

CRUDE OIL EXPORTS

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED THIRTEENTH CONGRESS
SECOND SESSION
TO
EXPLORE OPPORTUNITIES AND CHALLENGES ASSOCIATED WITH
LIFTING THE BAN ON U.S. CRUDE OIL EXPORTS

JANUARY 30, 2014



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CRUDE OIL EXPORTS

THURSDAY, JANUARY 30, 2014

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

The committee met, pursuant to notice, at 9:40 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Ron Wyden, chairman, presiding.

OPENING STATEMENT OF HON. RON WYDEN, U.S. SENATOR FROM OREGON

The CHAIRMAN. The Senate Committee on Energy and Natural Resources will come to order.

We are going to have a very busy morning today. But I want to start with some particularly exciting news. Senator Landrieu will be having her first grandchild in a few hours.

[Applause.]

The CHAIRMAN. She has been up most of the night. We will give her a round of applause. I'm not sure I would have even been conscious this morning. But Senator Landrieu, with her inimitable energy, is with us. We are glad that she is.

Senator Murkowski and I wanted, particularly, to have this hearing because America's energy renaissance has sparked a conversation on whether exporting crude oil is in the national interest. I think it is fair to say that this conversation is not going to be resolved any time over the next few weeks. Certainly there is a lot of interest here in the Congress on this subject and that is why we thought it was important to hold this hearing to begin a real conversation on a very important issue.

Personally I believe deeply in expanded trade. In my State one out of 6 jobs depends on international trade. Trade jobs often pay better than the non-trade jobs because they reflect a higher level of productivity which is often required to get American goods and services into international markets. When I'm asked to summarize my economic views I often say that one of my principle goals is to help make things in America, grow things in America, add value to them in America and then ship them somewhere. I have promoted that philosophy as Chairman of the Finance Subcommittee on International Trade.

That is why today's debate is especially important.

The fact is energy is not the same thing as blueberries and accordingly it is treated differently under Federal law. The Energy Policy and Conservation Act allows for the export of crude oil only when doing so is in the national interest. There simply isn't that

kind of requirement for blueberries or other commodities. National security, of course, is involved when Americans talk about exporting energy.

Right now there are several armed conflicts around the world, in South Sudan, Libya, Mozambique and elsewhere that are certainly being inflamed by fights to control oil. Now I'll put Oregon blueberries up against just about anything. But the last time I looked, nobody is fighting a war over blueberries.

It's hard to believe that only a few years after campaigns for America's energy independence, having been dominated by slogans such as "drill, baby, drill," our country now finds itself having a serious discussion on whether it should export crude oil. Energy independence has been a well-worn staple of virtually every politician's energy speech for decades. Now our country is in the enviable position of having choices about our energy future.

In other words the question becomes how can this energy boon create the greatest benefit for America?

Can energy help grow our economy and create jobs?

The answer is, of course.

Can this new production ease the pain at the pump for hard-working, middle class families?

Of course.

Can our country reduce its dependence on fuel from countries that do not always have our best interest in mind?

Again, of course.

Those are the easy questions.

The harder question is how can you come up with a policy where America can have it all?

Can our country get both the domestic benefits from exports and still retain a cost advantage for domestic consumers, both businesses and families?

That is certainly my goal. But in an effort to keep today's hearing under 7 or 8 hours, we're obviously going to have to have a focus. I want it understood for this hearing I have a particular interest in focusing on the consumer.

In any energy debate it's never very hard to find a voice for the various regions of America, for various industries in America and for various ideological points of view in America. Consumers, however, often don't have one. I just want it understood that on my watch, the consumer is not going to get short shrift.

Now it looks like a number of influential voices want to start exporting oil. I just want to hammer home the point this morning that, for me, the litmus test is how middle class families are going to be affected by changing our country's policy on oil exports. It is not enough to say some algorithm determines exports are good for the Gross Domestic Product or some other abstract concept.

American families and American businesses deserve to know what exports would mean for their specific needs when they fill up at the pump or get their delivery of heating oil. Simply charging forward and hoping for the best is not the way you get the best policy decisions. The responsibility of our committee, and we have always worked on these issues in a bipartisan way, is to make sure consumers are not going to get hammered by the cost of gas going

up because of some theory that everything is just going to turn out hunky dory in the end.

I'll wrap up by saying that I think there are important issues with respect to timing. There may be a time when crude oil exports are appropriate. One of the questions we're going to have to explore is whether that time is now.

When a conversation has begun on exporting crude oil, I am not hearing a similar conversation on ending imports. Our country is still importing about 40 percent of our crude oil, including from those places that do not have our best interests in mind. Every member of this committee understands the debate about energy as a global commodity.

We've all heard about how it's a global price. I'm sure we're going to hear that again today. But a global price does not automatically mean a stable price. If oil stops flowing from Saudi Arabia next week, American consumers and businesses would feel it in a hurry.

So the question is, does real energy security mean having the ability to be energy independent even if we never actually do it?

I think most Americans think our government would choose not to import oil and provide funding to regimes unfriendly to the United States if given the option.

All that said, we're going to listen to the arguments pro and con. I personally need to hear more. I will not be making any judgments today.

I look forward to working with Senator Murkowski, all of our colleagues, so that our country can maximize, I think, what we all would say is a historic set of circumstances that we want to think through carefully about how to tap the potential of.

Senator Murkowski.

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

Senator MURKOWSKI. Thank you, Mr. Chairman.

I appreciate your considered remarks and the opportunity to bring up this issue before the committee. As you and I have both noted over the past year we haven't shown any reticence in taking up the difficult issues that face this Nation when it comes to energy, energy production, the issues of export whether it's natural gas or now oil. This is what people expect us to do is take up the hard issues, have considered, thoughtful debate, dialog and then where and when appropriate, to act on that.

My hope is that today's discussion is the beginning of many very considered and thoughtful discussions on what is certainly a very timely issue given the position that this country is in when it comes to our dramatically increased oil production.

So again, I appreciate the opportunity to discuss this today. I would note that it has generated a fair amount of discussion. We haven't seen a full hearing room in a while. We've got good representation here on the committee. So I'm pleased to see that.

Mr. Chairman, you will recall that you and I were speaking together at the Center for Strategic and International Studies on unconventional natural gas production. It was last year, just about this time, I think, maybe a week or so off. But during the Q and

A after our presentation one of the attendees asked us about the ban on crude oil exports from the United States.

You proceeded to answer the question in a very thoughtful manner. When it came time for my response I said isn't it amazing that you're able to ask that question and not be laughed out of the room because a year prior to that it would not have even been possible to have that discussion. So where we have come in just a year in recognizing, again, that as a Nation when it comes to our energy production on several different fronts, the landscape has changed dramatically.

Thanks to my colleague at the end here what we're seeing coming out of North Dakota has really changed the dynamic from an energy perspective. It has helped with, clearly, with our jobs and our opportunities. But it's not just North Dakota. It's what we're seeing in Texas. It's what we're seeing in California.

Unfortunately we're not seeing it in Alaska. I regret to inform my colleagues that we're not going to see the opportunity for exploration up in the Beaufort or the Chukchi this year. Shell has just announced that they are not going to be moving forward in 2014 because of the recent decision by the ninth circuit and the lack of certainty from a regulatory and a permitting perspective from this Administration. Very troubling to me.

But let me get back to where I think we want to take the conversation here this morning.

Just a couple weeks ago I addressed the Brookings Institution. I presented a white paper on the energy trade. I called, at that time, for ending the prohibition on crude and condensate exports.

I will tell you I have been really gratified by the thoughtful responses. It hasn't been a knee jerk, oh my gosh, we can't do it. The sky is falling. It is much more considered and much more thoughtful. I think that's where we need to be with these discussions.

I want to prompt further discussion and debate on the issue. The analytical and the trade winds are blowing fiercely. It's not just the polar vortex. It's this discussion on a very important issue.

The architecture of U.S. energy exports must be renovated if our Nation is to lead the world on issues of trade, the environment and energy. The highest profile example is the outdated de facto prohibition on crude oil and condensate exports. This ban threatens record breaking U.S. oil production and American jobs by creating inefficiencies, gluts and other distortions.

It is my hope and expectation that this hearing continues the conversation that began at Brookings, raising all the issues, considering all sides and most important, reaching conclusions so that we can move forward rather than let the global energy markets developing around the world pass us by and having said that, I don't expect that we're going to either see the Administration moving forward with a decision next week or legislation coming from—forward from me or from other members of the Energy Committee here.

What I am hoping is that we can advance this discussion so that it is clearly understood that from the consumer's perspective it is understood and appreciated why exports would make sense. Is the timeliness issue that you bring up, Mr. Chairman, is critically im-

portant because timing is key here. The impact on American consumers is critical.

I happen to believe that opening up world markets to U.S. crude oil will lower the global price which will in turn lower the global prices for petroleum products. All things equal, the American consumer will benefit from this interaction as will those Americans that are employed directly and indirectly as a result.

Geopolitical impacts are also noteworthy here. The international trade dimension, given the ongoing trade talks with Europe and Asia, is just beginning to be understood. From today's vantage point I believe that national security will also be enhanced by our strengthened posture on energy trade.

We cannot let short term thinking distract us from the long haul. Gasoline prices will fluctuate. We know that. We see it every year.

There will be variations across different regions of the United States. This is due to a constellation of variables including infrastructure challenges, differing tax structures across states, various economic inefficiencies and other aspects of the Nation's refining and distribution system. Regional variations and prices are still, ultimately, variations on global prices.

Lifting the ban is about production. It's about jobs. The International Energy Agency, IEA, has warned that maintaining the ban may actually result in decelerating or shut in production which would be to the detriment of the Nation's livelihood.

So many things to chew on this morning, many things to carry forward in further discussions, but we've got a panel in front of us, Mr. Chairman, that I think is clearly knowledgeable, poised, to speak to these issues. I think we will gain from their input this morning. I thank them for being here and thank you for allowing us to have this opportunity on this important discussion.

The CHAIRMAN. Senator Murkowski, thank you for a thoughtful statement.

Without the committee being hit by one of those politi-facts, I'm told by our committee historians that this is the first hearing in the Congress in 25 years on this topic. So given that and the fact we have more than 10 percent of the Senate here, a number of Senators have indicated that they'd like to make a short statement.

Senator Franken did. Senator Landrieu.

**STATEMENT OF HON. AL FRANKEN, U.S. SENATOR
FROM MINNESOTA**

Senator FRANKEN. Yes, I didn't want to interrupt the Ranking Member, but when she was talking about our—where we've come in the last few years in oil production and thanked my esteemed colleague from North Dakota, Senator Hoeven.

I just wanted to point out that while as Governor he did all kinds of things to make sure that the Bakken was developed there. He did not discover the oil there.

[Laughter.]

Senator FRANKEN. I just wanted to point that out. But, if you would please discover some oil in Minnesota it would be most welcome.

[Laughter.]

Senator HOEVEN. You need to talk to our guest, Harold Hamm. He may do that yet.

Senator FRANKEN. OK.

The CHAIRMAN. We're clearly going to have a rollicking morning. [Laughter.]

The CHAIRMAN. Let me just go back and forth.

Is there a colleague on the other side who would like to make a quick comment?

Senator Landrieu would like to have one. I just know that a lot of you are under a time crunch.

Is there a colleague on the other side who just wanted a minute or two or we'll go to Senator Landrieu?

Senator Hoeven.

STATEMENT OF HON. JOHN HOEVEN, U.S. SENATOR FROM NORTH DAKOTA

Senator HOEVEN. Thank you, Mr. Chairman.

I'd just like to welcome Harold Hamm today. He really has been a pioneer in the Bakken. Senator Franken is not too far off when he talks about discovering oil.

He didn't discover the oil, but he certainly was a pioneer in discovering the methods including hydraulic fracturing and directional drilling and developing those methods in a way that made that oil recoverable in the billions of barrels. It is absolute leading an energy renaissance in this country.

So by way of introduction, I'm very pleased to welcome and introduce Harold Hamm this morning.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Hoeven.

I very much enjoyed my visit to North Dakota as well and appreciate your giving that opportunity.

Senator Landrieu.

STATEMENT OF HON. MARY L. LANDRIEU, U.S. SENATOR FROM LOUISIANA

Senator LANDRIEU. Mr. Chairman, I think for your purposes we have an excellent panel this morning. I want to thank both you and Senator Murkowski for such a thoughtful opening statement.

I'm going to submit my statement for the record.

But I do want to say that we are witnessing an energy revolution in the country today producing more energy at home here than we have in decades and to translate that into numbers. The EIA predicts this year the U.S. will average 8.5 million barrels a day in production, one million per day more than the average in 2013 and most importantly very near the record of 9.6 million barrels a day last achieved in 1970. That's why we're having this hearing today.

I think the testimony that Mr. Hamm and others will provide is that this number could be increased substantially based on new technologies, new opportunities which will benefit not just the exploration and production companies of which many hail from Louisiana and we're proud. But also the landowners, also the oil supply and gas suppliers, also the general manufacturers that make products completely unrelated to oil and gas, but that employ a great deal of Americans that are experiencing the excitement about

additional supply and potentially stable prices and reasonable prices.

So I'm going to put the rest of my statement in the record.

Most importantly I think for our refineries we do need to get on the record what our refineries in the country are positioned to process today and the kind of crude that's being produced and the mismatch that's there. We have to be very aware and sensitive of the investments that have been made by our refineries. So I think we're going to hear some of that today. I'm really looking forward to the testimony, particularly the users of it like Delta Airlines that uses a tremendous amount of fuel and has an important perspective for us to consider.

So thank you, Mr. Chairman. I'll submit the rest of my statement for the record.

[The prepared statement of Senator Landrieu follows:]

PREPARED STATEMENT OF HON. MARY L. LANDRIEU, U.S. SENATOR FROM LOUISIANA

I would like to begin today by thanking Chairman Wyden and Ranking Member Murkowski for convening a hearing on this incredibly timely and vital topic.

The U.S., as every witness has noted, is in the midst of an energy revolution, producing more energy here at home than we have in decades and reaping the incredible economic benefit that has come with it.

To put this into numbers, the EIA predicts that this year the U.S. will average 8.5 million barrels per day of production, 1 million barrels per day more than the average in 2013 and very nearly the record of 9.6 million barrels per day, last achieved in 1970.

This revolution is driven in large part by increased unconventional production, which has grown from nearly nothing 10 years ago to represent 1/3 of our current domestic production.

This is expected to rise, with EIA predicting that new unconventional production in the Bakken, Eagle Ford and Permian basin will drive the U.S. to match its record high domestic oil production level of 9.6 million barrels per day by 2016.

However, a barrel of oil produced in these unconventional plays is not the same as a barrel produced in Canada or elsewhere. We produce light to intermediate sweet crude-very high quality crude, but one that almost half of the 115 refineries in the U.S. are not designed to efficiently handle.

This mismatch, combined with decreasing demand for refined products such as gasoline, could lead to a surplus of supply without a readily available way to use it, barring retooling a large number of U.S. refineries or moving the crude elsewhere.

This raises the question we have arrived at today-what to do with this new wealth of supply? It is apparent from your testimonies that there are widely varying opinions on this matter, and I believe that discussions like this one are essential to creating a consensus.

I believe that this discussion, and the one ones certain to follow, hold exciting promise for our nation, and I look forward to working with my colleagues to develop a strong, fact-based policy.

The CHAIRMAN. Thank you, Senator Landrieu.

Let's go to the other side. Is there anyone on the other side who wanted to make a brief comment?

Senator Manchin I know was interested.

Senator Manchin.

**STATEMENT OF HON. JOE MANCHIN, III, U.S. SENATOR
FROM WEST VIRGINIA**

Senator MANCHIN. Thank you, Mr. Chairman.

I want to thank both you and Senator Murkowski for holding this historic hearing today. But I just can't help but think that where we are today and we're thinking about this which would

have never had this discussion a year, 2 years, 5 years ago. It really speaks of the innovation and the changes that you all have been able to develop for our country to make us much more secure.

I can only think about the LNG discussions we're having now, LNG exports, where we were going to import a couple years ago. So that's part of this too will play into it.

I think, Senator Wyden, you've put it so succinctly that basically that sweet spot. I can only think about 100 to 150 years ago the coal industry. What the coal industry did coming from my little State of West Virginia, the best coking coal in the world, making the steel that built the ships and built the industrial revolution as we have it, gave us the life that we have today that so many people have forgotten about and what they're still depending from our little State and where we would be if we would have sent that product out of the marketplace.

There's a balance to be had. I think that we're able to find that sweet spot, Mr. Chairman. I'm also going to introduce my statement for the record in more detail.

But I'm most interested in this topic and this discussion not just for us, but for our children and grandchildren and basically for the security of our Nation.

So I thank all of you for what you've done and what you've contributed.

The CHAIRMAN. Thank you, Senator Manchin.

[The prepared statement of Senator Manchin follows:]

PREPARED STATEMENT OF HON. JOE MANCHIN, III, U.S. SENATOR FROM WEST VIRGINIA

Thank you, Chairman Wyden and Ranking Member Murkowski for holding this very timely hearing. I know that this whole issue of whether to lift the oil export ban is a very new one—so much so that the Energy Information Agency, universities, and think tanks are still in the process of doing basic research into what lifting this longstanding ban would do. I truly appreciate having this opportunity to hear from our witnesses, who I understand have differing opinions on this topic. I am also eager to hear from my colleagues on this Committee regarding their views.

Personally, as we talk about the oil export issue, I can't help but think of the ongoing debate about LNG/natural gas exports. Just a few years ago, we were so short on natural gas here in the U.S. that we were building import terminals to bring it in from the Middle East and elsewhere. Then the shale boom happened. My home state of West Virginia is one of the places blessed to have a huge shale reserve, in the Marcellus and Utica shale plays. But we need to be very thoughtful and deliberate in how we choose to use these resources.

A hundred and fifty years ago, if the U.S. had exported our coal as a raw commodity, we would not have had the industrial revolution that made us a world economic power, creating buildings, ships, bridges, and rail lines out of the steel forged using that coal.

We need to find the right balance, where we are able to meet our domestic energy needs—for things like rebuilding our manufacturing base—while still allowing for some level of exports. I agree with Chairman Wyden, who refers to this as the "sweet spot" when we are talking about finding that level for natural gas.

I am interested to hear from our witnesses today about whether they view oil exports in the same way they would view gas exports, and if not, why not. And whether, in both cases, they think allowing wholesale export of crude oil is good for our economy and national security.

Thank you.

Senator Barrasso.

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

Senator BARRASSO. Yes, thank you, Mr. Chairman, for holding this important meeting.

I read a book this past weekend called Break Out. There's a whole section on what Mr. Hamm has been able to accomplish. It's about pioneers of the future. He truly is one. It goes into the epic battle that is going to decide America's fate. A lot of it has to do with our energy resources, the availability, the production and the new technology that's made it possible.

So I want to thank you, Mr. Chairman, for your leadership and bringing this group together.

Thank you.

The CHAIRMAN. Thank you, Senator Barrasso.
Senator Cantwell.

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

Senator CANTWELL. Thank you, Mr. Chairman. Thank you for the indulgence of statement. I'll try to be as brief as possible.

I guess there are two issues that I want to make sure are addressed. I don't know if they're going to be addressed at this morning's discussion. But those are the issues of safety and price.

I'm not saying you can't have oil transported safely. But we had a huge fire at our Tesoro Anacortes refinery that killed seven people, and a report is being released today about what happened. Certainly we've also had smaller incidents.

Now oil. If you think of the North Dakota and export opportunities, where is that going to go? On rail. So what are the safety issues? How do we address them?

So to me that's a very important issue.

Second, this issue of price.

I certainly believe that it's a global market and a global price. I definitely think we could do more to continue to police those markets to make sure that manipulation of oil futures doesn't affect the day to day price of oil which isn't really part of today's discussion either or part of the oil industry, but a little bit more about the banking industry. How many people have their fingers in the oil futures pot when they really aren't taking delivery for an end user.

But my point is is that this price issue, for us in the Pacific Northwest, given the world market and yet still being an isolated market, we've had some of the highest gas prices in the Nation constantly. So it affects us. So we're going to pay attention to that.

When the Congressional Research Service gave an informal, back of the envelope, estimate about this particular issue on exports, it's saying that some consumers could pay as much as 5 to 10 cents more per gallon if the ban is lifted. Now that's an informal discussion. I know the Chairman and the Ranking Member will get back to this at some point in time.

But to me, this is the issue. We know that oil markets and energy supplies are going to be tight in the future. How do we best police them so they're functioning like true markets? How do we

protect consumers in delivering the most cost effective resources so that our economy can continue to grow?

So I thank the Chairman for this indulgence today. It's a historic occasion. You're letting us have historic input before the witnesses. So thank you for that.

The CHAIRMAN. Thank you, Senator Cantwell.

Any colleagues on the other side?

Senator Portman.

**STATEMENT OF HON. ROB PORTMAN, U.S. SENATOR
FROM OHIO**

Senator PORTMAN. Thank you, Mr. Chairman.

I hadn't expected to have this opportunity either. But I appreciate your holding the hearing. You're right, it is historic that we're talking about this. Since 1975 we really haven't had a discussion because we haven't had a reason to and now we do thanks to hydraulic fracking and horizontal drilling and the technologies and the shale finds.

LNG exports issue is, I would think, more controversial a year ago than it is now. It's because we have found ourselves in a situation where, based on the economic analysis, it looks like we can afford to export. Still help our manufacturers in places like Ohio achieve what is happening which is unbelievable.

It is a revolution in the sense that we're finding more natural gas and oil and prices are low. But it's much more as to the impact on jobs in my State and other states where manufacturers are coming back. They're adding jobs because they're seeing that there will be a long term and stable price for energy which is an important input, particularly in some of the energy intensive industries in my State.

On the issue of oil, the one thing I'd love to hear today, Mr. Chairman, is whether the price at the pump is determined through the global market because I appreciate what Senator Cantwell said. She made some good points. We also hear that in effect what happens at the pump in Ohio and around the country is affected by the global marketplace, predominately.

We see that, you know, when there's an issue overseas where there is no disruption of supply but the potential for it we see the prices go up. So I would like to hear more about that, understanding how this differs from natural gas in terms of the market and ultimately what it can mean for our consumers.

Finally, since Senator Manchin talked about the sweet spot I'd love to hear a little more about what could be done in terms of maybe a swap specifically with Mexico that's been suggested by some folks where we would be exporting light, sweet crude in exchange for heavy crude and whether that makes sense. So it may not be a wholesale lifting of the export ban at this point, but it might be some opportunities for us to actually enhance our competitiveness in this country and be sure we have the right balance of energy resources in the context of again, this revolution that's really put the United States in a position to be more competitive across the board.

So those are things I'd love to hear, Mr. Chairman, today in the conversation. Again, really appreciate the witnesses being here. We've got a great panel.

The CHAIRMAN. Thank you, Senator Portman.
Senator Heinrich.

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

Senator HEINRICH. We're going on a long time here so I'll try to be brief.

But—

The CHAIRMAN. It's been 25 years.

Senator HEINRICH. That's a good point.

[Laughter.]

Senator HEINRICH. Yes, there's a lot of bottled up ideas here.

The CHAIRMAN. Ah, yup.

Senator HEINRICH. But I just want to remind my colleagues that one of the reasons why we're having this conversation, one of the reasons why the market has changed so much, is because of this technology that's been developed, as you said, horizontal drilling, but also hydraulic fracturing. Much of the basic research for that came out of our national laboratories including Sandia National Labs in New Mexico. My point is only that after several years of declining budgets and sequestration I think it's incredibly important for us to realize that things that we consider mature and industries that have been around a long time can be radically changed by our investments in basic research.

We need to continue to make sure that we don't lose sight of that.

The CHAIRMAN. Very good.

Other colleagues?

Senator Scott.

**STATEMENT OF HON. TIM SCOTT, U.S. SENATOR
FROM SOUTH CAROLINA**

Senator SCOTT. I'd feel left out if I didn't say something.

The CHAIRMAN. Alright.

Senator SCOTT. So I'll say something.

[Laughter.]

The CHAIRMAN. Not on our watch you won't be left out.

Senator SCOTT. Thank you, Mr. Chairman. You are always so kind and gracious.

Having the opportunity to go to Midland, Texas recently and see the results and the impact of hydraulic fracturing as well as horizontal drilling. It's quite remarkable where we find ourselves today especially when you look back over the history, 2004, 2005, 2006 that we were at a plateau. The end was coming very soon.

The reality of it is because of yourself, sir and I think it was George Mitchell, perhaps, that invested a lot of resource and took amazing risks to get us, as a country, into a position where we should have a larger conversation at some point in the near future about the impact of these export opportunities on our national security. One of the things that we recognize is that as we become more aggressive with our oil production and our oil, hopefully, ex-

porting I think it puts our Middle East competitors in a very unique position to take a serious look at their own budgets, their own revenues. Certainly as I look in our future, ours is pretty positive. But I think it does more for our national security that we've really articulated in the last several years.

The CHAIRMAN. Thank you, Senator Scott.

Any others?

Senator Baldwin.

**STATEMENT OF HON. TAMMY BALDWIN, U.S. SENATOR
FROM WISCONSIN**

Senator BALDWIN. Thank you, Mr. Chairman.

I wanted to talk a little bit about the context in which I'm going to be listening to the testimony and thinking about this input. I mentioned it actually at our hearing quite recently because this winter in Wisconsin families and business owners have had one issue on their minds. That's the cost and availability of propane.

It's an especially cold winter in Wisconsin this year. For many people who have for years relied on a steady propane supply, this year they're unable to find fuel to fill their tanks. At the same time regional suppliers have been depleted. Prices have risen from about \$2.20/gallon to over \$6.00/gallon. It's risen in just 3 weeks.

This is really devastating and very frightening for thousands of families across Wisconsin. I'm hopeful that the committee will take a close look at how we can solve this problem and figure out how we can prevent it from ever happening again.

But in addition to very tight domestic supplies this season we've also witnessed a dramatic, a fairly dramatic, increase in propane exports. In fact in the last 3 months at the very same time that Midwestern supplies were dwindling the export industry nearly tripled exports. The propane supply crisis should give us pause and should inform the larger discussion about another fuel that is also critical to our economy. Consumer supply protections are a central part of any serious debate about the future of crude oil exports.

Let me just add one other issue. I don't know if I'm going to get a chance to stay long enough to ask questions, so maybe I'll just suggest one area of interest. One of the major causes of the propane shortage in the Midwest has been as a result of infrastructure changes. Pipelines that have served the region for decades are being repurposed to serve new oil fields. As oil production increases these infrastructure pressures, I think, will only increase.

So all part of what I'll be—the context in which I'll be viewing today's discussion.

Again, Mr. Chairman and Ranking Member Murkowski, I very much appreciate our chance to hear the testimony today.

The CHAIRMAN. Thank you.

I think we're ready to go to our witnesses and our guests.

Any other comments from the other side?

Alright, let's go forward then.

Mr. Harold Hamm, Chairman and Chief Executive Officer, Continental Resources in Oklahoma City.

Mr. Graeme Burnett, Senior Vice President of Fuel Optimization for Delta.

Ms. Amy Myers Jaffe, Executive Director of Energy and Sustainability at the Graduate School of Management in the Transportation Studies area at the University of California at Davis.

Mr. Daniel Weiss, Senior Fellow and the Director of Climate Strategy at the Center for American Progress.

We welcome all of you.

We'll make your prepared statements a part of the record. I think the 4 of you could see that there is great interest among the Senators. You will have plenty of questions.

Mr. Hamm, welcome.

STATEMENT OF HAROLD HAMM, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, CONTINENTAL RESOURCES, INC., OKLAHOMA CITY, OK

Good morning, Chairman Wyden, Ranking Member Murkowski and members of the committee. My name is Harold Hamm. I serve as Chairman and Chief Executive Officer at Continental Resources, an Oklahoma City based independent oil and gas exploration and production company. We do not have refineries.

It's an honor to address you today on this critical subject of crude oil exports. Whether blueberries or barrels of oil restrictions hamper growth in the market and the same is with this critical product that we're talking about, crude oil because we need to lift this restriction sooner than later.

As Chairman of Domestic Energy Producers Alliance and as CEO of the company that co-developed the first field ever drilled exclusively with horizontal drilling, no fracks and a company that has the largest lease holder and most active driller in the Bakken Play in North Dakota is in a unique position to be one of the first to see American energy independence on the horizon 3 years ago. As technology continues to advance and new supplies of premium crude oil are discovered, today I see firsthand what's necessary to continue this American oil and gas renaissance and achieve energy independence for our country.

I appreciate you inviting me to share my experience and insight with you here today.

In October 2011 DEPA put a stake in the ground and predicted American energy independence by 2020. America's independent oil and gas producers have unlocked the technology and resources that made this a reality, not the majors. As a result we can today mark the recent 40th anniversary of the OPEC oil embargo by ending their oil scarcity in America and along with it ending the last short sighted regulation passed during that same period.

The laws passed in the 70s artificially controlled the supply, demand and price of U.S. energy and brought about unintended consequences. One law even banned the use of natural gas as a boiler fuel and mandated U.S. power plants to switch to less friendly alternative, coal. We understand what's happened.

Thankfully in response to dramatic changes in our global energy industry legislators have repealed or let expire nearly all post embargo regulations save two, the Energy Policy and Conservation Act of 1975 and the Export Administration Act of 1979 which essentially banned crude oil exports. The scarcity mentality that originally led to the creation of these export restrictions no longer

reflects the economic reality of the global energy marketplace that we have today.

We are entering a new era of energy abundance in America and the world. Heretofore we have only been able to extract hydrocarbons from reservoir quality rock primarily through vertical wells. But through technological breakthroughs in horizontal drilling we can develop resources previously thought to be unattainable by drilling two and 3 mile along laterals.

America now counts their natural gas supplies in centuries. Experts agree we'll be energy independent in terms of crude oil within this decade. This phenomenon was brought about by a group of independent American producers and missed by the general consensus of the industry. It was in complete contrast to the popular belief that the United States would be running out of oil and gas at the turn of the 21st century.

Today we must correct another popular misconception that we're not exporting petroleum. Nothing could be further from the truth. Major oil companies are exporting refined petroleum products without any limitations. Why should an independent producer be allowed to do the same?

Are we going to be their milk cows forever?

Over the years some have argued granting U.S. crude oil producers free access to world markets would drive up the cost of gasoline. The opposite is actually true. Unlike the exports of crude oil, exports of gasoline and other refined products are not restricted. Under current law our government has arbitrarily subsidized in some U.S. refineries, many of which are foreign owned, by giving them the ability to buy American oil at artificially low prices yet sell petroleum products in the higher priced global markets.

The true benefits of exports to the American consumer will be competition for the refining of gasoline. Indeed crude oil is no different than any other commodity demanded by consumers. The lower prices are only brought about by increased supply, greater competition, weaker demand or improved efficiency in the market. When governments attempt to legislate lower prices, it don't matter how well meaning the laws may be, market restrictions, market distortions and unintended consequences inevitably result. Supply and competition fall short of potential and the consumer ends up paying higher prices.

Over the past 18 months consumer prices for both gasoline and diesel have been reduced almost 20 percent due to the American energy renaissance brought about by horizontal drilling. A recent, released only yesterday, a report by ICF International states American consumers cost for these commodities can be reduced another \$6.6 billion per year if the export ban is removed.

We find ourselves at a crossroad. Do we cap oil production or modernize Federal rules and regulations to reflect the reality of today? Lifting export restrictions will strengthen our domestic oil industry, a critical component of our economy whose impact reaches far beyond the American consumer.

The energy sector has added jobs for millions of Americans and has also served as a job multiplier for our Nation's growing chemical and manufacturing industries.

Energy independence doesn't mean being isolationist. As we've seen in Cuba, Venezuela, North Korea, closed societies don't work. Energy independence means energy security.

In conclusion, the world has drastically changed since the OPEC oil embargo and reactionary enactment of Federal regulations in the 1970s. Even then that ban was symbolic, as we had no oil to export. Americans and consumers of all nations would benefit from the lifting of these restrictions that inhibit the export of crude oil produced in the U.S.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Hamm follows:]

PREPARED STATEMENT OF HAROLD HAMM, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, CONTINENTAL RESOURCES, INC., OKLAHOMA CITY, OK

Chairman Wyden, Ranking Member Murkowski and Members of the Committee, my name is Harold Hamm. I serve as Chairman and Chief Executive Officer of Continental Resources, an Oklahoma City-based independent oil and gas exploration and production company. It's an honor to address you today on the critical subject of crude oil exports. As Chairman of the Domestic Energy Producers Alliance and as CEO of the company that co-developed the first field ever drilled exclusively with horizontal drilling and the company that is the largest leaseholder and most active driller in the Bakken Play, I was in the unique position to be one of the first to see American energy independence on the horizon three years ago. And as technology continues to advance and new supplies of premium crude oil are discovered, today I see first-hand what's necessary to continue this American oil and gas renaissance and ultimately achieve energy independence for our country. I appreciate you inviting me to share my experience and insight with you here today.

In October 2011, DEPA put a stake in the ground and predicted American energy independence by 2020.¹ America's independent oil and gas producers have unlocked the technology and resources that make this a reality. As a result, we can today mark the recent 40th anniversary of the OPEC oil embargo by ending the era of oil scarcity in America and, along with it, ending the last of shortsighted regulations passed during that period.

The federal laws passed in the 1970s artificially controlled the supply, demand, and price of U.S. energy and brought about unintended consequences. For example, one law even banned the use of natural gas as a boiler fuel and mandated U.S. power plants switch to a less environmentally friendly alternative, coal.² Today America is still struggling to rectify the aftermath of this rash regulation.

In the years since the enactment of these laws, our elected officials have recognized our global energy industry has changed dramatically. Thankfully, in response to these changes, legislators have repealed or let expire nearly all post-embargo regulations save two: the Energy Policy and Conservation Act of 1975 and the Export Administration Act of 1979, which together essentially ban crude oil exports.

As the world has changed and other similar, post-embargo legislation has been phased out, the question has to be asked, "Why does the United States, a nation historically very supportive of free trade, continue to impose export barriers for domestic crude oil?" The fact is the supply and demand factors and "scarcity mentality" that originally led to the creation of these export restrictions in no way reflect the economic reality of the global energy marketplace of today.

We are entering a new era of energy abundance in America and the world. Heretofore, we have only been able to extract hydrocarbons from reservoir-quality rock, primarily through vertical wells. But through technological breakthroughs in precision horizontal drilling, we can develop resources previously thought to be unattainable. America now counts our natural gas supply in centuries, and experts including

¹Stephen Moore, "How North Dakota Became Saudi Arabia," Wall Street Journal (October 1, 2011)

²Powerplant and Industrial Fuel Use Act of 1978 (Repealed in 1987) http://www.eia.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/repeal.html

Raymond James,³ Citi⁴ and the International Energy Agency⁵ all agree we will be energy independent in terms of crude oil within a decade or two. In comparison, this offsets a 2005 high of 60% crude oil imports.

This phenomenon was brought about by a group of independent American producers and missed by the general consensus of the industry. The American oil and gas renaissance was in complete contrast to the popular belief that the United States was running out of oil and gas at the turn of the 21st century. In fact, under expectations of a far different domestic production outlook only a decade ago, the U.S. refining industry invested many tens of billions of dollars to retool refineries to process heavy, high-sulfur bitumen and tar sands from South America, Canada and Saudi Arabia.

Not only has horizontal drilling increased America's supply of crude oil, but also it has improved the quality. Primarily the oil produced through horizontal drilling is light, tight, low-sulfur crude, making it the best quality in the world. It's environmentally friendly, it promotes jobs, it's fueling a manufacturing and petrochemical industry comeback in America, and we need to make sure we don't disadvantage this high quality oil with refining capacity, wherever it may be located in the world.

The popular belief is that we're not exporting petroleum. Nothing could be further from the truth. Major oil companies are exporting refined petroleum products like gasoline and diesel with no limitations.⁶ Why shouldn't independent producers be allowed to do the same? Are we to be their subjugate milk cows, just like being able to export flour, but not wheat? No one will go for that.

Over the years, some have argued granting U.S. crude oil producers free access to world markets would drive up the cost of gasoline and other petroleum products for American consumers. The opposite is actually true. By imposing trade restrictions on a single segment of the energy industry, namely domestically produced crude, our government is arbitrarily subsidizing some U.S. refineries—many of which are foreign-owned—by giving them the ability to source American oil at prices well below the world market price, while at the same time giving them the “green light” to sell petroleum products into higher-priced international markets.

Energy independence is working—U.S. gasoline and diesel prices are down 20%. But America's oil and gas renaissance is in jeopardy. These outdated crude export restrictions have prevented domestic oil exploration and production from achieving its full potential—slowing potential job growth, restricting supply, and negatively affecting global refined product balances, which sends the wrong message to our trading partners around the world. Many refineries overseas designed to only process light, sweet crude similar to U.S. grades find it difficult to compete profitably with U.S. refiners with access to domestic crude at artificially low prices, forcing many to close and thereby reducing supplies of refined products on the global market.⁷ This effectively raises prices for consumers in the U.S. and all around the world. Many refineries in the Caribbean, Europe, India and South America are closing or operating at sub-optimal levels as they cannot compete with U.S. refiners running on discounted domestic crude oil. And, when supplies of gasoline and diesel fuel are restricted in the global market, the global demand for U.S. gasoline and diesel increases, thereby driving up the price U.S. consumers must pay at the pump.

The true benefit to the American consumer will be competition for the refining of gasoline. Indeed, crude oil is no different than any other commodity, product, or service demanded by consumers. Lower prices are only brought about by increased supply, greater competition amongst sellers, weaker demand, or improved efficiency in the manufacturing and distribution process. When governments attempt to legislate lower prices through regulations, no matter how well-meaning the laws may be when introduced, market distortions and unintended consequences inevitably result; supply and competition among producers is rendered short of potential, and the consumer ends up paying higher prices at the gas pump and in their monthly energy bills.

America is at a crossroads. Do we cap oil production or allow exports? Lifting export restrictions will strengthen our domestic oil industry, a critical component of

³ Raymond James “Yes, Mr. President, We Believe We Can Drill Our Way Out of This Problem” April 2, 2012, Accessed January 27, 2014

⁴ Citi GPS “Energy 2020 North America, the New Middle East?” March 20, 2012, Accessed January 27, 2014

⁵ International Energy Agency “World Energy Outlook 2013” November 12, 2012, Accessed January 27, 2014

⁶ Exports of petroleum products have nearly quadrupled from 870 thousand bpd in 2006 to nearly 3.6 million bpd in 2014, making the U.S. a net exporter of finished products http://www.eia.gov/dnav/pet/pet_move_wkly_dc_NUS-Z00_mbbldp_whtm

⁷ Valero Investor Presentation November 12, 2013 <http://www.valero.com/InvestorRelations/Pages/EventsPresentations.aspx>, Accessed January 27, 2014

our economy whose impact reaches far beyond the American consumer. At a time when unemployment sits at nearly 7% and, more importantly, U.S. labor force participation has fallen to just 63%,⁸ the energy sector has added jobs for millions of Americans—both directly and indirectly through energy service and equipment companies. It has also served as a job multiplier for our nation’s growing chemical and manufacturing industries. To this point, a recent IHS⁹ report issued in September 2013 on unconventional oil and gas—or oil and gas produced by horizontal drilling—found that:

- Employment attributed to unconventional oil and gas and petrochemical activity currently supports more than 2.1 million jobs. IHS projects it to grow to 3.3 million jobs by 2020 and 3.9 million jobs by 2025.
- In 2012, the unconventional oil and gas and petrochemical industries contributed nearly \$284 billion to GDP. IHS projects this to grow to \$468 billion in 2020 and \$533 billion by 2025.
- Unconventional energy increased U.S. household disposable income by \$1,200 in 2012. IHS projects the contribution to increase to \$2,000 per household in 2015 and \$3,500 per household in 2025.
- Unconventional energy activity and employment contributed more than \$74 billion in government revenues in 2012 and is projected to increase to \$138 billion per year in 2025.

By supporting the export of domestically produced crude, U.S. lawmakers can add to these totals in the form of increased jobs, GDP and tax revenues.

Beyond its economic benefits, supporting domestic oil production is vital for our national security. Indeed, the growth in domestic oil production over the past several years has contributed to a significant drop in U.S. reliance on imported oil.¹⁰ But national security and oil exports are not mutually exclusive; in fact, they go hand-in-hand. The authorization of oil exports promotes investment in additional energy resource and infrastructure development at home, enabling our nation to better control its own destiny.

But energy independence doesn’t mean being isolationist. As we’ve seen in Cuba, Venezuela and North Korea, closed societies don’t work. Energy independence means energy security. It means a chance for America to step back into a global leadership role by creating a world of balanced interdependency as opposed to dysfunctional interdependency. And it means no one can choke off supply, turn on the tap, or otherwise distort the market.

In conclusion, the world has drastically changed since the OPEC oil embargo and reactionary enactment of federal regulations in the 1970s. Even then the ban was symbolic, as we had no oil to export. Americans and consumers of all nations would benefit from the immediate lifting of restrictions that inhibit the export of crude oil produced in the U.S. The net result of taking this timely action would be:

1. Lowering fuel costs to American consumers and businesses by matching light, tight, low-sulfur domestic oil with refining capacity designed to efficiently process this type of premium quality crude.
2. Promoting job growth in the domestic energy sector by encouraging tight oil production.
3. Raising tax revenue at the local, state and federal level through GDP growth.
4. Advancing America’s march to energy independence.

The CHAIRMAN. Thank you very much, Mr. Hamm.
Mr. Burnett.

**STATEMENT OF GRAEME BURNETT, SENIOR VICE PRESIDENT,
DELTA AIR LINES, ATLANTA, GA**

Mr. BURNETT. Chairman Wyden, Ranking Member Murkowski and members of the committee, thank you for inviting me to testify

⁸Bureau of Labor Statistics. <http://data.bls.gov/timeseries/LNS11300000>. As of December 2013.

⁹IHS “U.S. Unconventional Oil and Gas Revolution to Increase Disposable Income by More than \$2,700 per Household and Boost U.S. Trade Position by More than \$164 billion in 2020, New IHS Study Says,” September 4, 2013. <http://press.ihs.com/press-release/economics/us-unconventional-oil-and-gas-revolution-increase-disposable-income-more-270>. Accessed September 24, 2013.

¹⁰Bureau of Economic Analysis, “U.S. Trade in Goods (IDS-0182).” Accessed July 12, 2013.

before you today. I'd ask that my full remarks be included in the record.

My name is Graeme Burnett. I'm the Senior Vice President for Fuel Optimization at Delta Airlines. In this position I manage Delta's jet fuel supply as well as serve as Chairman of the Board of Monroe Energy, the company that owns and operates Delta's refinery in Pennsylvania.

Behind the U.S. military Delta is the largest user of jet fuel in the world and jet fuel is our largest expense. Because of this we are uniquely situated both as an end user of crude oil and as a refiner to comment on the crude oil export ban and the current debate over whether to lift it. We believe strongly that the ban on U.S. crude oil exports is good policy and that lifting export limits now would come at the expense at the American consumer, who would pay more for gasoline, more for heating oil and more for the price of an airline ticket.

Today the going price for a barrel of U.S. crude is \$11 less than a barrel sold in Europe. This price differential can be easily explained. The U.S. crude market is a competitive one with price determined by supply and demand. Once the U.S. domestic market incorporated the increased supply of crude from places like North Dakota, the price of a domestic barrel of oil came down.

In contrast the global market is influenced by a cartel where OPEC countries control production in order to set prices. If we lift the export ban we would, in essence, be allowing the transport of crude out of a competitive market in this country and into a less competitive global one controlled by a few oil producing states.

The results would be easy to predict. U.S. crude would flow out of this country and onto the world market. OPEC would reduce supply to maintain high global prices. The United States use of home grown oil would diminish and prices here at home would rise to match the higher global price for a barrel of crude.

As one commentator put it, allowing for the export of home grown U.S. crude would do nothing more than import higher OPEC prices into the U.S. market.

It's clear who gains from this scenario. The oil exploration and production companies, many of which are foreign owned. With the increased supply of U.S. crude helping to push prices down these companies want to sell U.S. crude on the global market at higher prices largely determined by OPEC. It's equally apparent who would lose, the American consumer, who will see prices rise for gasoline, for petroleum products and for most consumer goods that rely on fuel to get to market.

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 the refineries in the Northeast, along the Gulf Coast and many were closing. In fact Delta purchased its Pennsylvania refinery in 2012 from ConocoPhillips after their facility had been closed nearly 1 year. The shale oil revolution breathed new life into U.S. refineries and created jobs for thousands of refinery workers.

In thinking about the merits of the export ban we should also consider one of its goals which was to help achieve energy inde-

pendence. By independence I mean the ability to meet our energy needs from sources within North America.

Notwithstanding the upswing in domestic production this country still imports around 33 percent of its daily crude oil needs from outside of North America. 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 sum, the export ban works. It may have taken a bit longer than we anticipated in the 1970s but we're now seeing its benefit, lower prices for crude in this country compared to global markets and an increase in home grown energy. The ban may be unnecessary at some point in the future, but we still have a long way to go to protect against oil market volatility and achieve true energy independence. That's why and I'll close with a sports metaphor here, lifting the ban now would be like ending the game after the first quarter.

Thank you, Mr. Chairman. I look forward to answering any questions that you and other members of this committee may have.

[The prepared statement of Mr. Burnett follows:]

PREPARED STATEMENT OF GRAEME BURNETT, SENIOR VICE PRESIDENT, DELTA AIR LINES, ATLANTA, GA

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

My name is Graeme Burnett. I am the Senior Vice President for Fuel Optimization at Delta Air Lines. In this position I manage Delta's jet fuel supply as well as serve as Chairman of the Board of Monroe Energy, the company that owns and operates Delta's refinery in Trainer, Pennsylvania. I have over 30 years experience in the petrochemical and refining sectors of the energy industry and, before coming to Delta, I worked in various capacities in Texas and across the globe for one of the top five oil companies.

Delta Air Lines is the largest non-military user of jet fuel in the world and, like all airlines, we participate in oil markets on a daily basis. Jet fuel after all is our largest expense. It contributes to the price of an airplane ticket, influences the types of aircraft we purchase, and helps determine whether we serve certain routes. Because of all this, we are uniquely situated—both as an end user of crude oil and as a refiner—to comment on the crude oil export ban and the current debate over whether to lift it. We believe strongly that the ban on U.S. crude oil exports is good policy. It is good for American consumers. And it is good for the airline industry and our passengers.

As we all know, the ban dates back to the 1973 oil embargo. With gas prices then soaring, Congress established a crude oil export ban to limit our nation's reliance on foreign oil and minimize the impact of volatile global oil markets on domestic gas prices.

While U.S. oil imports did drop in the 1970s and early 1980s, the ban did not—as critics will point out—insulate the country from foreign oil. In the years after the ban was created, this country remained vulnerable to volatility in oil markets and the price of a U.S. barrel of crude—known in the industry as West Texas Intermediate or WTI—tracked the price of a barrel of crude that traded on the global markets.

All that changed a just a few years ago. Beginning in 2011, when the country began to feel the impact of the domestic shale oil boom, a barrel of U.S. produced crude became cheaper than a barrel of crude trading on the global markets. See Attachment 1.* And today the going price for a barrel of U.S. crude is \$96. That's about \$11 less than a barrel sold in Europe.

This price differential can be easily explained. The U.S. crude market is a competitive one with price determined by supply and demand. Once the U.S. domestic market incorporated the increased supply of crude from places like North Dakota's

* Attachment has been retained in committee files.

Bakken formation, the price of a domestic barrel of oil came down. In contrast, the global market is influenced by an oligopoly where OPEC countries control production in order to set prices.

If we lift the export ban we would in essence be allowing the transport of crude out of a competitive market in this country and into a less competitive global one controlled by a few oil-producing states. The results would be easy to predict: U.S. crude would flow out of this country and onto the world market. OPEC would reduce supply to maintain high global prices. The United States' use of homegrown oil would diminish and prices here at home would rise to match the higher global price for a barrel of crude. As one commentator put it, allowing for the export of homegrown U.S. crude would do nothing more than import higher OPEC prices into the U.S. market.

It's clear who gains from this scenario: The oil exploration and production companies, many of which are foreign owned. With all the crude coming out of North Dakota, Wyoming, Texas, Pennsylvania and other states helping to push prices down, these companies want to lift the ban and sell U.S. crude on the global market at higher prices largely determined by OPEC. And it's equally apparent who would lose: The American consumer, who would pay more for gasoline, more for heating oil and more for the price of an airline ticket. In fact, according to Barclays PLC, lifting the export ban would stop the decline in U.S. crude prices and cost American motorists as much as \$10 billion a year in higher prices at the pump.

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 and many were closing. In fact, Delta purchased its Pennsylvania refinery in 2012 from ConocoPhillips after that facility had been closed for nearly one year.

The shale oil revolution breathed new life into these refineries and created jobs for thousands of refinery workers. By lifting the export ban and sending our crude overseas, we would reverse that trend. Refineries in Europe—where there is currently excess refining capacity—would be more than happy to refine our oil using European workers to do so. Put simply, lifting the ban will benefit European refinery workers at the expense of thousands of American jobs.

Furthermore, in thinking about the merits of the export ban, we should consider one of its goals: To help this country achieve energy independence; and by "independence," I mean the ability to meet our energy needs from sources within North America.

This country has benefited tremendously from increased domestic energy production in recent years. The shale boom and advances in production and extraction technology have helped us create jobs and reduce our dependence on foreign oil—and foreign regimes. Notwithstanding the upswing in domestic production, this country still imports around 33% of its daily crude oil needs from outside of North America. 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 sum, the export ban works. It may have taken a bit longer than we anticipated in the 1970s, but we're now seeing its benefits: lower prices for crude in this country compared to global markets and an increase in homegrown energy. The ban may be unnecessary at some point in the future. But we still have a long way to go to protect against oil market volatility and achieve true energy independence. That's why—and I'll close with a sport's metaphor here—lifting the ban now would be like ending the game after the first quarter.

Thank you Mr. Chairman. I look forward to answering the questions that you and other Members of this Committee may have.

The CHAIRMAN. Thank you very much, Mr. Burnett.
Ms. Jaffe, welcome.

STATEMENT OF AMY MYERS JAFFE, EXECUTIVE DIRECTOR OF ENERGY AND SUSTAINABILITY, INSTITUTE OF TRANSPORTATION STUDIES, GRADUATE SCHOOL OF MANAGEMENT, UNIVERSITY OF CALIFORNIA, DAVIS, CA

Ms. JAFFE. Thank you very much, Chairman Wyden and thank you to Ranking Member Murkowski and the members of the committee for this opportunity to talk to you about this important subject.

I have been writing about the influence of OPEC on our country since I was a junior in high school, believe it or not. I won a term paper contest in the State of Massachusetts with an essay on that topic. I'm so glad to be here to be able to, for the first time in 25 years, talk about the fact that we might get the goal post to take a sports analogy, get the ball through the goal post.

So the United States is a leading global power and economy. We promote open markets and free trade. We have for the last 30 years spent a tremendous amount of diplomatic effort to promote open markets and free trade in energy. That is a vital interest of the United States.

I appreciate the thoughtful comments of the committee in terms of stimulating full debate on this subject. We do not want to take policies or actions that enhance rather than weaken the monopoly power of OPEC or Russia to use energy as a weapon or a tool of statecraft. We want to lead from the front not from behind.

It is important for us to have this thoughtful debate and reevaluation of our current export policy. In doing so we need to consider how to avoid creating market distortions whether they temporarily benefit some consumers in a particular region or some industry we want to make sure that we are doing things that are more helpful than damaging. We need to consider the following things.

No. 1, we actually export our new oil and gas. We export our oil in the form of refined products directly so we don't have an export ban on gasoline or diesel fuel or propane. So therefore we're exporting that instead of exporting the crude oil.

So what we're really discussing is No. 1, what is the best way to organize free markets and to eliminate distortions and who gets the profit from the exports. Will the refining industry get the profits from the export or the upstream oil and gas industry get the profits from the export or will other industries get the profits from the exports because we're not in here to discuss banning all energy exports from the United States. We need to keep that in mind.

Because we have physical bottlenecks that prevent us from exporting our surplus of natural gas we are currently exporting coal. We need to understand that when you block, like the little boy with the finger in the dike, when you block a hole in one point of the dike, water pressure comes to another point in the dike and something will be exported that's a different thing. I think the natural gas example is the best example because nobody expected the United States, with its best, new abundance of natural gas and the industry and lower electricity prices that it is promoting, nobody expected the result of that to be the export of coal to Europe.

I'm just returning from the World Economic Forum in Davos. I can tell you that the entire discussion focused around Europe's need to reevaluate their entire energy policies because they are importing coal. Their emissions are going up. They are not drilling for natural gas. They realized that they have these huge distortions that have created a great economic advantage for the U.S. economy and a great disadvantage for the European economic system.

So we want to make sure that the policies that we promote here in our country will continue to allow us to achieve the advantages that we have.

I want to address for one moment the issue of gasoline price volatility because that is of such great concern. The solution to gasoline or any kind of consumer volatility in prices is to mandate minimum, minimal standards for inventory. That is what happens in Europe. That is what they do in Japan and in South Korea. That is how industrialized, full economies protect consumers against sudden disruptions like a refinery fire or a sudden cold snap in the winter. Inventory levels are the critical issue to tide markets under—through temporary swings that come for this week or that week or a month or a period of time.

I just in closing my remarks, I want to remind the committee and our public that when we had a temporary disruption gas land supply during Hurricane Rita and Katrina as Senator Landrieu might remember, Europe loaned us gasoline supplies from their mandatory strategic stocks that they require industry to hold. That is how we weathered through our crisis. We need to consider our relationship with our allies like Europe when we think about our future export policies.

[The prepared statement of Ms. Jaffe follows:]

PREPARED STATEMENT OF AMY MYERS JAFFE, EXECUTIVE DIRECTOR OF ENERGY AND SUSTAINABILITY, INSTITUTE OF TRANSPORTATION STUDIES, GRADUATE SCHOOL OF MANAGEMENT, UNIVERSITY OF CALIFORNIA, DAVIS, CA

The rapid growth of oil and natural gas production from unconventional shale resources in the United States has reopened debate on the question of U.S. oil and natural gas export policy. Foreign policy considerations should be central to the discussion of this issue. To date, the debate in the United States has focused mainly on domestic economic aspects and the possible benefits of actively promoting artificially low domestic prices through barriers to trade. Today, I will discuss the risks inherent in the continued promotion of logistical bottlenecks, even in the face of rising domestic production. I will also elaborate on the national security and foreign policy benefits that the United States can reap by promoting an open energy trade policy that permits exports of natural gas, condensate, refined petroleum products and crude oil.

The United States has for many decades been the leading nation in championing open markets and free trade in energy. Open trade and investment in energy is important to U.S. vital interests for many reasons. First and foremost, artificial restrictions on energy flows can be a source of international conflict and, in fact, has been a factor contributing to armed conflict in modern history. Moreover, the United States, by virtue of both its superpower role and its position as the largest oil consuming country, has a direct interest in preventing energy supply from being used as a strategic weapon. Finally, barriers to foreign investment in energy resources in key countries generally contribute to supply constraints, leading to rising global prices and potentially harming economic growth in major oil consuming countries such as the United States and its key industrialized trading partners. For these three reasons, the United States should continue to actively support open markets and free trade in energy and to do so, it cannot restrict its own energy exports. By leading the charge on new energy technologies and exports, the United States now has the ability to fashion a global energy world more to its liking where petro-powers can no longer hold American drivers hostage or turn off the heat and lights to millions of consumers in the United States or allied countries to further geopolitical ends.

Beyond these core American values and interests, it is important for the United States to conduct a thoughtful debate and re-evaluation of current export policy to avoid creating market distortions that, while temporarily benefiting some consumers in particular U.S. regions, may create more questionable medium to longer-term trends that could turn out to be more damaging than helpful. Our history of energy policy is replete with such negative examples, such as President Nixon's inflation-targeted price controls on natural gas which ultimately caused a long lasting shortage of natural gas supply in the United States and a two-tiered system of oil pricing that ultimately, in practice, incentivized imports of foreign oil.

An evaluation of export policy needs to consider the following key variables:

1) Long term geopolitical considerations are likely more important to our nation than the expediency of any short term commercial gain to a particular set of vested industry interests.

2) Transportation and supply bottlenecks can create distortions that can become very costly in economic terms over time even if they bring some short term benefits to consumers.

3) The United States participates in international trade and thus, blocking exports of one or more particular commodities or manufactured products cannot “protect” U.S. consumers from international prices. Ultimately, the discussion of banning some exports and not others is a question of who in the United States economy gets the profits from tapping the arbitrage of higher international prices. So for example, if gasoline prices are higher in the international market than in the United States, refiners will have a financial incentive to export gasoline until that arbitrage window closes. These U.S. gasoline exports will eventually produce the same boost in retail prices to U.S. consumers as crude oil exports.¹ That is because rising exports of U.S. gasoline to international markets will eventually erode profit margins for European, Asian and Latin American refiners, causing them to reduce their own refinery throughputs, lowering demand for crude oil and thereby weakening international crude oil price levels. In this way, rising U.S. crude oil production impacts global crude oil markets through displacement via U.S. refined product exports. Thus, it is not correct to say that the United States, by continuing to ban U.S. crude oil exports, can isolate American consumers from global prices. The often cited figures in Barclay’s assessment of the financial savings resulting from the export ban oversimplifies the mechanisms and correlations of the interactions of U.S. and global gasoline pricing. Differences in elasticity of gasoline demand in the United States and Europe over different time periods (ie consumer responsiveness to price changes), differing refinery configurations and costs, weather trends, and local inventory levels all influence the differences between gasoline prices in the U.S. and Europe in 2008-2010 vs today, not just changes in the price of U.S. midcontinent crude oil relative to UK benchmark Brent crude.

4) The “tyranny of distance” for oil, refined products and natural gas trade flows will in most circumstances guarantee U.S. users a continuing energy cost advantage over foreign competitors even if export bans are lifted due to the generally lower cost of transportation within the United States compared to long distance, waterborne exports. This transportation cost advantage is, in many cases, of significant size and will ensure that U.S. energy prices are lower than those of countries that would buy U.S. oil and gas ex-ship. U.S. oil and gas short haul exports to Mexico and Canada are already protected by the NAFTA free trade agreement.

5) The best way to protect U.S. consumers from sudden price movements in gasoline, heating oil or natural gas from unexpected supply disruptions or weather related events is to ensure that adequate inventories are on hand in regional markets. To protect U.S. consumers against volatility in fuel pricing due to shifting levels of global demand for refined petroleum product and/or natural gas exports, the United States should require U.S. producers and refiners to hold reasonable minimum inventories to guard against temporary domestic shortfalls of supply or seasonal volatility. Such minimum product inventory standards are already used successfully in Europe and Japan to enhance energy security and protect domestic markets in the event of an unusual event such as the Fukushima nuclear accident. In fact, the United States was able to weather Hurricane Rita and Katrina partly by borrowing gasoline from these mandated European minimum inventory stockpiles. As the United States shifts to a lower percentage of crude oil imports, it may want to consider holding a higher proportion of strategic stocks in the form of mandated commercially held stocks of refined products, rather than publicly held crude oil stores.

6) Crude oils and condensates from different geologic basins have different properties and are not fully fungible when it comes to refining them into usable fuels by various refineries. In particular, the light field condensate being produced in the United States from tight formations and shales require different forms of refinery distillation and other secondary processing than heavy oil production from offshore U.S. Gulf of Mexico, Canada, and Mexico. Top specialized analysts such as Alan Troner of Asia Pacific Consulting are forecasting that a large overhang of unusable condensate will emerge in the U.S. market by 2016

¹In the case of gasoline exports, refining companies like Valero get a larger share of the profits. In the case of direct crude oil exports, oil exploration and production companies get the bigger piece of the pie.

due to limitations on U.S. refiners' ability to process this particular quality of liquids. Relaxation of export rules for this class of associated liquids production would be desirable to maintain growth in production of natural gas and crude oil wells that also produce high levels of associated condensate. Asia Pacific Consulting estimates that as much as 500,000 b/d of the 3.5 million b/d to 4 million b/d of U.S. condensate production in the United States would not be easily absorbed into the U.S. refining and processing system by 2016 and might have to be simply shut-in until refiners can make investments to expand new units to handle such supplies, depriving the U.S. of export revenues and related trade and fiscal benefits (see appendix for more details).

GEOPOLITICAL BENEFITS

Energy trade can be used to strengthen our ties to important allies and trading partners and thereby enhance American power and influence. For example, U.S. LNG exports from the Gulf coast could be an important strategic back-up role to shaky Russian or Middle East gas supplies, for example, much the way the US served as an oil swing producer back in the 1960s, rendering an Arab oil boycott during the 1967 Arab-Israeli war infeasible. US Asian allies Japan and South Korea are seeking flexible US Gulf coast LNG contracts for reasons of economic and geopolitical leverage. Our ability to serve as a source for critical swing energy supplies enhances our importance to our energy trading partners in other geopolitical and economic spheres and allows us to help our allies in times of market instability.² It would, for example, constrain Russia's ability to use its energy supplier role as a wedge between the United States and its European allies.

As American shale production expands from natural gas to oil, the geopolitical benefits will mushroom both by improving U.S. financial strength and by eliminating U.S. vulnerability to economic blackmail. The upshot of shale oil will be to reverse the course of history and roll back the clock to pre-1973. Oil producing states will no longer be able to use the lever of a possible energy supply cut-off to America to pressure Washington to adjust its foreign policy. If domestic shale oil abundance someday more closely matches shale gas abundance and the US has no imports to replace, then we will have more discretion on when and how to use the Strategic Petroleum Reserve. In such circumstances, a President could consider using the SPR to either loan oil to other countries for geopolitical aims (for example, to counter the economic blackmail of the "oil weapon" against an allied country) or to provide extra oil into the market to head off attempts by coalitions of other energy producers to create artificial rises in global prices, should such oil price spikes start to cause financial or economic harm to the global economy.

In this regard, U.S. energy exports will weaken some of our adversaries such as Iran and Russia. US shale gas has already played a key role in weakening Russia's ability to wield an energy weapon over its European customers by displacement. By significantly reducing US requirements for imported liquefied natural gas (LNG), rising US shale gas production has increased alternative LNG supplies to Europe in the form of LNG displaced from the US market, limiting some of Russia's power. It has also already curbed Iran's ability to tap energy diplomacy as a means to strengthen its regional power or to buttress its nuclear aspirations by eliminating the need for Iranian natural gas to potential importing customers by creating surpluses of alternative supplies. This remarkable development, by allowing the U.S. to impose tighter sanctions, has brought Iran to the negotiating table on limiting its nuclear program.

Energy exports also improve our balance of trade. The health of the US economy and fate of the US dollar come under pressure when rising oil prices raised our massive oil import bill, worsening the US trade deficit.³ Such economic pressures are multiplied when we are forced by oil dependence to deepen our military commitments in the Middle East, thereby similarly adding to the US deficit. All this weakens the United States relative to China, which holds a large chunk of US indebtedness and free rides off expensive US naval activities to guarantee the free flow of oil from the Persian Gulf. Over time, shale development will reverse this strategic and economic disadvantage. As the years pass, it will be the Chinese economy that is more exposed than the United States to Middle East developments. Citibank esti-

²It is easy to imagine the expansion of American power if its natural gas companies could gear up to supply LNG to a European country cut off by Russia, such as happened in the winter of 2006. If the US can become an energy supplier of last resort, its geopolitical importance will rise significantly along with its diplomatic freedom of movement.

³For a detailed discussion of the link between the US dollar and oil prices, see Amy Myers Jaffe and Mahmoud El-Gamal, *Oil, Dollars, Debt and Crises: The Global Curse of Black Gold*, Cambridge, UK: Cambridge University Press, 2010

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

Finally, energy exports are already an important part of our free trade obligations to important neighbors such as Mexico and Canada as well as more distant long-standing allies such as South Korea. U.S. law requires the U.S. Department of Energy (DOE) to review and approve any natural gas exports to countries with which the United States does not have a free trade agreement. Current rule making requires that exports to our free trade partner countries be approved expeditiously. For nations not covered by applicable free trade agreements, the review is supposed to lead to approval unless the project is determined to “not be consistent with the public interest.” As a practical matter, the United States is already an exporter of domestic natural gas. The U.S. exported a total of 436.3 bcf of natural gas in the first quarter of 2013, mainly to Canada and Mexico. Canada has also been a major buyer of U.S. condensate. U.S. pipeline gas exports to Mexico are important to Mexico’s economic health and to border relations and therefore it is unlikely the United States would ever consider cutting off Mexico’s gas trade with us. South Korea now holds a Free Trade Agreement (FTA) with the United States. South Korea has indicated its desire to import U.S. Gulf coast LNG. Under normal economic conditions, it would not be in the U.S. economic and foreign policy interest to fail to honor our free trade obligations to South Korea while continuing to honor our obligations to Mexico. By extension, the United States, as an established exporter of natural gas, should not be turning away close allies like Japan and Europe. Since U.S. trade with Asia is important to our economic health, on balance it would not be in the U.S. interest to turn down Asian trading partners wanting to expand already massive trade to include natural gas, especially given that a preponderance of analysts have concluded that U.S. shale resources are large enough to minimize the pricing impact of LNG exports from the United States. This logic could also apply to refined petroleum products and condensates, which are already an important part of our current foreign trade.

Thus, I would argue that these many foreign policy considerations must be taken into account in any review on the question of the advisability of U.S. crude oil and condensate exports. We must consider all aspects of the implications of the energy export question on our national security and foreign policy interests. To focus only on the uncertain impact that exports might have on the U.S. industrial sector or gasoline prices in a specific region of the United States is foolhardy, given the complexity of interactive forces that will influence prices in the long run. Rather than second guessing price impacts which remain highly uncertain, we should widen the export debate to consider U.S. global priorities as well as domestic economic concerns.

In theory, the United States could behave like Russia and members of the Organization of Petroleum Exporting Countries (OPEC) and restrict hydrocarbon exports in general or to particular countries for political or nationalistic reasons. But we need to resist this temptation. Flows of U.S. oil and gas should follow profit incentives and market signals. The participation of American suppliers to the global market and foreign oil companies in the U.S. market extends the reach of U.S. anti-trust restrictions beyond our borders. It is true in general that foreign demand for American oil and gas can, all things being equal, put upward pressure on prices. But removing bottlenecks can smooth the functioning of markets, allowing arbitrage to promote flows to and from the most efficient geographic supply sources, eliminating localized volatility and easing sharp localized price movements during times of disruptions or unexpected events.

Efforts to engineer particular market responses on a local level can have unintended consequences. Greater U.S. cooperation on the global climate change agenda is of critical importance. Climate protection advocates worry that increased natural gas exports will lead to even greater use of natural gas instead of renewable sources. But bottlenecks preventing the free export of U.S. natural gas have, for example, led to the unintended consequences of increased exports of cheap displaced U.S. coal to Europe, unwittingly raising Europe’s carbon emissions despite strong EU clean energy directives. Efforts to stop the construction of the Keystone XL Pipeline to ship Canadian oil sands has led to an increase in rail traffic of crude oil around the U.S., again with unintended environmental and safety consequences.

The more oil supplies there are and the more liquid those supplies are, the more the global market will mirror the competitive U.S. market. Supply bottlenecks are what aggravate price volatility to begin with, as any Bostonian can attest this time of year. New England's historical lack of local storage and limited pipeline deliverability has over the years produced sudden price climbs in cold winters. Had new pipelines like the Rex Express, which connects Colorado and Ohio, not been in place this year, recent winter price swings would be even higher and more prolonged. It is the same with the disruptions of light crude from Libya and elsewhere around the world this past year; but for U.S. products exports and the lower requirement for light crude imports to the United States, global crude price levels would be far higher.

As U.S. domestic production levels rise, the United States will have to think carefully about the kind of exporter it wants to be and how to promote the ideal level of free trade and energy investment wherever possible. The United States needs to consider the usefulness of past experiences when we counted on our European allies to provide us with badly needed gasoline from Europe's strategic stocks during our difficulties with the U.S. fuel manufacturing and distribution systems during Hurricane Rita and Katrina. And we need to think carefully about what our global economic and security obligations might be, should an oil supply crisis of major proportions emanate sooner rather than later out of the Middle East—both before, and even after, the U.S. gets closer to being energy self-sufficient. The mindset of hoarding resources out of fear of shortages has never served major producing countries like the United States well. In the crisis years of the 1970s, such hoarding behavior worsened the dislocations, not eased them. By contrast, in more recent years, we have fashioned an international emergency oil supply response system that protected the global economy in the aftermath of Saddam Hussein's invasion of Kuwait, and would be important should a similar or even worse kind of conflict were to arise again in an important oil producing area of the Middle East or West Africa. I am not saying that President Obama should turn open the spigot on willy-nilly, given the current instability in the Middle East. But clearly the circumstances of our energy situation is changing and we should not cling to historical policies because they are familiar and thereby politically comfortable. What is required is a thoughtful policy that is grounded in the realities of how energy markets operate and taking into account what is best for the economy as a whole, and not specific consumers or industries.

APPENDIX.—FURTHER THOUGHTS ON MID-CONTINENT GASOLINE PRICES

The chart below, compiled with data from the U.S. Energy Information Administration (EIA) highlights that Midwest gasoline consumers are not, as has been reported in the media, reaping huge benefits from the crude oil discounts enjoyed by Midwest (PADD II) refiners compared to Gulf Coast (PADD III) refiners. The crude oil feedstock discounts enjoyed by refiners with access to mid-continent landlocked U.S. production (as illustrated by the blue line which shows the value difference in the crack spread between Midwest and Gulf coast refiners) did not lower the wholesale price of Midwest petroleum products compared to prices linked more closely to international markets, nor did they lower the retail prices of gasoline or diesel fuel prices in the Midwest markets served by PADD II refiners relative to the markets served by coastal refiners that do not enjoy these discounts. Since petroleum products are freely traded in a global market, U.S. petroleum product prices reflect international crude prices, not lower-priced domestic crude.

THE SPECIAL CIRCUMSTANCES OF U.S. CONDENSATE PRODUCTION

Liquid hydrocarbons suspended as particles in natural gas (under subterranean pressure and temperature) are called natural gas liquids or NGLs. Many tight oil and shale gas fields also produce NGLs, most commonly LPGs such as propane, butane, and iso-butane and condensate. Condensate typically remains liquid without special containment. It can be used as a petrochemical feedstock, a blending component, boiler feed, or as a diluent for the transport of heavy crude oil. It can also be processed directly in a splitter (special distillation tower design only for manufacture of light products) to produce lighter end refined products. Condensate is similar to ultra light, low sulfur crude oil and therefore is currently being blended in with the rising tight oil production stream. For some previously marginal Midwest refineries that lacked sophisticated secondary refining equipment, the increase of light tight oil and condensate blend has been a godsend, raising profits by substituting away from scarce foreign imported feedstocks. But for the more sophisticated refineries on the U.S. Gulf coast, rising supplies of condensate produce greater challenges. These refineries need a sufficient volume of heavier fuel oil or heavy gasoil

(VGO) as their feedstock to yield the optimum levels of gasoline, jet fuel and diesel production given the range of equipment in their facilities. Thus, there is a physical limit to how much condensate spiked crude oil they can use and still benefit from expensive coking units and to optimize the full scale of their distillation towers and facilities to produce the most valued combination of refined products. To some extent, refiners can blend some tight oil/condensate into heavier crude to add marginal volume use and tap the opportunity of the domestic production surge, but eventually to absorb all the condensate that is being produced, refineries will have to make large capital investment in new distillation tower capacity. Condensate's high naphtha yield reduces the working capacity of the tower. Valero is reconfiguring its existing tower at its Houston plant to be able to accommodate more condensate as is Marathon in Ohio and Kentucky facilities. Kinder Morgan is also commissioning a new splitting facility in Houston. But a lot of the rising U.S. condensate production is currently being sold to Canada for use as a diluent. By 2016-2017, the increase in condensate production is projected to exceed U.S. refiners and Canada's ability to absorb flows easily. As a result, the United States may need to relax restrictions for the export of field condensate or much of the incremental oil output from shale development will become increasingly physically unusable except outside the United States. In this case, lack of a clear export policy would lead to a reduction in further production increases of natural gas and tight oil.

The CHAIRMAN. Ms. Jaffe, thank you.
Mr. Weiss.

STATEMENT OF DANIEL J. WEISS, SENIOR FELLOW AND DIRECTOR OF CLIMATE STRATEGY, CENTER FOR AMERICAN PROGRESS

Mr. WEISS. Chairman Wyden, Ranking Member Murkowski and Senators of the Energy Committee, thank you for the opportunity to testify about whether to lift the crude oil export ban.

Since 2008 the United States has produced more and used less oil due to advances in drilling technology, innovatively employed by Mr. Hamm and his company and due to more efficient vehicles. This reduced oil imports and lowered our vulnerability to a foreign oil supply disruption that could cause a gasoline price spike. Lifting the ban on crude oil exports could squander this recently improved energy security and price stability.

To maintain these benefits we urge you to defend the existing domestic crude oil export ban.

When Congress passed it in 1975 the U.S. produced 64 percent of its oil and liquid fuels while importing only 36 percent. In 2013 we produced and imported nearly the same proportions of petroleum. The only experience we've had in the United States of lifting an oil export prohibition occurred following the 1996 removal of a ban on Alaska oil exports. During the ban much Alaskan oil was shipped to the West Coast.

A Congressional Research Service analysis found that lifting the oil ban tripled the already existing price difference between West Coast and national gasoline prices. CRS concluded that "when Alaskan oil exports ceased, the gasoline price differential between the West Coast and the national average did decline." Lifting the nationwide crude oil export ban could similarly raise gasoline prices.

The analysts Barclays Plc. predicts that lifting the export ban could add \$10 billion a year to consumers' fuel bills. Without the ban oil companies could sell their oil at the higher world market price which the Energy Information Administration projects will average \$9 per barrel higher this year. In fact yesterday the foreign domestic price spread for oil was \$10 a barrel.

Although domestic production has significantly grown over the past 5 years, thanks to Mr. Hamm and many of his colleagues, the Energy Information Administration projects that crude oil, I'm sorry, that crude oil production will peak in 2019 and begin a steady decline after that. This energy abundance could be a temporary phenomenon.

The EIA also predicts that in 2014 the U.S. will consume 5 million barrels per day more of oil and liquids than we produce. This gap between demand and supply will continue at least through 2040 growing by 13 percent. I'd advise you to look at the chart that the clerk has. Thank you.

This is hardly energy independence. Gesundheit. Any domestic oil sold overseas, my mother raised a polite son.

[Laughter.]

Mr. WEISS. Any domestic oil sold overseas must be replaced by more expensive imported oil which could raise gasoline prices. The replacement oil would likely be heavy crude imported from Venezuela and Canada. As you know Venezuela is not very friendly to the United States. Although Canada is our closest ally, its heavy tar sands oil produces nearly double the carbon pollution responsible for climate change compared to conventional U.S. oil as measured from well to tank by the National Energy Technology Lab. Neither of these are good options.

The U.S. imports more oil from the Organization of Petroleum Exporting Countries or OPEC than any other single source. OPEC oil is vulnerable to supply disruptions. EIA found recently that interruptions "may occur frequently for a variety of reasons including conflicts and natural disasters." Oil produced in the United States is significantly less vulnerable to supply disruptions and therefore provides more energy security.

As Mr. Hamm and Ms. Jaffe both noted, the U.S. is exporting 3 million barrels per day of refined petroleum products. So we are exporting oil already, but as a finished product made by American workers. That explains why AFL/CIO President Richard Trumka opposes the export of crude oil. He would rather see that oil kept here and made into a product by American workers rather than shipped as a raw feed stock to be made into a product by foreign workers.

Now oil companies are doing quite well. They're already making huge profits even with the export ban. The 5 largest oil companies, BP, Chevron, ConocoPhillips, ExxonMobil and Shell, made a combined total profit of over one trillion dollars in the last decade and that figure is based on their quarterly reports.

Our transportation system is almost entirely powered by oil which makes crude oil different from many other commodities. American families, the economy and our energy security are vulnerable to sudden foreign oil supply disruptions and price spikes. We must invest in alternative, non-petroleum transportation power including electric vehicles, advanced clean biofuels and public transit to reduce this exposure of relying on only a single fuel for such an important part of our economy.

Now there's no independent evidence that energy security or fuel prices will remain unchanged after the removal of the crude oil export ban. President Obama and Congress should maintain our re-

cent gasoline price stability and energy security by defending the ban on crude oil exports.

Thank you for having me and happy to answer any questions.
[The prepared statement of Mr. Weiss follows:]

PREPARED STATEMENT OF DANIEL J. WEISS, SENIOR FELLOW AND DIRECTOR OF
CLIMATE STRATEGY, CENTER FOR AMERICAN PROGRESS

Chairman Wyden, Ranking Member Murkowski, thank you for the opportunity to testify about whether to lift the crude oil export ban.

Since 2008, the United States produced more and used less oil due to advances in drilling technology and more efficient vehicles. This reduced oil imports and lowered our vulnerability to a foreign oil supply disruption that could cause a gasoline price spike. However, the Energy Information Administration predicts that the growth in oil production will peak in 2019, and domestic production will slowly decline after that.

Lifting the ban on crude oil exports could squander this new energy security and price stability. To maintain these benefits, we urge you to defend the domestic crude oil export ban.

After the 1973 Arab oil embargo, Congress enacted the Energy Policy and Conservation Act, which banned nearly all exports of domestically produced crude oil to keep this precious commodity at home and insulate drivers from price shocks.¹ At the time of the ban, the U.S. produced 64 percent of its oil and liquid fuels, while importing only 36 percent.² In 2013, we produced and imported nearly the same proportions of petroleum.

The only real-world experience of lifting an oil export prohibition occurred following the 1996 removal of a ban on Alaska oil exports.³ During the ban, much Alaskan oil was shipped to the West Coast. A Congressional Research Service analysis found that lifting the oil ban exacerbated the existing price differential between West Coast and national gasoline.

In 1995, West Coast pump prices [were] only 5 cents per gallon above the national average. But by 1999 West Coast gasoline was 15 cents per gallon higher. When crude exports stopped in 2000, the average [difference]. . . was 12 cents; it [later] narrowed further to 7 cents. . . . When Alaskan oil exports ceased, the gasoline price differential between the West Coast and the national average did decline.⁴

This experience suggests that lifting the nationwide crude oil export ban could similarly raise gasoline prices. Barclays Plc. predicts that lifting the export ban could increase total spending on motor vehicle fuel by \$10 billion a year.⁵ Sandy Fielden, director of energy analytics at RBN Energy, told Bloomberg that if there are more oil exports “The most obvious thing that’s going to happen is that crude prices will go up and so will gasoline.”⁶

If the ban is lifted, oil companies could sell some of their oil at the higher world market price, which the Energy Information Administration projects will average \$9 per barrel more in 2014 for some domestic oil.⁷

The Energy Information Administration predicts that in 2014 the U.S. will consume 5 million barrels per day (mbd) of oil and liquids more than we produce. This gap between demand and supply will continue at least through 2040, ultimately growing by 13 percent. Domestic oil sold overseas must be replaced by more expensive imported oil. This higher price could be reflected in higher gasoline prices.

¹Energy Policy and Conservation Act, Public Law 94-163, 94th Cong., 1st sess. (December 22, 1975), available at <http://thomas.loc.gov/cgi-bin/bdquery/z?d094:SN00622:@@L&summ2=m&>.

²Energy Information Administration, AEO2014 Early Release Overview (U.S. Department of Energy, 2014), Figure 12, available at http://www.eia.gov/forecasts/aeo/er/early_production.cfm.

³Lawrence Kumins, “West Coast and Alaska Oil Exports” (Washington: Congressional Research Service, 2013) available at http://assets.opencrs.com/rpts/RS22142_20060525.pdf.

⁴Ibid.

⁵Bradley Olson and Dan Murtaugh, “Falling Gasoline Hurts Exxon Plea for U.S. Crude Exports,” Bloomberg Business Week, January 28, 2014, available at <http://www.bloomberg.com/news/2014-01-28/falling-gasoline-hurts-exxon-plea-for-u-s-crude-exports-energy.html>.

⁶Ibid.

⁷Energy Information Administration, “Light Louisiana Sweet (LLS) crude oil now sells at a historically large discount to Brent,” This Week in Petroleum, December 11, 2013, available at <http://www.eia.gov/oog/info/twip/twiparch/2013/131211/twipprint.html>.

The U.S. imports more oil from the Organization of Petroleum Exporting Countries (OPEC) than from any other single source. OPEC oil is very vulnerable to supply disruptions.⁸ EIA found that interruptions

May occur frequently . . . for a variety of reasons, including conflicts [and] natural disasters . . . Total outages among the Organization of the Petroleum Exporting Countries (OPEC) producers recently rose to historically high levels.⁹

A commission of retired senior U.S. military officers recently noted that “No matter how close the country comes to oil self-sufficiency, volatility in the global oil market will remain a serious concern.”¹⁰

Oil produced in the United States is significantly less vulnerable to supply disruptions and therefore provides more energy security.

There is little benefit to Americans from lifting the ban, particularly since oil companies are already making huge profits even with it. The five largest oil companies—BP, Chevron, ConocoPhillips, ExxonMobil, and Shell—made a combined total profit of \$1 trillion over the last decade, based on their quarterly financial reports.¹¹

In 2013, the United States exported an average of nearly 1.5 mbd of diesel fuel and finished motor gasoline.¹² The sale of finished products enables American workers to provide added value to the crude oil. AFL-CIO President Richard Trumka opposes lifting the oil export ban because he believes that American workers should make crude oil into refined products here, rather than export it and refine it overseas.¹³

Our transportation system is almost entirely powered by oil and liquid fuels.¹⁴ Since we continue to import one-third of our oil, American families, the economy, and our energy security remain vulnerable to sudden supply disruptions and price spikes. We must invest in alternative, non-petroleum transportation fuels, including electric vehicles, advanced clean biofuels, and public transit to reduce our dependence on vulnerable oil supplies. These investments would also reduce carbon pollution responsible for climate change.

Currently, there is no independent analysis that predicts that energy security and fuel prices would remain unchanged after the removal of the crude oil export ban. President Obama and Congress should not trade away our enhanced gasoline price stability and energy security. Instead, you should join together to defend the ban on crude oil exports.

The CHAIRMAN. Mr. Weiss, thank you.

Thank all of you. It's been very helpful.

I'm just going to ask one question to start this off and particularly about what jumped out at me.

Mr. Hamm and Mr. Burnett have different views. Mr. Hamm is for lifting the restriction on oil exports and Mr. Burnett is not. But both believe the same benefits and potential pitfalls exist for their preferred policy position. Lower prices, if the Senate follows their advice, higher prices if we don't.

⁸Energy Information Administration, “U.S. Imports by Country of Origin,” available at http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbldpd_a.htm (last accessed January 2014).

⁹Energy Information Administration, Short-Term Energy Outlook Supplement: EIA Estimates of Crude Oil and Liquid Fuels Supply Disruptions (U.S. Department of Energy, 2013), available at http://www.eia.gov/forecasts/steo/special/pdf/2013_sp_05.pdf.

¹⁰Commission on Energy and Geopolitics, “Oil Security 2025: U.S. National Security Policy in an Era of Domestic Oil Abundance” (2014), available at http://secureenergy.org/sites/default/files/Oil_Security_2025_0.pdf.

¹¹Daniel J. Weiss, “Big Oil's Lust for Tax Loopholes: Oil Prices and Profits Rise While Big Oil Defends Its Tax Loopholes,” Center for American Progress, January 31, 2011, available at <http://www.americanprogress.org/issues/green/news/2011/01/31/8951/big-oils-lust-for-tax-loopholes/>.

¹²Energy Information Administration, “Exports,” available at http://www.eia.gov/dnav/pet/pet_move_exp_dc_NUS-Z00_mbbldpd_m.htm (last accessed January 2014).

¹³Clare Foran, “AFL-CIO President Opposes Lifting Ban on Crude-Oil Exports,” National Journal, January 14, 2014, available at <http://www.nationaljournal.com/energy/afl-cio-president-opposes-lifting-ban-on-crude-oil-exports-20140114>.

¹⁴Energy Information Administration, “Energy Consumption by Sector and Source, United States, Reference Case,” available at <http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2013&subject=2-AEO2013&table=2-AEO2013®ion=1-0&cases=ref2013-d102312a> (last accessed January 2014).

So the question then becomes for me how can this be?

We've got two very thoughtful individuals here and they have diametrically opposed views. They think the same benefits and same pitfalls will ensue for their position.

So is this a lack of knowledge on the effects of the policy?

Is it possible, as Ms. Jaffe alluded to in her written testimony, that different regions of the country would be affected in different ways and is the question if export restrictions are lifted is it possible that America would see prices go up in some parts of the country and down in others?

So let me just zip down the row and hear the 4 of you weigh in on that.

Mr. Hamm.

Mr. HAMM. Thank you, Chairman Wyden.

I think it comes down to one example I can give. Recently Bill Day, spokesman for Valero Energy, the largest oil refinery in the United States, they used to talk about the nationwide export ban. He said it insulated American consumers from geopolitical price shocks.

But in reality he told the market recently and these graphs that he handed out was that it provided a particular unfair advantage, if you will, in the market to Valero because they were seeing pressure on refineries outside of the U.S. and closures occurring. In fact this year projected about a million barrels a day refinery closures, last year about a half million barrels and 1.6 million barrels per day the previous year.

Now I think we all realize that refinery closures is not good for consumer prices anywhere that they're occurring. They're not good for my business. We need refineries that we can get oil to. If we're forcing the refineries out of business with an unfair advantage that they have, that they've been given, that's not good for anyone.

So the difference between me as the producer without a refinery and this gentleman with a refinery is considerable.

The CHAIRMAN. Same question, Mr. Burnett.

Mr. BURNETT. I think the fundamental difference in our position is whether U.S. oil prices would go up or go down as a result of exports. It's my position that if the U.S. begins exporting crude oil the OPEC producing countries in Saudi Arabia in particular will act to maintain crude oil price by reducing their output. So my logic is based on the fact that crude oil prices will rise to an international level will not decrease.

The net result of that would be increased feed stock cost to our refineries and the closure of refining capacity in the United States, particularly in the Northeast. The consequences of that is less supply of gasoline and other fuels and higher costs.

Thank you.

The CHAIRMAN. Alright.

Ms. Jaffe, you sort of started this by the allusion that there may be regional differences. So let me let you take a crack at this.

Ms. JAFFE. So first I have to talk about how the international oil market works because sometimes people are unclear. When we export refined products globally it means that refiners in Europe have bought those products and they have cut their refinery runs. So therefore OPEC is already affected because they cannot sell

more of their crude oil to Europe because those refinery runs are shut and our gasoline exports are already hurting OPEC.

Whatever OPEC policies they will take, they will take whether we export the products or whether we export the crude oil. So that is not the issue. Right?

The issue is the oil market. We have a slogan in the oil market. We call it the Tyranny of Geography.

The Tyranny of Geography means that whether I'm selling refined products or whether Mr. Hamm is selling his crude oil, he wants to sell it to the closest possible refiner because that is how he makes the highest amount of money because the transportation cost eats into his profits. That means that even if we were to lift the export ban the crude oil would first and foremost look for a buyer inside the United States because that is how it would be most profitable, because that would be the cheapest transportation.

Now if it happened that there was a refinery in Mexico or Canada that would benefit, actually most of our condensate today is going to Canada for use as a diluent for the transportation of heavy crude. The oil will flow to the best possible use.

Now what that can mean in when we have bottlenecks whether that's a pipeline bottleneck or we have some kind of a transportation bottleneck or we have some kind of regulatory bottleneck is that those bottlenecks create some distortions that might artificially lower prices in one particular geography for a particular time until that bottleneck is removed.

The CHAIRMAN. I'm over my 5 minutes.

Mr. Weiss, quickly.

Mr. WEISS. I'll be very quick, thank you.

It's important to note that we really don't export very much gasoline right now, a little bit less than 400,000 barrels a day. The primary product we export, particularly in Europe is low sulfur diesel. That's about a million point two barrels per day.

So I don't see that as being a real challenge.

I would agree with Mr. Burnett that it's tough to try and lower the price when the price of the commodity is controlled by a cartel that is committed to having at least \$100 barrel oil. So I would see that it would not lower prices at all to allow exports of gasoline, sorry, exports of oil.

The CHAIRMAN. Alright.

We'll continue this discussion. Just know that the Pacific Northwest has a history of some of the highest gasoline prices in the country. So if there are issues relating to the Tyranny of Geography in some way, you can be sure that the people that I represent are going to be very interested in that issue and steps taken to protect them and their well being.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Mr. Weiss, you had made reference to the Alaska export issue. There was also an essay that was recently released from the Center for American Progress. I guess it was published this week that also made some claims about Alaska and crude oil exports.

Mr. Chairman, I want to insert into the record a 1999 study* from the GAO that examined the impacts of lifting the ban on crude oil exports from Alaska. In that report they state despite higher crude oil prices for some refiners no observed increases occurred in the prices of 3 important petroleum products used by consumers on the West Coast, gasoline, diesel and jet fuel. This wasn't cited in the essay. I'd also like to submit for the record a report** from CRS back in 2006 which was also cited in this essay.

The CHAIRMAN. Without objection, that's ordered.

Senator MURKOWSKI. It's important that we make sure that we've got the full quotes in context there. So I wanted to make sure that we included that.

Ms. Jaffe, you mentioned the Tyranny of Geography. I was just reading an article reported yesterday where because of the glut of the oil coming from the North, in North Dakota, into the Gulf refineries that Texas is actually looking to move their crude through the Panama Canal up to the refineries in California. It speaks to the issue of alignment that Senator Landrieu mentioned that we get to a point where we're going to have a mismatch between what we are producing domestically and our ability to meet the needs, the capacity, within our refineries.

So just understanding and appreciating that it's getting to the point now where we've reconfigured as many refineries as we can. Maybe there's a little more room there. We're looking to some pretty significant decisions when you're moving crude from Texas through the Panama Canal to come up to the West Coast refineries and still hoping to make a profit there. We're looking for some solutions.

But this issue of timeliness is one that I have been trying to track. In EIA's latest oil market report they say the growing volumes of light, tight oil that cannot leave North America are increasingly posing a challenge to industry, putting the spotlight, of course, on where we are today which is the oil export ban. So this timeline comes up a lot in discussion.

I'm not asking Mr. Hamm or Ms. Jaffe for a date certain. But really what is your general sense on when these initiatives collide, if you will, with production? When do we hit that misalignment or that mismatch that could then cause some real disruption? Again, something, I think, we all tried to avoid.

I'll start with you, Mr. Hamm and then Ms. Jaffe.

Mr. HAMM. OK. Thank you, Senator.

I think the mismatch is beginning to happen already. You know, so many refineries were outbidded and they're refitted, you know, for heavier crude when it didn't look like supplies would be here domestically. That most of what they'd be refining would be the tar sand, the bitumen oil.

So without those retrofits the sweet crude doesn't fit very well with some of them. So, but you need to move that then to the more efficient ones that could handle this light, sweet, low sulfur, premium crude oil that we're producing in North Dakota and other places in the U.S. now.

* Study has been retained in committee files.

** Report has been retained in committee files.

So the mismatch is beginning to occur. A lot of people expected it to occur almost as quickly as the oversupply of natural gas. But there, supply and demand was equal. Price had been elevated a little bit with projections of shortage in the future, but with oil we've come from a 60 percent deficit with the oil in the U.S. or imports being 60 percent and reduced that half way to about 32 percent in 9 years. That's a really good move and a historic first.

Senator MURKOWSKI. Let's go to Ms. Jaffe. Mr. Hamm says it's coming soon. When are we going to see a mismatch?

Ms. JAFFE. When you look at the sort of specialized models for the trading of products and crude oil people anticipate that by 2016 our condensate flows will be so high that mixing them into the crude stream exports to Canada, use in petrochemicals, use in refining, will max out for our physical facilities unless there's some giant upsurge in investment for specialized equipment which is not on the horizon right now. In 2016 we would face a situation where companies like Continental Resources might actually have to stop drilling because there would be a containment problem. We would not be able to find a place to store all of this condensate if we can't produce it and export it.

Senator MURKOWSKI. We haven't seen a new refinery since in 25 years?

Ms. JAFFE. We have seen two companies that I know of, Marathon and Valero. Valero has put in—expanded a distillation tower in such a way to use more condensate. Marathon has made an investment in Ohio.

But, you know, these kinds of investments take time. So, you know, if we don't have a giant amount of investments announced in the next year or so then I think that it will be very difficult to absorb the condensate flows.

Senator MURKOWSKI. I am well over my time. I know that Mr. Weiss is sitting—

The CHAIRMAN. Without prejudicing any Senator's time, if you could quickly offer your view?

Mr. WEISS. Yes, thanks.

The Energy Information Administration has documented that the refining capacity in the last dozen years, since the year 2000, has increased by about two and a half million barrels per day even though we haven't opened a new refinery. That utilization rate is at about 87 percent. So, and third, there are numerous refineries that are going to be expanding over the coming years in North Dakota and Texas.

The CHAIRMAN. Senator Manchin is next and then Senator Hoeven.

Senator MANCHIN. Thank you very much, Mr. Chairman.

This will be a simple yes or no. Then if the answer would be no, if you could briefly explain why you would be no on this question.

Do you all believe that the XL pipeline, Keystone pipeline, would be a strategic advantage to the United States of America?

Mr. Hamm.

Mr. HAMM. Yes, I have certainly been in that camp, remain in that camp. You know, the thing that really hurt everybody up there is this delay that's going on with it.

Senator MANCHIN. So you're in favor of it? You're a yes on that?

Mr. Burnett.

Yes on that, Mr. Burnett.

Ms. Jaffe.

Ms. JAFFE. Yes, I think the only way to keep the Canadian oil sands in the ground is to lower demand.

Senator MANCHIN. But you're in favor of the pipeline?

Ms. JAFFE. I think if we have the demand for the oil we need to transport the oil by pipeline and not in other ways.

Senator MANCHIN. Gotcha.

Mr. Weiss.

Mr. WEISS. No, I'm not because of the huge increase in carbon pollution that would occur and because most of the oil would be refined into other products and exported overseas. So we get to keep the pollution. Other countries will get the petroleum products.

Senator MANCHIN. Gotcha.

My next question would be for those of us who do and in especially, you know, all of our states, but in West Virginia we don't understand. We keep talking about energy independence. We're having so much more and actually we're still paying high prices at the pump.

Can you explain, Mrs. Jaffe, but briefly, the OPEC's position? Are they always going to maintain that, the cartel, maintain that, the oil cartel and be able to control the pricing, world pricing, since we have such a large find, if you will? It looks like we're going to be in this position for quite some time.

Can that ever change to where we, in America, can benefit from the price?

Ms. JAFFE. So the past literature shows that the higher OPEC's market share, the more monopoly power they have to control the price. So as the United States becomes a bigger producer and let me say that the EIA projections are just based on current knowledge. We're having a total paradigm shift in the way we look for and produce oil, not only in the United States, but probably eventually around the world.

So these temporary projections about the peak, in my opinion, will turn out to be incorrect.

Senator MANCHIN. The difference of price.

Ms. JAFFE. Will be incorrect.

Senator MANCHIN. The difference, yes.

Ms. JAFFE. So the point is—

Senator MANCHIN. Yes.

Ms. JAFFE. As the United States and North America and Mexico and other countries produce more oil from unconventional resources. OPEC will have a smaller and smaller share of the market and therefore their producer power will be reduced over time to the extent that the United States exports LNG and exports crude oil at free market prices and countries that are in Europe and countries in Asia are able to buy spot market, incentive oil and gas at market competitive prices where we control anti-trust laws for the companies that sell and buy it. Right?

Then OPEC's power will be reduced dramatically over time.

Mr. WEISS. Senator Manchin, can I just?

Senator MANCHIN. The other person I wanted to ask you, but I'm going to ask Mr. Weiss to just comment.

Mr. WEISS. Just quickly. Three years ago the Saudi Oil Minister said that they wanted to have oil at \$100 a barrel, the world price. That's about what it's been with some exceptions, went up to \$125.

Senator MANCHIN. Sure.

Mr. WEISS. They are a cartel. They control about 40 percent of the oil that's produced. It's very easy for them, as Mr. Burnett was saying, to turn the spigot one way or another to get the price they want. That's how cartels work.

It's hard to see the United States increase in production at a million barrels a year, two, here/there, being able to really challenge that power.

Senator MANCHIN. The other thing would be the pricing, the way the pricing on crude or oil verses the pricing on natural gas. Why is there such a difference there? I mean we're not on the world market with gas and we have a lot more flexibility on gas, Mr. Weiss?

Mr. WEISS. There is not a worldwide market in natural gas in the way there is in oil. Gas, that's \$5 a million BTU here, is \$15 or so in Japan. It's because it's transportation is harder and because the supply is much more—

Senator MANCHIN. Finally, very quickly, for either Mr. Hamm or Mr. Burnett.

Do you all see feasibility for us bringing the price of gasoline at the pump down for the people, especially in West Virginia and all over the country? Are they ever going to see any relief at all?

Mr. HAMM. We've seen a decrease of about 20 percent with both diesel and gasoline over the past 18 months. I think everybody has realized that from California.

Senator MANCHIN. They haven't seen a 20 percent decrease in the price at the pump. I mean, we're still at \$3.30, \$3.50, \$3.60 in that neighborhood there.

Mr. HAMM. In some you'll see that. In Oklahoma City we're about \$2.85, \$2.90. It's down about 60 cents a gallon.

With diesel we run it close to \$5.00.

Senator MANCHIN. If someone would help me explain why West Virginia is still paying such high prices.

Mr. Burnett, very quickly and my time is up.

Mr. BURNETT. Seventy-two percent of the price of gasoline in the pump is due to crude oil price. When you lower crude oil price the gasoline will come down.

Senator MANCHIN. I'm sorry, Mr. Chairman.

The CHAIRMAN. To our guests we're going to have to call a little bit of an audible here because we've been told that there are going to be 4 votes on the Senate Floor at 11:15. So by my calculation each of the remaining Senators can have their 5 minutes. That will be good.

Senator Hoeven.

Senator HOEVEN. Thank you, Mr. Chairman.

First, Mr. Burnett, I want to commend Delta for buying a refinery in Pennsylvania and operating it. I think that's very good and particularly for using Bakken crude from North Dakota in that refinery. We appreciate that.

Also, Andi Newman, who is here with you today, is an outstanding individual and does a great job in government relations. I want to commend you on her as well. Thank you very much.

Mr. BURNETT. Thank you very much.

Senator HOEVEN. My questions are for Mr. Hamm.

I think the No. 1 priority for Americans when you talk energy is they want what they call energy independence. I know you would refer to it as energy security because it's a global market, but essentially producing more energy than we consume.

I can't think of anybody that's done more to help us achieve that. We're not there yet. But I can't think of anybody that's done more to help us move in that direction than yourself.

So my first question for you is what can the Federal Government do to help us produce more energy in this country, but specifically more crude because that's what you do? What can the Federal Government do to help us continue to increase our crude production?

I look at this graph and that doesn't show us producing more than we consume. So how do we get there? What can we do?

Mr. HAMM. First of all we need to change some rules that are totally archaic like the FCC rule today that limit what we can put on the books to 5 years. A lot of these resource plays, your Bakken for instance, it's going to take the next 15, 20 years to develop it. Yet I can't put those on my books. EIA doesn't get the numbers. So those numbers are totally distorted.

We had to teach them how to count. At one time they was only taking the crude oil numbers and not putting any of the natural gas to liquids in. Once they did that they finally realized that we're up about 12.6 million barrels a day production in this country.

So that's the first thing. We've got to get the numbers right. Those numbers are totally pessimistic.

The next thing, do no harm. You know, we're going down the right path. If we don't have a lot of tax changes and things like that. If we can get this export ban lifted where people can go ahead with their business, we can get there.

I don't know who you got it from. I'm jaundiced so I look at the rocks. But really what we produced in the past in this country for the past 160 years is basically what leaped off of these source rock beds. Now we can produce those source rocks effectively with horizontal drilling.

We're on our way to get there both with gas and with oil. All we need to do is basically do no harm.

Senator HOEVEN. My second question goes to transportation.

Recently they had accidents with rail moving crude. Of course, we need to address that and you know that. Tell me what we can do, what we should do, what you're doing, so that we can make transportation of crude by rail safer?

Mr. HAMM. Rail has come a long ways, you know, since basically it was deregulated. The regulations that put it out of business, as we all know, is deregulated. It's come back. It's doing a good job. We're seeing a lot of rail companies that are doing tremendous.

I think there's 3 things.

First of all in the oil field, safety is ultimate. So prevention of accidents, preparation, everybody is working on that.

So rerouting trains effectively, they're doing that. Twice the rail inspections, they're going to two a month at least on everything. Anything that's congested they're trying to handle it as quickly as they can.

So this is a new thing. It's come out there since standardization needs to be done. The rails are into it. They're working on it. Safety is of utmost importance to them. They're certainly doing their job.

Senator HOEVEN. As we develop more energy we need infrastructure. That means both pipelines and rail. Would you agree with that?

Mr. HAMM. I do and certainly pipelines, you know, rail costs more. It will put the oil to the places you need it, like his refinery and do it quickly. But pipelines eventually will take the place of it.

Senator HOEVEN. Just concluding question.

How do we both expand and develop more refineries? We're building a refinery in North Dakota. I think the first one in 25 years or something, Greenfield. But how do we get more refinery expansion and development in this country?

Mr. HAMM. The gentleman is right. There have been some capacity added to existing refineries over the years because you couldn't start one from scratch. There's so much Federal regulation you just couldn't start one. So basically expansion and add new tires and stuff has been done by the refining industry.

You know, I think that overall, you know, looking at the regulations that hinder them from building new ones that are more efficient and better certainly needs to be looked at as we go forward.

Senator HOEVEN. Yes, Mr. Burnett? It's got to be quick. I'm tight on time here.

Mr. BURNETT. My position is that there is sufficient capacity in the United States today in refining to be able to absorb all of the title that's being produced. The issue is infrastructure in getting the oil to the refineries.

We at Trainer Refinery started taking some Bakken. We would certainly like to take more, but the infrastructure isn't there yet. But these projects are all in progress. So it's just a lag effect from the fact the oil is there. It's being produced. There's a lag in the infrastructure, but it will come.

Senator HOEVEN. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

We have 15 minutes for 3 Senators.

Senator Heinrich.

Senator HEINRICH. Thank you, Chairman.

I want to go back to Ms. Jaffe on something that you touched on and then would like to get everyone's thoughts on it. It's one of my concerns here is just the potential lost opportunity cost in terms of are we exporting crude or are we exporting those refined petroleum products. It seems to me that we create more jobs by exporting refined petroleum products than by exporting crude.

Can you expand on that and then if any of you disagrees with that position, explain to me how we create more jobs by exporting crude oil than exporting refined petroleum products because when I was a kid, you know, my mom sewed Levis. We had a textile in-

dustry here. Now we just export wool and we export cotton. We don't make it into products here and those jobs have gone away.

Give me your thoughts on that.

Ms. JAFFE. I have an opinion on that. You know, when you're doing complex trading it's kind of hard to say. But what I would say generally speaking is that the experience in the industry is that companies like Continental Resources when they have better cash-flows they invest more of those cash-flows into drilling. Therefore we have even more oil in this country. Right? That drilling creates a lot of jobs.

When a refinery raises its through put rate to 90 percent versus 80 percent that probably doesn't create very many jobs at all. Refining is a very job—not a very job intensive industry. That's part of the reason why Saudi Arabia has so much trouble creating jobs inside the country because refining and petrochemical is not a labor intensive industry the way textiles is. So I would say on balance if your goal was just 100 percent jobs you would create more jobs having more cash-flow through the upstream side of the oil industry than the downstream side.

Senator HEINRICH. Mr. Weiss.

Mr. WEISS. Very quickly. Sorry.

The University of Massachusetts did a study several years ago that found that investments in oil production create one third the number of jobs compared to investments in wind, solar and other forms of clean energy. So if jobs in energy is what you're interested in, than investments in renewables has a much bigger payoff than investment in petroleum. In any aspect petroleum is very capital intensive, not as labor intensive.

Senator HEINRICH. Mr. Hamm and then we'll get to you, Mr. Burnett too.

Mr. HAMM. Yeah, I agree with Ms. Jaffe. Escort it where you want those jobs. There have been more jobs created in the upstream sector than anywhere else over the last 10 years.

So refineries, I used to work in one. It's not very intensive from a man power standpoint whether you're running 80 or 95 percent capacity it's about the same. So, but in our business we've created a lot of jobs.

Senator HEINRICH. Mr. Burnett?

Mr. BURNETT. One thing I want to emphasize is that the export of products is into a free and competitive market. Exported crude is not into a free market. It's controlled by OPEC.

I believe it's better for the United States to keep the added value in country. If you look at the producing countries around the world they are all building refineries, mega refineries, because they want the added value to stay in country too.

Thank you.

Senator HEINRICH. Great.

In the interest of getting to Senator Baldwin I'll—and Senator Scott, I'll yield back the last of my time.

The CHAIRMAN. Thank you. Gracious, as always.

Senator Scott.

Senator SCOTT. Thank you, sir.

Dr. Jaffe, I believe that our trade deficit is one of the biggest threats to our national security. In your testimony you touched on

how lifting the export ban on crude oil could help improve our trade deficit.

Could you expand a little bit on how exactly lifting the ban will improve our trade balance, particularly in regards to China?

Ms. JAFFE. Yes. So we're going to be, hopefully, in the unique position where our imports of crude oil which are a huge part of our trade deficit are going to go down over time. We're already seeing that.

We're going to have a situation where China is going in the opposite direction. They're going to have a higher and higher, rising amount of their trade is going to be for importing crude oil.

So as we move forward they will be increasing in their debt and their vulnerability to the international oil market. We will be able to strengthen our economy through these improvements in our trade balance.

I think that one of the things that China does from my travels there and discussions with them over geopolitics is they have us in a great cycle. They support Iran. They support other players in the Middle East that cause disruptions and instability. We have to spend our tax dollars sending our military out there and our young men to try to help with those troubles. That makes us more indebted to China because they're buying our treasury bills and bonds and so forth.

So, you know, when we can get out of that pattern we are not having this constant burden of rising prices and it's a burden on our trade balance. China is the one that feels the pain of all the instability in the Middle East. I think we'll find it easier to bring China to the table to negotiate with us about stability internationally.

Senator SCOTT. Thank you.

Before I hear Mr. Weiss, I wanted to get one more question in and then give you the balance of my time.

Mr. Hamm, you've been one of the best guys at this unconventional business, so to speak. When I read through your testimony you said that by 2025 we could see another million jobs or so coming out of the oil and gas industry. When you think about not lifting the export, the crude oil export cap, what does that do to our economy?

I know in North Texas we've seen the tremendous surge, North Dakota as well. Would this have a major impact on the jobs that could be created if we don't lift our ban?

Mr. HAMM. It could, particularly as Ms. Jaffe talked, you know, with some of the transitional plays such as in Texas with Alford. It produced a lot of condensate, per se, you don't have anywhere to go with them. It can certainly put a cap and stagnate what we're doing in the future.

So it's not a good thing if we're going to keep this industry going and get to where we're energy independent and cause OPEC to have a severe step back, then we need to follow through with this.

Senator SCOTT. Thank you, sir.

Mr. Weiss, do you want to comment on?

Mr. WEISS. Thank you, Senator Scott.

As long as we have the difference between consumption and supply here we're going to have a trade deficit on oil whether we ex-

port or not because if we export more oil the light, sweet crude we're going to have to import more import to make up for that gap. If one is concerned about reducing our oil trade deficit the No. 1 thing we could do is dramatically reduce consumption. We have new fuel economy standards that will get us to 54.5 miles per gallon by 2025 for the average car.

We could go beyond that after 2025. That's how we would reduce our trade deficit by dramatically reducing our consumption.

Senator SCOTT. Two things. I saw you shaking your head, Ma'am, Dr. Jaffe. Before you comment I would say that we could very quickly solve the problem of our deficit by allowing us to get on our Federal lands where we have hundreds of years of resources.

But, Dr. Jaffe.

Ms. JAFFE. Yes, I just want to point out every refinery in this country has a different configuration of what kind of crude oil it can or can't refine. Whether we export or don't export we're not going to physically change that except over a 10-year period, maybe over time. Right?

Because of the Tyranny of Distance refiners will invest regardless of whether we're exporting or not. If we have an imbalance in quality, right, we're either going to leave it in the ground or we're going to export it. If we're having an imbalance on what kind of quality of crude we can refine in this country and what kind of quality of crude we can't.

There may be a time when we could produce as much light crude in this country as could be physically, you know, by barrels that we need. But we're still going to need heavy crude because there's just going to be some refineries that already exist in the Gulf Coast that have certain configurations. There's just only so much light crude they can put through the system.

Senator SCOTT. Right.

Ms. JAFFE. We're always going to have to import heavy crude.

Senator SCOTT. Thank you.

I yield back the balance of my time.

The CHAIRMAN. Thank you.

Senator SCOTT. Which is a negative 16 seconds.

[Laughter.]

The CHAIRMAN. Thank you, Senator Scott.

Senator Baldwin.

Senator BALDWIN. Thank you, Mr. Chairman.

As I mentioned earlier Wisconsin is experiencing a propane crisis right now, very short supplies, increasing prices. So I'm very interested in the subject matter of this hearing from a perspective of how it will affect propane.

I have two questions for you, Mr. Burnett.

I mentioned earlier that one of the major components of our propane shortage in the Midwest has been the result of significant infrastructure changes. Pipelines that have served the region for decades are being repurposed to serve new oil fields. We understand that one pipeline, Cochin, in April will be repurposed, but has traditionally supplied propane to our area.

As oil production increases I think these infrastructure pressures will only increase. If more American infrastructure is dedicated to

oil that's heading overseas is there adequate remaining infrastructure in the United States to ensure that other essential fuels like propane continue to flow to Americans?

Mr. BURNETT. Whether the crude oil is refined domestically or exported the logistics problems will remain the same. Historically in the United States crude oil arrived in the Gulf Coast and all of the movement was from south to north. Since the advent of shale oil the movement has reversed and is moving from north to south and repurposing pipelines to get more and more shale oil to where it needs to go into the refineries.

So I don't know if that answers your question, but I think that it's going to continue.

Senator BALDWIN. No.

Mr. BURNETT. But I think it's also a very good argument for Keystone XL as well.

Senator BALDWIN. Do we know what impact the export of crude oil will have on the prices and the availability of propane and other critical fuels that are used in everyday life to heat homes and power tractors and do all sorts of other things?

Mr. BURNETT. I'm afraid I don't know the answer to that question on that.

Mr. WEISS. Senator? Oh, sorry.

Senator BALDWIN. Mr. Hamm and then we'll work down.

Mr. HAMM. OK. The export of crude oil won't affect propane in your State. You know, basically that's from the liquids out of natural gas production and so whether we export crude oil or not is not going to matter.

These infrastructure problems, hopefully, we can get to where we can build new pipelines in this country, quickly and, you know, so people have to realize that this is going to go forward as far as the energy renaissance. It will put money back into infrastructure that's necessary.

Senator BALDWIN. I've been trying to school myself on the production of propane because of the crisis that Wisconsin is facing. Crude oil has historically been a component of production. It is also producible from natural gas.

Mr. HAMM. It is primarily from natural gas.

Ms. JAFFE. Can I?

Senator BALDWIN. Anyways.

Ms. JAFFE. Also, yes, elaborate?

So I talked about the condensate export. So when you produce both natural gas in some fields and also crude oil natural gas liquids can be a byproduct. Propane is one of the things that gets stripped out of natural gas liquids.

So the export of crude oil to the extent that it stimulates more production in the United States or the export of natural gas to the extent that it stimulates more production in the United States, it will produce more and more propane over time. So people are expecting actually a giant surplus of propane over time.

But when you have this extreme weather event, no matter how much natural gas we're going to produce in this country, no matter how many refineries we have and how much surplus of oil there is in the global market, you know, Tyranny of Distance. If you have

a particular unique market that uses a particular fuel, you're always going to have weather related bottlenecks.

Senator BALDWIN. There were a number of other contributing factors, a harvest that used an exceptional amount of propane preceding it, so the supplies were low going into the extreme weather events that our State has been experiencing, pipeline disruption for maintenance. So, you know, complicating factors. The weather event alone didn't cause the shortages, but—

Ms. JAFFE. The solution to that is regulated inventory requirement.

Senator BALDWIN. I'm hoping to get back to you if I can give Mr. Weiss the chance to answer the question. I do want to follow up on that, if not at this hearing, afterwards.

Mr. WEISS. Thank you, Senator Baldwin. I'll be very brief.

There has not been an independent analysis to try and predict the impact of lifting the crude oil ban on the price of gasoline and other refined products. One thing this committee could do would be to ask the Energy Information Administration to conduct such an analysis.

Unfortunately due to sequestration and other budget cuts, EIA is having to scale back the amount of work it does. But I think that's probably for another hearing.

Senator BALDWIN. I have run out of time. But I did want to follow up with you, Ms. Jaffe, about that. I certainly heard that in your testimony at the end. It's something that we certainly need to be looking at, not only in Wisconsin, but other states impacted by the propane shortage.

The CHAIRMAN. You all may be experiencing another first here in the Senate because you're about to get what amounts to a joint question from myself and Senator Murkowski because we were both wrestling with the definition of energy independence. I probably frame it as how you go about defining energy security and then I'm going to yield to Senator Murkowski, who would also like to be part of the discussion.

So when I contemplate energy security I ask myself, does this mean no more imports, or does it mean the capacity for no more imports, or does it mean more exports than imports? I think this whole question of what constitutes energy security, you may want to characterize it as energy independence. I want to let my colleague weigh in on this because you are seeing our bipartisan efforts perhaps in one of our—we always try to find new ways to demonstrate it. We've never asked a joint question to my knowledge.

[Laughter.]

The CHAIRMAN. But there's always a first time here. Let me let Senator Murkowski be part of this. This will be the last question for the morning then we have the vote.

Senator Murkowski.

Senator MURKOWSKI. It's such an easy question here. But I'm just joking. I said we're starting to act like an old married couple. We're thinking the same way. Pretty soon we're going to be finishing one another's thoughts.

[Laughter.]

Senator MURKOWSKI. So I hope you'll let me finish the thoughts on oil exports.

The CHAIRMAN. You're on.

Senator MURKOWSKI. But I too have been thinking about how we define energy independence. We've got a couple ends of the spectrum here. We can either be very insular as a Nation and try to do it all ourselves and basically thumb our nose at the rest of the world, kind of difficult in most areas or we can do as Senator Wyden has suggested in one of his alternatives where we allow for greater flow of exports and opportunities across our borders and insulate ourselves from the shocks of world prices.

When I think about energy independence, energy security, it goes to things like economic security. How do we ensure that as we deal with our energy needs we have also helped our economy become stronger? We have also worked to create greater jobs and opportunities. But I don't view energy security to be a situation where we kind of close in on ourselves but rather that we are—we open up to a greater extent, but by doing so we become less vulnerable to the impacts of other, of actions of others.

So I do appreciate my colleague letting me join in on this. I said, no, you can't ask that question. I'm going to ask it.

I think it's important as the Ranking and the Chair on this committee to kind of wrap up this very important hearing, to take us back up to 30,000 feet. What are we really talking about here because I think it truly does go to the whole issue of, not only oil export, but export of our energy that we're successfully able to produce in this country?

So, I thank the Chairman.

The CHAIRMAN. The vote is on. So if each of you take about a minute we can still make the vote.

Mr. Hamm.

Mr. HAMM. Yes, I think it's plural instead of singular. You never get rid of it. I heard here earlier that the upstream producers were foreign owned. I would assure you that if more foreign owned refineries, Motiva, at least owned 50 percent by the Saudis. Venezuela owns their own refineries. So you never stop them from being able to ship their oil in.

I take it that we're energy independent when we're exporting less or more than they're bringing in.

So that's what you have to look at, the balance of the two. So I would suggest that we look at it overall, not being inclusive of just who we are and what our needs are.

The CHAIRMAN. Mr. Burnett.

Mr. BURNETT. First well let me define what I mean by energy independence. That includes crude condensates, gas, coal and alternative energies. It's all energies. I think you also need to define it as energy independence for North America, not the United States. It has to include Canada.

If you include Canada it's feasible for North America to be energy independent by a mile before 2030. What that means is that there will still be crude imports. There's a quality arbitrage, as was mentioned earlier.

But it would mean an increase in product exports and probably exports of coal and other energies as well.

The CHAIRMAN. Ms. Jaffe.

Ms. JAFFE. So I would say I agree with that given my slogan the Tyranny of Geography. There will always be balancing for quality and other reasons between different kinds of energy sources in and outside our borders. We have a free trade agreement with Mexico and Canada.

But I do want to end with the following two points.

No. 1, supply of bottlenecks, no matter how they're created are the things that make volatility intense as we heard about propane.

The second thing is that Senator Murkowski is correct. A secure global market is what's going to bring American consumers the lowest price and the most consistent stability in fuel prices. That is what the U.S. should seek to do to be a responsible participant in making sure we have a secure global market.

The CHAIRMAN. Mr. Weiss.

Mr. WEISS. Thank you. I appreciate the joint question. I'm sorry we're not able to give you a joint answer.

I think all discussion about energy independence or almost all of it is focused on supply. That is something we control some of and some we don't. My view is we need to focus on reducing our demand because that is something we do have control over. It will help save consumers money. It will help reduce the carbon pollution that will cause extreme weather, that will disrupt our energy production and transportation system.

So I think we need to really focus on reducing demand. Particularly when it comes to transportation which is fueled over 90 percent by oil, we need to invest in alternatives to oil whether it's electric vehicles, whether it is natural gas fueled trucks, whether it is public transportation, advanced biofuels. All of those things will give consumer choices so we are not solely dependent on this one fuel to run, essentially run, our economy because as long as we are we'll still be here having discussions about energy security and energy independence.

Thank you for having me.

The CHAIRMAN. Mr. Weiss, thank you.

Suffice it to say, this is the first hearing apparently on this topic. It will not be the last.

I knew it would be a piece of cake to find common ground on this question. This is going to be in the "to be continued" department.

So we thank you all. We thank you for your patience. The committee is adjourned.

[Whereupon, at 11:23 a.m. the hearing was adjourned.]

APPENDIX
RESPONSES TO ADDITIONAL QUESTIONS

RESPONSE OF HAROLD HAMM TO QUESTION FROM SENATOR WYDEN

Question 1. I know from your testimony and your background that you are a tireless advocate for domestic energy and domestic energy producers. You were predicting American energy independence when few others thought it could happen. Some may find that difficult to square with your passionate advocacy for opening up crude oil exports. My question to you is: how do you define energy independence? Does it mean no more imports or imports only from allies or friendly nations? Or does it mean having the ability to be self-sufficient, even if we decide it's not necessary to do so?

Answer. Energy independence means energy security. It means maximizing American oil and natural gas production and reducing the leverage of hostile or unstable foreign oil suppliers. In other words, it means America is no longer held hostage and neither are our friends.

RESPONSES OF HAROLD HAMM TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. Much attention has been paid in recent years to the oil production increases in North Dakota and Texas. Is this the full extent of the tight oil renaissance or do other regions hold particular promise?

Answer. Other regions hold promise on a significant but smaller scale, but there is not likely another Bakken.

Question 2. Generally speaking, where are the potential export markets for U.S. crude oil and condensate?

Answer. While we already have the ability to export condensate, potential markets for U.S. crude oil are Asia, Europe, Latin America and any other place with light oil refining capacity.

RESPONSE OF HAROLD HAMM TO QUESTION FROM SENATOR LANDRIEU

Question 1. Mr. Hamm, you make the argument in your testimony that a failure to lift the ban on crude export will result in a contraction of the growth we have seen and expect to see continue in the unconventional oil and gas industry. You reference an IHS global insight study that predicts 3.3 million jobs and \$468 billion in economic activity will be supported by the unconventional oil and gas industry by 2020, and argue that a failure to allow export would stifle this growth. It would seem that you are not alone, as just today, preliminary data from an ICF International study was announced that indicates exports could result in \$70 billion in new U.S. upstream investment by 2020.

a. With EIA currently predicting increased oil production until 2019, followed by a flattening of production, do you believe that additional investment driven by export would create enough additional production to drive further increases beyond the point at which EIA predicts increases will flatten?

Answer. Yes, EIA estimates are based on current technology that is light years ahead of where it was just a decade ago. When you consider that technology continues to advance and that today we are only recovering 5 to 10 percent of oil in place in these resource plays, the future looks incredibly bright if investment is encouraged.

b. Do you view export as essential to your future business strategy for the U.S.-that is, do you predict that you will enter into new investment if ban on crude export continues?

Answer. Free markets are essential to fully developing any opportunity. The question is, do we want to maximize all the benefits of America's oil and natural gas renaissance (jobs, GDP, national security) or only partially realize them?

RESPONSE OF HAROLD HAMM TO QUESTION FROM SENATOR BARRASSO

Question 1. In your testimony, you say that "America's oil and gas renaissance is in jeopardy." You state that the ban on crude oil exports has: "prevented domestic oil exploration and production from achieving its full potential." Last week, the Wall Street Journal published an article entitled: "IEA Warns U.S. Oil Output Growth Could Hit a Wall." The first line of the article reads that: "Surging U.S. oil production could hit a wall in the coming years if the country maintains its ban on crude exports, the International Energy Agency (IEA) said." As you know, the IEA works on behalf of its 28 member countries, including the United States. Do you agree with the IEA that U.S. crude oil production could hit a wall due to the ban on crude oil exports? Would you say that the growth in U.S. crude oil production has already begun to hit that wall?

Answer. Again, free markets are essential to fully developing any opportunity. Indeed, crude oil is no different than any other commodity demanded by consumers. When governments attempt to control supply or demand, no matter how well-meaning the laws may be, market distortions and unintended consequences inevitably result; supply and competition falls short of potential, and the consumer ends up paying higher prices.

RESPONSES OF AMY MYERS JAFFE TO QUESTIONS FROM SENATOR WYDEN

Question 1. In your testimony you say, "it is important for the United States to conduct a thoughtful debate and re-evaluation of current export policy to avoid creating market distortions that, while temporarily benefiting some consumers in particular U.S. regions, may create more questionable medium to long-term trends that would be more damaging than helpful." Keeping this in mind can you tell what if any comprehensive studies have been done on the effect of the repealing the crude export ban on American consumers?

Answer. I am not aware of a comprehensive study that has been done to date on the subject of the effect on American consumers of repealing the crude oil export ban under today's market conditions. Past studies about limited exports from Alaska or pipeline shipments to Canada are outdated and do not take into account the new conditions of global markets and the changed U. S. profile as a rising producer of oil and gas with extensive unconventional resources. In addition, any such study would have to compare the differences in effects between exporting oil in the form of refined products such as gasoline and diesel and the effects of exporting crude oil. I am not aware of any adequate studies that have been undertaken on this comparison. Limited statistical correlations that have been published by investment banks do not provide the proper intellectual framework to have predictive power and can be misleading by providing comparisons of regional prices that are subject to differing interpretations on cause and effect. Any comprehensive study would have to take into account not only global trade flows of oil and refined products and the impact of changes in those flows on oil prices but also the reaction of the Organization of Petroleum Exporting Countries (OPEC) or other major oil producers to the addition of extra crude oil from the United States to global markets. Changes in the price differential between light sweet crude oil and heavy sour crude oil would also have to be assessed as part of the exercise since U.S. exports are most likely to be of the former quality while many U.S. refiners seek feedstocks of the latter quality. It may be that light sweet crude oil of certain qualities and quantities would have to be shut-in if they could not be exported because there would be no market for them inside the U.S. refining system.

Question 2. Given the size and scope of the global crude market and the multitude of factors that can affect price, do you believe a comprehensive study could ever be done? If we can't be certain, what do we need to know in order to feel comfortable about lifting this ban?

Answer. Creating an accurate economic trade flow model that would be able to take into account refined product in flows and out flows and crude oil exports from the United States and their impact on global prices and localized US gasoline prices would be highly difficult. To be comprehensive, such a model would have to specify future quality of crude oil streams coming into production in the United States and abroad as well as detailed refinery configurations in major refining centers, making the simulation solution harder to program than successful models that have been made of the global natural gas market. Also, global crude oil markets are highly

influenced by market psychology and temporary geopolitical factors that are hard to separate from fundamental supply and demand.

However, there are concrete lessons from modern American history that are instructive about the distortionary effects of US restrictions on market clearing for crude oil. In 1958, President Dwight Eisenhower a system of mandatory crude oil import controls to protect domestic production from cheap foreign imports which were limited to 9% of domestic demand. As a result, a distortionary market for oil import tickets developed. The system did hold up U.S. domestic prices and stimulate more drilling for a while but eventually, the U.S. depleted its easy to produce oil and foreign import rates rose anyway. The import control system also led to the development of a refining industry in Puerto Rico and the Virgin Islands where the cheap foreign oil was allowed to be refined without the import restrictions and then the refined products shipped back into the United States. The program also encouraged American oil companies to invest in refining and marketing in foreign countries instead of inside the United States so that they would have a market into which to sell their foreign oil production that could not be brought back to facilities in the United States. The Nixon era oil price controls were similarly distortionary and created secondary markets in entitlements to oil that cost the tax payer billions of dollars to administrate and transferred revenues to parties able to game the system.

The United States has many goals in its policies towards energy markets and all of these considerations need to be given weight. As I stated in my testimony, we know concretely from detailed economic studies and practical knowledge that resource nationalism and artificial barriers to the free flow of oil and investment capital created by the Organization of Petroleum Exporting Countries (OPEC) and Russia have hurt global economic growth and been a root cause to financial crises in the past. The United States cannot be effective in eliminating this threat to the US economy, US consumers and our national security if we promote artificial barriers to open trade and investment in our oil industry.

We also know that many factors influence US gasoline price trends. The price of crude oil feedstock is the major long term variable in determining the level of US gasoline prices. Additionally, the level of regional inventories is also a critical input into gasoline price volatility. Thus, we know that if concerns exist about gasoline price volatility, those concerns could be better addressed by having a more effective policy regulating minimum gasoline inventory standards in light of the trend towards US exports of either refined products or crude oil.

RESPONSE OF AMY MYERS JAFFE TO QUESTION FROM SENATOR MURKOWSKI

Question 1. Canada and Norway are major hydrocarbon producers and exporters. Can the U.S. learn from their experience as it relates to our own debates over hydrocarbon export?

Answer. In times of past oil supply crises, neither Canada nor Norway were forced to suspend their crude oil exports to ameliorate fuel shortages in their own countries, nor did national surpluses in crude oil production (as compared to domestic demand) spur those countries to use trade policy to artificially shield themselves from global price trends. Rather, Canadian supplies in times of disruption continued to flow to the United States as usual and American consumers benefited from this policy. The Canadian and Norwegian economy saw financial gains from their hydrocarbon exports and these benefits were passed along to consumers in the form of 1) a more stable currency (Canada), 2) relatively smaller national budgetary problems, 3) a greater ability to fund social services such as health care and education, and 4) the creation of a sovereign wealth fund (Norway) to smooth out government revenues for future generations, among other benefits such as employment and technology innovation and knowledge that could be applied in non-oil sectors.

RESPONSES OF AMY MYERS JAFFE TO QUESTIONS FROM SENATOR LANDRIEU

Question 1. Ms. Myers Jaffe, would you expand on your note at the end of your testimony arguing that wholesale gas prices for areas in the U.S. with direct access to low cost light sweet crude production do not differ greatly from areas more dependent on the world price-specifically, how does gasoline and diesel's status as freely traded international commodities drive their wholesale price, and how would the export of U.S. crude affect this wholesale price-both here and abroad?

Answer. Since petroleum products such as gasoline and diesel fuel, including U.S. produced gasoline and diesel fuel, are freely traded in a global market, U.S. petroleum product prices reflect international crude prices, not necessarily U.S. domestic crude prices. If European or Asian or Latin American gasoline or diesel prices are higher than those in the United States, U.S. refiners will sell their gasoline and die-

sel in these more lucrative foreign markets until the price of gasoline and diesel rises sufficiently to equilibrate and eliminate the profitability of continuing to ship product overseas (ie closing the arbitrage window for exporting). Through this process of exporting refined products, U.S. prices will rise to international levels even if a surplus of domestic crude oil continues to weigh on domestic crude oil prices. Refiners will either make their profits made by refining U.S. domestic crude oil into products to be sold abroad or to be sold in the United States at prices equivalent to international levels (adjusted for differences in transportation costs). Eventually, if investors find that they can make more money by shifting exploration dollars to foreign countries instead of investing in oil and gas fields in the United States, the U.S. will lose the benefits of rising oil production and become more dependent on foreign imports again.

Question 2. On that line of questioning, could you expand on your concern that the Barclays study cited today does not accurately reflect the interplay of U.S. and global gas prices?

Answer. The often cited figures in Barclay's assessment of the financial savings resulting from the export ban oversimplifies the mechanisms and correlations of the interactions of U.S. and global gasoline pricing. There are many variables that influence U.S. gasoline prices to vary from global levels. For example, differences in elasticity of gasoline demand in the United States and Europe over different time periods can influence the relative price changes in each respective market. American consumer responsiveness to price changes tend to differ from that of Europeans, leading to variations in price trends on either side of the Atlantic. Differing refinery configurations and costs can also account for price disparities between U.S. and European fuel markets as can weather trends and differences in economic growth patterns. Finally, local inventory levels influenced the differences between gasoline prices in the U.S. and Europe in 2008-2010 vs today, not just changes in the price of U.S. midcontinent crude oil relative to UK benchmark Brent crude.

Question 3. You make a case for crude oil export as tool of geopolitics, similar to the way that a growing global LNG market has lessened the stranglehold that Russian gas suppliers have kept on Eastern Europe. What specific benefit do you see in allowing the export of U.S. crude?

Answer. By allowing the exports of U.S. crude oil, the United States can weaken the ability of foreign oil exporters to create artificial barriers to global oil trade that drive up prices and give oil producers political leverage over countries that are its major customers. While the U.S. government itself will not be an oil seller (except in the unusual circumstances of a strategic stocks release), the availability of U.S. crude oil to international markets creates a more competitive market that is harder to manipulate for geopolitical ends, limiting the power of Russia and other major oil producing states who might use energy to blackmail allies and other major economies to accept geopolitical actions or to support military or other actions inimical to U.S. interests. Energy trade strengthens our trade ties to important allies and trading partners and thereby enhance American power and influence. It would also improve our balance of trade with countries such as China, reducing imbalances in financial flows and thereby strengthening the U.S. economic power relative to Chinese economic power. Our ability to serve as a source for critical swing energy supplies enhances our importance to our energy trading partners in other geopolitical and economic spheres.

RESPONSES OF AMY MYERS JAFFE TO QUESTIONS FROM SENATOR BARRASSO

Question 1. In your testimony, you explain that the United States: "participates in international trade and thus, blocking exports of . . . commodities. . . cannot 'protect' U.S. consumers from international prices." You specifically address crude oil exports and explain that: "it is not correct to say that the United States, by continuing to ban U.S. crude oil exports, can isolate American consumers from global prices." You note that any benefits from keeping the export ban in place would be: "artificial[]," "short term," and "temporar[y]." Finally, you explain that policies, such as the export ban, can become: "very costly. . . over time" and "create. . . medium to longer-term trends that could. . . be more damaging than helpful." Would you elaborate on how the ban on crude oil exports, will not result, over time, in lower prices for American consumers, and that the ban may actually hurt American consumers in the long run? In the alternative, do you believe there is any downside to American consumers if the ban is lifted?

Answer. Since petroleum products such as gasoline and diesel fuel, including U.S. produced gasoline and diesel fuel, are freely traded in a global market, U.S. petroleum product prices reflect international crude prices, not necessarily U.S. domestic crude prices. If European or Asian or Latin American gasoline or diesel prices are

higher than those in the United States, U.S. refiners will sell their gasoline and diesel in these more lucrative foreign markets until the price of gasoline and diesel rises sufficiently to equilibrate and eliminate the profitability of continuing to ship product overseas (ie closing the arbitrage window for exporting). Through this process of exporting refined products, U.S. prices will rise to international levels even if a surplus of domestic crude oil continues to weigh on domestic crude oil prices. Refiners will either make their profits made by refining U.S. domestic crude oil into products to be sold abroad or to be sold in the United States at prices equivalent to international levels (adjusted for differences in transportation costs). Eventually, if investors find that they can make more money by shifting exploration dollars to foreign countries instead of investing in oil and gas fields in the United States, the U.S. will lose the benefits of rising oil production and become more dependent on foreign imports again.

Over time, allowing U.S. exports may facilitate a slightly higher U.S. oil production rate and this could mean that depletion of U.S. resources will take place faster than it might otherwise have transpired. Moreover, there are negative environmental impacts that are associated with the production and use of oil and thus, to the extent that U.S. exports entail higher oil production and use, there will be a downside to the lifting of the U.S. export ban. However, the best way to reduce the environmental impacts of producing and using oil are to enact measures that lower the demand for oil, such as energy efficiency standards, placing a cost on greenhouse gas emissions, and funding for public transportation. These would be more effective ways to reduce the negative environmental impacts of oil production and use than banning U.S. exports since if demand for oil exists in the U.S. or globally, it will be met by one supply source or another regardless if the U.S. exports its oil in the form of refined products or the form of crude oil.

Question 2. In your testimony, you state that “[o]ur history of energy policy is replete” with examples where the Federal government did more harm than good. You cite “President Nixon’s. . . price controls on natural gas which ultimately caused a long lasting shortage of natural gas supply.” You also cite the “two-tiered system of oil pricing that ultimately. . . incentivized imports of foreign oil.” Would you expand upon the lessons to be learned from the Federal government’s past mistakes in setting energy policy?

Answer. One of the things that differentiates the United States from China and Russia is our reliance on free markets to set prices based on supply and demand. Market related pricing ensures that capital is deployed efficiently, ultimately lowering costs of goods and promoting productivity and economic benefit. In our history, the United States has experimented with price and market controls in energy, often resulting in creation of shortages and the stifling of optimum levels of investment.

However, there are concrete lessons from modern American history that are instructive about the distortionary effects of US restrictions on market clearing for crude oil. In 1958, President Dwight Eisenhower a system of mandatory crude oil import controls to protect domestic production from cheap foreign imports which were limited to 9% of domestic demand. As a result, a distortionary market for oil import tickets developed. The system did hold up U.S. domestic prices and stimulate more drilling for a while but eventually, the U.S. depleted its easy to produce oil and foreign import rates rose anyway. The import control system also led to the development of a refining industry in Puerto Rico and the Virgin Islands where the cheap foreign oil was allowed to be refined without the import restrictions and then the refined products shipped back into the United States. The program also encouraged American oil companies to invest in refining and marketing in foreign countries instead of inside the United States so that they would have a market into which to sell their foreign oil production that could not be brought back to facilities in the United States. The Nixon era oil price controls were similarly distortionary and created secondary markets in entitlements to oil that cost the tax payer billions of dollars to administrate and transferred revenues to parties able to game the system.

Question 3. In your testimony, you encourage Congress to consider America’s “global priorities” as we debate the crude oil export ban. Specifically, you state that: “Long term geopolitical considerations are. . . more important to our nation than the. . . short term commercial gain to. . . vested industry interests.” You explain that energy exports would: “strengthen our ties to important allies and trading partners and thereby enhance American power and influence.”

You also say that energy exports: “will weaken. . . our adversaries such as Iran and Russia,” “give us an upper hand with China”; and “improve our balance of trade.” Would you expand upon the geopolitical benefits that America will experience if we lift the ban on crude oil exports?

Answer. By allowing the exports of U.S. crude oil, the United States can weaken the ability of foreign oil exporters to create artificial barriers to global oil trade that drive up prices and give oil producers political leverage over countries that are its major customers. While the U.S. government itself will not be an oil seller (except in the unusual circumstances of a strategic stocks release), the availability of U.S. crude oil to international markets creates a more competitive market that is harder to manipulate for geopolitical ends, limiting the power of Russia and other major oil producing states who might use energy to blackmail allies and other major economies to accept geopolitical actions or to support military or other actions inimical to U.S. interests. Energy trade strengthens our trade ties to important allies and trading partners and thereby enhance American power and influence. It would also improve our balance of trade with countries such as China, reducing imbalances in financial flows and thereby strengthening the U.S. economic power relative to Chinese economic power. Our ability to serve as a source for critical swing energy supplies enhances our importance to our energy trading partners in other geopolitical and economic spheres.

Question 4. In your testimony, you explain that: “The United States has for many decades been the leading nation in championing open markets and free trade in energy.” You also state that: “the United States should continue to actively support open markets and free trade in energy and to do so, it cannot restrict its own energy exports.” Would you say that our own restrictions on crude oil exports and liquefied natural gas exports undermine our nation’s credibility when advocating for open markets and free trade in energy?

Answer. There can be no question that the United States loses its credibility when advocating for open markets and free trade in energy when we ban free trade in our own crude oil and natural gas production. We cannot simultaneously call on other countries to freely export their oil and gas and vote to restrict our own energy trade. Removing bottlenecks and trade barriers can smooth the functioning of markets, allowing arbitrage to promote flows to and from the most efficient geographic supply sources, eliminating localized volatility and easing sharp localized price movements during times of disruptions or unexpected events.

The United States needs to consider the usefulness of past experiences when we counted on our European allies to provide us with badly needed gasoline from Europe’s strategic stocks during our difficulties with the U.S. fuel manufacturing and distribution systems during Hurricane Rita and Katrina. And we need to think carefully about what our global economic and security obligations might be, should an oil supply crisis of major proportions emanate sooner rather than later out of the Middle East—both before, and even after, the U.S. gets closer to being energy self-sufficient. The mindset of hoarding resources out of fear of shortages has never served major producing countries like the United States well. In the crisis years of the 1970s, such hoarding behavior worsened the dislocations, not eased them. By contrast, in more recent years, we have fashioned an international emergency oil supply response system that protected the global economy in the aftermath of Saddam Hussein’s invasion of Kuwait, and would be important should a similar or even worse kind of conflict were to arise again in an important oil producing area of the Middle East or Russia.

Question 5. In your testimony, you discuss the “tyranny of distance.” You explain that the costs to ship crude oil, natural gas, and refined products overseas: “will in most circumstances guarantee U.S. users a continuing energy cost advantage over foreign competitors even if export bans are lifted.” You explain that this cost advantage: “is, in many cases, of significant size and will ensure that U.S. energy prices are lower than those of countries that would buy U.S. oil and gas.” Would you elaborate on this cost advantage as it relates to (1) crude oil and (2) liquefied natural gas exports?

Answer. The costs for shipping oil and refined products to Europe, Asia and Latin America vary with the level of market rates for chartering a tanker and the exact distance for the journey. In the case of crude oil, these costs can range roughly from 50 cents a barrel to several dollars, depending on demand for tankers and distance. For liquefied natural gas, the costs for regasification and shipment to Asia will be roughly \$4.50 per mcf to Asia and \$3.50 to \$4.00 to Europe. Generally speaking, these transportation costs must be covered by higher landed oil or natural gas prices in Europe or Asia to have the arbitrage window encourage exports from the United States. In other words, U.S. prices have to be lower by the amount related to shipping costs than the international price to stimulate the international trade.

RESPONSES OF AMY MYERS JAFFE TO QUESTIONS FROM SENATOR CANTWELL

Question 1. Ms. Jaffe, I am interested in your suggestion that keeping a strategic cushion of refined products could help protect consumers from sudden supply and/or price shocks. You might be aware that this Committee attempted to address this concern by passing out of Committee S. 967, the Strategic Petroleum Reserve Modernization Act of 2009. Considering that this bill was passed on a party line vote, with heavy criticism from Republican Committee Members and the oil industry, it strikes me as unlikely that such an idea could be put into practice in the near future. Does your opinion regarding the desirability of U.S. crude oil exports change, assuming that the U.S. Government will take no additional action to safeguard consumers from supply shocks?

Answer. US consumers will be subject to supply shocks from global markets irrespective of whether we export oil in the form of refined products or in the form of crude oil because the international price is transmitted into our markets via whatever exports and imports we participate in. The American public should be outraged that elected officials are entertaining accommodations to the US refining industry without regard to the low historical inventory levels carried by that industry and the impact of those low inventories on exposing gasoline prices to upward volatility. US refining companies are presently exporting gasoline to foreign markets without ensuring that adequate inventory levels are present to protect their local American customers. Inventories are a critical tool to smooth out the supply dislocations that come about from localized refinery accidents, severe weather, and international disruptions. Since the US refining industry and their supporters in Congress are not calling for a ban on US gasoline exports, I don't see how the ban on US crude oil exports is in any way useful to protect US consumers from the effects of global prices.

Moreover, the point needs to be made that US exports of any oil commodity, whether it is gasoline or crude oil, eventually contributes to lower global oil prices overall. The global oil market is like a bathtub and the more water one puts in the tub in any location, the more water is available in all locations. By analogy, it doesn't matter if that water comes directly from the bathtub tap or is heated first on the stove and then put in the tub (refinery processing). Adding a cup of water—whether from the tap or from the tea kettle—in any location raises the level of water in the tub. The more fluid is put in the tub (ie global marketplace) the lower the prices will be for all users of the water (oil). Additionally, if water is taken out of the right side of the tub, it affects the water level on the left side of the tub equally. There is no way to protect the water level in one particular location of the tub from the sudden removal of water from a different location.

Question 2. In your testimony and comments, you focused largely on the national and global implications of the export ban. Could you comment on what likely regional impacts would result from lifting the ban? It strikes me that Washington State is a natural export point for railed crude bound for Asian markets, and that my constituents would face increased rail traffic, with associated safety risks and congestion. However, I do not see how they get any benefit from this increased traffic, in terms of relief in the prices that they pay at the pump. Could lifting the ban directly benefit Washington State consumers in any way?

Answer. Washington consumers would benefit like all Americans from the benefits from U.S. crude oil exports. But there are associated risks that would accompany rail traffic of volatile materials and Washington state will have to assess those risks and whether it wants to continue to participate in the transport and shipping of good overseas including goods that pose greater safety risks than others. It will be important to mitigate such risks if condensate and very light crude oil is going to be transported through Washington state by ensuring proper equipment and safety procedures are in place.

RESPONSES OF AMY MYERS JAFFE TO QUESTIONS FROM SENATOR FLAKE

Question 1. This hearing produced much discussion about the existence of a global price for crude oil and refined petroleum products such as gasoline. To that point, the Energy Information Administration (EIA) has suggested that the price for these products is “driven by the international market” subject to short term fluctuations in the supply chain, including regional price adjustments. Do you believe that the price for crude oil and refined products such as gasoline is set by the global markets? Please include an explanation of the support for your position.

Answer. The notion that the price of crude oil and refined products such as gasoline is set by the global market is well established in the scholarly energy economics literature and has been statistically verified by studying the co-movements of prices of different kinds of crude oils. I refer the committee to the writings of Maurice

Adelman (“Is the World Oil Market One Great Pool” *The Energy Journal*, 13(1); Bentzen, J. “Does OPEC influence crude oil prices? Testing for co-movements and causality between regional crude oil prices, *Applied Economics* 29: 1375-1385)

Question 2. If you believe, those prices are set by global markets, does that mean that the “domestic” crude oil discount (i.e., the lower input cost for refiners using domestic crude) that some have suggested has been retained by the refiners, as opposed to being passed along to consumers? Or, do you believe that the purported domestic crude oil discount is reflected in current domestic gasoline prices?

Answer. As I mentioned in my testimony, there is little statistical evidence that consumers are receiving benefit from the lower feedstock costs for refiners in the US Midcontinent where U.S. domestic crude oil is plentiful. The crude oil feedstock discounts enjoyed by refiners with access to mid-continent landlocked U.S. production have not lowered the wholesale price of Midwest petroleum products compared to prices linked more closely to international markets, nor did they lower the retail prices of gasoline or diesel fuel prices in the Midwest markets served by PADD II refiners relative to the markets served by coastal refiners that do not enjoy these discounts. Since petroleum products are freely traded in a global market, U.S. petroleum product prices reflect international crude prices, not lower-priced domestic crude.

Question 3. There has been some discussion about the use of crude oil swaps to alleviate some of the anticipated excess production of domestic light sweet crude. Do you see that as a viable option? What role, if any, would you foresee Congress playing in facilitating crude oil swaps?

Answer. Swaps take place in the marketplace from time to time and could be an alternative to outright crude oil exports but one has to ask why the Congress would require a refiner to buy unneeded U.S. light crude oil as a means to purchase the heavy sour crude it requires from abroad to fill adequately its refinery processing slate. Since the crude oil market is a global one and the United States cannot cut itself off from global market pricing trends, it is unclear what benefit is derived from requiring swaps instead of outright exports. Swaps is a second best option.

Question 4. During the hearing, you mentioned that one way to protect ourselves from domestic energy emergencies is through minimum inventory standards. Can you elaborate on that more? Do you, for example, envision something in addition to the strategic petroleum reserve, such as minimum commercial reserve requirements, as you briefly discussed in your testimony?

Answer. There is no question given the high level of refined product exports departing the United States and the sensitivity of wholesale gasoline prices to market disruptions and sudden changes in supply or demand that minimum commercial inventory standards for U.S. refiners would help reduce temporary price spikes in gasoline prices. As I discussed during my testimony, such policies exist in Europe and Asia. The best way to protect U.S. consumers from sudden price movements in gasoline, heating oil or natural gas from unexpected supply disruptions or weather related events is to ensure that adequate inventories are on hand in regional markets. To protect U.S. consumers against volatility in fuel pricing due to shifting levels of global demand for refined petroleum product and/or natural gas exports, the United States should require U.S. producers and refiners to hold reasonable minimum inventories to guard against temporary domestic shortfalls of supply or seasonal volatility. Such minimum product inventory standards are already used successfully in Europe and Japan to enhance energy security and protect domestic markets in the event of an unusual event such as the Fukushima nuclear accident. In fact, the United States was able to weather Hurricane Rita and Katrina partly by borrowing gasoline from these mandated European minimum inventory stockpiles. As the United States shifts to a lower percentage of crude oil imports, it may want to consider holding a higher proportion of strategic stocks in the form of mandated commercially held stocks of refined products, rather than publicly held crude oil stores. I refer the committee to my article “The Role of Inventories in Oil Market Stability” published in *The Quarterly Review of Economics and Finance* 42 (2002) 401-415.

RESPONSE OF DANIEL J. WEISS TO QUESTION FROM SENATOR WYDEN

Question 1. In your testimony you speak about the volatility of energy markets, particularly oil, as it relates to energy security you said, “OPEC oil is very vulnerable to supply disruptions.” Do you believe this volatility will continue, and if so, do you believe the US will be more dependent on OPEC oil if we allow exports?

Answer. The Energy Information Administration (EIA) recently found that Organization of the Petroleum Exporting Countries (OPEC) supply disruptions in 2013 reduced the anticipated growth in world global fuels supply. EIA reported this find-

ing in the just published “Short-Term Energy Outlook Supplement: Uncertainties in the Short-Term Global Petroleum and Other Liquids Supply Forecast.”¹ EIA determined that

In January 2013, EIA’s Short-Term Energy Outlook (STEO) projected that global liquid fuels supply growth would average 1.0 million bbl/d in 2013, but EIA’s latest estimate shows that global supply grew by about 0.6 million bbl/d in 2013. The difference mainly reflects higher-than-expected unplanned supply disruptions among OPEC producers.²

This same analysis found that

OPEC disruptions increased in the second half of 2013, reaching 2.6 million bbl/d by the end of the year because of increased disruptions in Libya. The issues underpinning the outages in these countries are unresolved, resulting in uncertain oil production outlooks for these countries.³ (Emphasis added)

As the production of U.S. oil has grown, the importation of foreign oil has declined from 57 percent in 2008 to 40 percent in 2013.⁴ This includes a 35 percent reduction in crude oil imports from OPEC since 2008, which was the second largest amount of imports since 1973.⁵ As U.S. domestic production continues to grow, EIA projects OPEC crude oil imports will decline by 47 percent between 2013 and 2020.⁶

Despite the important growth in domestic oil production, the U.S. will consume over 5 million barrels of oil and liquids per day in 2014 compared to the amount it produces.⁷ Unless there are large reductions in demand, the demand-supply gap will grow if the U.S. exports crude oil and liquids. This gap could be filled by oil from both OPEC and non-OPEC nations. If the U.S. begins to export significantly more oil than it did in 2013, it would have to import oil to offset the exports.

Oil companies would like to export “lighter” crude oil because there has been a slight increase in light oil production in the U.S. over the past few years.⁸ In 2013, EIA reported that domestic crude oil was light, with an average API gravity of 35.3. Imported oil was intermediate, with an average API gravity of 28.¹⁰

EIA projects that the increase in domestic production will “replace imports of medium and heavy crude.”¹¹ If exports were allowed, refiners could import slightly heavier oil as they were before the domestic production increase began in 2009. The three largest importers of heavy oil are Canada, Mexico, and Venezuela, with average imports of 2.6 million barrels per day (mbd), 1.0 mbd, and .8 mbd, respectively, during the first 11 months of 2013.¹² Presumably, some of the increase in heavier crude oil to offset any domestic exports will come from Venezuela, which is a member of OPEC. I am not aware of any projections of changes in future oil imports from these three nations if the crude oil export ban is lifted.

¹ Energy Information Administration, Short-Term Energy Outlook Supplement: Uncertainties in the Short-Term Global Petroleum and Other Liquids Supply Forecast (U.S. Department of Energy, 2014), available at http://www.eia.gov/forecasts/steo/special/pdf/2014_sp_01.pdf.

² Ibid.

³ Ibid.

⁴ Energy Information Administration, AEO2014 Early Release Overview (U.S. Department of Energy, 2013), available at <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282014%29.pdf>.

⁵ Energy Information Administration, “U.S. Imports from OPEC Countries of Crude Oil,” available at <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pets&s=mcrimxx2&f=a> (last accessed February 2014).

⁶ Energy Information Administration, “Imported Liquids by Source, Reference case,” available at <http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=8-AEO2014ER&table=101-AEO2014ER®ion=0-0&cases=ref2014er-d102413a> (last accessed February 2014).

⁷ Energy Information Administration, AEO2014 Early Release Overview (U.S. Department of Energy, 2014), Figure 12, available at http://www.eia.gov/forecasts/aeo/er/early_production.cfm?src=Petroleum-b2.

⁸ Energy Information Administration, Annual Energy Outlook 2013 (U.S. Department of Energy, 2013), Figure 98, available at http://www.eia.gov/forecasts/aeo/MT_liquidfuels.cfm.

⁹ Crude oil with an API gravity greater than 35.0 is “light,” while oil with an API gravity less than 25.0 is “heavy.” In 2013, EIA reported that domestic crude oil was light, with an API of 35.3. Imported oil was intermediate, with an API of 28.

¹⁰ Energy Information Administration, Annual Energy Outlook 2013, Figure 98.

¹¹ Energy Information Administration, “WTI-Brent Spread Projected to Average \$11 per barrel in 2014,” This Week in Petroleum, February 12, 2014, available at <http://www.eia.gov/oog/info/twip/twip.asp>.

¹² Energy Information Administration, “U.S. Imports by Country of Origin,” available at http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbbldpd_m.htm (last accessed February 2014).

RESPONSES OF DANIEL J. WEISS TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. The International Energy Agency states in its January 2014 Oil Market Report: “The growing volumes of light tight oil that cannot leave North America are increasingly posing a challenge to industry, putting the spotlight on the US crude oil export ban.” Last year, the head of the IEA—Maria van der Hoeven—warned that the ban threatens production. Where, in as much detail as possible, do you believe the IEA’s analysis is incorrect?

Answer. The International Energy Agency (IEA) “Oil Market Report” is not incorrect, but it is incomplete. It is simply a snapshot of U.S. crude oil production in 2013 and 2014, and not a projection of future production. The EIA reference case projects that U.S. crude oil production will peak in 2019, and then began a slow but inexorable decline through 2040, when production will be less than it was in 2013.¹³ (See graph below)*

The IEA notes that the U.S. oil industry has adjusted well to the significant increase in domestic production. It has

Demonstrated the capacity of the US oil industry and markets to seize new opportunities and adjust on their own to changing realities.

Although US production growth in 2013 far surpassed our projections, the industry met the challenge of extra supply in its stride. The accommodation of the additional production was possible because of refinery, pipeline and crude rail capacity expansions, allowing the Midwestern crudes to reach the Gulf Coast and East and West Coast refineries.¹⁴

This seems to obviate the need to allow crude oil exports at this time.

Question 2. Do you believe American consumers (e.g., motorists) have benefited from the record increases in oil production domestically?

Answer. The IEA “Oil Market Report” noted that U.S. drivers have not appreciably benefited from the increase in U.S. production.

Remarkably, surging US supply and runs have not markedly lowered product prices for consumers. Rising global demand and supply shortfalls elsewhere—with twice as much annual growth in global demand as in world supply last year—have kept OECD [Organization of Economic Co-operation and Development] stocks tight and oil prices generally high.¹⁵

In 2013, inflation adjusted gasoline prices were the sixth highest in the past 37 years, at \$3.54 per gallon, according to EIA.¹⁶ This occurred even though the U.S. had its highest domestic oil production since 1988.¹⁷

In 2012, the Associated Press conducted an analysis of the relationship between domestic oil production and gasoline prices, but found no correlation between the two.

A statistical analysis of 36 years of monthly, inflation-adjusted gasoline prices and U.S. domestic oil production by The Associated Press shows no statistical correlation between how much oil comes out of U.S. wells and the price at the pump.¹⁸

EIA reports that the price of crude oil is responsible for 71 percent of the price of a gallon of gasoline.¹⁹ As long as the price of oil is set on the world market controlled by the OPEC cartel, then it will be very difficult for U.S. production to significantly affect the price of gasoline.

The most effective way to help consumers is to produce cars that use significantly less gasoline. For instance, the 2025 fuel economy standard for passenger and light duty vehicles will save drivers an estimated average fuel savings of \$8,000 over the

¹³ Energy Information Administration, “Petroleum and Other Liquids Supply and Disposition, Reference case,” available at <http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=8-AEO2014ER&table=11-AEO2014ER®ion=0-0&cases=ref2014er-d102413a> (last accessed February 2014).

* Graph has been retained in committee files.

¹⁴ International Energy Agency, Oil Market Report, (International Energy Agency, 2014) available at <http://omrpublic.iea.org/currentissues/fullpub.pdf>.

¹⁵ Ibid

¹⁶ Energy Information Administration, “Regular Gasoline Retail Prices,” available at <http://www.eia.gov/forecasts/steo/realprices/> (last accessed February 2014).

¹⁷ International Energy Agency, Oil Market Report.

¹⁸ Seth Borenstein and Jack Gillum, “Fact Check: More US drilling didn’t drop gas prices,” Bloomberg Businessweek, March 21, 2012, available at <http://www.businessweek.com/ap/2012-03/D9TL1BO00.htm>.

¹⁹ Energy Information Administration, “What do I pay for in a gallon of regular gasoline?” available at <http://www.eia.gov/tools/faqs/faq.cfm?id=22&t=10> (last accessed February 2014).

life of a new car.²⁰ This is equivalent to lowering the price of gasoline by \$1 per gallon.²¹

Investments in alternatives to gasoline would also help drivers spend less on transportation. This could include the construction of public recharging infrastructure for electric vehicles, the commercial production of cellulosic (non-crop) advanced biofuels, and investments in public transportation. All of these could provide cleaner, cost effective alternatives to gasoline.

RESPONSE OF DANIEL J. WEISS TO QUESTION FROM SENATOR LANDRIEU

Question 1. Mr. Weiss, you use a very specific example to prove the link between U.S. crude export and increased price. You cite a CRS report on the period of 1995-2000, when exports of crude produced in Alaska and refined on the West Coast were accompanied by shifts in price. You contend that the increase from West Coast prices being 5 cents above the national average in 1995 to being 12 cents in 2000, the year exports stopped. However, this same CRS report makes the point that West Coast gasoline prices, as evidenced by their starting point above the national average, are subject to influences beyond price increases-additional environmental regulations and constricted refining capacity are cited specifically. The CRS report goes on to state that these factors could also explain the price differences seen in the West Coast market-the CRS report states that in fact they would have had "significant bearing, even during the years of crude exports."

a. Do you contend that the price differences seen in this instance are still related directly to exports, or do you agree with the CRS report that external factors could also have driven this price difference?

Answer. I noted in my testimony that

"The only real-world experience of lifting an oil export prohibition occurred following the 1996 removal of a ban on Alaska oil exports. During the ban, much Alaskan oil was shipped to the West Coast. A Congressional Research Service analysis found that lifting the oil ban exacerbated the existing price differential between West Coast and national gasoline.

In 1995 . . . West Coast pump prices [were] only 5 cents per gallon above the national average. But by 1999 West Coast gasoline was 15 cents per gallon higher. When crude exports stopped in 2000, the average [difference] . . . was 12 cents; it [later] narrowed further to 7 cents. . . . When Alaskan oil exports ceased, the gasoline price differential between the West Coast and the national average did decline.

"This experience suggests that lifting the nationwide crude oil export ban could similarly raise gasoline prices. Barclays Plc. predicts that lifting the export ban could increase total spending on motor vehicle fuel by \$10 billion per year. Sandy Fielden, director of energy analytics at RBN Energy, told Bloomberg that if there are more oil exports, "The most obvious thing that's going to happen is that crude prices will go up and so will gasoline."²²

The CRS report strongly suggests, but does not prove, that the elimination of the Alaska oil exports contributed to the increase in West Coast gasoline prices between 1996 and 2000. I noted in a response to a question that there has not been an independent assessment of the impact of lifting the crude oil export ban on domestic gasoline prices. In response to a question during the hearing, I urged the Senate Energy Committee to seek such an analysis from the Energy Information Administration. As you know, Senators Ron Wyden and Maria Cantwell recently sent a letter to EIA requesting such an analysis.²³

b. You also quote the Commission on Energy Security as saying that "volatility in the global oil market will remain a serious concern." What is your opin-

²⁰The White House, "Obama Administration Finalizes Historic 54.5 MPG Fuel Efficiency Standards," Office of the Press Secretary, August 28, 2012, available at <http://www.whitehouse.gov/the-press-office/2012/08/28/obama-administration-finalizes-historic-545-mpg-fuel-efficiency-standard>.

²¹Ibid

²²Daniel J. Weiss, Testimony before the U.S. Senate Committee on Energy and Natural Resources, "U.S. Crude Oil Exports: Opportunities and Challenges," January 30, 2014, available at <http://www.americanprogress.org/issues/green/report/2014/02/05/83559/u-s-crude-oil-exports-opportunities-and-challenges/>.

²³Letter from Sen. Wyden and Sen. Cantwell to Administrator Sieminski, February 3, 2014, available at <http://www.energy.senate.gov/public/index.cfm/democratic-news?ID=4dd7893d-d472-425a-81f0-197e5fdf46b7>.

ion of Ms. Myers Jaffe's argument that U.S. crude exports, used as a tool of geopolitics, may have the effect of reducing volatility in the global oil market, much of which is driven by geopolitical conflicts?

Answer. As you note, much of the price volatility in the global oil market "is driven by geopolitical conflicts." I am not an expert in the regional conflicts in the Middle East, Africa, or other oil producing regions. However, even from my lay person's perspective it seems that ancient sectarian disagreements, government repression, joblessness, and vast disparities of wealth in these nations are a major part of many of these conflicts. It is difficult to imagine, for instance, that the export of one million barrels of oil per day from the U.S. would have much impact on these factors.

RESPONSES OF DANIEL J. WEISS TO QUESTIONS FROM SENATOR FLAKE

Question 1. This hearing produced much discussion about the existence of a global price for crude oil and refined petroleum products such as gasoline. To that point, the Energy Information Administration (EIA) has suggested that the price for these products is "driven by the international market" subject to short term fluctuations in the supply chain, including regional price adjustments. Do you believe that the price for crude oil and refined products such as gasoline is set by the global markets? Please include an explanation of the support for your position.

Answer. There is ample analysis that reinforces the idea that there is a global market price for oil, set by the OPEC cartel that produces 40 percent of the world's oil.²⁴ For instance, EIA explains that

Crude oil prices are determined by worldwide supply and demand.

One of the major factors on the supply side is the Organization of the Petroleum Exporting Countries (OPEC), which can have significant influence on prices by setting production limits on its members, who together produce more than 40% of the world's crude oil. OPEC countries have essentially all of the world's spare oil production capacity, and possess about two-thirds of the world's estimated crude oil reserves.²⁵

OPEC meets regularly to assess the benchmark price for crude oil. At its meeting in December 2013, it was reported that

Saudi Arabia and other OPEC members argue that benchmark crude oil prices, currently averaging \$100 per barrel, provide acceptable income for producers without weighing too heavily on consumers.²⁶

An analysis of oil prices by the Associated Press noted that "oil is a global commodity and U.S. production has only a tiny influence on supply. Factors far beyond the control of a nation or a president dictate the price of gasoline."²⁷

While there is a world market price for oil, gasoline prices mostly, but not solely, depend on the world oil price, and can vary widely by country, and by region within the U.S. This is due to different capacity and efficiency levels at refineries, transportation costs, taxes, and other factors. In February, a gallon of gasoline ranged from 40 cents per gallon in Iran to \$3.32 per gallon in the U.S. to \$10.74 per gallon in Norway.²⁸

There was much less variation in the U.S., but there were still regional differences in gasoline prices. EIA reports that for February 10, 2014, gasoline prices ranged from \$3.09 per gallon in the Gulf Coast to \$3.52 in the West Coast—14 percent higher.²⁹

Question 2. If you believe, those prices are set by global markets, does that mean that the "domestic" crude oil discount (i.e., the lower input cost for refiners using domestic crude) that some have suggested has been retained by the refiners, as opposed to being passed along to consumers? Or, do you believe that the purported domestic crude oil discount is reflected in current domestic gasoline prices?

²⁴Energy Information Administration, Short-Term Energy Outlook, (U.S. Department of Energy, 2014), available at http://www.eia.gov/forecasts/steo/report/global_oil.cfm.

²⁵Energy Information Administration, "Oil Crude and Petroleum Products Explained," available at http://www.eia.gov/energyexplained/index.cfm?page=oil_prices (last accessed February 2014).

²⁶"Opec keeps production ceiling," AFP, December 5, 2013, available at <http://thepeninsulaqatar.com/business/qatar-business/263469/opec-keeps-production-ceiling>.

²⁷Borenstein and Gillum, "Fact Check: More US drilling didn't drop gas prices".

²⁸"Petrol prices around the world, February 2014," MyTravelCost.com, available at <http://www.mytravelcost.com/petrol-prices/> (last accessed February 2014).

²⁹Energy Information Administration, "Gasoline and Diesel Fuel Update," available at http://www.eia.gov/petroleum/gasdiesel/gas_geographies.cfm#pricesbyregion (last accessed February 2014).

Answer. The impact on consumers from the recent increase in some domestic crude oils is unclear. Nationwide, the average refiner crude oil acquisition cost increased in 2013 to \$102.90 per barrel from \$100.71 and \$100.72 in 2011 and 2012, respectively.³⁰ This higher price could limit the benefit of higher production to drivers. EIA speculates that

Larger price discounts for U.S. crude oil production versus alternate world crudes, such as greater WTI and LLS discounts to Brent, may be needed to encourage Gulf Coast refiners to process the increased supplies.³¹

In other words, the price discount is not yet sufficient to increase gasoline production enough to affect prices.

On the other hand, there may be regional impacts that benefit some drivers. On February 6th, 24/7 Wall St., a website for investors, reported that “AAA also expects regional variation in gasoline prices, largely the result of access to cheaper North American crude oil.”³² 24/7 Wall St. reported in January that

Refining companies with the majority of their operations on the Gulf Coast of the United States have been in the driver’s seat for profits during the past several months of 2013. Access to cheaper U.S. crudes has lifted some refiners’ margins.³³

Question 3. There has been some discussion about the use of crude oil swaps to alleviate some of the anticipated excess production of domestic light sweet crude. Do you see that as a viable option? What role, if any, would you foresee Congress playing in facilitating crude oil swaps?

Answer. Crude oil swaps could address some of the excess production of domestic light sweet crude, but several potential impacts should be evaluated to before allowing such swaps. What impact will swaps have on domestic gasoline and diesel prices? Will the swaps increase our dependence on oil from allies or other nations? Will the swaps encourage the production of oil with more well-to-tank carbon pollution? Until EIA or some other independent bodies analyze these and related questions, swaps should not go forward beyond what can occur under existing law.

If such an analysis demonstrates that swaps would not harm drivers, increase dependence on oil from non-allies, boost the production of tar sands or other dirty oils, then the Commerce Department has the authority to approve export applications to facilitate the swaps. There is no need for Congressional involvement.

Question 4. During the hearing, you mentioned that one way to protect ourselves from domestic energy emergencies is through minimum inventory standards. Can you elaborate on that more? Do you, for example, envision something in addition to the strategic petroleum reserve, such as minimum commercial reserve requirements, as you briefly discussed in your testimony?

Answer. In October, New York became the first state to establish a “strategic gasoline reserve” to prevent serious supply disruptions during extreme weather events or other emergencies.³⁴ New York plans to store up to 3 million gallons of gasoline for first responders and other motorists. Establishment of additional reserves could supply gasoline in other states in the event of future supply disruptions. Because of technical limitations on storing significant amounts of gasoline for long periods of time, there would probably have to be multiple smaller reserves rather than several large reserves, as with the Strategic Petroleum Reserve. The Senate Energy Committee should explore the need for such gasoline reserves, as well as the technical and economic feasibility of building and maintaining them.

Amy Myers Jaffe, another witness at the January 30th hearing, recently promoted a mandate to ensure a certain amount of refined product inventories. She wrote:

Regulators [should] mandate a minimum level of mandatory refined product inventories in the United States. Such a system exists in Europe and

³⁰Energy Information Administration, “U.S. Crude Oil Domestic Acquisition Cost by Refiners,” available at http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=r1200___3&f=m (last accessed February 2014).

³¹Energy Information Administration, “WTI-Brent Spread Projected to Average \$11 per barrel in 2014,”

³²Paul Ausick, “Price of Gasoline Will Rise: AAA” 24/7 Wall St., February 6, 2014, available at <http://247wallst.com/energy-economy/2014/02/06/price-of-gasoline-will-rise-aaa/#ixzz2tdFMWQr>.

³³Paul Ausick, “Oil Refiners: Is There a Value Play?” 24/7 Wall St, January 2, 2014, available at <http://247wallst.com/energy-business/2014/01/02/oil-refiners-is-there-a-value-play/>

³⁴Andrew M. Cuomo, “Governor Cuomo Launches First-Ever Strategic Reserve to Prevent Supply Gaps During Emergencies,” Governor’s Press Office, October 26, 2013, available at <http://www.governor.ny.gov/press/10262013Strategic-Gasoline-Reserve>.

Japan and allowed Europe the flexibility to provide gasoline to the United States during the production shortfalls that occurred following Katrina and Rita, preventing worse dislocations. The system helped Japan in the aftermath of the Fukushima crisis.

A US government program reserving the right to use for strategic national emergency releases a portion of this mandated minimum supplementary industry refined product stocks of 5% or 10% of each refining company's average customer demand would ensure that needed supplies of gasoline or heating oil in inventory to ease the impact of sudden weather related demand surges or accidental disruption of consumer supplies.³⁵

I believe that this proposal would help address future extreme weather or other unforeseen events that cause gasoline supply disruptions.

RESPONSE OF GRAEME BURNETT TO QUESTION FROM SENATOR WYDEN

Question 1. I understand that Delta is concerned about exports increasing domestic fuel prices and those higher fuel prices hurting Delta's bottom line.

- Can you quantify the impact that exports could have on your costs?

Answer. As outlined in our prepared testimony, we believe that lifting the export ban would harm refineries in the U.S. and benefit refineries in Europe, where there is currently excess refining capacity. In particular, if we export crude oil, we believe many of our refineries, particularly in the Northeast, will close. This will reduce our domestic supply of jet fuel and have a similar impact on prices as have recent, temporary supply interruptions in New York Harbor. Those interruptions impacted the jet crack, sometimes by 2 cpg (\$0.84/bbl) of jet fuel. Assuming the same level of supply interruption, Delta's Trainer facility would be subject to an additional cost of \$61 million per year. Other data, such as the data included in the Barclays study on crude exports, indicates the impact of a more permanent supply disruption to be closer to 7 cpg (\$3/bbl), which would increase the negative impact on Delta to over \$200 million per year.

- Is Delta at all concerned that domestic oil production will exceed US demand and that producers will cut production if they do not have access to all possible markets for their product?

Answer. If the transportation infrastructure is in place, crude can get to the right refiner and there should be sufficient capacity within the US to absorb domestic oil production. To date, all the oil production coming out of Bakken and elsewhere has not been able to get to the appropriate refining centers, hence a dislocation in price. This is the result of an infrastructure problem, not a demand problem. In any case, multiple infrastructure projects are currently in progress and are due to come on line over the next two years, allowing the free flow of crude to the centers that can process it. Crude quality has been raised as an issue, but provided the economic driver (i.e. price) is there, the refineries can quickly adapt to handle this crude oil, and in fact many such projects are already in progress. Data shows there is an additional 425k bpd refining capacity being added, as well as more than 350 k bpd of condensate splitting capacity.

Furthermore, production capacity will not be reduced while crude oil remains above \$80/bbl. This is supported by a range of estimates available in the public domain for the break-even economics on US shale oil production. For instance:

- \$45-70/bbl—A Myers Jaffe, UC Davis, Jan 15, 2014
- \$60-80/bbl—T Kartevold, Statoil, Feb 2013

- It would seem that much like we have seen in the natural gas sector, at some point, prices could drop to a level where it is not in the producer's interest to continue drilling new wells. Does Delta foresee such a scenario in its long term projections or do you see oil prices remaining high enough to make it profitable for producers to continue producing?

Answer. The long term outlook for Brent crude oil price appears to be stable in the \$100-\$110/bbl range, with WTI some \$8-\$12/bbl below that. These ranges are

³⁵ Amy Myers Jaffe, "Washington Needs to Embrace the New American Century: More Thoughts on US Exports," The Energy Collective, February 17, 2014, available at http://theenergycollective.com/amjaffe/341836/washington-needs-embrace-new-american-century-more-thoughts-us-exports?utm_source=hootsuite&utm_medium=twitter&utm_campaign=hootsuite_tweets.

in line with EIA's Energy Outlook forecasts. As stated above, domestic oil production will continue while WTI crude prices remain above \$80/bbl. Moreover, the crude oil situation cannot be compared to the natural gas market, as we can produce more gas than we can consume domestically, whereas we are still a major importer of crude oil.

Until exports were permitted, gas production simply matched consumption. Exporting natural gas was determined to be in the public interest as it was foreseen that exports would raise the cost of gas closer to levels sufficient to justify renewed production from "dry" gas wells (i.e. those that do not have associated NGL's) that were closed down due to the very low market price (at the time, around \$3per mmbTU).

This logic in fact supports our contention that crude exports will increase prices domestically, not reduce them. Unlike gas, US crude oil:

- Is insufficient to meet total US demand
- Can displace imports of foreign waterborne crude
- Is an unfinished product which can be upgraded to high-value exportable finished products by US refineries, supporting high paying jobs.

RESPONSE OF GRAEME BURNETT TO QUESTION FROM SENATOR MURKOWSKI

Question 1. The International Energy Agency states in its January 2014 Oil Market Report: "The growing volumes of light tight oil that cannot leave North America are increasingly posing a challenge to industry, putting the spotlight on the US crude oil export ban." Last year, the head of the IEA—Maria van der Hoeven—warned that the ban threatens production. Where, in as much detail as possible, do you believe the IEA's analysis is incorrect?

Answer. The IEA report states that the "Crude Wall" can be avoided by, among other items, "expansion of pipeline capacity, continued increases in refinery throughput and a change of refinery crude slates." While we believe their estimates of new refinery capacity are too low, we are in agreement with their overall logic. In addition, we believe that refinery feedstock conversion can happen relatively quickly with the right price driver, and that exports will be unnecessary to alleviate the Crude Wall. The following tables* indicate that capacity is being added, and more will follow.

RESPONSE OF GRAEME BURNETT TO QUESTION FROM SENATOR LANDRIEU

Question 1. Mr. Burnett, your company is in the unique position of being not only a purchaser and refiner of crude, but also a consumer-in essence; you represent the entirety of the lifecycle of crude past the upstream. In your testimony, you make the case that the current low price of U.S. produced light sweet crude allows your refinery, one of the roughly half in the country configured for that type of crude, to operate at a cost that allows Delta to procure jet fuel at a discount when compared to its competitors. You go on to argue that U.S. consumers benefit similarly, and point to a Barclays study that indicates lifting the ban could cost the U.S. billions. You also argue that this low cost light sweet crude is essential to keeping some refineries open, which I am sensitive to as it is also a major concern for Alon, an independent refinery in my state.

- a. Do you foresee a way in which U.S. refiners such as yourself could remain competitive if crude exports are allowed?

Answer. Merchant refiners that are not part of an integrated supply chain such as Trainer/Delta will not be sustainable if the ban is lifted and domestic crude prices approach international crude prices. A narrowing of the WTI-Brent spread by \$4/bbl will threaten approximately 1 million barrels of US refining capacity with closure, with the resulting loss of jobs and economic fallout for the neighborhoods in which they are located.

- b. Is there a divide between smaller and larger refiners that determines who is able to remain competitive in a market with U.S. export by virtue of either greater volume or more efficient production?

Answer. There are two factors for viability—one is economy of scale (size), the other is location (proximity to the feedstock). As you can see from the net cash margin curve above, most of PADD I (East Coast) refineries are less competitive due to both location and complexity. Some PADD III (Gulf Coast) refineries are also

*Tables have been retained in committee files.

threatened; assuming these Gulf Coast refineries are well located for supply, the threat comes from lack of economy of scale/complexity.

c. While it does not directly apply to your refinery in the Northeast, Ms. Myers Jaffe points out in her testimony that wholesale gas prices in the Midwest, an area with refineries with direct access to U.S. light sweet crude, did not vary greatly from wholesale gas prices in the Gulf Coast, an area that is much more closely tied to global oil prices. This seems to indicate that because gasoline and refined products are freely traded on the global market, unlike U.S. crude, they are much more closely related to global oil prices. Do you see this same interplay at your Monroe facility-that is; do you sell refined products into the open market at wholesale rates close to the world average, or at a reduced rate?

Answer. There are indeed links between product prices in the US and global oil prices, but there is further complexity. Refined product price drivers include:

1. Crude oil prices
2. Crude oil transportation infrastructure and cost
3. Product specifications
4. Product transportation infrastructure and cost
5. Balance between product supply and demand, impacted by
 - a. Global refinery utilization
 - b. Product inventory levels

Product prices in the New York Harbor market (where Trainer sells its products) follow the price drivers listed above, and are linked to the international market, either by import parity or export parity, depending on the arbitrage at any point in time. Marine logistics costs, duties and taxes also have to be taken into account of course, when comparing product prices from one region to another.

d. Additionally, you contend that U.S. refineries depend on this price spread to remain open-and again, I am certainly sensitive to that. However, with such a large amount of light sweet crude being produced, it would seem unlikely that a shortage is your concern; rather, your concern is that prices could increase to match the world market, undoing an important advantage. Do you believe that the "tyranny of distance" that Ms. Myers Jaffe references-simply, the cost benefit to being close to the production you draw from-could provide these refineries with the competitive edge they require to remain profitable?

Answer. If exports are allowed, crude oil prices will rise to international levels. Domestic barrels would be priced at export parity rather than import parity, so there will still be a differential between domestic and imported barrels due to geography, but greatly reduced from current levels. Refineries operate on slim margins, and if the crude price differential were to narrow from \$11/bbl (stated in my testimony) to say \$5/bbl, approximately 1 to 1.5 million barrels of refining capacity would close in the US. Typically, those most threatened would be the smaller, less complex refineries, predominantly in the Northeast where logistics costs are higher.

RESPONSE OF GRAEME BURNETT TO QUESTION FROM SENATOR BARRASSO

Question 1. In your testimony, you state that Delta Air Lines: "believe[s] strongly that the ban on U.S. crude oil exports is good policy." However, I also understand that Delta supports continued growth in U.S. crude oil production. Last week, the International Energy Agency (IEA) warned that the ban on crude oil exports could slow the growth in U.S. crude oil production. As you know, the IEA is an independent organization that works on behalf of 28 oil-consuming nations, including the United States.

A. Do you agree with the IEA's assessment made in the January 2014 Oil Market Report?

Answer. The IEA assessment correctly identified certain elements that need to be in place in order not to hinder oil production, the most important being infrastructure. The lack of infrastructure has caused a price dislocation that wouldn't change with or without exports, as the crude cannot get to market. However, this situation is being rapidly addressed, and bottlenecks will be eliminated within two years. Once the infrastructure is fully in place, there is sufficient refining capacity within the US to handle the crude, although some investment may be needed in heavy crude refineries to maximize light crude capability. These modifications are also in progress, as the price driver is sufficient to encourage US refiners to process domestic crude.

B. Would Delta support lifting the ban on crude oil exports if the ban slows the growth in U.S. crude oil production?

Answer. Delta does not believe that the ban will slow production at current crude pricing levels.

RESPONSES OF GRAEME BURNETT TO QUESTIONS FROM SENATOR FLAKE

Question 1. This hearing produced much discussion about the existence of a global price for crude oil and refined petroleum products such as gasoline. To that point, the Energy Information Administration (EIA) has suggested that the price for these products is “driven by the international market” subject to short term fluctuations in the supply chain, including regional price adjustments. Do you believe that the price for crude oil and refined products such as gasoline is set by the global markets? Please include an explanation of the support for your position.

Answer. The price for crude oil is not set by global markets. OPEC has the ability to modify the supply side of the equation to raise prices. See the chart below.* It is a cartel, and its sole raison d’etre is to control crude oil prices and preserve their own domestic economies.

OPEC controls 40% of the market. Most Middle East producing countries require a crude price of \$100/bbl or higher to balance their fiscal and current account budgets, as shown in the IMF table below.*

Question 2. If you believe, those prices are set by global markets, does that mean that the “domestic” crude oil discount (i.e., the lower input cost for refiners using domestic crude) that you suggested during the hearing has been retained by the refiners, as opposed to being passed along to consumers? Or, do you believe that the purported domestic crude oil discount, which you estimated as an \$11 cost advantage to U.S. consumers, is reflected in current domestic gasoline prices?

Answer. The price differential, estimated at \$11/bbl, is absorbed by different players in the value chain. The lions share \$6-7/bbl currently goes to the mid stream companies and railroads that have the logistics to transport the crude. Approximately \$1-2/bbl goes to the US domestic refining industry, and the remainder is passed on to the consumer. Barclays estimated the consumer discount at \$3/bbl (7 cpg)

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* Graphic has been retained in committee files.