus Christi oil refinery," PennEnergy Editorial Staff article, December 3, 2014.

Table 1 Reported Calendar-Day Distillation Capacity [12]
(Thousand Barrels Per Day)

	2007	2013	2014	2015	2016
Total U.S.	9,988	10,814	10,886	11,003	11,207
PADD 2	2,199	2,324	2,351	2,403	2,423
PADD 3	5,150	5,848	5,874	5,934	6,088

Table 2 Survey Respondent Refinery Size Distribution

Average Calendar Day Distillation Capacity (Thousand Barrels Per Day)	Survey No. of Facilities	U.S. No. of Facilities	No. of Survey Facilities as Percent of U.S. Facilities in Same Size Range
0-49	7	39	18%
50-99	19	33	58%
100-149	13	18	72%
150-199	10	12	83%
200-249	10	16	63%
≥250	10	18	56%

Note: The U.S. count was taken from EIA's reported operable calendar day distillation capacity as of January 2014.

The Gulf Coast (PADD 3[13]), which had a 64 percent response rate, is a critical area because it represents about 50 percent of all U.S. capacity, and many of the pipeline changes to date have been made to move new crude production within and to that region. The Midwest (PADD 2), which has been increasing its use of heavy Canadian crude oil, had a 62 percent response rate. PADDs 1, 4 and 5 combined had a 54 percent response rate, with the East Coast (PADD 1) being well over 60 percent and the Rocky Mountains and West Coast (PADDs 4 and 5) individually having less than 50 percent, but still providing meaningful and substantial shares.

The survey requested crude quality breakdowns as follows:
- Heavy (<=24°API)
- Medium (>24 - 30.9°API)
- Light (>30.9 - 41.9°API)
- Super Light (>41.9 - 50°API)
- Condensate (>50°API)

This breakout was based on crude groupings used by Turner Mason & Company, a petroleum engineering and management consulting firm, in many of its reports. It was chosen because it provided enough granularity to capture most U.S. tight oil in one category, the super light category, with condensates broken out separately.

12 Survey data tables are not explicitly sourced as coming from the survey on each table.
13 Petroleum for Administration Defense District. Appendix D provides a map of the regions.

4 Results

The Results chapter summarizes the survey responses. It is divided into the five major topics of the survey: 1) actual and planned crude oil use by quality; 2) capability to run increasing light crude oil production; 3) changing U.S. refining crude unit yield patterns; 4) paths to obtaining U.S. light crude oil; and 5) investments.

4.1 Respondents' Actual and Planned Crude Use

Table 3 summarizes the actual and planned crude oil inputs to the refineries represented in the survey. Condensate inputs could not be shown due to potential disclosure of individual respondent's data.[14] From 2007, before tight oil production was visible, through 2013, total inputs increased in this respondent group, but super light crude increased the most, rising almost 850,000 barrels per day during this six years. Recall that super light quality is the category that captured most increases in U.S. production.

Table 3 provides an answer to a key question. In the two years from 2014 to 2016, the respondents representing 61 percent of U.S. capacity alone are planning to increase their use of super light crude oil over 730,000 barrels per day. With nearly 40 percent of U.S. capacity not represented in the survey, total industry plans to increase super light crude oil use would be even higher.

Table 3 Total Refinery Actual and Planned Inputs of Crude Oil by Gravity

(Thousand Barrels Per Day)

	2007	2013	2014	2015	2016	Percent Increase 2007-2016	Volume Change 2014-2015
Heavy (<=24°API)	2,187	2,469	2,442	2,718	2,798	28%	356
Medium (>24 - 30.9°API)	2,042	1,867	1,963	1,542	1,291	-37%	-672
Light (>30.9 - 41.9°API)	3,855	4,033	3,890	3,980	3,659	-5%	-231
Super Light (>41.9 - 50°API)	565	1,411	1,723	2,149	2,456	335%	733
Condensate (>50°API)	D	D	D	D	D	D	D
Total Excl. Condensate	8,649	9,780	10,018	10,389	10,204	18%	186

Table 4 Share of Crude Quality Inputs (Excluding Condensates)

	2007	2013	2014	2015	2016
Heavy (<=24°API)	25%	25%	24%	26%	27%
Medium (>24 - 30.9°API)	24%	19%	20%	15%	13%
Light (>30.9 - 41.9°API)	45%	41%	39%	38%	36%
Super Light (>41.9 - 50°API)	7%	14%	17%	21%	24%

14 The letter "D" is used in this report to indicate that, while data was collected for a given table cell, it had to be suppressed due to potential disclosure of an individual company's data.

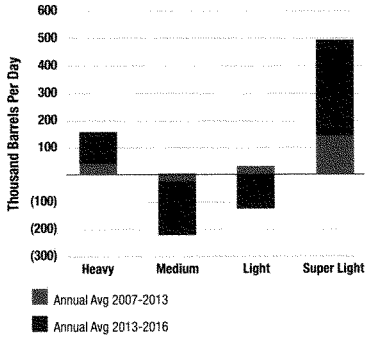
Table 4 demonstrates the shift in crude qualities on a share basis. Super light crude oil inputs, as a share of inputs excluding condensates, doubled from 7 percent in 2007 to 14 percent in 2013. By 2016, this category is projected to make up 24 percent of the inputs, as shares of light and medium crude oil inputs decline. Heavy crude oil maintains is proportion of total crude use.

Figure 5 displays the changes in quality on an annual average basis for the historical six years from 2007 through 2013, and the three-year period from 2013 through 2016. The first period captures the transition from before the tight oil production increases to when those volumes had grown significantly. Respondents increased their use of super light crudes the most during this time period. Heavy and light crude oil volumes also increased, with medium volumes declining slightly. This pattern indicates that much of the historical super light growth likely came from backing out imports and filling increasing capacity.

The period from 2013 to planned 2016 presents some differences from the 2007 to 2013 historical period. Again, heavy and super light crude inputs increase, with super light crudes still increasing the most. Heavy crude oil maintains its proportional share of crude use, but survey respondents are now significantly reducing their use of medium and light crude oils. Those declines would typically be coming from import reductions. As described in the background section, medium crude imports had declined slightly historically, consistent with the survey results, but this chart implies that some of the largest declines in the next few years could come from medium quality crudes.

The crude quality plans for PADDs 2 and 3 (Tables 5 and 6) are a reminder of the wide variations in crude use not only among individual refiners, but also among regions. PADD 2 (Midwest) contains refiners that have been expanding their use of Canadian heavy oil sands crude. Many also have access to the North Dakota Bakken crudes. Table 5 shows super light and heavy volumes are increasing, while light volumes are declining.

Figure 5 Annual Average Historical & Future Tight Oil Changes in Crude Quality



Note: The data represent the differences in crude inputs between the stated years divided by the number of years in the interval.

Table 5 PADD 2 Refinery Actual and Planned Inputs of Crude Oil by Gravity

(Thousand Barrels Per Day)

PADD 2	2007	2013	2014	2015	2016	Percent Increase 2007-2016	Volume Change 2014-2016
Heavy (<=24°API)	D	632	630	658	710	D	80
Medium (>24 - 30.9°API)	D	D	D	D	D	D	D
Light (>30.9 - 41.9°API)	1,358	1,346	1,352	1,361	1,079	-21%	-273
Super Light (>41.9 - 50°API)	D	360	411	451	561	D	150
Condensate (>50°API)	D	D	D	D	D	D	D

Table 6 illustrates a different pattern of crude use in PADD 3 (Gulf Coast). Heavy, light and super light crude volumes are increasing. However, the ratio of heavy crude oil volumes to the total light plus super light volumes is declining slightly, while super light crude oils are representing a growing share of the light plus super light total. Together this implies a continued increase in average API for the respondents in this region.

Table 6 PADD 3 Refinery Actual and Planned Inputs of Crude Oil by Gravity

(Thousand Barrels Per Day)

PADD 3	2007	2013	2014	2015	2016	Percent Increase 2007-2016	Volume Change 2014-2016
Heavy (<=24°API)	1,223	1,323	1,336	1,521	1,586	30%	249
Medium (>24 - 30.9°API)	1,030	1,314	1,382	1,053	D	D	D
Light (>30.9 - 41.9°API)	1,347	1,631	1,591	1,727	1,812	35%	221
Super Light (>41.9 - 50°API)	371	752	878	1,141	1,292	248%	414
Condensate (>50°API)	D	D	D	D	D	D	D

4.2 Capability to Run Increasing U.S. Crude Production

U.S. refiners set their plans based on their individual outlooks, which could be very different, given the tremendous uncertainties associated with U.S. production forecasts, world crude oil prices and logistics. Refiners' near-term plans do not necessarily reflect what their facilities are currently capable of doing under different circumstances and economic considerations. After reporting on plans, the survey asked respondents to address current capability to use U.S. light oil over and above planned volumes. To do this, each considered how much crude in the light, super light and condensate categories they could process if the volumes were economic to run and if delivery of the crude oil were not an issue (i.e., infrastructure were in place for refineries to receive U.S. light tight oil). Specific economic assumptions were not provided. In addition, respondents were also asked to continue to supply the same domestic product volumes they planned in their current projections, and to assume no additional changes to capital investments beyond their current plans. They were not required to supply the same volumes of product exports.

Table 7 summarizes how much light tight oil the survey respondents currently are capable of running under the survey assumptions. The main increase in crude capability was in the super light category, highlighted in Figure 6. Comparing 2014 super light actuals with 2014 capability, Table 7 and Figure 6 show that respondents could have run an additional 866,000 barrels per day of U.S. super light crude oils in 2014, while reducing another 469,000 barrels per day of light crude imports, had delivery infrastructure, production and economics supported the need.

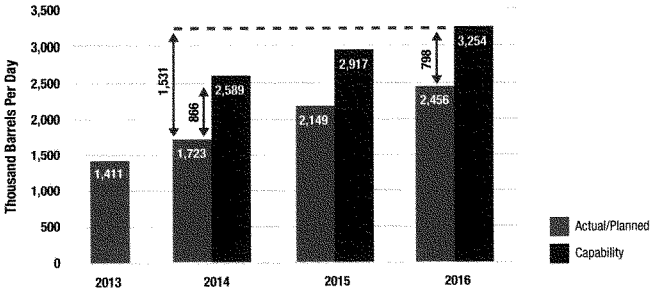
Table 7 and Figure 6 also indicate that in 2016, the respondents have the capability to run an additional 1.5 million barrels per day more super light crude oil than they actually ran in 2014. This is about 800,000 barrels per day more than respondents plan to run in 2016 (Figure 6). Table 7 also indicates that if these refineries ran an additional 1.5 million barrels per day of super light in 2016 than in 2014, they also would reduce 446,000 barrels per day of light crude imports over those used in 2014.

Table 7 Total Capability to Process Increasing U.S. Light Crude Oil Greater than 30.9° API
(Thousand Barrels Per Day)

	Actual	Capability			Capability 2014 Compared to Actual 2014	Capability 2016 Compared to Actual 2014
	2014	2014	2015	2016	Change	Change
Light (>30.9°API - 41.9°API)	3,890	3,421	3,514	3,444	(469)	(446)
Super Light (>41.9°API - 50°API)	1,723	2,589	2,917	3,254	866	1,532
Condensate (>50°API)	D	236	284	284	N/A	N/A

The survey results indicate that, under the assumptions of the capability estimates, this refining industry subset representing 61 percent of U.S. capacity alone has more than adequate capability in the short term (through 2016) to handle projected U.S. tight oil crude production. In February EIA projected that U.S. production in the lower 48 states (including the tight oil formations) may increase 720,000 barrels per day from 2014 to 2016. This contains more than light tight oil, but even if it were all light tight oil, the volumes are well within the capability of the respondent industry subset. EIA also projected the federal Gulf of Mexico area to increase production 220,000 barrels per day. Gulf of Mexico offshore crude oil is generally medium sour, but contains some

Figure 6 Planned Use of Super Light Crude Oil vs. Capability to Use



Note: Capability represents potential volumes that could be run if economics were favorable, and if delivery of the crude oil were not an issue.

"heavier" light crude oils like Louisiana Light Sweet crude oil (about 37° API). The lighter Gulf of Mexico crudes are easier to process than light tight oils as they tend to have qualities better balanced for U.S. refineries, such as less naphtha content. Any growth in Gulf of Mexico volumes will be processed in the United States at the expense of similar quality imports. The combined federal Gulf of Mexico and lower 48 increases in production, which total to an additional 940,000 barrels per day[15] between 2014 and 2016, is not all light tight oil.

15 EIA's February 2015 projected net production increase from 2014 to 2016 is 860,000 barrels per day, reflecting the continuing decline in Alaskan production.

Regionally, capability to use more super light crude oil varies (Tables 8 and 9). For PADD 2 respondents to increase their use of super light crude oil over their plans, they would likely decrease their use of light oil a little more than they were already planning. Consistent with PADD 2 planned inputs, this region shows a net decline in the capability total of light plus super light crude oil. PADD 3, on the other hand, would change from its planned increase in light crude use, to a decrease in light crude use as additional volumes of super light crude were used. Consistent with planned volumes, PADD 3 total light plus super light capability is increasing.

Table 8 PADD 2 Capability to Process Increasing U.S. Light Crude Oil Greater than 30.9° API
(Thousand Barrels Per Day)

	Actual	Capability			Capability 2014 Compared to Actual 2014	Capability 2016 Compared to Actual 2014
	2014	2014	2015	2016	Change	Change
Light (>30.9°API - 41.9°API)	1,352	1,100	1,034	1,050	-252	-302
Super Light (>41.9°API - 50°API)	411	595	673	673	184	262
Condensate (>50°API)	D	D	D	D	D	D

Table 9 PADD 3 Capability to Process Increasing U.S. Light Crude Oil Greater than 30.9° API
(Thousand Barrels Per Day)

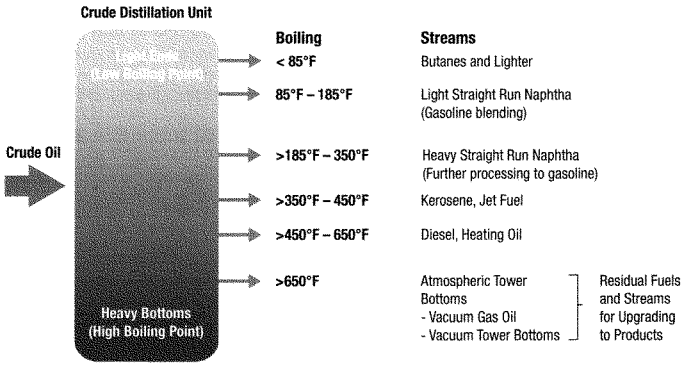
	Actual	Capability			Capability 2014 Compared to Actual 2014	Capability 2016 Compared to Actual 2014
	2014	2014	2015	2016	Change	Change
Light (>30.9°API - 41.9°API)	1,591	1,443	1,594	1,544	(148)	(48)
Super Light (>41.9°API - 50°API)	878	1,242	1,401	1,673	364	796
Condensate (>50°API)	D	D	D	D	D	D

4.3 Changing Crude Unit Yield Patterns

The first major step in refining is distilling or separating crude oil into different hydrocarbon streams by boiling point (Figure 7). Light crude oil will have a high share of "light weight" material that boils at low temperatures, such as light and heavy naphtha, while heavy crude oils will have a smaller share of those light materials and a larger share of material that is heavy and boils at very high temperatures, like those present in atmospheric tower bottoms. As domestic refiners use more U.S. super light crude oils and less of other heavier crude types, they sometimes must alter the equipment that processes crude oil before it reaches the distillation unit, and may even alter the crude distillation unit. Regardless, the use of more super light crude oils would change what comes out of the crude distillation unit. Using proportionally more light crude oil results in higher yields (i.e., volume shares) of light streams like naphtha, and lower yields of heavier streams.

The survey included questions on the yields of the streams coming from the crude distillation units to determine if respondents' shifts in crude input quality had created large changes in their

Figure 7 Separating Crude Oil into Streams for Further Processing



yield patterns. As yield patterns shift from heavier streams to lighter streams, they can reach points that require refiners to alter processing units downstream of the distillation unit.

Table 10 summarizes the survey results. When comparing 2007 to 2016, as expected the respondents see increases in the yields of lighter streams, while heavier streams decline. For example, from 2007 to 2016, the naphtha streams together increased 2.8 percentage points in yield (light straight run increased 1.6 percentage points and heavy straight run increased 1.2), while atmospheric tower bottoms, vacuum gas oil, and vacuum tower bottoms declined 2.5 percentage points in total (atmospheric tower bottoms declined 0.9 percentage points, vacuum gas oil declined 0.4, and vacuum tower bottoms dropped 1.2 percentage points). The results indicate that for

Table 10 Average Crude Distillation Yields

	2007	2013	2014	2015	2016	Change from 2007 to 2016
Butane and Lighter	2.2%	2.3%	2.6%	2.7%	2.7%	0.5%
Light Straight Run Naphtha	6.5%	7.4%	7.4%	7.7%	8.1%	1.6%
Heavy Straight Run Naphtha	15.8%	16.1%	16.5%	16.8%	17.0%	1.2%
Kerosene/Jet	9.9%	10.0%	10.1%	10.0%	9.9%	0.0%
Diesel/Heating Oil	19.1%	18.4%	18.4%	18.2%	18.1%	-1.0%
Atmospheric Tower Bottoms	3.2%	2.8%	2.7%	2.7%	2.3%	-0.9%
Vacuum Gas Oil	24.9%	25.0%	24.8%	24.5%	24.5%	-0.4%
Vacuum Tower Bottoms	18.5%	18.0%	17.5%	17.5%	17.3%	-1.2%

Note: Average yields are weighted by facility crude input volumes. Facilities without a vacuum tower completed the atmospheric tower bottoms row, while those with a vacuum tower completed the vacuum gas oil and vacuum tower bottoms rows.

the aggregate respondent group, the shifts from 2007 to 2016 are not unusually large; however, the aggregate numbers can mask the yield shifts that individual refiners may experience. The aggregate shifts in Table 10 would not be expected to significantly impact the aggregate product output slate. Yield results are consistent with investment plans summarized below that indicate few planned investments downstream of the crude unit relative to other investments to use more U.S. light crude oil.

4.4 Paths to Using More U.S. Light Crude Oil

The survey requested information to explore how refiners are increasing their use of light crude oil. Respondents allocated their increases in inputs of light crude oil (crudes ranging from 31° API and higher) to eight paths shown in Table 11. The first data column shows the aggregate increase in light crude oil volumes by path from 2013 to 2016. The paths are listed from the highest volume to the lowest over this four-year time frame. Those same paths are ranked separately during the historical years 2013-2014, and future years 2015-2016. Increasing access to logistics infrastructure to obtain new U.S. crude production is the path that ranks first in both historical and future years. That is, the largest increase in refiners' use of U.S. light crude oil came from infrastructure changes that allowed for increased delivery of the oil to refiners. Substituting for imports ranks second historically, but crude distillation unit investments are expected to have a larger impact than import replacement in the two future years.

Table 11 U.S. Light (> 31° API) Crude Volume Increases Allocated to Means of Increase & Ranking by Volume

Means of Increase	Thousand Barrels Per Day	Rank	
	2013-2016	2013-2014	2015-2016
New delivery infrastructure access paths	1,704	1	1
Replace similar quality imports (no investment)	995	2	3
Downstream units investment	595	3	6
Adjust crude mix without significant investments	370	4	5
Crude distillation investment	320	5	2
Crude pre-fractionation investment	154	6	4
Naphtha/light ends overhead system investment	D	D	D
Other	D	D	D

Note: Volumes in Table 11 are not comparable to volumes on Table 3. Table 11 includes volumes of U.S. crude oil that replaced imports, for example, and would be expected to be larger.

Table 12 breaks out more information on how U.S. refiners are using logistics infrastructure to increase their U.S. tight oil input volumes. This table captures the relative frequency respondents indicated that a change in infrastructure allowed them to improve U.S. light crude use by tight oil producing region during 2013 through 2016. Respondents recorded 159 instances when a change in access mode resulted in an increase in light crude oil use.

Ten regions were included on the form, but most activity was in just four of those regions highlighted in Table 12; all other regions are aggregated into the "Other" column of that table. The

Table 12 Relative Crude Access Activity by Tight Oil Region and Transportation Mode 2013-2016

Mode of Crude Oil Delivery	MT/ND Bakken	TX Eagle Ford	TX/NM Permian	CO/WY Niobrara	Other	Total
Pipeline	17%	7%	13%	4%	3%	43%
Water	1%	14%	3%	0%	1%	18%
Rail	10%	0%	0%	6%	1%	16%
Rail/Water	8%	1%	0%	0%	1%	9%
Pipeline/Rail	2%	0%	0%	3%	0%	4%
Pipeline/Water	0%	1%	1%	1%	2%	4%
Truck	0%	0%	0%	0%	3%	3%
Truck/Pipeline	0%	0%	0%	0%	1%	1%
Total	**37%**	**24%**	**16%**	**13%**	**10%**	**100%**

Note: The table represents the distribution of all instances where a change in access allowed respondents to use more tight oil. A total of 159 instances were recorded from 2013 through 2016, and represents 100% on the table. Totals may not equal the sums due to rounding.

Bakken producing region showed the most crude delivery activity at 37 percent of the total 159 instances of improved access provided by the respondents, presumably because Bakken is an area that was new to crude production and had the least infrastructure in place. Two older crude producing areas, Eagle Ford and Permian, also showed significant crude delivery activities. Even though these areas had some logistics infrastructure in place, their reinvigorated production volumes required changes in and expansions to the infrastructure, and the survey respondents indicated a significant number of crude delivery increases to take advantage of those increased volumes.

The pipeline delivery mode is where most changes occurred, followed by water and rail. Most rail movements of crude oil within the United States have been from the Bakken area, which this survey emphasizes. The rail/water combination was also fairly large. Rail/water includes rail movements to inland waterways, or rail to a coast location where the crude is then moved by tanker or barge to a refinery. Truck and truck/pipeline were indicated in several of the less active crude producing regions grouped under "Other."

4.5 Investments in Refining and Infrastructure

In addition to volumes, the survey captured refining and infrastructure investments designed to use additional U.S. light crude oil. Specific capital projects targeted to increase use of U.S. light crude that were finished or plan on being finished during 2013 through 2016 are aggregated in Table 13. This table displays the total dollars spent or planned to be spent during these years, and the associated increase in capacity to process that light crude oil (i.e., all crude greater than 31°API) as measured in barrels per stream day.[16] The respondents reported over $5 billion dollars

16 Barrels per stream day: The maximum number of barrels of input that a distillation facility can process within a 24-hour period when running at full capacity under optimal crude and product slate conditions with no allowance for downtime. This value is greater than capacity expressed as barrels per calendar day, which takes into consideration time needed for maintenance.

18

of project investments during this time to gain about 2 million barrels per day of increased capacity to process the light crude oil. In context, the total U.S. refining sector accounts for about $10 billion per year of capital expenditures.[17]

The rankings in Table 13 show that investing in delivery infrastructure to receive U.S. crude oil has the largest total expenditures and results in the largest increases in capacity to use more volumes of light crude oil. The next largest category was investments in crude distillation capacity to handle the new crudes; it also had the second highest volume of additional light crude oil. But the rankings then shift, with crude pre-fractionation projects[18] ranking third in expenditures, while only achieving fourth place for additional volumes. Naphtha/light ends overhead system projects[19] had the lowest aggregate expenditures, but ranked third in additional light volumes.

The last column in Table 13 illustrates that the highest ratio of investment dollar/daily capacity barrel was associated with the downstream unit projects to increase light crude oil use. While investing in delivery infrastructure and naphtha light ends overhead system projects were the lowest cost per daily capacity barrel.

Table 13 2013-2016 Aggregate Investment Ranking to Use More U.S. Crude Oil & Associated Crude Capacity Increases

	Investment Expenditures	Additional Light Crude Capacity (>30.9 API) Resulting from Investment	Ratio of Investment Dollars/Daily Capacity Barrel
	Ranking	Ranking	Ranking
Increase access	1	1	4
Crude distillation	2	2	3
Crude pre-fractionation	3	4	2
Downstream units	4	5	1
Naphtha/light ends overhead system	5	3	5
Total	**$5,039,560,000**	**2,021,700 BPSD**	**$2,493/BPSD**

Note: Ranking number 1 is the largest value. BPSD - Barrels Per Stream Day. Total volume increase is not comparable to the investment volumes in Table 11. For example, Table 11 allocation of increasing light crude oil volumes to investment categories include volume gains resulting from investments made prior to 2013.

17 Industrial Info Resources Topline Market Spending Forecast, 2014 Q4 Edition.

18 Crude pre-fractionation is a step that removes some of the light material from crude oil before it goes to the atmospheric distillation unit. In many cases the process is a pre-flash tower where an atmospheric flash reduces the amount of light ends in the crude being sent to the crude heater prior to atmospheric distillation. This process allows more crude to be run through the crude heater, which can be limited by heat release. Another pre-fractionation process separates light components of crude oil in a distillation column prior to the crude heater.

19 Projects to expand the capacity of the equipment that handles naphtha and other light ends material distilled and exiting "overhead" from the atmospheric distillation tower.

5 Conclusion

The survey results from facilities representing 61 percent of U.S. capacity emphasize that U.S. refiners are not capacity constrained in the near term to using growing production from the domestic tight oil resource base. Current plans of the refining industry survey respondents alone reflect use of U.S. superlight crude oil adequate to absorb the February EIA production forecast for the onshore lower-48 states – the region encompassing U.S. tight oil production. These respondents will achieve their plans by continuing to reduce imports of light and medium quality crude oils and by investing to better utilize this domestic resource.

Lack of delivery infrastructure from new producing areas slowed U.S. refinery access to new production, but significant changes and expansion in this infrastructure have occurred and will continue to evolve. The respondents are putting more capital into improved access to U.S. crude production than into any other area targeted to increase light crude processing volumes.

Additionally, if access and favorable economics support refiners using more U.S. crude oil than reflected in their current plans, the respondents have the physical capability to use volumes substantially higher than planned. As previously mentioned, given the fact nearly 40 percent of the industry is unrepresented, nation-wide refinery plans and physical capability to run additional light crude oil exceed the volumes represented in this survey.

In conclusion, U.S. refining is not a bottleneck to producing and using more very light U.S. crude oil over the next few years. The refining industry continues to substitute U.S. crude oil for volumes previously imported from less stable parts of the world, both supporting energy security and allowing time for policymakers and the public to better understand and debate how best to deal with the changing U.S. energy environment.

Appendix A. Misunderstanding U.S. Refineries' Ability to Use Increasing U.S. Light Crude Production

Roll Call, Jan. 27, 2015
Op-ed by William O'Keefe, chief executive officer of the George C. Marshall Institute, is president of Solutions Consulting Inc.
http://www.rollcall.com/news/congress_needs_to_free_us_energy_resources_commentary-239612-1.html?pg=2&dczone=policy

Congress Needs To Free U.S. Energy Resources
"For Americans, the steep increase in U.S. supply of oil and gas has brought with it a bounty of benefits. The energy sector has increased employment in states that otherwise saw economic decline, and the growth in direct jobs has indirectly benefited communities throughout the country. At the same time, the taxes paid by the energy industry have helped bolster our national economy....Despite being outdated and largely irrelevant, the ban on U.S. crude exports has gone unaddressed for the past 40 years simply because it remained a non-issue when U.S. energy production was declining. However, we have reached a turning point. **Most U.S. refineries, which were built when the country imports of crude oil were growing, are fitted to process heavy petroleum — not the light, sweet crude oil that represents the increase in domestic production. As a result, the impressive production growth over the last decade has largely outpaced our refining capabilities, creating a glut of light crude oil locked inside our borders.**"

Wall Street Journal, Jan. 16, 2015
Editorial
http://www.wsj.com/article_email/oil-export-myths-1421451968-lMyQjAxMTA1MDE2NzkxNzcxWj?autologin=y

Oil Export Myths
Lifting the ban will increase U.S. supply and energy security.
"...To the extent more U.S. crude makes it to the global market, prices will be lower, other things being equal. **All the more so given that most U.S. oil is lighter crude that can't all be processed by U.S. refiners.** American refineries on the Gulf Coast were built to process heavy imported crude from the likes of Venezuela. Light crude is valuable and should be fetching a premium. Instead, U.S. producers are at the mercy of U.S. refiners, since the export ban means they have nowhere else to sell. As U.S. supplies have swelled, those refineries have had more leverage to push down prices for U.S. shale oil. While the price of Brent crude, the world benchmark, is still about $50 a barrel, producers in the Bakken Shale in North Dakota this month are averaging about $34 a barrel for light crude. Exports would allow a more efficient oil market. Opponents of lifting the ban argue that keeping U.S. oil here will enhance U.S. energy security, as if it can be stockpiled for use in an emergency. The feds already have the Strategic Petroleum Reserve, which can provide some relief in a genuine crisis. But companies are only going to drill if they can sell oil at a profit."

Bismarck Tribune, Jul. 24, 2014
Article
http://bismarcktribune.com/bakken/breakout/domestic-oil-production-approaching-refinery-capacity/article_138e6dba-1342-11e4-bfe9-001a4bcf887a.html

Domestic oil production approaching refinery capacity
"An oversupply of crude oil in the United States isn't something mentioned very often, if at all. But as a result of surging domestic production, that could be the case in the months ahead with light sweet crude oil production likely exceeding current refinery capacity for that class of crude in the near future. Tight oil extraction in plays like the Bakken in North Dakota and Eagle Ford in Texas, have led to a renaissance in domestic oil production. **The catch - U.S. refineries are nearing full capacity for light sweet crude oil processing - is that most facilities are configured to process heavy crudes instead."**

CNBC, Jul. 13, 2014
Web Article
http://www.cnbc.com/id/101823507

US oil output booms—now refiners have to catch up
"The United States is swimming in oil and gas. But processing the new-found bounty is posing a challenge to U.S. refiners, which can't come to grips with the abundance in domestic supply. A production renaissance has catapulted the United States into the upper strata of global energy producers. Yet with fewer than 150 refineries, the U.S. has a surprisingly limited capacity to process the bounty."

Reuters, Jun. 2, 2014
Column
http://www.reuters.com/article/2014/06/02/usa-oil-exports-kemp-idUSL6N0OJ3W520140602

U.S. refiners struggle with too much light crude: Kemp
By John Kemp
"Most of the extra oil produced in the United States in the next two years will be light crudes and condensates that domestic refineries will struggle to process - intensifying pressure for at least a partial relaxation of the country's export ban. U.S. oil production is set to increase by another 2 million barrels per day in 2014-15. More than 60 percent of the forecast growth will consist of light oils with a specific gravity of 40 degrees API or higher, according to the U.S. Energy Information Administration ("U.S. crude oil production forecast: analysis of crude types", May 29). **But with imports of competing crudes from West Africa already reduced close to zero, U.S. refineries will be unable to process all this extra oil without enormous investment in equipment.** Distillation towers, furnaces, heat exchangers and downstream conversion units would need expensive and time-consuming overhauls to enable them to handle a higher share of light oil."

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Motley Fool, Jun. 16, 2014
Web Article
http://www.fool.com/investing/general/2014/06/16/can-refiners-keep-up-with-surging-us-oil-produc-tio.aspx

Can Refiners Keep Up With Surging U.S. Oil Production?

"Though advances in drilling technology have propelled U.S. crude oil production to levels not seen since the late 1980s, many U.S. refineries are poorly equipped to handle these growing volumes of mainly light, sweet crude oil -- a higher quality grade of crude as measured by API gravity and sulfur content. Let's take a closer look at the main factors driving this growing mismatch between U.S. refining capacity and domestic crude production and why Valero may be the best positioned refiner to benefit from this trend. ... **Many U.S. refiners are poorly equipped to handle these light sweet grades of crude mainly because they were upgraded over the past decade to process heavier, sour crudes. After all, nobody was expecting a shale revolution 10 years ago and refiners figured they would continue to rely on imports of heavier grades. Therein lies the main issue -- the growing mismatch between surging light sweet crude production and refining capacity configured to process imported heavy, sour crudes. While some of these refineries do have the flexibility to modify their feedstock to process greater volumes of lighter crudes, doing so would generally reduce their utilization rate and, therefore, profitability.** In order to process higher volumes of lighter crudes, Gulf Coast refineries that have been configured to handle heavy, sour crudes would have to invest heavily in distillation towers, downstream conversion units, furnaces, and other equipment. Such an overhaul would require hundreds of millions of dollars and as long as five years to complete."

Appendix B. AFPM Technical Papers on Processing Light Tight Oil

The following are papers presented at AFPM annual meetings in 2012, 2013, and 2014

Arriaga, Raul (Albemarle Corp.). "Sink or Swim? How to Thrive in the Flood of Tight Oils." AM-14-64, March 2014.

Davis, Samuel (Wood Mackenzie). "Can U.S. Refiners Invest for Success?" AM-14-53, March 2014.

Deepak, R.D. (Criterion Catalysts and Technologies). "Challenges of Processing Feeds Derived from Tight Oil Crudes in the Hydrocracker." AM-14-15, March 2014.

Dion, Michael (GE Water & Process Technologies). "Challenges and Solutions for Processing Opportunity Crudes." AM-14-13, March 2014.

Federspiel, Michael (Grace Catalysts Technologies). "Processing Tight Oils in the FCC: Issues, Opportunities, and Flexible Catalytic Solutions." AM-14-16, March 2014.

Foster, Jim (Platts). "Petrochemical Landscapes: The Blessing and Curse of the Shale Revolution." AM-14-34, March 2014.

Green, M. Scott (KBC). "Tracking and Auditing the Impact of New Crudes on Refinery Operability and Profitability." AM-14-43, March 2014.

Gunaseelan, Praveen (Vantage Point Energy Consulting). "Impact of US Shale Gas and Liquids on the Refining Sector." AM-12-04, March 2012.

Gunaseelan, Praveen (Vantage Point Advisors) and Matt Thundyil (Transcend Solutions). "How Shale Hydrocarbons are Reshaping US Refined Product Markets." AM-13-56, March 2013.

Hittle, Ann-Louise (Wood Mackenzie). "Will OPEC Sideline U.S. Producers by Defeating Tight Oil?" AM-14-12, March 2014.

Huovie, Chad (UOP), Richard Rossi (UOP), Dan Sioui (UOP), Mary Jo Wier (UOP), Rajeswar Gattupalli (UOP), and Jeff Sexton (Marathon Petroleum). "Solutions for FCC Refiners in the Shale Oil Era." AM-13-06, March 2013.

Kemp, Charles and Rick Thomas (Baker & O'Brien, Inc). "Growing U.S. Oil and Gas Production Set to Reshape Competitive Position of U.S. Refineries." AM-13-62, March 2013.

Lockhart, Mark (Burns and McDonnell). "Shale Gas Boom and Tight Oil - A New Era for the Refining Industry." AM-14-39, March 2014.

Lordo, Sam (NALCO Champion). "Use of Crude Unit Overhead Monitoring Automation Improves Reliability in Processing Conventional and Non-Conventional Crude Oils." AM-14-73, March 2014.

Marques, Patricia (Petrobras). "Distillation Heater Operation while Processing Tight Oil." AM-14-14, March 2014.

Mayes, John (Turner, Mason & Company). "Changing Crude Qualities and Their Impacts on U.S. Refinery Operations." AM-14-42, March 2014.

Ohmes, Robert, Michael Gibson-Robinson, and Robert Powell (KBC Advanced Technologies, Inc). "Characterizing and Tracking Contaminants in Opportunity Crudes." AM-13-33, March 2013.

Pan, Shaun (BASF). "Capturing Maximum Values for Processing Tight Oil through Optimization of FCC Catalyst Technology." AM-14-23, March 2014.

Stark, Joseph (Baker Hughes). "Selection of Hydrogen Sulfide Scavengers for Minimal Refinery Impact." AM-12-21, March 2012.

Vogt, Kaspar (Albemarle). "Diesel Hydrotreating Challenges & Opportunities When Processing Tight Oil." AM-14-17, March 2014.

Wier, Mary (UOP LLC). "Optimizing Naphtha Complexes in the Tight Oil Era." AM-14-35, March 2014.

Wojciechowski, Michael (Wood Mackenzie). "The Impact of Resurgent North American Crude Production on Refining Crude Slate." AM-13-35, March 2013.

Wright, Brude and Corina Sandu, PhD (Baker Hughes Incorporated)."Problems and Solutions for Processing Tight Oils." AM-13-55, March 2013.

Ye, Eric (DuPont Sustainable Solutions). "Gasoline Production in the Age of Tight Oil, Renewable Fuel Mandates, and Tier 3 Regulations." AM-14-36, March 2014.

Appendix C. Survey Form

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AFPM Crude Oil Capacity Survey

Introduction:

The purpose of this survey is to illustrate that many refiners have and are planning to use more U.S. light crude oil in the next few years. This will be used to help dispel the misunderstanding that refiners cannot use more US light crude oil. In addition, the survey is designed to capture changing refinery access to the tight oil production regions, and refining capability to use more light crude oil, if economics and access encourage more light crude use.

Please note that all data will be aggregated and will be collected and analyzed by a third party. AFPM and its staff will neither collect nor review any of the individual company data.

Please complete the survey by **November 21, 2014**.

Contact Information

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Survey Instructions:

a. The Survey tab contains the entire AFPM Crude Oil Capacity Survey. Please complete 1 survey per individual refinery.
b. Please read all instructions before completing each section of the survey.
c. All cells highlighted BLUE should be completed unless otherwise noted.
d. Additional instructions for specific sections are presented below.
e. Additional definitions can be found on the "Definitions" tab.
f. Once complete, please save your worksheet and upload it into your secured account: https://secure3.verisconsulting.com/AFPM

Part III	***Output Yields (Percent of Crude Input):*** - If your facility does not have a vacuum tower, please fill in **Atmospheric Tower Bottoms**. Otherwise, please complete for **Vacuum Gas Oil** and **Vacuum Tower Bottoms**.
Part IV	***Please attribute increases in light US crude use* for >30.9° API to the actions below:*** - Totals on this table may exceed the annual crude changes in PART III because this table includes replacing light imports with light US crude oil - which could potentially have little impact on light crude oil being run in PART III. - ***Replace similar quality imports (no investment)*** - This row is trying to capture import substitution. It could include some small investments to make the substitution. ***Please indicate what kind of access path(s) has or will change from the prior year using the drop-down options in the matrix below:*** - If no change in access path will contribute to your increased US light oil use, please select "None."
Part V	**Assumptions for Part V:** - **For All years:** Assume you will still need to meet your normal market requirements. (i.e., don't cut volume output) - **For 2014:** Using equipment in place, use actual 2014 prices and *assume unlimited access to US light crude* - **For 2015-16:** Assume a) current investment plans, b) price incentives large enough to use as much light crude oil as you can, and c) access to unlimited supply of US light crude, BUT d) continue to produce enough product volume to serve your current domestic transportation and heating markets (product exports can be reduced).
Part VI	***Investments costs both in total dollars and daily barrels (in BPSD) of additional light crude (>30.9° API)*** - When light-crude-use expansion is part of a larger project, estimate and report the portion of project designed to increase light crude use for this section. - In both tables, place the total investment cost in the year the project is completed. - In the first table, please indicate the investment size in thousands of dollars. - In the second table, please indicate the resulting additional daily barrels of light crude. - Confirm the accuracy of your entries by reviewing the dollars/BPSD calculation to the right of the second table.

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AFPM Crude Oil Capacity Survey

Note: All cells highlighted BLUE should be completed unless otherwise noted.

Part I: Facility ID - Individual Refinery

Company:
Refinery Name:
City:
State:

PART II: Facility Size

	Actual		Estimated		
	2007	2013	2014	2015	2016
Calendar Day Distillation Capacity (KB/D)					
Annual Crude Runs (KB/D)					

Data Check				
2007	2013	2014	2015	2016
-	-	-	-	-

PART III: Inputs and Outputs

Instructions:

Output Yields (Percent of Crude Input):

- If your facility does not have a vacuum tower, please fill in **Atmospheric Tower Bottoms**. Otherwise, please complete for **Vacuum Gas Oil** and **Vacuum Tower Bottoms**.
- Please make sure that the sum of input volumes are equal to the Annual Crude Runs in Part II.

Input Volumes by API (KB/D)

	Actual		Estimate		
Inputs	2007	2013	2014	2015	2016
Heavy (<=24°API)					
Medium (>24 - 30.9°API)					
Light (>30.9 - 41.9°API)					
Super Light (>41.9-50°API)					
Condensate (>50°API)					
Total	-	-	-	-	-

Output Yields (Percent of Crude Input)

	Actual		Estimate		
	2007	2013	2014	2015	2016
C4 and lighter (<85°F)					
Light Straight Run (85-185°F)					
Heavy Straight Run (>185-350°F)					
Kerosene/Jet (>350-450°F)					
Diesel/Heating Oil (>450-650°F)					
Atmospheric Tower Bottoms* (>650°F)					
Vacuum Gas Oil (>650-1000°F)					
Vacuum Tower Bottoms (>1000°F)					
Total	0%	0%	0%	0%	0%

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PART IV: Means of Getting More Light US Crude Oil

***In this section, please only consider use of US Light Crude Oil.**

Instructions:

Please attribute increases in light US crude use* for API >30.9° to the actions below:

- Totals on this table may exceed the annual crude changes in PART III because this table includes replacing light imports with light US crude oil - which could potentially have little impact on light crude oil being run in PART III.
- Replace similar quality imports (no investment) - This row is trying to capture import substitution. It could include some small investments to make the substitution.

*****Replace similar quality imports (no investment)*** - This row is trying to capture import substitution. This could include some small investments to make the substitution.

Please indicate what kind of access path(s) has or will change from the prior year using the drop-down options in the matrix below

- If no change in access path will contribute to your increased US light oil use, please select "None."
- To enter a access path that is not indicated on the drop-down list, simply type your answer into the cell.

Please attribute increases in light US crude use for >30.9° API to the actions below (in KB/D):

	Actual	Estimate		
	2013	2014	2015	2016
Replace similar quality imports (no investment)**				
Adjust crude mix without significant investments				
Participation in new crude access paths				
Investments (actual or planned)				
- Crude prefractionation investment				
- Crude distillation investment				
- Naphtha/light ends overhead system investment				
- Downstream Units investment				
- Investment to increase access (e.g., invest in rail, pipe, etc)				
Other (fill in)_____				
Total	0	0	0	0

If you selected Participation in new crude access paths **or** Investment to increase access **above, please complete the following table. If not, please proceed to Part V.**

Please indicate what kind of access path(s) has or will change from the prior year using the drop-down options in the matrix below:

- If no change in access path will contribute to your increased US light oil use, please select "None."
- To enter an access path that is not indicated on the drop-down list, simply type your answer into the cell.

	Actual		Estimate		
Source of light volume:	2007	2013	2014	2015	2016
TX, Eagle Ford					
MT/ND, Bakken					
TX/NM, Permiam					
CO/WY, Niobrara-Codell					
Haynesville					
Marcellus					
OK Woodford					
OK, TX Granite Wash					
LA, TX Auston Chalk					
CA Monterey					
Other (fill in) _____					

Example:

Actual	Estimate		
2013	2014	2015	2016
	1		
	1		
	8		
		10	
			10
0	10	10	10

- This refinery planned increases to light US crude oil of 10KB/D in 2014-2016.

- For those three years, each column adds to 10 KB/D.

- The column totals here for this refinery would not be expected to equal >30.9° API in the inputs table in Part III because Part III does not account for substituting light US crude for simlar API imports.

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PART V: Capability (vs Plans) to Use More US Light Crude Oil

Assumptions:

- **For All years:** Assume you will still need to meet your normal market requirements. (i.e., don't cut volume output)
- **For 2014:** Using equipment in place, use actual 2014 prices and *assume unlimited access to US light crude*
- **For 2015-16:** Assume a) current investment plans, b) price incentives large enough to use as much light crude oil as you can, and c) access to unlimited supply of US light crude, BUT d) continue to produce enough product volume to serve your current domestic transportation and heating markets. Product exports can be reduced.

Please indicate your capability to use light US crude in KB/D (see Assumptions above):

	Estimate		
	2014	2015	2016
Light (>30.9°API - 41.9°API)			
Super Light (>41.9°API - 50°API)			
Condensate (>50°API)			

What are your assumed crude runs for these estimates (in KB/D)?

2014	2015	2016

PART VI: Investment Dollars

Instructions:

- **First Table:** Please indicate the investment size in thousands of dollars.
- **Second Table:** please indicate the resulting additional barrels of light crude in BPSD.
- In both tables, place the total investment cost in the year the project is completed.
- When increasing light crude use is part of a larger project, please estimate the share of that project designed to increase light crude use.
- Confirm the accuracy of your entries by reviewing the dollars/BPSD calculation below the second table.

If investments are planned, indicate the investment costs in total dollars and the resulting additional barrels of light crude in Barrels per Stream Day (BPSD). Please refer to the Instructions above.

	Actual		Estimate		
Investments (actual or planned - Thousands $)	2007	2013	2014	2015	2016
- Crude prefractionation investment					
- Crude distillation investment					
- Naphtha/light ends overhead system investment					
- Downstream Units investment					
- Investment to increase access (e.g., invest in rail, pipe, etc)					
Total	$0	$0	$0	$0	$0

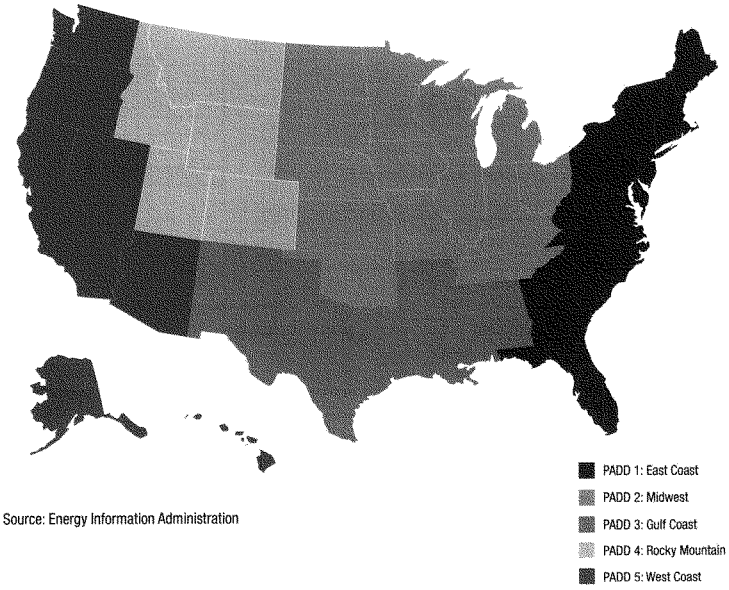
	Actual		Estimate		
Barrels per Stream Day (BPSD) of additional light crude (>30.9° API)	2007	2013	2014	2015	2016
- Crude prefractionation investment					
- Crude distillation investment					
- Naphtha/light ends overhead system investment					
- Downstream Units investment					
- Investment to increase access (e.g., invest in rail, pipe, etc)					
Total	0	0	0	0	0

Please review the calculated ratios here and revise your responses in Part VI if necessary.

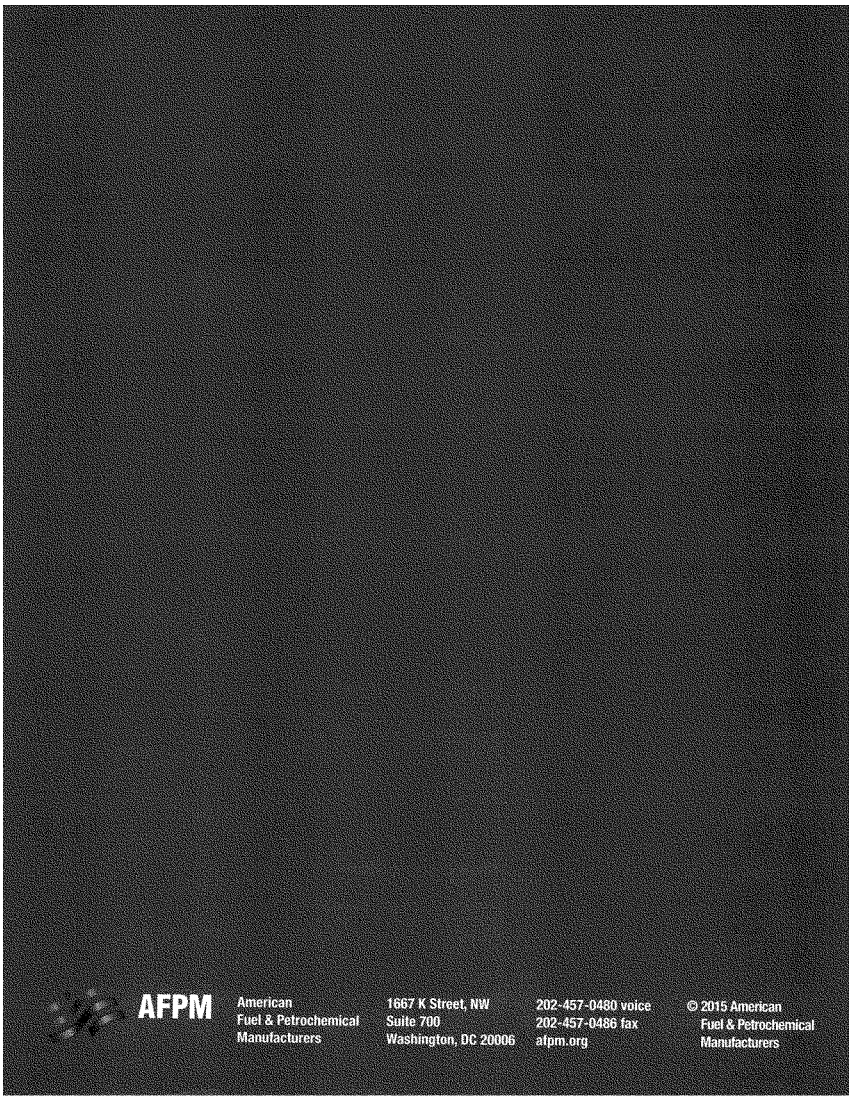
	Actual		Estimate		
Dollars per BPSD (in Thousands $)	2007	2013	2014	2015	2016
- Crude prefractionation investment					
- Crude distillation investment					
- Naphtha/light ends overhead system investment					
- Downstream Units investment					
- Investment to increase access (e.g., invest in rail, pipe, etc)					
Total					

Appendix D. Petroleum Administration for Defense District Map

Petroleum Administration for Defense Districts



Source: Energy Information Administration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The CHAIRMAN. Thank you, Mr. Drevna. And let's finally hear from Mr. Warmann, welcome.

STATEMENT OF JEFFREY WARMANN, CHIEF EXECUTIVE OFFICER, MONROE ENERGY INC.

Mr. WARMANN. Thank you, Chairman Murkowski, Ranking Member Cantwell and the members of the Committee. Thank you for inviting me to testify.

My name is Jeff Warmann. I'm the CEO and President of Monroe Energy. We own and operate a refinery in Trainer, Pennsylvania. I have 30 years of experience in the petroleum industry. I'm here to testify on behalf of Monroe Energy and the Crude Coalition.

Current restrictions on exports of U.S. crude oil provide real economic benefit to U.S. consumers, businesses and protect our national energy's independence and security. The repeal of this law would do great harm and lasting damage to these vital interests.

I want to make five points this morning, very quickly.

First, the export law benefits U.S. consumers and businesses. The impact of lower fuel costs to U.S. household income and consumer confidence can't be understated. It's dramatic. It's measureable. It's broad based and it's real.

The new Allstate national journal poll has confirmed that lower gasoline prices have made a huge difference in American families' lives allowing them to spend more of their savings and money in ways that ripple throughout our economy. An average family saves over a thousand dollars from lower fuel prices right now. Do we really want consumers to lose this savings?

Lower fuel prices also reduce the cost of doing business, especially in transportation, petrochemical, agricultural and manufacturing sectors.

Second, there is no free trade in the international crude market.

Let me be crystal clear about this point. I strongly support free trade, but the global crude market is neither open nor is it free.

There is no inconsistency for free trade and against crude exports. Lifting our export restrictions would allow the transportation of U.S. crude outside of competitive American market into a less competitive global one that's controlled by OPEC. OPEC is a cartel in every sense of the word and will continue to manipulate the world's oil market to its desires.

Third, removing the export restrictions would raise crude oil prices and cost American jobs.

The shale oil revolution breathes new life into close refineries. We created thousands of refinery jobs for workers as well as supporting tens of thousands of additional jobs throughout the nation. Refining jobs have a huge multiplier effect.

A study commissioned by the Commonwealth of Pennsylvania found that for each local refinery job it supports 61 jobs nationwide. That means one refinery employing a thousand workers supports 61,000 jobs nationwide. Repealing this law would benefit foreign refinery workers at the expense of all these thousands of American jobs. Our refineries would lie dormant again.

Fourth, the U.S. refineries have plenty of capacity to process light crude, and I defer to the AFPM studies as well as the Baker O'Brien studies. Every one of the opposing studies, like my col-

league here Charles Drevna has said, look at it in a very static mood, not a dynamic mood—mode and we can accommodate the light, tight oil produced even under the most optimistic scenarios by the EIA.

Fifth, the purpose the export law is as important today as when it was enacted. Despite the production renaissance of recent years our country still imports 35 percent of our total crude oil needs from OPEC countries, over three million barrels a day and three times as much oil from Saudi Arabia as we did at the time that the export law was put in place.

Exporting U.S. crude means importing more oil from overseas and subjecting ourselves to the whims and the uncertainty of OPEC regimes. We are on the cusp of developing true energy independence where we can produce, refine and domestic oil virtually filling every petroleum need here at home. Allowing exports of American crude sabotages this goal which has been an important policy objective for over a generation.

The issues surrounding exports of American crude oil are very complex. My company and my fellow crude coalition members strongly believe that allowing exports of crude will harm American households and businesses, the U.S. refining sectors and our nation's energy security and independence. Prudence dictates that Congress refrain from making such drastic change to this long standing pillar of our energy policy and our national security.

Thank you very much, and I look forward to answering any questions you may have.

[The prepared statement of Mr. Warmann follows:]

Prepared Testimony of Jeffrey Warmann
Chief Executive Officer, Monroe Energy Inc.
On Behalf of the CRUDE Coalition

U.S. Senate Energy & Natural Resources Committee
United States Crude Export Policy Hearing

March 19, 2015

Good morning: Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee. Thank you for inviting me to testify before you today.

My name is Jeff Warmann and I am the Chief Executive Officer of Monroe Energy LLC, a company that owns and operates a refinery in Trainer, Pennsylvania. I have more than 30 years of experience in the refining as well as the chemical and petroleum industries, including extensive knowledge of petroleum refining, marketing, trading, supply, and distribution operations. In addition to my industry experience, I am also the co-inventor of eight patents concerning additive injection and ratio blending.

I am here today to testify on behalf of Monroe Energy as well as on behalf of Consumers and Refiners United for Domestic Energy, known as The CRUDE Coalition. My company, Monroe Energy, is a member of CRUDE as are Alon USA, PBF Energy and Philadelphia Energy Solutions. Together, our refineries are located in California, Delaware, Louisiana, New Jersey, Ohio, Pennsylvania and Texas. The employees of our companies turn 1.3 million barrels a day of oil into finished petroleum products – diesel fuel, gasoline, home heating oil, etc.

Put simply, the current restrictions on the export of U.S. crude oil provide real economic benefit to U.S. consumers and businesses and protects our nation's energy independence and security.

Removing Export Restrictions Would Raise Oil Prices, Cost Jobs and Diminish U.S. Infrastructure

At the outset, it's important to point out that the market for crude oil in this country is a competitive one, determined by supply and demand. The global market, in contrast, is controlled by a handful of oil producing states that keep a tight hand on the production throttle and can control prices at their own whim.

If we lift the export restrictions on U.S. crude, we would in essence allow the transport of crude out of a competitive market in this country and into a less competitive global one controlled by the likes of Iran, Russia, Libya and other unfriendly regimes. The results would be easy to predict: U.S. crude would flow out of this country and onto the world market. OPEC would manipulate the market to maintain high global prices and the price of a barrel of crude in this country would rise to match the higher OPEC-controlled global price.

World crude markets are not "free markets;" they are moved artificially by a self-proclaimed cartel - OPEC. Right now, OPEC member countries produce about 40 percent of the world's crude oil, and OPEC's oil exports represent approximately 60 percent of the total petroleum traded internationally. OPEC not only has the power to regulate its members'

production, but as EIA's Adam Sieminski acknowledged, "producers in the countries of the Persian Gulf region hold very large reserves of easy-to-develop oil, that will continue to play a central role in oil markets."

OPEC can move markets up or down depending on the circumstances. History has documented the level of control OPEC has maintained over crude oil markets, and this control dispels any claim that such markets are free or open.

Our country's refinery workers also stand to lose from lifting export limits. Some recent history can help explain why. Before the shale oil boom, there was too much capacity in refineries in the Northeast and along the Gulf Coast. Many were closing. The shale oil revolution breathed new life into these refineries and created jobs for thousands of refinery workers. In addition, as a result of the multiplier effect, each refining job kept here in the United States is supporting additional local, state, and national jobs. For example, a study commissioned by the Pennsylvania Department of Labor and Industry looked at the effects of the refinery closures in Southeast Pennsylvania, and the report revealed each local refinery job supported an additional 18 jobs in Southeast Pennsylvania, 22 jobs in the state and 61 jobs in the nation.

By lifting export restrictions and sending our crude overseas, we would be sending American jobs overseas as well. Our refineries would lie dormant once again. Refineries in Europe – where there is currently excess refining capacity – would be more than happy to refine our homegrown crude with the help of European workers. In other words, repealing the law will benefit European refinery workers at the expense of thousands of American jobs.

The Export Law Benefits U.S. Consumers And Businesses

It's not just refinery workers who benefit from the export law. Increased domestic production combined with export restrictions have provided real, broad-based benefits to U.S. consumers and businesses alike. During the past year, an American family with one car has saved more than $1,000 in the cost of gasoline; families with two vehicles have saved substantially more. Households using fuel oil to heat their homes, moreover, have saved at least another $1,000.

The impact of the increased production on household income and consumer confidence cannot be overstated: It is dramatic, measurable, broad-based, and real. In fact, it is difficult to identify a greater boost to consumer savings over the past 12 months than the drop in fuel prices all Americans have experienced, which is a direct result of the drop in crude oil prices.[1] That jolt to the economy simply would not have materialized if the export law had not been in place.

U.S. businesses have also reaped the benefits of the export law. Lower oil prices reduce the cost of doing business for firms of all types, with the transportation, petrochemical, agricultural and manufacturing sectors being perhaps the biggest beneficiaries. This savings allows businesses more room to invest, which contributes to greater economic growth.

[1] According to the EIA, the retail price of gasoline is comprised of four cost components: taxes, distribution and marketing, refining, and crude oil. Of these factors, crude oil is the largest component of the price of gasoline (54%).

We are mindful of the fact that oil producers are not reaping the profits they earned just a few years back and are bearing the brunt of the current oil price bust. But this fact is not sufficient justification for an end to export restrictions. Temporary dislocations in the oil markets are no reason to change the longstanding crude export policy, which has been supported by Republicans and Democrats alike.

Oil production has always been characterized by a boom and bust cycle. As anyone in the industry can tell you, increases in price stimulate production, which in turn leads to increased supply. As we're seeing today, that increased supply lowers prices, which in turn reduces production. Diminished supply then leads to higher prices, which in turn stimulates production once again.

Based on our knowledge of and experience in the markets for both crude oil and finished petroleum products, we know that the crude export law has kept prices lower for consumers and businesses than they otherwise would be. We strongly dispute studies that claim prices for gasoline at the pump will go down if crude exports are permitted.

These studies are flawed, making a number of assumptions that don't reflect how oil markets actually work. As just one example, none of the studies took into account the effects of increased refined product exports, which decreased foreign refinery throughputs. And increased domestic supply of crude also displaced foreign imports. Both of these phenomena increased the world surplus of crude, which weighed on Brent prices.

When export proponents talk about eliminating the Brent/WTI discount, they are not talking about the Brent price dropping; they're talking about the WTI price rising to meet the Brent price. Many export proponents cite studies that assume production will increase if export restrictions are lifted. But whether drilling economics are fundamentally affected would depend on the world price of crude. If the world price of crude remains at its low level, it will not be sufficient to stimulate increased U.S. production.

Oil markets are highly complex. A multitude of factors plays in to price calculations on both the supply and the demand side of the equation. The EIA recently said that the values of futures and options contracts suggest a very high uncertainty in the future price of crude oil, and with so much production around the world on the sidelines because of conflicts or governmental economic mismanagement, there are even more variables to the future crude price equation.

Economists may be able to arrive at the predictive price conclusions they want using unrealistic or even fanciful assumptions about how markets will behave. But our refiners know - based on practical experience in the marketplace every day – that taking away one key thread of a longstanding policy will unravel oil markets in this country. And repealing current law will create a new level of business uncertainty that will impact all the businesses that serve the petroleum supply chain, with negative consequences for consumers.

Growing Crude Stockpiles Do Not Present A Crisis

Recently we have seen news reports about growing crude stockpiles. These stockpiles are not increasing because of our crude export law. They are rising because the oil market is in "contango." That means that the futures price for crude oil is higher than the expected spot price. Traders have spotted an opportunity and are capitalizing on it by storing more oil.

Not all the oil being stored in places like Cushing, Oklahoma, is American oil. There is a significant proportion of Canadian oil being stored there, too. In November, pipeline company Enbridge started up its Flanagan South pipeline, which carries Canadian heavy crude from Michigan to Oklahoma. This has only added to supplies at Cushing.

And at this point in time, some refineries have been going off-line for regular season maintenance. The EIA expects U.S. inventories of crude to peak around mid-year. At the end of February, American storage facilities still had significant capacity left for additional stockpiles.

These storage features of the market are temporary. They do not represent a crisis of any sort that justifies a change to our export policy.

The Infrastructure Problem Is Serious

I also want to address some misunderstandings about the price differential between the West Texas Intermediate (WTI) and Brent benchmarks for oil. Some producers have called the differential "ominous." Others have identified a temporary large spread in prices and waved it as justification for a policy change. They have offered unsubstantiated predictions that the spread will widen "dramatically."

The fact is that, year-over-year; the spread differential is not nearly as large as some producers have been claiming. EIA has forecast a WTI discount to Brent of $3/barrel on average in 2015 and $4/barrel in 2016.

But that's not the full context. Cushing, Oklahoma, the price settlement point for WTI, is right in the middle of the country. But refineries on either coast and in the Gulf incur transportation costs to get American light tight oil to us, whether by rail, by ship or by pipeline. Those costs are significant. That means that the total input cost of American crude to our refineries is not as discounted as the spread might suggest.

The real problem is infrastructure. Getting American crude oil to refineries that for years relied on significant imports via ship has been a continual challenge. In many cases, governmental action – or inaction - has been a significant impediment to private investment in improvements to our pipeline network, for example. Traders discount WTI against Brent in part because of the significant added transportation costs to get WTI to market.

U.S. Refineries Have Plenty Of Capacity To Process U.S. Light Tight Oil

We need to end once and for all this myth that American refiners can't handle U.S. crude.

A study conducted last year by energy experts Baker & O'Brien showed that American refiners have the capacity to handle all the U.S. Light Tight Oil forecast to be produced under even the most optimistic scenarios by the EIA. There is no report that says otherwise. And the economics of U.S. LTO have stimulated the investment of billions of dollars to better accommodate getting that oil to refineries and will continue to do so.

I would like to clarify the position of refiners on this issue. Refiners who have no upstream operations are much more likely to share our view on crude exports. Integrated companies who have production operations as well as refining operations may take a different view because of how they would operate if the export law were repealed.

By seeking repeal of the export law, those integrated firms are looking to produce more light U.S. crude and export it, unrefined, to places with growing demand like China, projected to be the main source of global demand growth in 2015 and 2016. Some integrated firms will export to European refiners, bypassing American refining competitors. We'll see more petroleum products refined in Europe but derived from American crude returning to our shores. If this were to happen, American refining capacity will drop, and good American jobs will be lost and the economic activity and energy security that are derived from increased domestic production will be minimized.

The Purpose Of The Export Law Is As Important Today As It Was When the Law Was Enacted

In thinking today about the merits of export restrictions, we should also consider one of its key goals, which is to help this country achieve energy security and independence.

Despite the production renaissance of recent years, our country still imports around 33% of its daily crude oil needs from outside of North America and around three times as much oil from Saudi Arabia as we did at the time the export law was enacted. That's why exporting U.S. crude makes little sense. If we allow for the export of U.S. crude, we'll have to import more oil from overseas and subject ourselves, once again, to an increasing degree of price volatility and higher global prices.

In addition, one byproduct of the law – and one not predicted 40 years ago when it was first enacted – is that our increased domestic production and enhanced energy security has made life more difficult for petro dictators who previously relied on selling oil to the U.S. to prop up their failing and autocratic regimes. Our current energy boon has brought down the price of oil to levels below what these authoritarian – and largely anti-American – regimes need to pay their bills and wreak havoc around the world.

All of this raises the question: Why repeal the law now? We are on the cusp of developing true energy independence, where we can produce – and refine - virtually all of our petroleum needs here at home. Allowing exports of American crude sabotages that goal, which has been an important policy objective for over a generation.

The Public Supports Maintaining Export Restrictions

Finally, as this Committee continues to gather information on the impact of crude oil export restrictions, it is imperative to remember that the general public opinion overwhelmingly supports leaving the crude oil export law in place.

Last year, CRUDE engaged the University of New Hampshire Survey Center to poll voters in New Hampshire on their opinions regarding U.S. crude oil export policy. The survey

results were overwhelmingly in favor of keeping the current export law. Here are some key survey points:

- Two thirds of New Hampshire voters believe the U.S. is importing too much oil from foreign countries, with 86% agreeing that the U.S. should reduce the amount of oil imports from the Middle East and other countries before exporting domestic crude.

- 85% of Granite State voters agree the U.S. should limit exports of crude oil if doing so keeps gasoline prices from rising in the U.S.

- 78% of New Hampshire voters want the government to be certain about the impact of crude oil exports on gasoline prices before the current law is changed.

The results of the New Hampshire survey clearly demonstrate that voters want energy independence and a reduction of crude oil imports before we agree to export our homegrown crude. Other independent polls confirm our findings. Hart Research, for example, recently released a nationwide poll showing that large majorities of voters across party lines oppose exporting more U.S. oil to foreign countries.

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The issues surrounding exports of American crude oil are complex. My company and my fellow CRUDE Coalition members strongly believe that allowing exports of crude will negatively impact American households and businesses, the U.S. refining sector, and our nation's energy security and independence. Prudence dictates that Congress refrain from making such a drastic change to this longstanding pillar of our energy policy and our national security.

The CHAIRMAN. Thank you, Mr. Warmann. I appreciate the testimony from each of you this morning. Now let's begin our questions.

I want to start with what Americans are talking about when they're thinking about whether or not we should change a policy to allow for exports. I think you can tell from my opening statement and from comments that I've made over the past year that I think it is time to look at this policy and to repeal it for a lot of, what I consider to be, substantive policy reasons. But at the end of the day, the people I work for really don't give a hoot about what the policy is. What they want to know is, is it going to cost me more money when I'm filling up, whether it's filling up my car or my snow machine or my boat or home heating fuel?

So the question that I would ask of you, Mr. Pascual and Ms. Rosenberg, you are the folks that are looking at these studies that are out there and the analysis and the critique as to what lifting the export ban would actually reveal in terms of pricing. Can you speak directly to that? And either one of you proceed. Mr. Pascual.

Mr. PASCUAL. Thank you, Madam Chairman. I think you're absolutely right. The critical focus on the part of Americans, and Senator Cantwell has indicated this as well, is that the critical issue is price. Every single study that has been done by a major institution has gotten to the same conclusion, lifting the export ban will reduce the price of gasoline in the United States.

The reason for this is that the price of gasoline is tied to the Brent crude international benchmark price, not to WTI which is the benchmark price in the United States. If we are able to export light, tight oil from the United States, we add to the global supplies that contribute to that Brent crude benchmark. As a result of that we help drive down the international oil price that is fundamentally tied to the price of gasoline in the United States and around the world.

If you look at the trends over time, if you look at it across the world, the same issue is true in every single market. The price of gasoline is linked and tied when there are open markets to the price of Brent crude.

So the ability to export actually drives up international supply for the crude oil that's necessary. It drives down the price of gasoline. And in addition to that it has a number of other benefits that we've laid out on this panel of increasing jobs, of increasing revenues to states, of increasing Gross Domestic Product and the product of individual states as well.

The CHAIRMAN. Thank you. Ms. Rosenberg, do you care to add anything?

Ms. ROSENBERG. I'd agree with everything that Carlos just said. I'll just add that these studies that we're talking about, they're not only independent studies, some of them are industry sponsored, but also studies by the EIA, as you mentioned originally in your opening statement, have also made this point that the prices for gasoline for our consumers here in the United States are largely tied to the international benchmark price, to the Brent price.

The CHAIRMAN. Let me ask a question to reinforce a point, and I think both of you spoke to it. The suggestion has been made that the reason we would even consider lifting this export ban is because this is something that the industry wants.

So I'm not going to ask Mr. Lance this because, as the CEO of ConocoPhillips, people would say, well, of course ConocoPhillips would like to see the export ban lifted.

But what I think is important to understand, a little more clearly, is why it is important to other sectors. I think, Mr. Pascual, you mentioned it in the manufacturing sector, the banking sector, the financial sector, the benefits that we see when we allow for increased production.

Ms. Rosenberg, you were focusing more on the benefits from a national security perspective.

We have seen domestic production rising for years. We're backing out imports there which, ultimately, have the same effect, pushing more oil out into the global market, to the extent that lifting the ban would boost production even further then. Have we seen national security benefits already because of what we have put out on that global market?

Ms. ROSENBERG. I think we have, and there are a couple of key ones that we should bear in mind.

The first is the economic benefit that this energy, larger energy production, has given to our country. And when our economy is stronger when we are less indebted which shows up in our balance of trade.

When we capture more of the rents of our oil consumption here at home instead of sending those revenues to producers abroad that emboldens the United States. It gives it a stronger position to lead internationally. It makes us a stronger, more important trading partner and a strategic leader on international security issues.

We've mentioned the significance for the United States in being able to move forward with tough energy sanctions on Iran, in particular, and also when thinking about Russia as well with our European counterparts coming from a position of strength as an energy producer and a strong economic base gives the United States that ability to lead forcefully on such international security issues.

The CHAIRMAN. I'd like to ask you more on the sanctions piece of it and particularly with Russia, but I'm going to turn to my colleague and Ranking Member.

Senator CANTWELL. Thank you, Madam Chair. I love this discussion about price since you and I are probably from the states with some of the highest gas prices or consistently highest gas prices. So, at least from my perspective, I'm always interested in learning how we're going to lower gas prices.

I love the confidence, Mr. Pascual, with which you predict that lifting this export ban will lower gas prices. I've spent much of my career trying to make sure that we protect consumers from high prices and enforce federal laws on price manipulation.

For us on the West Coast, the question is how many trains a day are we going to have through our state, or is the oil just going to bypass us all together? How do we get gas lower prices? And that juxtaposed to the rest of the nation constantly eludes us.

So I want to turn to the safety question for a second and Mr. Drevna or Mr. Warmann, about this issue of volatility. In fact, I even saw on one site somebody suggested we might be willing to do something about the volatility of the Bakken crude if we could just export it. Do we need to be shipping this much natural gas in

the product and isn't there something that needs to be done about stabilizing that?

Mr. DREVNA. Well, let me take it here first. Well, first of all we are really, as the industry, looking forward to the final rule coming out from DOT. My industry has spent over $4 billion investing in new tank cars, and we understand that's not going to be enough.

We understand that the new cars are going to come out, I mean, the new specs are going to come out on cars whether they are existing or new. We're going to have to refurbish. We're going to have to buy new.

That being said, the cars on the tracks today, they are well, well, within the limits of the volatility of the crude. The problem, Senator, is not the cargo. The cargo can be shipped safely.

There's very little difference between 13.9 psi and 13.7 psi when you're looking at shipping crude, and that's the difference in the Bakken verses some others. The problem is that have we got so cavalier in this nation that it's okay to have two to three derailments a day no matter what the commodity is?

So when we're looking at the PHMSA and the DOT proposal it's fully, in our opinion, it's fully focused on the tank cars. And we, as the industry, are going to be right in line supporting and getting those cars up to specification.

But to cavalierly say we'll accept two to three derailments because the railroads have done——

Senator CANTWELL. Just to be clear. I'm not——

Mr. DREVNA. I know, I know.

Senator CANTWELL. I'm not going to accept that, and I'm calling for higher standards. I'd like for Mr. Warmann to also weigh in on this because I'm pretty sure your refiners don't really want all that natural gas in the product.

So why are we shipping this? I see headlines about bomb trains, and I'm not being cavalier about it. I'm calling for a higher standard. In fact, I want them to implement a rule at PHMSA to limit crude oil volatility in rail cars. Mr. Warmann.

Mr. WARMANN. Yes, Senator, you're correct. The refineries would like to have lower rvp crude oil. However transporting higher rvp materials we do every day.

It can be done safely. I think Mr. Drevna in a recent statement said that there was 1,861 derailments, of which six were crude in 2014. So it's a more complex and holistic solution that we need to look at.

The industry is looking at reducing the rvp doing some more stabilization of the product. We're looking at reinforced rail cars. We don't want the rail. We want crude in our refineries.

Senator CANTWELL. Why does Eagle Ford come out more volatile and we make them reduce it, and then yet Bakken comes out and we don't make them reduce it? So now every major metropolitan area across the country has to worry about this.

Mr. WARMANN. There's markets and there's places to put the lighter ends in the Gulf Coast rather than in the Bakken. That's one of the problems is the alternative is to flare it which there are flaring regulations that prevent you from flaring certain quantities, and that that forces us to try to deal with a commodity that we're trying to logistically move somehow.

One of the things that I would take a look at though as we're looking at this regulation is the condition and the inspection of the railroads. The industry is moving to much more sophisticated and robust rail cars, but there's been nothing put onto the railroads for increased inspections, increased inspection of equipment, the condition of their tracks or anything else.

So I think it's a more holistic view that we have to take of this whole transportation situation.

Senator CANTWELL. My time has expired, Madam Chair. But just to make a point, I believe in the holistic approach and the Reid vapor pressure should be examined as well and PHMSA should act on it. So thank you.

The CHAIRMAN. Senator Cassidy.

Senator CASSIDY. Mr. Drevna, I enjoyed your testimony, but let's explore it a little bit.

Now if there is currently capacity to take all this light, sweet or all this crude that's domestically being produced, theoretically there would be no discount relative to Brent. The fact that there is discount, obviously, could be different factors. If we had the Keystone XL pipeline taking it out of the Bakken, obviously we would save lives and lower the cost.

But if I look at Louisiana sweet, and we're right there, my Gosh, in refinery heaven. I think I've got it right now. It's almost too much to believe, an $11 discount relative to Brent.

So if there was current capacity, why would there be any discount relative to Brent?

Mr. DREVNA. Well, you know, Senator Cassidy, you're right. But let's not take a snap shot in time as we sometimes do and say, okay, now we've got to make our decisions right today on what's happening.

You know, over the past years, months, you're seeing that Brent WTI discount shrink. As a matter of fact well not too long ago Brent was selling a little bit less than WTI in certain areas. So what we're saying is that all we want you to do is make sure you understand.

Senator CASSIDY. No, I'm sorry, let me just finish though.

Mr. DREVNA. Yeah.

Senator CASSIDY. Let's explore this a little bit more.

Mr. DREVNA. Yeah.

Senator CASSIDY. Your survey on your members——

Mr. DREVNA. Right.

Senator CASSIDY. And frankly it is in the interest of your members to reply that they have increased capacity. They know this debate is taking place, and they'd like to indicate that they can absorb the capacity and that shipping overseas is not required.

Mr. DREVNA. Correct.

Senator CASSIDY. So when you surveyed them did you get some sort of documentation of the amount of money that they are currently investing to expand capacity? Did they send you a list of the bonds that they put out, etcetera?

Mr. DREVNA. We—as my testimony says, we—they are putting, you know, $5 billion into——

Senator CASSIDY. I accept that that is what they said. I've learned in this job to say what I've been told, not what I know.

Mr. DREVNA. Well——

Senator CASSIDY. The reason I say that is because, again, we have this discount. Bakken you could explain because we can't get the Keystone passed. But when I look at the refinery capacity in the Midwest on oil, for example, which I think is the only place that can take that easily right now through pipeline, there's still a discount there.

Mr. DREVNA. Well, Senator, what's happened though is you had that bottleneck over the past years right there at Cushing. We've got the southern leg though. You're seeing day by day that bottleneck is——

Senator CASSIDY. That's why I wanted to look at Louisiana light and Louisiana light in next to all those refineries still is selling at a discount relative to Brent.

So that seems that that's not so much infrastructure because we've got pipelines in Louisiana. I'll stop there.

Mr. DREVNA. Well, first of all I want to go back. You mentioned that the refiners who responded to the survey don't want the crude export. That's not correct, sir. The AFPM, all we're saying is we don't oppose it, understand all the parameters and——

Senator CASSIDY. I only have a little bit of time, I'm sorry.

Ms. Rosenberg, I enjoyed your testimony. I saw Larry Summers and I'm saying this off the top of my head, but Larry Summers gave a talk where I think he said that we would increase GDP by one percent. So we have this anemic 2 point—your CBO is estimating that our GDP is going to grow by two percent over the next five or six years. It's awful. Under Clinton and Reagan it grew by three and a half and under this it's been two percent. But we can increase it by one percent just by allowing exports. Now I know there's people in Louisiana that travel to North Dakota to work in the Bakken because there's such a demand for labor, folks make good money by traveling there.

Any thoughts upon Summers' estimate of one percent growth in GDP by allowing exports, what that would mean in terms of jobs for working families because right now that's what we're struggling to create?

Ms. ROSENBERG. I certainly think of his remarks as authoritative on such issues. There are other people who've made other particular estimates for the amount of increase that allowing crude exports would give to our GDP. There's a range of estimates.

But broadly there's a belief amongst independent analysts and many stakeholders in this industry that, in fact, there would be quite a significant GDP bump associated with lifting the ban and therefore stimulating growth in the industry.

Senator CASSIDY. I'm out of time. I'll just say that, again, as far as principle challenge right now is creating jobs for blue collar workers because no industry better for creating blue collar jobs than that for the exploration and production of fossil fuels and is, by definition, domestic. So it cannot be shipped overseas although the product can.

I would just say anything that could increase GDP by one percent is certainly something we should explore, because there's some family out there whose livelihood depends upon us making a wise decision and the wiser the better in terms of domestic job growth.

Madam Chair, I yield back.

The CHAIRMAN. Senator Cassidy, thank you. Senator Manchin.

Senator MANCHIN. Thank you, Madam Chairman. Thank you for this hearing, and thank all of you for being here.

Let me just say for those of us who can remember the 1974 embargo, we had to wait in line and then we had to have certain numbers on our license plates when we could go get gas, alternate. We remember those days. We don't want those to happen again.

And I think some decisions were made back because of that is where we are today.

With that being said, in West Virginia, it would be hard for me to explain to the people to grasp the whole world market, if you will. But if we start unfettered export it would reduce the price of their gas. That's a hard one.

And if we did do that and the prices didn't go down or would go up, we'd all be chastised for it.

On the other hand, if it was tied to our foreign relations policy and I mean that, tied to the foreign relations policy and there would be a trigger on when we could export based on production, U.S. production. And that trigger would be based on do we have ample production if production decreased? And if it does—somehow there's got to be a way that I can go home and explain to West Virginia, this is good for our country.

We are defending our country. We are making our country more solid. We're not buying and we're not being drug into wars we shouldn't be drug into. We're helping prop up our native neighbors by having access to our abundance right now.

I just think there's a win/win here. We just got to find it, but there's a win/win for all of us.

We can protect the market. We can make it stronger overseas. We can protect our NATO allies, and it looks like we're all going in two different directions, either we unfetter or nothing.

Mr. Lance, you might want to comment on this even though you would be expected to be a self interest from Conoco, you're still an American that cares about or the family cares about what we do.

Mr. LANCE. Yeah, I do, Senator. Thank you.

I think it is an important—the energy in the United States is at the juxtaposition of many issues, climate, energy security, and national security as well. So I take your point.

I think I'm here to assure the group that from the ENP side from the independent producer side, this revolution is real. This revolution is long lasting. It's going to create a dramatic surplus in light, sweet crude that the refiners cannot take.

They are making investments. We will be sending crude to the refiners that have/make those investments to go do that, but we're going to greatly exceed their capacity to take this crude.

So we have to ship it overseas. We have to get it into the open market. When we do that, as others have testified, the global supply will increase. We'll reduce the volatility. We'll decrease the amount of gas price.

We'll be seeing this and there's fact points today that's going on today. The consumers are not winning from the fact that we have world oil prices exceeding U.S. prices.

Senator MANCHIN. As you all have observed sometimes we're not always on the same page here as far as elected officials. We're trying to get on the same page, a page that we can all work off of.

Mr. Warmann, could you all accept a trigger? Basically if production was at a certain level, we had the excess and they're producing and then the refiners. But that would give us the green light to go ahead and export.

Mr. WARMANN. Senator, I would definitely say, I would focus more on what we're importing. We're still importing, you know, six, seven million barrels a day, two and a half million barrels of light crude a day. Basically, if you export the light crude we're just going to bring in more light crude.

And two, you're offsetting points, it's a matter of transportation. I can tell you specifically in Trainer, Pennsylvania, you have a benchmark of WTI crude in Cushing and it takes me $3 by pipeline and $5.50 by ship to get it to Trainer. So that's WTI plus $8.50.

Brent is in the North Sea. It takes $2 to get it to me. So if you take those there should be a $6.50 discount to WTI verses Brent just on a transportation basis.

And of course, that floats with transportation variables as well as the availability barriers.

Senator MANCHIN. Can anybody on the other side here explain why we're still importing so much and how we would go home and explain to well, now we have to export? If we export why would we be importing if we can export now? Mr. Pascual.

Mr. PASCUAL. Senator, thank you. I'd be glad to. One of the advantages that we have with our refinery system, and it is an advanced and sophisticated refinery system, is that it was focused and tooled on processing heavy crude oil. As a result of the efforts that we have made in the refinement of that system, we're able to get the maximum number of products out of heavy crude oil and use them within the United States.

The light, tight oil that is being produced now in the United States does not match the refinery configurations, and as a result of that you don't get the maximum level of production.

And I think Americans can understand that if you have one kind of product that has a higher international price, you sell that product.

Senator MANCHIN. Are we bringing light in or bringing heavy in?

Mr. PASCUAL. We're bringing heavy in.

Senator MANCHIN. Well I thought Venezuela was light?

Mr. PASCUAL. No, Venezuela is heavy crude. And——

Senator MANCHIN. So we're bringing both in, a little.

Mr. PASCUAL. Right. We're bringing in principally heavy. And one of the things that's happened as a result of the production of light, tight oil in the United States is that we've radically reduced our imports of light, tight oil from both the Middle East and from Africa. The role that OPEC plays in exports to the United States is radically collapsed. Our imports have gone from 60 percent of our consumption to 27 percent of our consumption in just the last five years.

That is a massive national security benefit, and the way to keep it is to maximize the incentive to producers to maintain and sustain our productive capacity.

And the best way to do that, I think we've heard from everybody on the panel, is to give American producers the widest market to be able to export their product.

That's what maximizes competition. That's what brings the best prices back to the United States. That's what generates jobs as a result of the supply chain. That's what has the massive impact that we've documented in our study of 400,000 new jobs, economy wide, an increase of $86 billion annually in our GDP.

Senator MANCHIN. Madam Chair, I'm sorry, but if we could have the Committee on both the Ranking side and the Majority side to work on getting us the facts, all members, the facts of what we're importing, the amount that we're importing, the type we would be exporting and if there's a trigger mechanism on production.

Because if there's a trigger mechanism then the domestic retailers, the domestic customer, you and I, can still benefit from a lower price because of the heavy production.

If the production drops and we're still exporting, we're going to pay a heavier price for that. Supply and demand.

So if we could get that from our Committee.

The CHAIRMAN. I appreciate the comments from the Senator from West Virginia. I think it should be pretty easy to get a better understanding.

Senator MANCHIN. One is shaking their head no and the other is saying yes.

The CHAIRMAN. Well, no, in terms of collecting the information that you're requesting in terms of what we import, where we import, what type whether it's heavy or light? We can make sure that we have that at our disposal. That's why we have the benefit of a hearing like this is to educate one another.

Let's go to Senator Daines.

Senator DAINES. Thank you, Madam Chair, and I'm glad that we're having this thoughtful conversation. I look at this in the backdrop of we're addressing a policy that's 40 years old. I was a little kid then. I'm not sure Cory Gardner was even around during the oil crisis of '73. And I remember the 55 mile an hour speed limit. [Laughter.]

I set you up there, Cory.

I remember the 55 mile an hour speed limit in Montana, you know, big, wide, open roads there and having to set that thing at double nickels and then followed by the oil export ban of '75.

For me, I think, the thoughtful conversation needs to revolve around what's going to happen 30 to 40 years from now based on policy decisions that we make today. We've moved clearly from a scarcity type of environment to now one of abundance. And I think that's why I'm glad to have this conversation today as we thoughtfully consider this policy.

I too, am concerned about what's going on on the national security on the challenge we face overseas. Looking around the world from Russia to Iran, many of the world's energy resources are in unstable regions. They're in oppressive dictatorships. I look at the top ten oil producers in the world, I should say, oil and liquids producers. It is great news that the U.S. is now number one surpassing Russia and Saudi Arabia. But you look at the list of the top ten, Russia, China, Iran, Iraq, then Saudi Arabia, UAE, Ku-

wait. These are in unstable parts of the world. Some of these are run by dictators.

I do believe the world should rely more on American-made energy instead of Russia and the Middle East.

Ms. Rosenberg, a question for you. How will increasing flexibility for crude oil exports strengthen our position on the Iran sanctions?

Ms. ROSENBERG. Well, thanks for the question.

So, right now we're actually at a critical moment in the negotiations, the P5+1 negotiations, with Iran and I believe some of your colleagues have heard testimony from Administration witnesses this morning in the Senate Foreign Relations Committee about the negotiations and the Iran sanctions.

Being able to make sure that the oil market is well supplied gives the United States the leverage to be able to impose sanctions on Iran, energy sanctions on Iran, with our allies which remove their oil from the market. The energy sanctions that the United States and our European allies imposed in 2012, that Carlos mentioned, took about a million and a half barrels of Iranian oil off the market.

The reason why that did not spike prices and politically and economically, the United States, our consumers and consumers globally and in our partner ally country nations were able to manage that was because the United States and Saudi Arabia as well were able to make a huge contribution in additional supply in order to keep the market relatively balanced at a period when there was really, historically high, and unprecedented levels of supply disruption in the market.

If there is a political instance where there is a need to impose further sanctions on Iran then being able to make a credible threat that the United States and its allies can impose further sanctions then the United States will need to be in a position of stoking or stimulating supply to the market. Lifting the crude export ban will help to do that.

Senator DAINES. Thank you. And, you know, it is a gift we're leaving for our children, grandchildren right now, I think, is this ability for the U.S. to move to the top of that producing list for oil and liquids here in the world. This, I think, truly will contribute not only to our own national security but to the stability and security of the entire world.

And it wasn't because of Washington, DC policies. It's the innovation. It's the power of the free markets that now we are in this position and why we're seeing gas at a lower level, saving the American average household $750 a year which I know a lot of Montanans are thankful for.

Mr. Lance, I'm happy to hear about your Montana roots. It's good to have another—you're a petroleum engineer. I was a chemical engineer. You're a Montana Tech. I'm an MSU Bobcat and thankful for your leadership on this important issue.

I also think we need to have the humility here in Congress that we don't understand all of the complexities of the supply chain, the light verses heavy, the production, the logistics in the delivery system as well as refining capacity. It's a complex equation that, I think, none of us up here would think we can manage that from

DC. But the free markets will figure that out with an abundance of oil.

I'd like to ask you how will increasing crude oil exports create more good paying jobs and decrease gas prices?

Mr. LANCE. Yes, again, Senator, you know, it's the basic premise that getting more crude oil into the open market will decrease the price of gasoline for our consumers.

One just brief, fact point that—proof point, that describes that.

Six weeks ago, many have said, and I think Mr. Drevna said that WTI and Brent were trading at the same price. I was buying gasoline in Houston for $1.80 a gallon. Since that time WTI price has increased $10 over U.S. prices. U.S. prices stayed the same, and now I'm paying $2.20 a gallon for gasoline in Houston, Texas.

So the fact is the consumer didn't win. The consumer saw the price of worldwide crude go up $10, and U.S. crude stayed exactly the same. You would have thought gasoline prices—if it was tied to U.S. prices would have stayed the same. They did not. Gasoline prices went up.

You just have to look at the market today and understand you see it happening in the market today for the consumer. This export ban, lifting that export ban, is a pro consumer policy for the United States. And that's how it reduces the gasoline price. And it's happening today. It can happen today if we were to export crude.

Senator DAINES. Right. thanks, Mr. Lance. I'm out of time.

The CHAIRMAN. Thank you, Senator Daines.

Senator Barrasso.

Senator BARRASSO. Thank you, Madam Chairman.

Mr. Lance, just following up on that because in your testimony you're calling on all policymakers to lift the ban on exporting crude oil from the United States. Since the export ban was established, Democrats and Republican Administrations have taken steps to ease the export ban.

I think in the 1980s Ronald Reagan issued determinations that crude oil exports to Canada for consumption in Canada are in our national interest. More recently the Obama Administration issued guidance that process condensate may be exported without a license. And last month, I along with Chairman Murkowski and others, called on the Administration to issue a determination that crude oil exports to Mexico for consumption in Mexico are in the national interest.

So I question, what other steps can the Administration take to relax the ban on crude oil exports?

Mr. LANCE. Yeah, thank you, Senator. I think, you know, certainly the Administration and the President could issue a national interest determination and eliminate the export ban for all of the domestic crude that we're producing in the United States. And as you quote, there's been recent examples of that, more recently President Clinton, who lifted the ban in Alaska.

GAO has studied that over the last four to five years and have indicated there was no change in pricing of gasoline on the West Coast, the primary market for Alaskan crude.

So yes, the Administration could do something to offset that.

You mentioned a few things that are helping. Lifting—allowing some of the condensates to be produced, but that's a very small

step in a large step that's needed to take to fix the problem we see coming.

Senator BARRASSO. So is there anything preventing the Administration from taking these steps today?

Mr. LANCE. Not that I'm aware of.

Senator BARRASSO. You were just talking a little bit with the previous question in terms of jobs and the economy. What kind of job losses would you expect to see if the Administration actually chooses to not act?

Mr. LANCE. Well, today I'd say for our company and for our industry you just have to look at what's happened since November as the price has fallen over 58, 60 percent. And it's exasperated by the fact that WTI is trading or U.S. crude is trading below global crude prices.

We've lost a thousand rigs in this business in the matter of three to four months. Each one of those rigs employs 150 to 180 people. And I think Senator Cassidy represented, you know, these are blue collar jobs. These are people coming out of high school that can get a $100,000 a year job. These are twice—they pay twice the average that the national—that the government looks at when they quote job figures.

So it's been real. It's happening today, and it's magnified by the fact that we can't export crude today.

Senator BARRASSO. Thanks.

Ms. Rosenberg, in your testimony you just visited about it or talked a bit about Iran. I was just going to go in the same area. You had said that U.S. crude exports will have the effect of reinforcing pressure on Russia's energy security, and it's certainly in line with key U.S. national security goals.

You go on to say that crude oil exports will also constitute an important strategic act of support for our allies in Europe who are more threatened by Russia and regional destabilization.

So could you expand a bit on your comments for the Committee specifically in regard to that part of the world?

Ms. ROSENBERG. Sure, thank you for the question. So if the United States is able to—policy makers lift the ban and the upstream industry produces more it claims a greater portion of the supply pool for the United States globally and will, as we've discussed, have an effect on pushing down the Brent price.

That will force—that will cause greater competition in Europe, for example. Russia, that is to say, Russia will have to compete a little harder in Europe in order to sell its crude there. It sells quite a lot of crude there and will therefore collect somewhat less revenue. So that's the revenue impact for them.

It's—I don't want to over sell this. I think it is modest, but it is strategically quite meaningful. And it looks to Europe and to Russia and to the international community like a show of support for our key allies in Europe that feel very threatened and very vulnerable towards—in their position at the receiving end of energy from Russia that has proved in the past to be a coercive supplier.

Senator BARRASSO. Mr. Pascual, would you like to weigh in on this at all?

Mr. PASCUAL. Yes, thank you, Senator.

When we saw each other at the Munich Security Conference a couple of years ago one of the big issues that was the focus of attention there was competition in energy and in particular, natural gas.

And the same analogy applies to crude oil. One of the most important things to eliminate regional monopolies and regional dominance is to give the assurance that consumers in any particular part of the world have access to global supplies and a competitive global market.

We've made progress in that in oil, but we have a situation right now where ironically the United States is the major producer that claims an exception to participating freely in those global markets. If we signal that we will participate by putting our crude oil onto that global market as we have been with natural gas, we're sending the signal to our allies, to our friends, to our customers, that we're going to compete to support a competitive environment that gives consumers maximum choice that allows them to diversify their resources and eliminates the dominance that any one particular supplier can have because of a regional position that it has with its neighbors.

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

The CHAIRMAN. Thank you, Senator Barrasso. Very interesting. Let's see. Senator Gardner.

Senator GARDNER. Thank you, Madam Chair for holding the hearing. Thanks to the witnesses for being here today.

I think it's important that we talk about the impact that this incredible energy revolution has had on our country. In Colorado alone that's more than 200,000 jobs have been created that's resulted in new roads and new schools. 30 percent of downtown Denver's office space is a building that's either owned or occupied or leased to by an energy company. And that's an incredible, incredible opportunity that we've had economically in this recent energy boon.

And so today's questions, very basic questions of supply and demand. What happens when you have too much supply? What happens when you have decreasing demand or not enough demand to drive investments in those increases of supply?

Those are all important economic questions. And I think Senator Daines said it well. Having to understand how that impacts our consumers is important.

I guess this hearing and this debate boils down to a very simple question. Learning today and going forward, will allowing oil exports further increase our national security and increase the economic benefits to our communities? It's a very simple question that we can boil this down to. Does it increase jobs both on and off the oil field? Does it impact price on and out of the oil industry? To consumers, what does it mean? And so it's important.

When we talk about increasing the Gross Domestic Product by one percent that's an incredible opportunity for this country, one percent according to the President's past budget documents, according to budget experts here in the Senate, a one percent increase in Gross Domestic Product could create one million jobs. That's putting one million people to work. That is an amazing economic growth engine that we have to consider.

Secretary Moniz talked about, "There are a lot issues in the energy space that deserve some new analysis and examination in the context of what is now an energy world that is no longer like the 1970s." That's a quote from Secretary Moniz.

So a very important issue. And we've talked a lot about the benefits of what could happen with exporting. We've talked about concerns with exporting.

But to Mr. Pascual, I guess the question I would have is what happens if we don't change this policy of the 1970s? What happens to jobs? What happens to the economy? What happens to both industry and non industry if we don't lift the policy?

Mr. PASCUAL. Senator, thank you. As a company that is headquartered in Denver, a company you visited, you've come to understand, I think and know the independence of our analysis and the scrutiny that we give to the work that we do. I think this brings us down to a very fundamental point. If we do not eliminate these variables, we give up opportunities and job creation and income creation. And the figures are quite startling.

In terms of the supply chain itself, under a very conservative base case analysis, the implication is that we lose 124,000 jobs in the supply chain.

If we look at economy wide what are the impacts that we would see, again, under a conservative scenario, 400,000 jobs economy wide.

If we look at the impact on GDP, the loss that we would see is $86 billion.

If we look at revenue to federal, state and local level taxes, the loss that we would see, the opportunity we are missing, is $1.3 trillion over the period of 2016 to 2030.

These are things that we have documented exhaustively. We were able to do it because we were also able to analyze, in detail, the productive capacity that's created by relaxing prices or giving a greater price boost as a result of exports.

We have the data that has allowed us to look at individual wells throughout the country to look at what the productive effect is. And just as importantly we have the input/output models that allows us to look at the entire impact through the supply chain.

I think a critical thing for Americans to understand and to recognize is that this isn't just about oil. It's looking at the entire service sector and equipment sector. Who produces the engines? Who produces the steel? Where does the concrete come from? Who are the workers that are involved in that process?

And that is not just an oil production issue. It's something that cuts across the entire United States. I think it's important that we have the opportunity to highlight that. So thank you for the opportunity to do so.

Senator GARDNER. Thank you, Mr. Pascual.

To Ms. Rosenberg, I think last year sitting on the House Energy and Commerce Committee we had testimony from one of Mr. Pascual's colleagues at IHS, Daniel Yergin, a Nobel prize winning economist, excuse me, a Pulitzer prize winning economist. He talked about how the fact that oil production in the United States had kept the Iranian sanctions from failing, and that's probably something that could be said of other instances. In your testimony

you talked about our foreign policy, how this could help our foreign policies. So I guess what I'm asking is this. We have been pushing forward on LNG export, expedited LNG export permits here. A lot of the significant reason behind that is to give our allies a chance to have an alternative to LNG other than Russian monopolies. Could the same be said of our petroleum exports?

Ms. ROSENBERG. Thank you for the question.

I——

Senator GARDNER. Crude oil, excuse me, crude oil exports.

Ms. ROSENBERG. Right. I think it's an analogous situation. They're different markets. They're of different sizes, different liquidity. They're supplied in different ways, pipeline versus other—ship, waterborne transport, et cetera.

But I think the analogy is right which is to say that the United States taking a greater share of the global supply pool, becoming a bigger exporter and also being a more important trading partner is beneficial for the markets, for efficiency, for pricing and also in sending a message of support on the importance of free trade and also the significance of our trading relationships, strategically with our partners, and what that means for our adversaries.

Senator GARDNER. Thank you. Thank you, Madam Chair.

The CHAIRMAN. Thank you, Senator Gardner. Senator Hoeven.

Senator HOEVEN. Thank you, Madam Chairman.

We're in a global battle for market share as to who produces oil and gas in this country, and we're duking it out with OPEC. And we're duking it out with Russia and Venezuela and other parts of the world.

We're in that competition right now when the world benchmark price for oil is Brent crude and that's $10 higher than the West Texas benchmark. So we, in essence, are fighting for market share here in America at a $10 disadvantage to our competitors. Anybody in any business could tell you that's a real problem.

And so, we're at risk for growing our oil and gas industry, our energy industry, in this country versus having it shrink if we don't address this oil export problem and soon.

So, Mr. Lance, I'd like you to address that issue in terms of jobs and energy production and economic growth here at home.

Mr.—could you pronounce your last name? I——

Mr. PASCUAL. Pascual.

Senator HOEVEN. Mr. Pascual, could you talk about it in terms of the importance to consumers because we have to inform consumers that this is something that is important for their benefit.

And then I'm going to turn to Mr.—and again I'm going to have to ask for pronunciation. Drevna?

Mr. DREVNA. Yes, sir.

Senator HOEVEN. What can we do, on the refining side, to better match up our domestic production of light and heavy so that you can process both and it works well for us in this country?

So those would be my three questions starting with Mr. Lance.

Mr. LANCE. Thank you, Senator. Yes, your basic premise around the competitive nature of the investment in this industry, given the fact that there today is a $10 differential between U.S. crude prices and global. It is correct. We are at a competitive disadvantage to our overseas competitors who are developing around the world at

higher prices than what we're getting for the product, that is of similar quality around the world, here in the U.S.

It's an interesting fact, you know, five years ago most of the investment in cash flow off our companies was going to investment in international growth. In the last five years that's completely turned around. Most of the investment in cash flow from international opportunities are coming back here to North America, back home for investment.

And—but it's being compounded by the fact that we have this differential and this competitive disadvantage with respect to the crude price that we're getting for U.S. crude.

The jobs that we will create, you've heard a number of quotes. I can give you one real quick, for every dollar difference we would reinvest that dollar back into this business. That dollar is about, you know, for an individual company, $100, $150 million. That's one rig. That's 180 to 200 jobs, just direct jobs.

Carlos has talked about what the indirect benefit that has. It is significant. And again, I point out that these are blue collar jobs that are very high paying in our industry. We offer benefits, both health and welfare benefits, along with retirement benefits that are really leading in this business. It has a significant impact.

Senator HOEVEN. So this is a major issue determining whether energy companies will invest billions here at home or overseas. Is that accurate?

Mr. LANCE. That's correct. If the difference continues you'll want to make Brent-based investments rather than WTI investments.

You're seeing that today with the dropoff in the rates of the investment contraction that this industry has had over the last year.

Senator HOEVEN. Mr. Pascual, our best case to the consumer why this is important and benefits the consumer?

Mr. PASCUAL. Senator, I think it's important to keep going after this issue as you're doing. It's been a consistent theme throughout this hearing, and the point that it fundamentally comes back to and the Chairman and Senator Cantwell put this on the table from the outset, is in the end consumers want to know what's going to happen at the pump.

At times it may seem counterintuitive that if you export a particular product it could actually contribute to a lower price of gasoline, but we've seen consistently that that's the case. And the reason that that's the case is the tie between international oil markets and how gasoline prices are determined. The key index is in the Brent crude price.

Mr. Lance gave an excellent example of how, just recently, we saw a virtual equivalence of U.S. benchmark prices and international prices. Since then we've seen an increase of the international price by about $10 a barrel. U.S. prices for gasoline have increased as a result of that even though the U.S. benchmark price has stayed low.

It's a lesson that has taken us time to learn, but we have a particular opportunity now with the abundance in capacity that we have in the United States to take advantage of this moment, to be able to liberalize the export of that product.

I would just say one final thing. If we look from the perspective of what sustains the benefits that we've had in the United States

from this energy abundance, and the reason we got here is because of investment, it's that investment that created jobs. It's that investment that created production.

And if we want to get back to that investment as quickly as possible, especially at a time when capital expenditures in the United States energy industry have been cut by 35 percent, the best signal you can give is to those producers and those who are financing energy that the capacity to export is to the widest, most competitive market possible. That's when it's going to give them the best long term return. That's what's going to get the American energy industry back to the innovation and productivity the fastest possible, and that's what's also going to maintain our energy security over time.

Senator HOEVEN. Thank you, Mr. Pascual. I'd like to commend you on your study. I think that was very helpful bringing this information out. But it is basic supply and demand, isn't it?

More investment generates more supply. More supply helps bring down Brent crude benchmark which is the world price. And again, that benefits our consumers.

Mr. PASCUAL. The basic principles of supply and demand hold. And earlier the question was raised as what is the best thing that we can do for future policy?

Well, we've learned over time. And here we have now hundreds of years of experience is that competition and markets is the best bet for our economic policy. It stimulates innovation. It stimulates productivity. It stimulates jobs.

But it's also the best thing for our national security because when you have companies in countries competing you avoid the kind of dominance that single players in that market can take.

And we have a special opportunity today. OPEC has gone into hibernation. We saw that on November 27th of last year. OPEC essentially said, we can't influence the international price of oil.

We have a chance now out of the United States and if we look at what's happening in Canada and the potential out of energy reform in Mexico, to see a North America that becomes a foundation for energy stability, globally. We have not had that opportunity. It is a historic moment that we have.

Senator HOEVEN. Thank you, Mr. Pascual.

I do have other questions, but I can come back, Madam Chairman, however you'd like to do it.

The CHAIRMAN. We're going to have one more quick round.

Senator HOEVEN. Okay.

The CHAIRMAN. So if you'd like to come back or stick around we'll go for round two. I really appreciate the discussion that we're having, particularly on the focus on national security. I think we all recognize that the world is a very, very volatile place right now. There is a lot of focus here in the Capitol on what is happening in Iran, and we've heard the discussion about the added oomph that sanctions are able to play when we've got more flexibility here.

I had a meeting yesterday with General Breedlove, who is head of the European Command, and it was a discussion about Arctic issues and the role that my state plays in that from a military perspective. It was an interesting discussion in talking with him. We

had a map that was entitled, Russia's Arctic Push. It details from a military perspective what we're seeing coming out of Russia.

And the conversation turned to some of the comments that have been coming out of late in Armed Services and Defense Appropriations about where the threats are right now. General Dempsey suggests that perhaps the biggest threat in front of us right now is not what we're seeing out of Iran, but what is potentially coming from Russia with a threat to European security.

It does cause us, I think, to look again, very critically, at how we deal with Mr. Putin. How we deal with these national security threats. We don't have the resources, the men and women, to put the boots on the ground to be able to do what we would like to do from a defense perspective, so we have to look to what other tools we have.

One of the tools that we have, clearly, is our resources. Our oil resources—it is such an important part of this discussion here. So again, I appreciate what we have heard there.

Mr. Pascual, I want to ask you a question and this will probably take you back to your time when you were with the Energy Envoy and there at the State Department with the Bureau of Energy Resources. The question to you is whether or not you heard from other nations, requests to the United States to open up our oil markets to them? The reason I ask is there wasn't too many years ago when we here in this country were crying foul when China was withholding critical minerals, rare Earth elements, that Japan, very desperately, wanted. And China in very much a power play said no, we're not going to be sending anything your way.

It causes me to wonder if other nations are viewing us that way that well, you're okay in encouraging us to get our oil from a coercive supplier, like Russia, but why wouldn't you be willing to help us out, United States? Can you lend me your experience in the position you were in whether you had any of those discussions with other countries?

Mr. PASCUAL. Chairman, thank you.

It was an issue that arose constantly. I'll give you a couple of examples.

In India when we were negotiating with India to diversify its energy resources to reduce its imports from Iran, one of the first questions they asked was where do I get the alternative supply? Where can I go? And why will not the United States put more oil on the international market and give us the opportunity to benefit from that? Or even if they aren't importing oil from the United States directly, to have the supply impact that we might have had through our exports so that they might be able to buy more cheaply, oil more cheaply, elsewhere.

In Turkey, again, very similar issues came up with the refiners. One of the questions they asked was where do we go for the alternative supply, and why are you putting us in a situation where we're going to have to become more dependent on Russian oil?

In Europe the issue consistently came up of why will not the United States open up its market for export and indeed it has become a central issue in the TTIP negotiations.

With China, again, another major question and there was a certain irony here. Here the United States over three decades had

been after China to eliminate its restrictions on the export of resources including rare Earths and when they were looking for more supplies internationally we had to say, we had restrictions on critical commodities in the United States.

It's those kinds of restrictions that, in the end, affect American credibility, and in the moment when we have to put through an important policy makes it much more difficult to negotiate.

We're able to succeed in these cases because there was an opportunity to show countries why diversification of their imports away from Iran was in their national security interest. It was not an easy negotiation. We would have served our interest by having much more flexibility.

The CHAIRMAN. Thank you. I appreciate the explanation there. Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chair.

Let's start with you, Mr. Warmann. As we discuss and look at oil exports I start thinking about how different parts of the country might be affected and whether the Pacific Northwest or New England, might become more dependent on imported oil or gasoline diesel or home heating oil if the exports were legal. Do you see that kind of shift?

Mr. WARMANN. You do see some sort of shift. One of the questions that we come back to is the form of export. You can exert the same efforts and give the people what they want if you do it in a form of products, gasoline and diesel. If you do it in the form of the raw product you don't capture that GDP, the jobs and the other things within America that we're perfectly capable of.

So you have the same leverage over the countries, and Europe needs the refined products. Other people need refined products.

If you just export the crude, you lose all that value in the value chain. You lose those jobs. It goes overseas, and we're talking about OPEC. The exports go into a market that is controlled by OPEC, and I disagree that OPEC is in hibernation. It's their choice to open up the production. It's their choice to lower their contract price in order to put pressure on Russia to bring other OPEC cheaters in line and you also have to pull in—put some rationalization on the unconventional exploration going on within the U.S. That is a choice they are making. That is the control they're exerting on the market, and they continue to do that.

Coming back to some of these issues about the pricing. One of the things that is depressing the spot price right now, making such a difference, is there's a cotangoed plan of market. It's a trader. You know, traders manipulate the market, to a certain extent.

The price of oil in the futures market is higher than it is now. Even us, we have rented storage and are storing oil. With all this—oil the current spot price will go—is going down because of the amounts of oil.

But if you look at the future, the Brent, WTI tightens back up to about $6, $7, and that is all in transportation. And it comes back to what you're saying, location differential.

The benchmark of WTI is in the middle of the continent. The benchmark of Brent is in the North Sea. You have transportation differentials so it means different things to different people.

On the East Coast there should be a six and a half cent—dollar per barrel differential. On the West Coast it has everything to do with being able to bring in foreign material verses the real cost from the Bakken and tying that together. And the thing about products is you actually are in a free market that's not controlled by OPEC. It's not controlled by anybody, and we can be more open to exert our influence in that form.

Senator CANTWELL. I think we have three New Englanders on this Committee. We already know they pay outrageous home heating oil prices, so if we got into this situation where one part of the United States basically had to rely more on imports and the other part of the United States had that capacity to benefit, as you were saying, from the Gulf, then we would be in two different scenarios here. So I think it's something to think about as we think about this policy.

Thank you, Madam Chair.

The CHAIRMAN. Senator Daines.

Senator DAINES. Thank you, Madam Chair.

Once upon a time I was a manufacturing guy. I ran operations for 12 years for Proctor and Gamble. There was an Israeli physicist named Eliyahu Moshe Goldratt who wrote a book called, "The Goal, Looking at the Theory of Constraints." I think as we look at this very complicated equation from production to delivery, refining, and ultimately to the gas pump is something that probably none of us are qualified to probably make an assessment. None of us saw 40 years ago when these policies were put in place what would happen with this renaissance and revolution, certainly in the petroleum production industry.

With that as a backdrop I want to look at this constraint right now on refining, and perhaps Mr. Drevna, looking at some of these regulations, for example, from the EPA. How are the EPA ozone national ambient air quality standards impacting your ability to expand capacity and/or operate?

Mr. DREVNA. Well Senator, if you look at the proposal that EPA has out and the one we just commented on yesterday, I think it was yesterday we submitted our comments. If the current standard of 0.75 goes down to 0.6 or up to 0.7 what they were talking, what the proposals are. A lot of this conversation you're hearing here today is moot because you're not going to be able to burn it here. You're not going to be able to develop it here. You're not going to be able to transport it here. You're not going to be able to fly an airplane out of a single engine fuel somewhere in Montana or Wyoming or North Dakota, because they're going to be in non attainment.

So if we want to talk about energy and national security and that's a great thing, I can agree with about 75 percent of what Pascual has said. You've got to look at all the parameters that are involved in energy development and energy use and energy security.

So, yes, the regulate—we have a built in regulatory kind of skein that we work with with the new system, we're lowering sulfur and gasoline. We're lowering this. We're lowering that. We're lowering CO_2 emissions.

Pretty soon we keep lowering it and there's going to be nothing left to lower.

Senator DAINES. Well, project this for a moment. These regulations go in place. We continue this amazing renaissance revolution of American oil production. The world's leading oil and liquids producer now in the world.

We keep moving this up what happens now in this overall equation to refining capacity with these regulations? And what does that mean for the consumer?

Mr. DREVNA. You know, we are right now one of—very globally competitive in the U.S. refining sector. We are the most sophisticated, advanced refinery system in the world. We're able to take, you know, to do it very efficiently, do it very effectively with a lot of blue collar jobs that both Pascual and Jeff have talked about.

It will put a grinding halt to it. We might as well export it because we can't be—we won't be able to use it here.

And so it's—this is what I said in my opening statement and our testimony. Can we, for once, look back at the 70s and say, okay? What was happening there? And what did we do to respond?

You know, we took an Arab oil embargo which really, in essence, could have been just a nuisance. And what did we do, we put price controls on. We limited production, and we turned a nuisance into a dog gone near catastrophe.

So then we, our energy policy was, the next time around, well oh, synthetic fuels corporation and don't stock those Christmas lights up.

For crying out loud, can we get an energy policy based upon the abundance that we have now but take in all the parameters whether it's our environmental regulations, the Jones Act, renewable fuel standard? Look at them holistically and come up with something that makes sense, not only for the upstream producers——

Senator DAINES. Yeah——

Mr. DREVNA. But for the economy and for consumers.

Senator DAINES. Again, we're debating a policy that's four decades old. Going forward 40 years, that's what, ten Presidential elections away, 40 years from now what will we have to look at here as we look at this very complex supply chain? And you know, Washington DC is trying to figure out a way to manage that.

Mr. DREVNA. Well, we——

Senator DAINES. I'll put my bet on the free markets.

Mr. DREVNA. That's exactly my point.

Senator DAINES. Yeah.

Mr. DREVNA. Let's look at the total free market.

Senator DAINES. Right.

Mr. DREVNA. And just not look at silos. We're going to do a free market here, but we're not going to do it over here.

Senator DAINES. Well, one more question for Mr. Warmann. Does Monroe Energy plan to invest to expand your refinery to process more crude?

Mr. WARMANN. We have been. We have invested well over $100 million in being able to take in light oil as well as partnered with a group that has invested almost $200 million in getting the rail cars and unloading them.

And I agree, the transportation is one thing that we need to improve upon. Pipelines, things along those lines definitely make markets more efficient and take some of this discrepancy between pricing out and make heating, home heating oil, in one area more similarly priced to another.

Right now we are trying to, whether we export it or whether we use it in refineries which is preferable. You still have some antiquated transportation systems that need improvement, and that goes back to what Mr. Drevna is saying, you have to look at the whole thing, holistically, the transportation, the supply, the displacements, where is the demand for it, the environmental regulations that go with it.

One thing that keeps us from running the stabilizers with the producers, and Mr. Lance can speak to this. One thing that keeps us from running those stabilizers to reduce the rvp so much is there's no place to go with that particular natural gas or product. There's no way to export it so you have to burn it, but there's limits on what you can burn.

So you're sitting here balanced trying to get production up, trying to get the rvp lower. But you're also limited on this side by how much you can burn. So what do you do with that? What do you do with that product?

You've got to get it out of there somehow, so you either have to transport it via railcar or you have to burn it and you're limited on burnings. So we're——

Senator DAINES. Thank you. Thanks, Madam Chair.

Mr. WARMANN. Yeah.

The CHAIRMAN. Thank you, Senator Daines. Senator Hirono.

Senator HIRONO. Thank you, Madam Chair.

I wanted to refer to some testimony that was provided to the Armed Services Committee just today by General Paul Selva, United States Air Force, who is the Commander of the United States Transportation Command, wherein he acknowledged once again the importance of the Jones Act.

It is very clear as a member of the Armed Services Committee that keeping our ship building capacity strong is very important to our national security. That's what it comes down to. So Mr. Devon, Devra?

Mr. DREVNA. Drevna.

Senator HIRONO. Drevna, sorry. You raised some concerns in your testimony about the Jones Act containing that it raises the price of shipping. But of course we all know that the Jones Act requires these U.S. ships to comply with safety, environmental and minimum wage rules that other countries do not impose.

Knowing how our military views the Jones Act as part and parcel of keeping a strong shipbuilding capacity and industrial base and that arena and how important that is, I'd like to just ask if any of the rest of the panel members disagree with General Paul Selva's statement wherein he said, "Without the contribution that the Jones Act brings to the support of our industry there is a direct threat to national defense." Do any of you disagree with that statement?

Mr. DREVNA. I'm looking at the Jones Act in commerce, and we're talking about national security. Here we're talking about shipping product to foreign nations so they can be nationally secure.

We, you know, I'm not going to disagree with the view of the military on what they believe they need, but there's a major difference between the military and commerce. And in commerce, as the Chair person said earlier, we want to make sure and the Ranking Member. We want to make sure that what we do here, what you do here in the Senate and anywhere else, doesn't negatively impact the consumer. I don't think it has to be an all or nothing.

You mentioned the fact that or you mentioned that we have strict shipping standards. Well, the U.S. Coast Guard is not about to let any ship come in from a foreign port that doesn't meet our standards or leave our country shipping out oil but going to a foreign port that doesn't meet our standards.

So again, let's look at the barriers to free trade. What we need to do for energy and national security. And it's not ever, Senator, an either or an or. I think there's enough of a, you know, there's wiggle room in between the two and you can make policies that keep the policy, that keep the country safe, to keep the country strong and yet, doesn't penalize the consumer or put refineries, some refineries out of business.

Senator HIRONO. Well, I understand the argument that you're making, but I represent a state that is 90 percent dependent on shipping and the Jones Act does provide us with that reliable service, not to mention that it is the Jones Act that makes sure that in times of national need that there are ships that are available to that, to meet that contingency. So I don't think it's that easy to separate out the commerce side and Jones Act.

You do mention you believe the Jones Act does result in higher, probably result, in higher costs, and I would like to see some of the factual evidence of that because I do have familiarity with the arguments that the Jones Act makes consumer prices higher, and that has generally been not supported by evidence.

Do any of the rest of you want to weigh in at all? I know that Mr. Drevna has concerns about the Jones Act, and I'm wondering whether the rest of you also see a connection between exporting crude oil and the Jones Act?

Mr. WARMANN. I can tell you, Senator, from direct experience. When we receive a foreign cargo we have to have Homeland Security. It's a point of import. We have to allow the foreign workers to offload.

The other thing is if it's from Africa I now have to put in medical protocols to prevent things like Ebola and other things from importing into the ports.

So there's a lot of effort that we have to go through in handling foreign ships verses American ships, and it comes back to American jobs. And I can personally tell you, having been in Philadelphia, the Philadelphia port was a ghost town until this renaissance. And now they have backlogs in supplies and jobs and demand for steel and everything else that—for years. They have five, six years of backlog as well as San Diego. You see ports in Mississippi and Alabama increasing their capacity as well as their backlogs. This is all American jobs all driven from this renaissance.

And another transportation issue that needs to collectively be looked at from a holistic standpoint when we look at energy policy. I totally agree with you. I think that the Jones Act provides us a lot of security benefits.

I would hate to think of an Iranian ship that has LNG that's sitting in the middle of St. Louis' port, the port harbor there. The things that could be done with that are astronomical. To me, that should cause a great amount of national security issues. So that's just some of the things that you can imagine.

Senator HIRONO. Thank you, Madam Chair.

The CHAIRMAN. Thank you. Senator Hoeven.

Senator HOEVEN. Mr. Lance, would you like to respond to that last question?

Mr. LANCE. I would, just quickly. We're a large Jones Act shipper, so our Alaskan trade, our polar tanker trade, is a Jones Act shippers that goes to the West Coast and do supply your state in Hawaii with crude from Alaska. So we found that to be a very effective tool to continue to do that.

And some of Senator Cantwell's earlier concerns, when President Clinton lifted the export ban from Alaska, we were able to ship and the GAO has looked at that repeatedly and there has been no impact to West Coast gas prices, California, Washington and Oregon as we were shipping crude to other places outside of the United States. Another proof point relative to exporting does not increase gasoline prices for the consumer. We have a living example of that that's been occurring since the 80s in the Alaskan trade.

Senator HOEVEN. Thank you, Mr. Lance.

Mr. Drevna, would you agree it's better that we produce more energy in this country rather than less? It's three questions for you. Would you agree that it's better to produce more energy here at home rather than less? Would you agree that we have an imbalance between the amount of light and heavy crude that we produce and the amount of light and heavy our refineries can actually refine, refining capacity? And if you agree with both of those, which I think you probably will, but you can certainly say what you think. What can we do to match up our refining capacity? How can we help refiners better match the mix of light and heavy we produce here at home?

What can we do to help you? I mean, regulation, transportation, investment incentives, what helps?

Mr. DREVNA. Well the answer to your first question is an unequivocal, yes.

Senator HOEVEN. Good.

Mr. DREVNA. Absolutely. To answer your second question is between, as I said in my written and oral statement, between now and 2016 we, as refiners, can handle that additional 730 barrels a day with investments already being made and will have been made.

Going forward, and again, as I said we're not opposed as an association and as a total industry, we're not opposed to the lifting of the ban.

What can you do post say '16? We've got a fairly good transportation delivery system going north/south in the country. We don't have that good of a transportation system going east/west. This is

why the advent of the Bakken crude and shipping it via rail. But even going north/south——

Senator HOEVEN. So you're saying we need pipelines?

Mr. DREVNA. Yes, sir.

Senator HOEVEN. And transportation.

Mr. DREVNA. Yes, sir.

Senator HOEVEN. I just want to make sure. More pipelines?

Mr. DREVNA. Well, it's the Keystone XL pipeline that has sort of become a metaphor for what we don't have in this country.

Senator HOEVEN. But would you say part of producing more energy in this country means we have to have the energy infrastructure to move it safely and dependably, meaning the right mix of pipeline, rail and roads?

Mr. DREVNA. Absolutely, Senator, and that is something if you look at the vast increase in production that ConocoPhillips and others have done. It's been done by American ingenuity. It hasn't been done by government Fiat.

Senator HOEVEN. Private investment.

Mr. DREVNA. Turn us loose. Let us do the job environmentally safe and safety in all around. Just turn us loose.

Senator HOEVEN. It sounds to me like you're right on this, but what can we do to help the refineries do more in terms of investment at the refineries so they can process light or heavy?

Mr. DREVNA. They're doing it. They're doing it. Again, it's the free market, but we have to, again, I don't want to be——

Senator HOEVEN. Well, you're starting to get at it with the regulation. I'm just looking for any specifics that we can look at in terms of legislation, just like we're working on oil export.

Are there other specifics that we should be looking at in legislation?

Mr. DREVNA. Well——

Senator HOEVEN. Transportation, obviously.

Mr. DREVNA. Transportation is the big one. We've got to get rid of these bottlenecks. You've got to get these pipelines permitted.

You've got, I mean, there's a lot going on out there that folks don't really understand or know about, about how the pipelines have done some great things over the past three, four, five years. We need to do more. We need to get the permitting done. We need access.

If you want to increase energy security we need access on federal lands. Gee, think about what would have happened over the past four or five years if all of this stuff that we've been producing would have been on federal lands. We wouldn't be producing it. We wouldn't even be having this conversation. We'd be still worried about 1975.

Senator HOEVEN. Thank you, Mr. Drevna. I really appreciate it.

And of course, you remember, I'm sure of his association, Mr. Warmann, but I guess if there's something else you'd want to add I should give you the chance.

Mr. WARMANN. We are strangle held by the amount of transportation we're currently trying to build out. Transportation projects usually take several years.

We currently run about 60 percent domestic. We'd like to increase that even more so. The balance coming from some of our

neighbors to the north and the south, but that transportation is an issue both in the current reliability of the existing systems as well as the permitting of new systems.

So that is one thing from a holistic standpoint we need to look at, and if in the national interest we need to put in pipelines, we need to put in pipelines. Everybody has a two inch pipeline hooked to their house if they have natural gas. There should be no problem just hold us accountable. We will build it. We will maintain it. There's no incentive for us not to do it responsibly.

The last thing I want to do is lose product out of a pipeline or out of my refinery. That's lost profit. That's lost money to me, and we're working on very slim margins, a tenth of what our upstream friends are doing on a per barrel basis. So every little drop means everything to us.

There's no incentive for us to do anything other than what is perfectly, environmentally compliant and friendly and get the product from one place to another effectively.

Senator HOEVEN. Thank you. I'd like to thank all of you, and I appreciate your responses.

The CHAIRMAN. Thank you, Senator Hoeven.

We have a vote that has been called. So you are spared from subsequent rounds.

I'm going to ask one quick follow up question because I've seen this back and forth here where it's been stated by the folks at this end of the table that we've got more oil than our refineries can accommodate, and this end of the table says, we can handle all of the capacity.

So to you, Mr. Lance, I'm not going to ask for confidential business information here, but just generally as a producer, have you been in a situation where you've tried to sell light crude to a refiner and basically been turned away?

Mr. LANCE. Yes, Senator. In fact just in the last month we've tendered cargoes to even Monroe Energy and have been told not only can we not take it, we're unwilling to take it. We cannot take it. We cannot process the crude that you've put into the marketplace.

So that's happening today, and so I would dispute the fact that maybe the refineries will, over time, be able to make the investments to take this crude. The sure fact that we're trading at a $10 discount today demonstrates the fact that they cannot. Now they're in refineries. They're in turn around season.

The CHAIRMAN. Right.

Mr. LANCE. They're doing some things today. This occurred before the contango in the curve started, so Cushing inventories were building before the traders got involved with the contango. This was an issue that started in the last part of last year. It has continued on through the first part of this year and has exaggerated the drop in the oil price.

So yes, it's happening today. Refineries cannot take the produce that we're producing today, and in fact my company has tendered that and been told no. Not even will we take it at a steep discount, we are unable to take it completely.

The CHAIRMAN. Well and I think this is where we sit with this conversation about alignment, and got into a lot of discussion when

we had the Keystone XL pipeline in front of us. The reason why it was necessary to have this pipeline coming down and just the alignment or misalignment of where we are right now with the product coming out of different parts of the country that is effectively different in terms of what our refineries can handle.

So again, this has been a great conversation. I could spend the rest of the afternoon with you, but again, you've been saved by the vote.

In addition to thanking you all for giving us your time here this morning, I want to thank you for continuing this conversation with us because I think, as a Committee, we are engaged to do just that.

I thought that Senator Gardner summed it up in a pretty tight manner when he said what we're trying to do here as a Committee is to focus on this as a policy and assess from a national security perspective which, I believe, is critical but at the same time making sure that we're looking out for the economic well being of the people around the country. The economic well being is making sure that this resource is available to them at an affordable price, that the jobs that come with it across the country are there and recognized.

But again, what we've heard today I think has been good. I think it's been constructive and know that we will continue this discussion further.

And with that I'd like to give my colleague the final word.

Senator CANTWELL. I know we have a vote, so I'll just be short. I would just sum up my thoughts on the last set of comments. If you want a pipeline, play by the rules. That is, adhere to the environmental laws that are on the books and don't try to skirt around them.

If you want to transport this on oil trains, make sure it's safe.

The issue about whether they have a place to strip out natural gas is not my problem. My obligation to the people in the State of Washington is to make sure they are safe and secure, and right now we don't have enough standards in place to make sure that is happening.

So if we want to continue this discussion of more oil trains than it better be about standards. I'll look forward to my colleagues joining me on the Floor when they have a chance to vote for that kind of standard and see if they want to make trains more secure or not.

Third, I think we probably will, at some point in time, get into the discussion about federal lands. I know, Mr. Drevna, you were saying let's let them go and drill more on federal lands.

The resource extraction from our federal lands is not paying their fair share to the American taxpayer, and you will hear more from us on that in the future.

So, thank you, Madam Chair, and I do appreciate the broad discussion. I think it's going to be great to have this debate, not just in this Committee, but on the Floor of the United States Senate. Thank you.

The CHAIRMAN. I look forward to it. Thank you all.

We stand adjourned.

[Whereupon, at 12:13 p.m., the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

U.S. Senate Committee on Energy and Natural Resources
March 19, 2015 Hearing: U.S. Crude Oil Export Policy

Responses from Mr. Carlos Pascual to Questions for the Record
Submitted by Senator Jeff Flake

Question 1: In your testimony you highlight the international effects, particularly in Western Europe, of increased domestic natural gas production. Earlier this year before this committee Mr. Koranyi of the Atlantic Council testified that a change in LNG export policy could have positive effects on our allies who rely on Russian natural gas, even before one molecule of gas reaches European shores. He explained that just the potential to have additional U.S. natural gas on the market will change natural gas user's choices of supplier. Does this effect also apply in crude oil export policy? Are there international effects that you would expect to see immediately after a change in policy, before one drop of U.S. crude reaches European ports?

Answer 1: Elimination of the crude oil export ban will have an immediate effect on U.S. relations with Russia and China: it will eliminate any precedent of U.S. actions to restrict exports of natural resources to other countries on grounds of national security or domestic economic concerns. With Russia this will eliminate the risk that Russia can cite U.S. actions to withhold exports, based on nationally determined interests, in order to justify possible Russian actions to withhold exports and exercise geopolitical pressure on its customers. With China, eliminating the export ban will reinforce the U.S.-decades long efforts under the GATT and WTO to oppose China's restrictions on the export of commodities such as rare earths. The global oil market is not completely analogous to global gas trade. Global oil markets are highly competitive due to the ability to readily transport commodities across regions. Transit capacity for natural gas across regions is more expensive than moving oil, and there are extensive gaps in infrastructure. These greater constraints on the movement of natural gas make the U.S. ban on oil exports even more problematic, as the United States is the only major oil producer with such as a ban, and we provide the precedent for others to follow us, such as a potential Russian ban on gas sales to Europe, that would be against the national interests of the United States and our Allies.

Question 2: People have expressed concerns that because lifting the crude export ban would result in higher input costs for domestic refineries, Americans would see a resulting increase in gas prices. Your written testimony explains that due to the connections between the price of Brent crude and U.S. gasoline prices, lifting the crude export ban would cause U.S. gasoline prices to fall. There are currently large regional and state-to-state variations in gasoline prices. Will the predicted decrease in gasoline prices be felt uniformly across the U.S.? Do you foresee any region or state experiencing an increase in gasoline prices as a result of lifting the crude export ban?

Answer 2: Variations in the price of gasoline from global, region-to-region, and US state-to-state are driven by three factors: location, quality, and degree of government taxation or subsidy. These three variables often produce pricing differences among countries, regions and states.

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Most motorists think of gasoline as a uniform product, however significant quality differences exist between grades, which vary seasonally, both in the United States and throughout the world. This quality difference between gasoline grades can be reflected in terms of ignition properties (octane), emissions properties (sulfur, volatility, reformulation), and adulterant properties (lead, oxygenates, biofuels). Quality specifications influence pricing variations between regions in that they alter the cost to manufacture gasoline. Costs can increase or decrease depending on the level of processing required to meet the set specifications. Quality also influences regional price variability in that it has the ability to expand or contract the supply of a given grade of gasoline. The more regionally specific the required properties become, the less likely it is that supply can be provided from outside of that region.

California's very specific formulation for gasoline illustrates how availability and prices can vary across states. California's formulation is so specific that it is typically produced only by the refineries that operate in the state, limiting the availability and level of surplus supply. If heavy maintenance or unforeseen refinery shutdowns further contract the availability of supply, California can find itself short of supply with a corresponding price increase. The price increase is necessary to incentivize refiners from other regions, who do not ordinarily produce California specific gasoline, to change their gasoline formulation and ship that product to California.

Location influences the regional variations in gasoline price in that it can affect both the infrastructure requirements or efficiency of moving gasoline to and from a given market. Similar to quality, location can shrink or expand the supply of gasoline in a given market. Geographically isolated markets can have large price variations from other markets in that they can be structurally or seasonally over or undersupplied. The degree of location-specific price increase or decrease is a function of the geographic distance to the next source of supply, the mode of transportation (pipe, tanker, barge, train, truck), and the price needed to attract supply from neighboring markets.

Taxes and subsidies affect regional price variability as they either directly add or subtract costs experienced by end-use consumers.

The lifting of the crude export ban fundamentally adds supply to the global light crude market and decreases the price of the Brent benchmark for light crude oil, the primary raw material used in the production of gasoline. A lower Brent benchmark price will decrease the global price of gasoline. With all primary gasoline markets connected through trade, lifting the export ban will uniformly decrease the underlying price of gasoline both globally and across the United States. This common underlying price does not exclude price differences due to gasoline quality, location, and taxation policy.

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Responses from Mr. Jeff Warmann to Questions for the Record
Submitted by Senator Al Franken

Question 1: I am very concerned about the safety of trains carrying Bakken crude oil through my state of Minnesota, especially in light of recent explosions all over North America. So far, most of the focus has been on the safety of tank cars carrying the oil, which is an extremely important issue. But I also believe that the oil itself should be made safer before it is shipped. One way to make the Bakken crude oil less volatile is to remove the natural gas liquids at the well-head, through an oil conditioning process.

- Do you think that oil conditioning – in conjunction with safer tank cars and new safety measures – is a cost-effective way to make the crude oil safer for transport by rail, particularly given the fact that the vast majority of Bakken well sites already have the necessary conditioning equipment in place?
- From a refiner's perspective, what would be the benefits of receiving the more uniform crude oil that would be produced by conditioning at the well-head?
- Would a more extensive refining process, such as oil stabilization, produce a safer product, if it is completed before the crude oil is loaded onto oil tank cars?

Answer: I am concerned about the recent rail incidents as well. Approximately 60 to 70 trains a week carry crude oil from the Bakken region and travel through Pennsylvania, including deliveries to our Trainer refinery. I believe the solution to the rail accidents will require the Administration, Congress, and the rail industry to work together to reach solutions. As you know, the oil industry is already investing over $4 billion in sturdier railcars, but ultimately the largest safety enhancement will be on the rails themselves – making sure that whatever is on the tracks – be it crude oil, ethanol, or any other hazardous material – stays on the tracks.

Rail car breach, explosion, and fire are *symptoms* of derailments, not *the cause* of them. Please do not misunderstand me - I believe that reinforced railcars with better braking systems and lower volatility of transported crude oil all have a significant part to play, but in a much bigger, more holistic solution.

The Federal Railroad Administration's own data show that there were over 1,100 Class 1 derailments in 2014, averaging more than three each day. Six of those 1,100 derailments involved the transport of crude oil.

The leading cause of these derailments is poor track conditions. I believe a more robust track integrity and inspection program, coupled with incentives to both improve the gauge of the rails and install leading-edge safety and fail-safe operations control systems, would have a significant impact on reducing derailments of any kind.

Reducing the volatility of the crude certainly benefits a refiner. However, if your question is directed at the volatility of Bakken crude, the fact is, there is no significant difference in volatility between Bakken and other similar crudes.

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The complicating factors to Bakken crude volatility are the limitations and reductions on flaring light ends by the North Dakota Industrial Commission (NDIC). The infrastructure for moving by-products from crude oil production from the region is not built out yet; there certainly is not enough rail or pipeline infrastructure to cost-effectively compress and move the light ends to market. Requiring more light ends to be removed from the crude will increase the amount of light ends flaring. Limiting light-ends flaring will cause the allowable production of crude to be limited.

The safest, long-term solution is to construct more interstate pipelines, as it is undisputed that pipelines are the safest means of transport for crude and petroleum products. Such a solution resolves all of these concerns: rail safety, volatility, rail infrastructure, flaring light ends, etc.

Question 2: The energy security of the United States is critical. But even today, we import approximately 30 percent of our daily crude oil to meet our energy needs. The number-one source of these imports is from OPEC nations. Such dependence on foreign oil is a threat to our energy security. If we start exporting some of our crude oil, are we going to have to make up the difference by importing more oil from OPEC? Some of my colleagues have stressed the importance of free trade in the context of oil exports. But with OPEC controlling so much of the market, is there such a thing as "free trade" when it comes to crude oil?

Answer: Your analysis of the situation is correct. If we export crude oil, the U.S. will have to import more foreign oil. By repealing the law on crude oil exports, crude oil will be shifted out of a competitive market into a less competitive global market controlled by a few oil-producing states with highly volatile (and some anti-American) regimes leading them.

The international crude oil market is not a true "free market." The long-term, well-documented level of control over crude oil markets exhibited by national oil companies and the OPEC cartel virtually eliminates any claim that such markets are free or open. OPEC exists to control market share and crude oil prices, which it recently demonstrated by allowing the price of oil to tumble by over 50 percent. Right now OPEC member countries produce about 40 percent of the world's crude oil, and OPEC's oil exports represent approximately 60 percent of the total petroleum traded internationally. OPEC's control of the market eliminates the notion of "free trade."

Simply put, when an oil producer announces a significant new oil field discovery, the world oil market barely moves. But if the Saudi Arabian Oil Minister makes a simple comment, the oil price can move several dollars a barrel. Again, will our potential exports of crude oil disrupt OPEC control? The answer is a resounding no. Exporting crude will just tie America more directly to the oil market price that OPEC controls.

As a result of increased domestic production, we are importing less foreign crude. That means we are affecting demand for world crude, so we are impacting the global supply/demand picture. Crude prices have tumbled as a result without the need for exports.

Repeal of current law would mean domestic crude oil producers will have the ability to ship oil to refineries in Europe at a lower cost compared to delivering the same oil to refineries located

on the East Coast of the United States. This would render domestic refineries, particularly in the Northeast, unable to compete with foreign refineries. Put simply, lifting the ban will benefit European refinery workers at the expense of thousands of American jobs while endangering U.S. refining capacity that is critical to our national security. Energy security is not just about producing enough crude oil for the nation's needs, but also about maintaining the domestic refining capability to transform that feedstock into the products we consume here in America. Losing American refining capacity would take us further away from energy security.

Such an outcome would be devastating to our balance of trade. We would export more crude, export less finished petroleum product (at a much higher price per barrel), and we would import more foreign crude and foreign-refined product.

There is no need to send U.S. crude abroad because refiners here in the United States have the capacity to handle the increased domestic production. An analysis done last year by energy experts Baker & O'Brien conclusively demonstrated that the U.S. refining industry will invest in capacity to absorb an additional 3.1 to 4.3 million barrels per day of domestic oil. This estimate exceeds the Energy Information Administration's highest forecast for incremental oil production for the remainder of this decade. AFPM's recent capacity study supports the conclusions of the Baker & O'Brien study. U.S. refiners are expanding domestic crude processing capacity, while displacing imports and simultaneously benefiting American consumers.

I would like to clarify the record and address the claim made by Mr. Ryan Lance about Monroe turning down a Conoco shipment and not having enough capacity to refine his offered crude shipment. Monroe and Conoco have never entered into an agreement in which Monroe could turn down delivery. Monroe has entered into key U.S. crude oil supply deals with other companies, in which we watch the quality of the oil to ensure the crude quality matches the price we agreed to pay. Pursuant to the terms of our contract with suppliers, Monroe is able to reject crude supply that does not conform to our contract specifications. Mr. Lance's claims are false; Monroe never turned down a Conoco shipment because Monroe does not have a contract with Conoco. In addition, Monroe has never declined U.S. produced crude oil based on some "lack of capacity".

I would also like to address the issue of the differential between the West Texas Intermediate (WTI) benchmark crude price and the Brent benchmark crude price. If you look at the posted price for WTI versus Brent, you will see, of course, that Brent is at a higher price than WTI. If you stop right there you miss a critical element to the differential that producers deliberately avoid.

There is a logistics cost to bring WTI-priced oil to the market. Oil prices trade at levels of parity on *a delivered basis* to refineries. When a refiner considers purchasing oil for processing, the cost of logistics must be considered. Those logistics costs necessarily depress WTI in relation to Brent.
Brent currently trades at a $6 premium compared with WTI because there is a significant cost differential for WTI to get to the U.S. East Coast, compared to an EQUALLY PRICED barrel of Brent to the U.S. East Coast.

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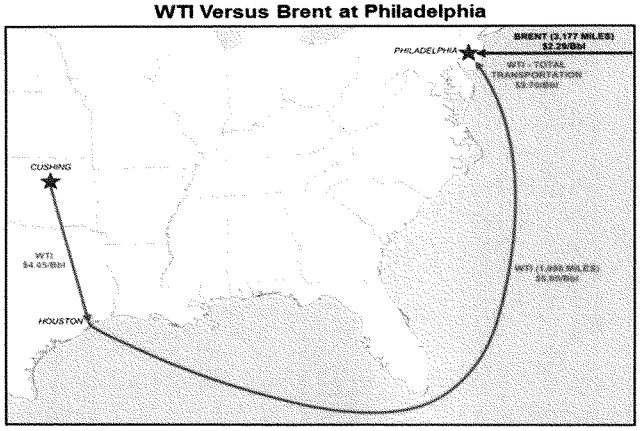
March 19, 2015 Hearing: U.S. Crude Oil Export Policy

WTI Versus Brent at Philadelphia



WTI at Philadelphia = WTI Cushing + $4.05/Bbl Pipeline Tariff + $5.65/Bbl Shipping Cost
WTI at Philadelphia = WTI Cushing + $9.70/Bbl

Brent at Philadelphia = Brent ARA + $2.29/Bbl Shipping Cost
Brent at Philadelphia = Brent ARA + $2.29/Bbl

WTI at Philadelphia = Brent at Philadelphia + $7.41/Bbl

Forward Curve on Brent / WTI Spread is $6.00/Bbl to $7.00/Bbl

The producers like to paint a picture of greedy refineries making a killing off of the WTI/Brent differential. This has no basis in fact. Unlike upstream companies that function on a $10 to $15 per barrel net margin (even with the steep discounts that have been testified to during the recent hearings); U.S. East Coast refiners function on margins less than 10% of that, $1 to $2 per barrel net margins during the periods of time that the refiners were supposedly reaping the rewards of this highly discounted U.S. domestic crude oil. This is why any legislation that is enacted that varies the price of crude several dollars will substantially harm the American refining industry, especially on the East Coast.

Statement of the
Association of American Railroads
in Response to Testimony before the
Senate Committee on Energy and Natural Resources on
United States Crude Export Policy

March 19, 2015

The Association of American Railroads submits the following written statement in connection with the Senate Energy Committee hearing on March 19, 2015 on United States Crude Export Policy. In particular, our statement corrects the record regarding statements made at the hearing concerning the rail sector's lack of commitment and actions to address safety concerns.

Nothing could be further from the truth.

The freight rail industry shares the public's deep interest and concern regarding the safe movement of crude oil by rail, and it's important to set the record straight as far as all that is being done to safely move crude oil trains. Railroads follow the most stringent safety measures when transporting crude and other hazardous commodities. This is why freight railroads have a stellar record for crude rail safety -- 99.995 percent of all rail crude oil shipments reach their destination without a release caused by a train accident. What's more, 2014 looks to be the safest year in railroad history, with accident rates registering at record lows.

But the reality is that even one accident is one too many. Railroads recognize that more work must be done to ensure public awareness of the railroad industry's safety record and the specific steps being taken with regard to crude by rail to provide confidence in the transportation of crude oil by rail. Working cooperatively with government agencies, our customers, our employees and our suppliers, we're applying significant risk mitigation measures based on what we've learned over the past few years of increased crude oil traffic. The railroad industry takes seriously its common carriage obligation, and we are aware of the importance of our nation's ability to safely and reliably utilize the tremendous national asset that domestic crude oil represents.

First and foremost, what will make moving crude by rail safer is tougher tank cars. Railroads safely carry hazmat cargo every day. But a critical component of safety is ensuring that the car is appropriate for the commodity being carried. There's no way around this fact. Crude customers have made recent upgrades to tank car fleets; however, freight railroads are seeking to replace or upgrade the entire fleet of tank cars tasked with transporting crude oil.

The freight rail industry doesn't own tank cars, but has long advocated for increasing the federal design and construction standards for tank cars that carry oil because they are such a critical safety element. The railroads want the government to direct that cars should have new safety features such as increased shell thickness, jacket protection, thermal protection, full-

height head shields, higher-capacity pressure relief valves and more. These can help mitigate the potential for rupture of a tank car and limit the severity of an incident if an accident occurs.

In the next few weeks, the U.S. government is expected to finalize its own regulations on the issue. The rail industry is urging the Obama administration to align with Canada and direct tough, new oil tank car standards.

Safely moving crude by rail is a shared responsibility, one the rail industry takes exceedingly seriously. Railroads devote enormous resources to enhancing safety no matter what they are carrying. That said, railroads have done top-to-bottom reviews of their operations and taken steps to further improve the safety of moving crude oil by rail. Specifically, the rail industry has taken these actions to date:

Increased track inspections and defect detectors: Railroads are performing more track inspections than required by the federal government on lines where trains travel with at least 20 carloads of crude oil. Comprehensive track geometry vehicles, which measure track alignment and assess track conditions, are conducted on crude oil routes. Specialized track-side "hot box" detectors alongside crude oil routes measure the condition of tank car wheel bearings and help identify potential problems before an incident occurs.

Secure routing, speed restrictions, improved braking: Railroads and federal agencies have jointly developed the Rail Corridor Risk Management System, a sophisticated statistical routing tool designed to help railroads identify safe and secure routes for transporting highly hazardous materials. Major U.S. railroads use this routing tool today for trains carrying crude oil. Meanwhile, railroads adhere to a self-imposed 50-mph speed limit for trains carrying 20 or more carloads of crude oil. Speeds are reduced to 40 mph through federally designated high-threat urban areas. Trains operating on main line tracks carrying at least 20 carloads of crude oil are also equipped with enhanced braking systems.

Improved safety coordination: Freight railroads are providing emergency responders and firefighters with details on the hazardous materials transported through a given community. The idea here is to be highly transparent with local safety officials and to ensure that safety remains top of mind for all who are responsible for the safe transport of hazardous materials. At the same time, the industry provides training and education to first responders across the nation.

Investments to reduce accidents: One of the most effective ways railroads have reduced accidents is through the continuous upgrading, maintenance and modernization of the 140,000-mile rail network. Since 1980, the industry has spent $575 billion on the nation's rail system. In 2015, that number is projected to be $29 billion, or approximately $80 million a day.

The aggregate effect of these actions is that the U.S. rail industry has one of the best safety records of any industry. Railroads have gone to great lengths to reduce the risk of derailments; their safety record reflects that. But in order for crude oil from domestic oil fields to be

transported with greater levels of safety, an upgrade in the tank car design needs to be established by the DOT and an aggressive transition framework from older, less safe cars established. Thank you for this opportunity to submit written, clarifying testimony for the hearing record.

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Statement for the Record
Senate Committee on Energy and Natural Resources Hearing
Thursday, March 19, 2015 at 10:00 a.m.
Re: U.S. crude oil export policy

Submitted by: National Stripper Well Association Chairman Mike Cantrell

Chair Murkowski, Ranking Member Cantwell, Members of the Committee:

The National Stripper Well Association (NSWA) is the only national trade association which represents producers and operators of marginally economic crude oil and natural gas wells in the United States. The U.S. has more than 770,000 marginal wells currently in production, which makes up nearly 20% of all U.S. oil and natural gas, making a significant contribution to the nation's economic security, and our local communities. Worldwide, it should be noted that the United States is the only country with significant production of stripper wells, and one of the few countries in the world with private ownership of mineral rights that makes it possible. Nationwide, approximately 400,000 jobs are directly or indirectly dependent upon marginal or stripper oil and gas wells. In fact, U.S. stripper wells collectively produce 1.2 million barrels per day, and NSWA is the only national association that represents *solely* the interests of the marginal well producers and operators before Congress, the Administration and the Federal bureaucracies. Established in 1934, NSWA has been at the forefront of the battles in Congress to promote domestic industry, to decontrol the price of stripper oil, helped lead the fight to eliminate the windfall profit tax on stripper well producers and recapture precious ground lost in the seemingly never-ending battle over the percentage depletion allowance.

Today, we are here to add our voice to the growing chorus of Americans calling on Congress to allow domestic energy producers to sell their products to America's allies and the world. Stripper well producers, like many in America's oil and gas industry, have for decades been in an economic struggle with international forces beyond our control bent on setting the world price of oil. Much of the internationally traded oil of the world is controlled by a combination of foreign governments and state-run corporations who collude together to control the price of oil to benefit their own agendas, with no regard for the impact on the American people or businesses.

This was most prominently highlighted in the 1970s, when our nation was suffering from energy shortages and long gasoline lines. It was then that U.S. energy policymakers established the first ban on exports in the 1975 Energy Policy and Conservation Act. It was seen as a tool to protect America then, but is a barrier to protecting America now.

America's oil and gas sector has undergone a tremendous renaissance in the 21st Century. Technology advancements have changed the international dynamic of energy reasserting America as the world leader in energy development. These tremendous scientific achievements, along with billions and billions in domestic investment, are taking place all across the oil and gas industry. This includes our nation's stripper wells, which have benefited from advancements in well design, fracturing and flooding that are enhancing recovery of both old and new wells. The reality is that all across the oil and gas sector, America has just started to open a new era of energy abundance.

However, just as many stripper well operators and companies are making massive new investments into driving this new era of abundance the same global forces that have driven world oil prices for the last 40 years are once again colluding together to stifle our energy development. And the U.S. ban on crude oil exports is hurting our ability to finance, invest, and advance our energy production.

The massive expansion of domestic light oil has flooded our refineries, storage facilities, and pipelines with more oil than it can handle already at certain times of the year, and will overwhelm our entire domestic refining capacity in the near future. This puts added pressure on both producers and refiners to find solutions to this oil glut. And while producers are making new investments, it will take time and investments by refiners to build up their capacity to use all this new resource that is coming to the market. This lack of sufficient domestic capacity leaves producers little choice but to sell at a discount to world prices, threatening new investment and forcing many producers to consider reducing their production capacity. For NSWA members, this is a disaster for many because once they are forced to stop production, is it unlikely much of that production will ever be restarted.

This not only affects stripper well producers, but will ripple through the economy as a whole as well. According to the Interstate Oil and Gas Compact Commission, an organization of the governors 38 oil- and gas-producing states, if all marginal oil and gas wells were plugged and abandoned, the estimated lost output in direct production and indirect and induced economic effects would total $52.4 billion, with 241,733 jobs lost.

There is a solution to this challenge: Allow our domestic energy producers to compete with those foreign state-owned corporations on the international market. When America competes on the world market, Americans win. When given the opportunity, our skills, work ethic and abilities make the United States the most productive and successful nation on earth. The energy industry is no exception.

Allowing American energy producers the opportunity to challenge the world will once again provide an opportunity to prove American excellence. In addition, it will compete with the global forces that seek to control and command the world oil price. For that reason, it is clear through multiple studies from Government Accountability Office, the Congressional Budget Office, IHS, Brookings Institute, and a host of other independent voices that American consumers will benefit from the approval of crude oil exports.

However, consumer benefits are not the only reason Congress should have to repeal the ban on exports, National Security is a major concern too. The same international collusion that has impacted American energy prices directs energy prices for many of America's allies. Our domestic energy boom can become an allied energy boom. In the same way American ships and planes brought freedom during the World Wars, and American cars and industry brought freedom and economic advancement to the world in the late 20th century, American energy can bring freedom in the 21st Century.

By opening American exports of oil and natural gas to America's allies, we can free our allies from a dependence on nation states that are not our friends, and who fund terrorism around the world, and conspire to deny basic human rights and dignity on a regular basis. American NATO allies like Poland, Hungary, and Estonia are overwhelmingly dependent on Russian oil and gas. Allowing American producers to compete with Russia on this playing field will free those nations from their dependence and grant them greater energy security.

A wise man once said, "The best way to break a cartel is to outproduce it." Which is exactly what America's domestic producers are doing to the world energy markets. Already U.S. production has filled our refineries past capacity. Now, let American producers do the same for the world and let us reap the benefits of this abundance for the American worker, our own economy, and national security.

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