# ENERGY OPPORTUNITIES IN NORTH AMERICA

## HEARING

BEFORE THE

SUBCOMMITTEE ON
THE WESTERN HEMISPHERE

OF THE

## COMMITTEE ON FOREIGN AFFAIRS
## HOUSE OF REPRESENTATIVES

ONE HUNDRED FIFTEENTH CONGRESS

FIRST SESSION

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JUNE 7, 2017

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# ENERGY OPPORTUNITIES IN NORTH AMERICA

**WEDNESDAY, JUNE 7, 2017**

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON THE WESTERN HEMISPHERE,
COMMITTEE ON FOREIGN AFFAIRS,
*Washington, DC.*

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 2172, Rayburn House Office Building, Hon. Jeff Duncan (chairman of the subcommittee) presiding.

Mr. DUNCAN. A quorum being present, the subcommittee will come to order.

Before we get started, first off, let me apologize to my subcommittee for the markup last week or 2 weeks ago and the snafu with me getting here. I am glad we got the markup finished. But Ileana actually chaired it for me, so I apologize to the subcommittee.

We also have some staff changes on the majority side. We have promoted Rebecca Ulrich to staff director, and we also have a professional staff member, Juan Carlos Monje here. So there are new additions on our side. And we are losing, Ron Criscuolo, he is headed to the Department of Homeland Security. So we have got some changes on the subcommittee on the Republican side. I just wanted to let y'all know about those. So you can welcome them to the staff.

Anyway, so we will go ahead and get started.

Over the past few years, this subcommittee has prioritized the issue of energy very intentionally. Not only is it in my wheelhouse, but we have taken time to examine opportunities in the region and consider how the U.S. can increase energy cooperation with our neighbors to pursue greater economic growth, create jobs, lower gas prices, and increase our energy security.

Today's hearing on North American energy opportunities follows legislation that I authored in the 113th Congress to approve the U.S.-Mexico Transboundary Hydrocarbon Agreement. The Agreement was negotiated with Secretary Clinton, and we had to provide the implementing language. And it was actually included in the CR/Omnibus, but became law and opened up about 1½ million acres in the western Gulf of Mexico. In the last Congress, we had numerous subcommittee energy hearings; a Government Accountability study on North American energy that Ranking Member Sires and I requested, which is currently ongoing; a hearing on South American energy potential was held last month.

In my view, energy holds a very important key to unlocking untapped potential for the hemisphere. That potential is both energy potential but also ways that we can collectively work together for energy independence.

And I believe the Trump administration has an incredible opportunity now to increase U.S. energy engagement in the region to the benefit of U.S. interests, as well as those of the region as a whole. After all, the United States is the largest energy producer in the Western Hemisphere, producing over 12 million barrels of oil, 27 trillion cubic feet of dry natural gas per day. Collectively, as of 2015, North America accounted for 72 percent of Western Hemisphere oil production, 85 percent of natural gas production. As tight oil and shale gas in the United States, Canada's oil sands, and Mexico's energy reforms and offshore oil prospects create circumstances for a far more highly integrated and interdependent North American energy market.

A stronger North American energy partnership would expand the size of our energy market, lead to more jobs, reduce costs for consumers, and enhance North American energy security and independence. Of course, global oil prices will continue to impact U.S. energy interests. However, the U.S. would likely experience less impact from the volatility in the Middle East, attempts by OPEC to regulate energy output and prices, and even Venezuela's energy production free fall if we relied less on these sources of energy and instead built a stronger North American energy market to lower our risks and meet our needs more effectively.

I have long talked about American energy independence and North American energy independence. I have broadened that to a hemispheric energy independence, which is a little broader than today's hearing. But if we think hemispherically, the opportunities are boundless.

Consequently, I believe the Trump administration has an excellent opportunity now in efforts to improve NAFTA, to include energy issues in any future deal. The energy landscape has changed substantially since NAFTA was first negotiated and thus warrants closer examination and potential inclusion, in my view. I hope to work with USTR on that issue as well as the Trump administration.

In addition, the Trump administration has another opportunity with the recently concluded negotiation of the U.S.-Mexico Section 123 agreement to consider how U.S. nuclear exports to Mexico might assist our southern neighbor with its stated objectives to reduce the use of fossil fuels and carbon emissions through nuclear power. This agreement awaits White House consideration and submission to Congress for review.

According to U.S. industry, if this Section 123 agreement moves forward, Mexico plans to construct two new nuclear plants, which could potentially generate more than $2 billion in direct U.S. exports and support more than 10,000 jobs in more than 20 U.S. States if U.S. firms end up constructing those new power plants.

Let's consider for a moment the recent energy developments in North America that have brought us here today. The U.S. has experienced the greatest natural gas supply transformation of any country in the world in recent years due to shale. Today, Canada's

the fifth largest energy producer in the world and our largest foreign supplier of energy. It also has the world's third largest proved oil reserves and is one of the largest producers of dry natural gas.

Likewise, Mexico is a major producer of petroleum in the world. It is the fourth largest in the Americas. Several recent discoveries of oil and natural gas in Mexico, the development of unconventional resources, and considerable shale resources near the U.S.-Mexico border offer additional promising opportunities. Furthermore, Canada's privatized oil sector and Mexico's 2013 reforms opening its energy sector to private investments make further energy cooperation with these non-OPEC members more critical to U.S. national interests.

We have a slide on the board today from API which shows the trilateral trade and energy across our northern and southern border with Mexico and Canada. I would ask everyone to take a look at that. It is available for all the members on our screens.

In conclusion, the collected value of the energy trade between U.S. and Canada and Mexico exceeded $140 billion in 2015. More can be done, and President Trump's America First energy plan is an important blueprint for achieving greater U.S. energy security and independence. However, I believe that in order for that plan to maximize its potential, we need to expand North American energy cooperation. Currently, our trilateral trade in crude oil, natural gas, refined products, and electricity is joint and integrated in many ways.

Our neighbors are major buyers of petroleum products refined here in our country, and energy products cross our borders multiple times. Natural gas originating in Canada is often exported to the United States in one part of the country and then reexported back into Canada in another part just due to the logistics.

Over 50 natural gas pipelines link North American energy markets, 6 oil pipeline systems link the U.S. and Canada, and over 30 major electricity transmissions connect the U.S. and Canada. Yet while we have substantial room to improve and grow our energy partnership, especially with Mexico, I look forward to hearing from our witnesses on how the U.S. can work with our neighbors to build a stronger North America.

I would now turn to the ranking member Sires for his opening remarks.

[The prepared statement of Mr. Duncan follows:]

**Chairman Jeff Duncan**
**Opening Statement**
**Foreign Affairs Committee's Subcommittee on the Western Hemisphere**
*"Energy Opportunities in North America"*
Wednesday, June 7, 2017 at 10:00 a.m. in Rayburn Room 2172

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Over the past few years, this Subcommittee has prioritized the issue of energy very intentionally. We have taken time to examine opportunities in the region and consider how the U.S. can increase energy cooperation with our neighbors to pursue greater economic growth, create jobs, lower gas prices, and increase our energy security. Today's hearing on North American energy opportunities follows legislation that I authored in the 113th Congress to approve the U.S.-Mexico Transboundary Hydrocarbons Agreement, which became law; three Subcommittee energy hearings last Congress; a Government Accountability Office (GAO) study on North American energy that Ranking Member Sires and I requested, which is currently ongoing; and a hearing on South American energy potential last month. In my view, energy holds a very important key to unlocking untapped potential for the hemisphere, and I believe the Trump Administration has an incredible opportunity now to increase U.S. energy engagement with the region – to the benefit of U.S. interests as well as to the region as a whole.

After all, the United States is the largest energy producer in the Western Hemisphere, producing over 12 million barrels of oil and 27 trillion cubic feet of dry natural gas per day. Collectively, as of 2015, North America accounted for 72 percent of Western Hemisphere oil production and 85 percent of natural gas production. Tight oil and shale gas in the United States, Canada's oil sands, and Mexico's energy reforms and offshore oil prospects create circumstances for a far more highly integrated and interdependent North American energy market. A stronger North American energy partnership would expand the size of our energy market, lead to more

jobs, reduce costs for consumers, and enhance North American energy security and independence. Of course, global oil prices will continue to impact U.S. energy interests. However, the U.S. would likely experience less impact from the volatility in the Middle East, attempts by OPEC to regulate energy output and prices, and even Venezuela's energy production freefall if we relied less on these sources of energy and instead built a stronger North American energy market to lower our risk and meet our needs more effectively.

Consequently, I believe that the Trump Administration has an excellent opportunity now in efforts to improve NAFTA to include energy issues in any future deal. The energy landscape has changed substantially since NAFTA was first negotiated and thus warrants closer examination and potential inclusion, in my view. In addition, the Trump Administration has another opportunity with the recently concluded negotiation of the U.S.-Mexico "Section 123 Agreement" to consider how U.S. nuclear exports to Mexico might assist our southern neighbor with its stated objectives to reduce the use of fossil fuels and carbon emissions through nuclear power. This agreement awaits White House consideration and submission to Congress for review. According to U.S. industry, if this "Section 123 Agreement" moves forward, Mexico plans to construct two new nuclear plants, which could potentially generate more than $2 billion in direct U.S. exports and support more than 10,000 jobs in more than 20 U.S. states if U.S. firms end up constructing those new plants.

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Mexico is a major producer of petroleum in the world and is the fourth-largest in the Americas. Several recent discoveries of oil and natural gas in Mexico, the development of unconventional resources, and considerable shale resources near the U.S.-Mexico border offer additional promising opportunities. Furthermore, Canada's privatized oil sector and Mexico's 2013 reforms opening its energy sector to private investment make further energy cooperation with these non-OPEC members more critical to U.S. national interests.

In conclusion, the collective value of the energy trade between the U.S., Canada, and Mexico exceeded $140 billion in 2015. More can be done, and President Trump's "America First Energy Plan" is an important blueprint for achieving greater U.S. energy security and independence. However, I believe that in order for that Plan to maximize its potential, we need to expand North American energy cooperation. Currently, our trilateral trade in crude oil, natural gas, refined products, and electricity is joint and integrated in many ways. Our neighbors are major buyers of petroleum products refined in our country, and energy products cross our borders multiple times. Natural gas originating in Canada is often exported into the U.S. in one part of the country and then re-exported back to Canada in another part. Over 50 natural gas pipelines link the North American energy market, six oil pipeline systems link the U.S. and Canada, and over 30 major electricity transmissions connect the U.S. and Canada. Yet, we have substantial room to improve and grow our energy partnership, especially with Mexico. I look forward to hearing from our witnesses on how the U.S. can work with our neighbors to build a stronger North America. I turn now to Ranking Member Sires for his opening remarks.

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Mr. SIRES. Good morning. Congratulations, Rebecca and Carlos. Welcome on board.

Good morning to everyone. And thank you, Chairman Duncan, for holding this hearing.

Today's hearing will focus on the relationship, prospective opportunities, and upcoming challenges in energy cooperation between the United States and our close neighbors and allies, Mexico and Canada.

The energy market in North America has become large and integrated. Because of this, North America must take particular steps to ensure that our energy cooperation remains beneficial to all parties. The current relationship between the U.S. and its North American partners is strong.

For instance, Canada is currently the largest single supplier of crude oil to the U.S. Electricity trade between the U.S. and Canada has increased 230 percent between 2006 and 2015, and Mexico is the largest customer of U.S. natural gas. Mexico and the U.S. have exponentially increased the amount of pipelines between the countries to expand on its ability for future trade. While our current integration is stronger than ever, there are opportunities in the future to have an even more robust relationship.

With large potential in solar, wind, and hydropower, I believe that working toward further integration within the renewable energy industry is in the national interest of the U.S. Countries all over the world are already seeing that investing in renewable energy sources is driving their economies into the future and producing jobs for the next generation. We must work with our allies to make sure the U.S. isn't just a part of this trend, but one of the leaders.

Unfortunately, President Trump's decision to pull out of the Paris climate agreement leaves the U.S. out in the cold, joined by only Syria and Nicaragua, the only two other nations not party to the agreement. I am heartened by the response of many American cities and companies to state their commitment to energy diversity and making sure the American people have access to the jobs and stability that comes with a more efficient and independent energy matrix.

These challenges present unique circumstances for North America to strengthen its commitment to energy integration. The U.S. needs to reassure its southern and northern neighbors that we are dedicated to energy integration and will help where possible to pursue this interest. However, this requires dedication and cooperation on all fronts. I am confident that the U.S. will continue to develop an official energy policy with its neighbors.

I look forward to hearing from our panelists how we can address the challenges and where the future of North America and energy industry lies. Thank you.

Mr. DUNCAN. The gentlelady from New Jersey is recognized—I am sorry, New York. Ms. Kelly is recognized.

Ms. KELLY. Thank you, Mr. Chairman.

I was disappointed by the Trump administration's recent decision to withdraw from the Paris Agreement and retreat into diplomatic isolation. This decision not only endangers our planet, but also hurts America's credibility abroad. And let us not forget that Presi-

dent Trump has already strained our relationships with Mexico following degrading remarks about Mexican citizens and threats to slap a 20 percent tariff on imports. This threatens our position as Mexico's largest trading partner and foreign supplier of natural gas.

How do these actions add to U.S. energy security? How do they promote U.S. interests? It is my hope that this hearing will shed light on the path forward to promote general economic growth and job creation that is as mutually beneficial as possible. The future of North American energy is changing as renewable energy becomes cheaper and electric grids become more efficient. Supporting these different technologies will promote not only a clean environment, but also decrease our reliance on foreign energy.

I look forward to hearing from the witnesses on charting a responsible path forward for North American energy policy. And I thank you, Mr. Chair.

Mr. DUNCAN. I thank the gentlelady.

The chair will go to the gentleman from Florida for a brief opening statement.

Mr. YOHO. Thank you, Mr. Chairman. I appreciate you convening this meeting. And I think this is very important that we have this meeting today.

You know, with the abundance that America and North America has been blessed with, as far as natural resources, and with our Caribbean Basin and our South American basin, our neighbors so close that we have so much energy that we utilize that to bolster the security, especially of the Caribbean islands.

You know, if you look at Puerto Rico, the majority of their oil or energy production is from heavy oil that comes from Venezuela. If you look at the U.S. Virgin Islands, they have an energy shortage. That region pays the most for electricity than anybody else when you look at the Continental United States. And so exporting LNG out of North America makes sense to bring clean energy to those areas, in addition to national security. You know, to have a steady supply from an ally to U.S. territories, versus getting it from Venezuela just makes sense. And this is something I look forward to hearing your testimonies on.

And I just have to say, Mr. Chairman, about President Trump pulling out of the Paris accord, I think it was the right thing to do. I think that tied our hands as Americans. It indebted this country to paying and transferring wealth from this country to other countries, and it wasn't going to really change anything. He has said he is going to renegotiate this. And it is not that he doesn't want clean air or clean energy. He wants to do it where it is best for this country. And if it is best for this country, it is going to be better for the people that we work with.

I yield back.

Mr. DUNCAN. I thank the gentleman.

Mr. Espaillat.

Mr. ESPAILLAT. Thank you, Mr. Chairman. Ranking Member Sires, thank you for putting together this hearing on the energy opportunities in North America.

Certainly, this is an opportune time to discuss this particular issue as we see the impact of the collapse of the oil industry and

how it has impacted the Caribbean and central South America from Venezuela. And we saw for many years how the Petrocaribe initiative was used as a political tool in that region. Now, many of those countries in the Caribbean are either facing extremely high rates of electrical costs or have spotty energy supplies, leading to their economic development to be delayed, if not stifled.

But for the longest time, Canada and Mexico have been the United States' allies in matters of energies, commodities and vice versa. There has been an active and increased energy trade between our countries where Canada and Mexico have each represented a crucial part in the United States' energy independence and security. Unfortunately, this economic relationship risks disruption due to the actions taken by the current administration, most notably the withdrawal from the Paris climate accord, which even North Korea has signed onto and stayed there.

So when we hear that Syria and Nicaragua are the only two that have opted out, we also should look at the ones, the countries that are still in the agreement. And even North Korea is still in the agreement. And, of course, the President's talks on building the wall has strained relationships with Mexico. So all these actions may clearly put at risk our lives with Canada and Mexico to continue to excel in topics related to energy. I hope that your testimony will shed some light on some of these issues. Thank you.

Thank you, Mr. Chairman.

Mr. DUNCAN. You are welcome.

Mrs. Torres, do you have an opening statement, briefly?

Mrs. Torres. No, thank you.

Mr. DUNCAN. All right. So we will turn to the testimony from our witnesses. We thank you for being here today.

Before we get started, you will notice some lights in front of you: Green, yellow, and red. We are going to operate on a 5-minute timeframe. As it gets close to the end of your time, it will start going to yellow. When it gets to red, your time is up, and you can just wrap up. Try to stay on time. Many members have other meetings today, but we want to get to as much as possible.

So at this time, I will recognize Ms. Ladislaw for 5 minutes.

**STATEMENT OF MS. SARAH LADISLAW, DIRECTOR AND SENIOR FELLOW, ENERGY AND NATIONAL SECURITY PROGRAM, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES**

Ms. LADISLAW. Thank you very much.

Good morning, Chairman Duncan, Ranking Member Sires, and members of the committee. It is my pleasure to be here today to speak with you about energy opportunities in North America. My name is Sarah Ladislaw, and I direct the Energy and National Security Program at the Center for Strategic and International Studies. We are a bipartisan, nonprofit organization headquartered in Washington, DC, and we provide strategic insights and sound policy guidance on matters relating to energy. My remarks and written testimony today represent my views and not the views of my colleagues or the institution that I represent.

One thing that Democrat and Republican candidates had in common during our last round of elections is that they recognized the United States has amazing energy resources. And these resources

can play an important role in sealing our economy, creating jobs, and advancing our foreign policy objectives.

This newfound energy confidence is a shift from the sentiment of years past when growing energy import dependence and high prices left the United States feeling vulnerable to global market disruptions and searching for secure alternatives.

For decades, as part of this quest for greater energy security, the United States worked with its neighbors Canada and Mexico to cultivate the kind of economic and security advantages that come with an integrated, close proximity market in energy trade. We signed trade arrangements, fostered cross-border infrastructure, and met regularly to discuss energy policy and regulatory issues. And we even sought to harmonize standards relating to electric reliability, offshore drilling safety, and a host of other issues.

Because of those efforts, North America is now one of the most energy advantaged continents on the planet with ample oil, natural gas, coal, nuclear, solar, biomass, wind, and hydropower resources. Even beyond its basic resource base, North America has attributes that make it additionally advantaged. As one longtime energy executive once told me, resources alone are not enough. To make an energy project work, you must have the critical math: A market for these resources; access to financing and technology and skilled labor; infrastructure; a sound political, legal, and commercial environment; and a proper return on investment. And North America has this critical math.

Because of this energy advantage and the slowing of our energy demand growth, North America is coming close to achieving energy self-sufficiency. According to the 2017 BP energy outlook, North America is projected to be energy self-sufficient by 2020.

So does self-sufficiency mean that we have achieved all the promises of energy independence? Definitely not. North America will need access to markets to sell its energy resources in technologies. We will also need our energy trading partners within the hemisphere and around the world to achieve economic and security advantages that come from building trade relationships.

Even with all these energy advantages, North America still faces energy-related challenges, many related to the important changes taking place in the energy sectors of our respective economies. Over a period of two decades, as many of you have noted, North America's low production landscape has undergone some profound changes that have altered the oil delivery infrastructure on the continent, led us to lift a decades long oil export ban in the United States, to historically significant changes in the Mexican Constitution allowing for private investment.

Similarly, dramatic shifts are taking place in natural gas supply and delivery in North America, with the United States now serving as an LNG exporter and a major supplier of gas to Mexico; and, in the electric power sector, where shifts in consumer preferences, available technologies, the cost of renewable energy, and preferences for low-carbon energy sources are challenging the existing systems and creating new opportunities in electric power markets throughout the continent.

Indeed, these are exciting and complex times for the North American energy landscape. So what should North America do with

its energy advantage? In my view, we should foster it by promoting much of what has made it successful thus far: Working toward greater integration and shared priorities.

In order to make the most of these energy advantages, Canada, Mexico, and the United States should continue to prioritize high-level energy policy dialogues that have proven very successful in the past, modernize NAFTA to reflect progress that has been made and to prepare for future energy challenges, adopt a regional approach to energy infrastructure discussions, and assess and address our shared vulnerabilities.

In closing, I want to thank the committee for taking on this important topic, and I look forward to the discussion.

[The prepared statement of Ms. Ladislaw follows:]

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

Statement Before the

House Committee on Foreign Affairs
Subcommittee on Western Hemisphere

# *"Energy Opportunities in North America"*

A Testimony by:

**Sarah Ladislaw**

Director and Senior Fellow, Energy and National Security Program
Center for Strategic and International Studies (CSIS)

**June 7, 2017**

**2172 Rayburn House Office Building**

Good morning Chairman Duncan, Ranking Member Sires, and members of the subcommittee. It is my pleasure to be here today to speak with you about *energy opportunities in North America.* My name is Sarah Ladislaw, and I direct the Energy and National Security Program at the Center for Strategic and International Studies (CSIS). CSIS is a bipartisan, nonprofit organization headquartered in Washington, D.C. The CSIS Energy and National Security Program provides strategic insights and forward-thinking policy guidance that balances economic, environmental, and security priorities in the context of market and geopolitical uncertainties. My remarks and written testimony represent my views and not the views of my colleagues or CSIS as an institution.

One thing Democrat and Republican candidates had in common during our last round of elections is that they recognized that the United States has amazing energy resources that can play an important role in fueling our economy, creating jobs, and advancing our foreign policy objectives. This newfound energy confidence is a shift in sentiment from years past when growing energy import dependence and high prices left the United States feeling vulnerable to global market disruptions and searching for secure alternatives.

For decades, as part of the quest for greater energy security, the United States worked with its neighbors, Canada and Mexico, to cultivate the kind of economic and security advantages that come with an integrated, close-proximity market in energy trade. We signed trade arrangements, fostered cross-border infrastructure, met regularly to discuss energy policy and regulatory issues, and even sought to harmonize standards relating to electric reliability, offshore drilling safety, and a host of other issues.

Because of those efforts, North America is now one of the most energy-advantaged continents on the planet with ample oil, natural gas, coal, nuclear, solar, biomass, wind, and hydropower resources. On the fossil fuel side of the equation, the continent accounts for 14 percent of world oil reserves and 6 percent of global natural gas reserves, from which it produces 23 percent of global oil and 27 percent of global natural gas. North America is the second-largest producer of wind and solar and the second-largest producer of hydropower. North America also accounts for 22 percent of global primary energy consumption.

Even beyond its basic resource base, North America has attributes that make it additionally advantaged. Canada, Mexico, and the United States are generally regarded as stable countries in which to do business and have excellent labor pools from which to draw talent, world-class universities and hubs of innovation, access to financing, and robust private-sector capabilities. As one long-time energy executive once told me: resources alone are not enough; to make any energy project work you must have the "critical math"—a market for the resources; access to finance, technology, and skilled labor; infrastructure; a sound political, legal, and commercial environment; and proper return on investment. North America has this critical math.

Because of this energy advantage and the slowing of our energy demand growth, North America is coming close to achieving energy self-sufficiency. According to the 2017 BP energy outlook,

North America is projected to be energy self-sufficient by 2020.[1] For nearly 40 years, American politicians have set the goal to reach energy independence. Today, the United States, together with its partners in Canada and Mexico, are closer to achieving energy self-sufficiency than anytime during that period. The idea of energy independence has deep roots. Initially conceived in response to America's vulnerability to oil supply disruptions brought about by the Arab oil embargoes, years later the concept was resurrected as American troops headed off to the Middle East for what many politicians believed were oil-derived foreign policy interests in Iraq. And then again the goal took on new prominence as strong Chinese energy demand growth started to raise concerns about resource competition. Energy independence has been a consistent theme of U.S. energy policy because it resonates with the American public and speaks to so many objectives sought by policymakers: insulation from security, economic, and foreign policy vulnerabilities. So, does self-sufficiency mean we have achieved all the promise of energy independence? Definitely not.

Particularly at this moment in time, it is important to note that even as a net exporter of energy, the United States and its partners in North America will continue to be dependent on trading relationships throughout the world for economic and security benefits. Instead of looking to the world for energy resources to fuel our inexhaustible growth, we will be looking to rapidly growing markets to sell our resources and technologies. We will also need our energy trading partners within and outside the hemisphere to achieve economic and security advantages that come from building trade relationships. Indeed, North America's energy advantage does not mean complete independence or isolationism—nor does it mean this emerging idea of "energy dominance" is a viable or desirable mindset even for the most energy abundant regions in the world, especially given that the U.S. has benefited from cooperative trade in energy for many decades and still imports nearly 8 million barrels a day of crude oil, only some of which comes from our North American neighbors

Even with this energy advantage, North America is still faces energy related challenges, many of them having to do with the societal objectives that influence our energy production and use, like economic growth, security, job creation, and environmental sustainability. Many of the challenges are also related to the important changes taking place in the energy sectors of our respective economies, namely oil and gas production, electricity production, transmission and use, and transportation. Indeed, North America's energy sectors are transitioning in terms of the source, amount, location, and transportation of energy production and consumption. Two years ago, the CSIS Energy and National Security Program called attention to the amazing oil supply resurgence happening in the United States and the impacts it was having on the volume, location, and quality of oil supplies on the continent, including implications for future oil production, transportation, and use within North America.[2] Over a period of two decades, North America's oil production landscape has undergone some profound changes, including the onset of oil sands production in Canada, the decline in oil production in Mexico, and the dramatic surge in U.S. tight oil production. These developments have led to even more dramatic changes in the oil

[1] BP, "BP Energy Outlook 2017: Regional Insight - North America," http://www.bp.com/content/dam/bp/pdf/energy-economics/energy-outlook-2017/bp-energy-outlook-2017-region-insight-north-america.pdf.

[2] Frank Verrastro, et al. "Delivering the Goods: Making the Most of North America's Evolving Oil Infrastructure", February 26,2015. https://www.csis.org/analysis/delivering-goods

delivery infrastructure on the continent, to lifting a decades old oil export ban in the United States, to a historically significant change in the Mexican constitution allowing for private investment. Similarly dramatic changes are taking place in natural gas supply and delivery in North America—with the United States serving as an LNG exporter and major supplier of gas to Mexico—and in the electric power sector where shifts in consumer preference, available technologies, the cost of renewable energy, and a preference for low-carbon energy sources are challenging existing systems and creating new opportunities in electric power markets throughout the continent.

Indeed, these are exciting and complex times in the North American landscape. So, what should North America do with its energy advantage? In my view, we should foster it by promoting much of what has made it successful thus far - working towards greater integration and shared priorities. In order to make the most of these energy advantages Canada, Mexico. and the United States should:

- *Continue to prioritize high-level energy policy dialogues.*
  Each of the last three administrations has engaged in tri- and bilateral dialogues to exchange views and even coordinate actions on areas of common interest. These dialogues have helped foster shared understanding during times change of disagreement and have even led to coordinated approaches to electric reliability. They have also been a forum for soliciting private sector and civil society views that can help inform policy and regulatory discussions. Under the Obama administration, the three countries of North America set forth some aggressive joint objectives in the areas of data, regulatory cooperation, clean energy promotion, methane emission reduction, and much more. Not all of these objectives will match the priorities of the Trump administration, but some are worth doing regardless of the potential difference in agendas. Given the amount of change going on in North America's energy sectors, these dialogues should be continued and prioritized.

- *Modernize NAFTA to prepare for the future.*
  The United States has signaled its intent to reopen the North American Free Trade Agreement (NAFTA). North America's energy sector has benefitted from but is not overly impacted by the provisions within NAFTA. An excellent paper written by Laura Dawson of the Woodrow Wilson Center points out that oil, natural gas, and electricity are traded duty free, and products related to energy have relatively low tariffs.[3] NAFTA affects rules governing investment, services, government procurement, and rules of origin, which in turn impact the energy sector but more tangentially. When it comes to energy and NAFTA a "do no harm" approach should be taken, recognizing that free trade in energy across borders is still in North America's interests. While many of the concerns related to NAFTA have little to do with the energy sector, energy trade can be held hostage to other contentious issues or can be affected by other trade-related measures like the various Buy America proposals being discussed in the United States today. There are things that can be done to address the economic dislocations being experienced in many

[3] Laura Dawson, "What do NAFTA renegotiations mean for the North American energy sector?," Wilson Center, April 3, 2017, https://www.wilsoncenter.org/article/what-do-nafta-renegotiations-mean-for-the-north-american-energy-sector.

parts of North America and ways to build additional energy advantages among the three countries, but few of these lie within the context of renegotiating NAFTA.

- *Regionalize infrastructure discussions.*
  Congress and the administration have indicated that investing in infrastructure is a priority. Regardless of efforts to streamline or invest in the nation's infrastructure, many of the obstacles faced by developers are at the local and regional level and many of these involve cross-border pipelines or infrastructure. Whether pipelines through the Midwest or transmission lines in the Northeast and Southwest, infrastructure development requires a regional approach to overcome emerging opposition to much of the continent's midstream infrastructure. There may also be benefits to creating regional strategies to develop innovation clusters and create ties between states and provinces that are pursuing aggressive low-carbon policies.

- *Assess and address vulnerabilities.*
  Despite North America's energy advantages it still has vulnerabilities. For example, all three countries are impacted by global oil supply disruptions, which can drive up prices and create delays and/or shortages for various fuels. As the United States experienced with propane shortages in 2015, market and weather conditions can combine to create shortages even in a country experiencing a period of relative energy abundance. While oil markets are currently well supplied, in times of disruption—whether caused by hurricanes, as was the case in 2003 and 2005, or political instability in other countries, like the Venezuelan disruption in 2000 and Libya outage in 2013—North America benefits from shared infrastructure, strategic stockpiles of oil, and being part of a global network of strategic petroleum supplies.

  Another good example is the vulnerability of the continent's energy systems to cyber attacks and more mundane but still serious issues of reliability. Earlier this year the Department of Energy released the second installment of the Quadrennial Energy Review, which offered a number of recommendations about how North America should strengthen its reliability measures (particularly between the United States and Mexico) and to work together to assess and prepare for cyber vulnerabilities as well.[4]

In closing, I want to thank the committee for taking on this important topic. North America is one of the most energy-advantaged continents on the planet. Even beyond its basic resource base, North America has attributes that make it additionally advantaged. North America's energy advantage does not mean complete independence or isolationism. North America's energy sectors are transitioning in terms of the source, amount, location, and transportation of energy production and consumption. In order to make the most of these energy advantages, Canada, Mexico, and the United States should modernize NAFTA and other trilateral mechanisms to prepare for the future; regionalize infrastructure discussions; and assess and address vulnerabilities to continental energy security. Thank you and I look forward to the discussion.

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[4] U.S. Department of Energy (DOE), *Quadrennial Energy Review: Transforming the Nation's Electricity System: The Second Installment of the QER* (Washington, DC: DOE, January 2017), 7-28, https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf.

Mr. DUNCAN. Thank you.
The chair will now recognize Mr. Padilla.

**STATEMENT OF AARON PADILLA, PH.D., SENIOR ADVISOR, INTERNATIONAL POLICY, AMERICAN PETROLEUM INSTITUTE**

Mr. PADILLA. Chairman Duncan, Ranking Member Sires, and members of the subcommittee, thank you for the opportunity to speak with you today. My name is Aaron Padilla, and I am a senior advisor for international policy at the American Petroleum Institute, which represents all facets of U.S. oil and natural gas industry.

Today's North American energy market, including oil and natural gas, is highly integrated and interdependent. A critical component of the North American energy market is the U.S. energy renaissance. The U.S. is now the largest producer of oil and natural gas. According to the EIA, the U.S. is projected to surpass the historical 1970 peak in crude oil production by 2018. Since 2005, natural gas production in the U.S. has increased by 47 percent.

In recent years, U.S. companies have also experienced unprecedented productivity gains, enhancing the ability of U.S. producers to quickly increase production in response to changing global market demand. For example, in 2011, a typical rig operating in the Bakken basin in North Dakota or Montana would create 234 barrels per day of new oil production in a month. Today, Bakken rigs are nearly five times more productive, generating over 1,100 barrels per day of new oil production every month.

Greater export market opportunities also have emerged for U.S. energy. In 2016, the U.S. exported more than 190 million barrels of crude oil to 26 countries, including 11 in the Western Hemisphere. That same year, the U.S. began shipments of liquified natural gas from the lower 48 States. And since February 2016 through March 2017, the U.S. exported 331 billion cubic feet of LNG to 21 countries, including six in the Western Hemisphere.

Looking closer at North America, the U.S., Canada, and Mexico together form a unique global energy center. According to the EIA, North America is on the verge of achieving energy self-sufficiency, as Sarah mentioned, when you consider the consumption of liquid fuels production against the production of liquid fuels and that we are on the verge of meeting that as soon as 2020.

Energy flows between the U.S., Canada, and Mexico are multidirectional, as depicted on the map from the graphic that we produced that the chairman mentioned at the beginning of his remarks.

Canada is the top export market for U.S. crude oil, motor gasoline blending components, and kerosene type jet fuel. Mexico is the largest export market for U.S. pipeline natural gas, total refined products, finished motor gasoline, and distillate fuel oil. In addition, significant U.S. crude oil imports from Mexico are manufactured in the U.S. into the refined products that are exported back to Mexico.

As for natural gas in 2016, the U.S. exported 2.1 trillion cubic feet of natural gas by pipeline to Canada and Mexico.

The U.S. pipeline capacity for natural gas exports to Mexico have rapidly expanded in the past few years, and they are expected to

nearly double in the next 3 years. Mexico is also a new market for U.S. LNG, receiving 67 billion cubic feet of natural gas shipped since February 2016.

U.S. refineries also receive crude oil from Canada and Mexico, which all supports U.S. jobs. In 2016, 69 U.S. refineries, primarily in the Midwest, processed heavy sour crude oil from Canada. Also in 2016, 12 U.S. refineries along the Gulf Coast imported crude oil from Mexico, producing refined products for both the U.S. and Mexican markets. And since 2000, Mexico's net imports of gasoline and diesel have tripled, most of which are supplied by refineries here in the U.S.

Canada and Mexico are also significant markets for U.S. investment in oil and natural gas. Mexico's hydrocarbon sector is just now opening to foreign investment for the first time in nearly a century. In Mexico's December 2016 bid round of deepwater blocks, U.S. companies were successful in capturing five of the eight blocks awarded.

The North American region has a strong and vibrant energy market. It is imperative that U.S. policy continues to facilitate our energy renaissance here at home, allowing for responsible domestic oil and natural gas development, and continuing to foster the dynamic energy flows in the region. We also need sufficient infrastructure to ensure additional energy supplies can reach U.S. consumers and international markets.

In addition, as the President and Congress begin to consider potential changes to NAFTA, we urge them to keep in mind the important role this agreement has played in the North American energy market. NAFTA has eliminated tariffs for oil and natural gas products, liberalized natural gas exports to Canada and Mexico, and provided strong investment protections which are consistent with U.S. law and that are essential for U.S. oil and natural gas investments in the region.

In conclusion, we have a robust and dynamic regional market that supports U.S. jobs and U.S. consumers with access to affordable energy. We look forward to working with Congress and the administration to continue the U.S. energy renaissance, energy linkages to North America, to the rest of the Western Hemisphere, and to the world.

Thank you, and I look forward to answering your questions.

[The prepared statement of Mr. Padilla follows:]

**U.S. House of Representatives**
**Committee on Foreign Affairs**
**Subcommittee on the Western Hemisphere**
**"Energy Opportunities in North America"**

**Testimony of Aaron Padilla, Ph.D.**
**Senior Advisor, International Policy**
**The American Petroleum Institute**
**June 7, 2017**

Chairman Duncan, Ranking Member Sires, and Members of the subcommittee, thank you for the opportunity to speak with you about North American energy within the Western Hemisphere. My name is Aaron Padilla, and I am a Senior Advisor for International Policy with the American Petroleum Institute (API).

API is the only national trade association representing all facets of the oil and natural gas industry, which supports 9.8 million jobs and 8 percent of the U.S. economy. API's more than 625 members include large integrated companies, as well as exploration and production, refining, marketing, pipeline, marine businesses, and service and supply firms.

Today's North American energy market, including oil and natural gas, is highly integrated and interdependent (see attached API *North American Energy* backgrounder). This energy partnership benefits the United States by expanding the size of our energy markets, creating economies of scale that attract private investment, lowering capital costs, and reducing energy costs for consumers. Energy system integration enhances U.S. energy security by enabling North American energy independence and creating opportunities to export.

A critical component of the strong and dynamic North American energy market are the technological breakthroughs in the oil and natural gas industry that have unleashed a U.S. energy renaissance, moving us from an era of energy scarcity to an era of energy abundance. The United States is now the largest producer of oil and natural gas in the world.[1] The U.S. regions with most significant growth in oil and natural gas production include the Bakken play in North Dakota and Montana, Eagle Ford play in the south Texas, and Permian basin in west Texas and eastern New Mexico. According to the U.S. Energy Information Administration (EIA), the United States is projected to surpass the historical 1970 peak of crude oil production by 2018.[2] Natural gas production also continues to demonstrate significant growth. Since 2005, natural gas production in the U. S. has increased by 47 percent, and EIA projects a 42 percent increase in total natural gas production from 2016 to 2040.

[1] https://www.eia.gov/beta/international/
[2] 1970 Production Peak - https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS2&f=A
EIA forecast - https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf

In recent years, U.S. companies have experienced unprecedented productivity gains, as more oil and natural gas is produced from fewer rigs in less time,[3] enhancing the ability of U.S. producers to quickly increase production in response to changing global market demand. For example, in 2011 a typical rig operating in the Bakken would create 234 barrels per day of new oil production in a month. Today Bakken rigs are nearly 5 times more productive, generating over 1,100 barrels per day of new oil production every month. Similar drilling productivity gains are seen in U.S. natural gas basins. In one month, a rig operating in the Marcellus basin today creates over 13 million cubic feet per day of new natural gas production, over 5 times the production level in 2011.[4] Increased energy production has created jobs right here at home, helped to reduce energy costs for U.S. families and bolster U.S. manufacturing. At the same time, carbon emissions are at their lowest levels in almost 25 years[5], primarily due to fuel switching to natural gas.

In recent years, greater export market opportunities have emerged for U.S. energy, creating U.S. jobs, incentivizing increased domestic production, helping to further integrate U.S. energy in the world market, and enhancing our national security interests abroad. At the end of 2015, Congress and the President lifted the 40-year old ban on crude oil exports. In 2016, the United States exported more than 190 million barrels of crude oil to 26 countries, including 11 countries in the Western Hemisphere.[6] That same year, the U. S. began shipments of liquefied natural gas (LNG) from the lower 48 states. Since February 2016 through March 2017, the U. S. exported 331 billion cubic feet of LNG to 21 countries, including six in the Western Hemisphere.[7] This also adds to the robust exports of U.S. refined products, in particular to Central America, South America, and the Caribbean where local refineries face challenges meeting increasing local demand.[8] In 2016, the United States exported 1.7 billion barrels of total products to 152 countries, including 44 in the Western Hemisphere, which represents 61 percent of these exports.[9]

The U.S. energy boom is also shifting global energy markets. Greater U.S. oil and natural gas production and exports, and reduced imports, have increased supplies and put downward pressure on global prices, impacting production decisions around the world. For example, the Organization of the Petroleum Exporting Countries (OPEC) and several other countries recently agreed to limit oil production for another nine months, largely in response to U.S. shale oil production.[10] North American energy integration has also contributed to greater U.S. influence in global energy markets, which curtails the decades of influence OPEC has had on world markets.

[3] https://www.eia.gov/petroleum/drilling/pdf/dpr-full.pdf
[4] Ibid
[5] U.S. DOE, Energy Information Administration, Monthly Energy Review March 2017. Lowest since 1992.
[6] https://www.eia.gov/dnav/pet/pet_move_expc_a_EPC0_EEX_mbbl_a.htm
[7] https://energy.gov/sites/prod/files/2017/05/f34/LNG%20Monthly%202017_1.pdf
[8] https://www.reuters.com/article/usa-refining-kemp-idUSL8N1IZ3SD
[9] https://www.eia.gov/dnav/pet/pet_move_expc_a_epp0_eex_mbbl_a.htm
[10] https://www.wsj.com/articles/how-american-shale-drillers-flipped-opecs-script-1495618203

Looking closer at the dynamics in North America, the United States, Canada and Mexico together form a unique global energy center. According to EIA, North America is on the verge of achieving energy self-sufficiency with the production of liquid fuels expected to exceed consumption across the United States, Canada, and Mexico by 2020.[11] Energy flows between the U.S., Canada, and Mexico are multi-directional and robust. In 2016, the U.S. exported 1.6 billion barrels of crude oil and total products to Canada and Mexico.[12] That same year, the United States imported 1.4 billion barrels of crude oil and total products from Canada and Mexico.[13] While overall U.S. crude oil production has increased significantly, resulting in a decrease in crude oil imports from 3.4 billion barrels in 2010 to 2.9 billion barrels in 2016,[14] U.S. refineries continue to receive crude oil from Canada and Mexico. Imported crude oil from Canada and Mexico now accounts for a larger percentage of total U.S. imports, growing from 34 percent in 2010 to 49 percent in 2016.[15]

Canada and Mexico are top export markets for U.S. energy. Canada is the top export market for U.S. crude oil, motor gasoline blending components, and kerosene type jet fuel.[16] The United States is a net exporter to Mexico of natural gas and refined products, and Mexico is the largest export market for U.S. pipeline natural gas, total refined products, finished motor gasoline, and distillate fuel oil.[17] In addition, significant U.S. crude oil imports from Mexico are manufactured in the U.S. into the refined products that are exported back to Mexico. As for natural gas, in 2016 the United States exported 2.1 trillion cubic feet of natural gas by pipeline to Canada and Mexico[18] while importing 2.9 trillion cubic feet from those countries.[19] The U.S. produces 90 percent of the natural gas it uses, importing 97 percent of the rest from Canada.[20] In addition, the United States exported 27 billion cubic feet of LNG to Mexico in 2016.[21]

This integrated energy market helps to reduce U.S. exposure to potential supply disruptions from other regions. The combination of the surge in U.S. shale production and the flexibility of the free market and of free trade means that the United States, as the leading oil and natural gas producer in the world, can respond to market forces to help the global market adjust to shortages or surpluses.

North American energy integration supports American jobs by opening the United States as a manufacturing destination for Canadian and Mexican crude oil. Both Canada and Mexico produce heavy crude oil, which sophisticated U.S. refineries in the Midwest and Gulf Coast regions are well-suited to process. In 2016 for example, 69 U.S. refineries, primarily in the Midwest, processed heavy sour crude

[11] www.eia.gov/outlooks/aeo/pdf/appa.pdf
[12] https://www.eia.gov/dnav/pet/pet_move_expc_a_EP00_EEX_mbbl_a.htm
[13] https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_a.htm
[14] https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRIMUS1&f=A
[15] https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbbl_a.htm
[16] https://www.eia.gov/dnav/pet/pet_move_expc_dc_NUS-Z00_mbblpd_a.htm
[17] https://www.eia.gov/dnav/pet/pet_move_expc_dc_NUS-Z00_mbblpd_a.htm
[18] https://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm
[19] https://www.eia.gov/dnav/ng/ng_move_impc_s1_a.htm
[20] Government of Canada. Canada- U.S. Relations: Energy – Natural Gas.
[21] https://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm

oil from Canada,[22] producing much needed refined products for U.S. consumers and supporting thousands of U.S. jobs. The United States and Mexico also form a similar interdependent energy partnership. In 2016, 12 U.S. refineries along the Gulf Coast imported crude oil from Mexico,[23] producing refined product for both U.S. and Mexican markets. Since 2000, Mexico's net imports of gasoline and diesel have tripled, most of which are supplied by refineries in the United States.[24] The six refineries in Mexico, all owned and operated by the state-owned company Petróleos Mexicanos (PEMEX), were built before 1980. They cannot meet Mexico's increases in domestic demand for fuels, and some of their existing capacity is not configured to process the increasingly heavy crude that Mexico produces.[25] Mexico therefore exports crude oil to refineries in the United States, which manufacture refined products that are exported back to Mexico. EIA states that "while Mexico hopes to reduce its imports of refined products by improving domestic refining capacity, analysts contend that Mexico does not have a natural competitive advantage in refining, given the country's close proximity to a sophisticated U.S. refining center."[26]

U.S. and Mexican natural gas markets are also becoming more interconnected. U.S. pipeline capacity for natural gas exports to Mexico has rapidly expanded in the past few years; it currently stands at 7.3 billion cubic feet per day and is expected to nearly double in the next three years.[27] Mexico is also a new market for U.S. LNG, receiving 67 billion cubic feet of natural gas shipped since February 2016.[28] Mexico's energy reforms, strong growth in natural gas demand in the power sector, declining domestic production, and availability of U.S. natural gas have all created an opportunity to increase energy trade between the United States and Mexico.

The United States and Canada also benefit from a relatively seamless border that allows electricity grid managers to optimize electricity generation assets on both sides of the border in order to improve electric reliability and efficiency. Currently, there are more than 30 active major transmission connections (69 kilovolts or greater) between the two countries, trading approximately $3 billion of electricity in 2014.[29] Although the predominant flow of trade is from north to south, it is not entirely one-sided. Canada is an overall net exporter of energy to the United States, but the roles are reversed in certain regions, particularly where there are infrastructure constraints.

The United States and Mexico trade a smaller amount of electricity currently along the border regions where Mexico imports some power from California and Texas. However, Mexico's recent energy reforms present a huge opportunity for electricity and natural gas trade with the United States.

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[22] https://www.eia.gov/petroleum/imports/browser/#/?e=201701&f=m&s=200901&vs=PET_IMPORTS.WORLD-US-ALL.M
[23] Ibid
[24] International Energy Agency (IEA). 2016. *Mexico Energy Outlook*, p. 23.
[25] Ibid
[26] https://www.eia.gov/beta/international/analysis.cfm?iso=MEX
[27] https://www.eia.gov/todayinenergy/detail.php?id=28972
[28] https://energy.gov/sites/prod/files/2017/05/f34/LNG%20Monthly%202017_1.pdf
[29] US Department of Energy. 2015. *Quadrennial Energy Review (QER). Chapter VI: Integrating North American Energy Markets*.

Mexico's growth in its domestic electricity market has largely been met with generation from new natural gas-fired plants, driving the increase in U.S. natural gas exports to Mexico.

Canada and Mexico are significant markets for U.S. investment in oil and natural gas. For example, according to the U.S. Department of Commerce, Canada and Mexico are the two largest markets for U.S. upstream oil and natural gas equipment, with U.S. exports reaching $6.5 billion in 2016 and projected to increase to $10 billion in 2020.[30] In 2015, U.S. companies' foreign direct investment (FDI) in Canada totaled $4.52 billion for oil and natural gas extraction and $8.8 billion in petroleum refining.[31] In the upstream/exploration and production, these investments include production in the oil sands of Alberta, the fields of the McKenzie Delta in the Arctic, and offshore in the Maritimes of Newfoundland and Labrador. In the midstream, these investments include pipelines across the country, U.S.-Canada cross-border pipelines. And in the downstream, these investments include refineries, retail, and marketing assets.

Mexico's hydrocarbon sector is just now opening to FDI for the first time in nearly a century. Mexico nationalized the oil industry in 1938 and created a monopoly for the state-owned company, PEMEX, which grew to become the largest company in Mexico and one of the largest oil companies in the world. However, over time, Mexico's total oil production has declined substantially, falling 32 percent from its peak in 2004, and in 2015 reaching its lowest level since 1981.[32] In 2013, to address declining production and the need for competition and foreign investment to modernize the energy sector, Mexico enacted historic constitutional reforms to end PEMEX's monopoly and open Mexico's market to foreign investment.

U.S. strength in oil and natural gas has positioned U.S. companies to meet Mexico's needs for technical expertise and capital to modernize their energy sector. In 2015, U.S. companies' FDI in Mexico totaled $420 million for oil and natural gas extraction and $1.96 billion for support activities for oil and gas extraction.[33] In Mexico's December 2016 bid round of deepwater blocks, API member companies BP, BHP Billiton, Chevron, ExxonMobil, Murphy, Statoil and Total were selected among winning bidders in Mexico's most recent and most-subscribed bid round of deepwater blocks in the Gulf of Mexico; each operating company's investment may be greater than $1 billion.[34] Considered another way, in Mexico's December 2016 bid round of deepwater blocks, U.S. companies were successful in capturing five of the eight blocks awarded. One block was won by a venture led by the Malaysian state-owned oil company Petronas, and the other two blocks were won by CNOOC, China National Offshore Oil Corporation – the Chinese state-owned oil company. CNOOC's two blocks – Blocks 1 and 4 in the Perdido Fold Belt – are considered especially promising because they are located near the Trion field and just south of the U.S.-

[30] http://www.trade.gov/topmarkets/pdf/Oil_and_Gas_Top_Markets_Report.pdf
[31] Source: US Bureau of Economic Analysis (BEA). US Direct Investment Position Abroad on a Historical-Cost Basis: Industry Detail for Selected Countries, 2015.
[32] https://www.eia.gov/beta/international/analysis.cfm?iso=MEX
[33] Source: US Bureau of Economic Analysis (BEA). US Direct Investment Position Abroad on a Historical-Cost Basis: Industry Detail for Selected Countries, 2015.
[34] Rigzone. 5 December 2016. *BHP, CNOOC, European majors among winners for Mexican deepwater blocks*.

Mexico maritime border in the Gulf of Mexico. The CNOOC success in the recent bid round shows that Mexico has options for foreign investors in its newly-opened energy sector. The CNOOC success is in line with China's recent strategies to secure energy supplies globally and strengthen its ties with hydrocarbon-rich countries.

The North American region has a strong and vibrant energy market, benefiting U.S. families, workers, and businesses – as well as those across Canada and Mexico. If we want to maintain and grow this important partnership, it is imperative that U.S. policy facilitates our energy renaissance, allowing for responsible domestic oil and natural gas development and continuing to foster the dynamic energy flows in the region.

We need sufficient infrastructure to ensure additional energy supplies can reach U.S. consumers and international markets. A recent ICF study[35] projects that by 2035 the United States will produce up to 12 million barrels of crude oil per day, up to 131 billion cubic feet of natural gas per day, and up to 19 million barrels of refined product per day. This will require up to $1.34 trillion in private oil and natural gas infrastructure investment by 2035 and support up to 1 million U.S. jobs annually. This infrastructure will be critical to maintaining the strong North American energy market.

As the President and Congress begin to consider possible changes to the North American Free Trade Agreement (NAFTA), we urge them to keep in mind the important role this agreement has played in fostering the dynamic energy relationship between our countries. As an energy superpower, with the United States as the world's leading producer of oil and natural gas, NAFTA has allowed U.S. oil, natural gas, and derived products to flow to and from both Canada and Mexico. NAFTA eliminated tariffs for crude oil, gasoline, motor fuel blending stock, distillate fuel oil and kerosene type jet fuel – all of which would increase without the free trade agreement. NAFTA also liberalizes trade in energy between the U.S., Canada and Mexico, including the automatic liberalization, per the Natural Gas Act, of U.S. natural gas exports to Canada and Mexico by virtue of NAFTA being a free trade agreement between the parties. NAFTA also plays a critical role for U.S. foreign direct investment in Canada and Mexico. Although Mexico's hydrocarbon market was excluded originally in NAFTA, Mexico's subsequent energy reforms trigger a "ratchet clause" in NAFTA that provides access to Mexico's market, on par with such access provided in NAFTA to Canada's oil and natural gas market. In addition, NAFTA's provisions for strong investment protections, which are consistent with U.S. law, are essential for U.S. oil and natural gas investments in Canada and Mexico. Overall, NAFTA supports U.S. jobs and manufacturing in energy, helps to make energy more affordable for American families, enhances energy security and affordable energy for U.S. allies, and enables U.S. companies to compete in Canada and gain opportunities for development in Mexico.

In addition, the U.S., Canadian, and Mexican governments should continue and enhance consultations and dialogue to further bolster our energy partnerships. From the private sector perspective, we, along

[35] http://www.api.org/news-policy-and-issues/energy-infrastructure/oil-gas-infrastructure-study-2017

with the Canadian Association of Petroleum Producers (CAPP) and the Asociación Méxicana de Empresas de Hidrocárburos (AMEXHI, the Mexican upstream oil and natural gas industry association), have an ongoing and robust dialogue concerning industry practices and policies.

In conclusion, North America has a robust and dynamic energy market which facilitates the flow of oil and natural gas products between our countries and the world, supports U.S. jobs, and provides American consumers with access to affordable energy. We look forward to working with Congress and the Administration to continue the U.S. energy renaissance and our energy linkages to North America, the rest of the Western Hemisphere, and the world. Thank you and I would be happy to answer any questions that you may have.

# North American ENERGY

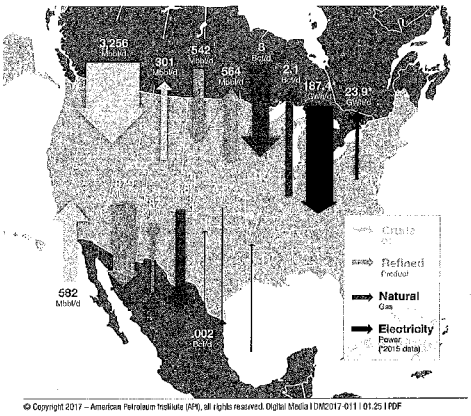
energy API
AMERICAN PETROLEUM INSTITUTE

Today's highly integrated and interdependent North American energy markets (oil, natural gas, electricity) benefit the United States by expanding the size of our energy markets which create economies of scale that attract private investment, lower capital costs, and reduce energy costs for consumers. Energy system integration enhances U.S. energy security by enabling North American energy self-sufficiency and by providing export markets for the U.S. as the world's largest producer of oil and natural gas.

## NORTH AMERICAN ENERGY FLOWS

North American energy markets (oil, natural gas, electricity) are integrated and interdependent with energy infrastructure and trade crossing the borders of the U.S., Canada and Mexico. The trade in crude oil, natural gas, refined products such as gasoline and petrochemicals, and electricity between the U.S., Canada and Mexico is multi-directional.

FIGURE 1. NORTH AMERICA ENERGY FLOWS BY COMMODITY, 2016



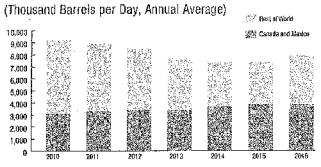



## CRUDE OIL

Oil production from shale resources, made available by hydraulic fracturing and horizontal drilling, has led a U.S. revolution in crude oil production. As a result, imports of crude oil by the U.S. decreased from 9,213 thousand barrels per day (Kb/d) in 2010 to 7,677 Kb/d in 2016. At the same time, imported crude oil from Canada and Mexico now account for a larger percentage of total U.S. imports, growing from 33.9% in 2010 to 48.7% in 2016.

Canada is a major producer of heavy crude oil, which is suited for the complex refineries in the U.S. Midwest and Gulf regions. Canada supplies virtually all of the heavy oil processed at Midwest refineries and a large percentage of the heavy oil processed at Gulf Coast refineries. Mexico also produces heavier crude oil, which is well-suited for U.S. refineries.

FIGURE 2. U.S. CRUDE OIL IMPORTS, 2010–2016
(Thousand Barrels per Day, Annual Average)




## NATURAL GAS

The U.S. is a net importer of natural gas from Canada, although at declining rates, and the U.S. is a net exporter of natural gas to Mexico. The U.S. produces 90% of the natural gas it uses, importing most (97%) of the rest from Canada.[1] Natural gas pipeline constraints have made Canadian imports of natural gas more cost effective for U.S. customers in certain U.S. markets, especially in the Northern U.S. In addition to consumer benefits, the interconnectedness of the Canadian and U.S. and Mexican natural gas markets enhances system flexibility and reliability.

U.S. and Mexican natural gas markets are also becoming more interconnected: U.S. pipeline capacity for natural gas exports to Mexico has rapidly expanded in the past few years and currently stands at 7.3 billion cubic feet per day (Bcf/d) and is expected to nearly double in the next three years.[2] Mexico is also a new market for U.S. liquefied natural gas (LNG), with 27,845 Mcf of natural gas shipped from the U.S. in 2016. Mexico's energy reforms, strong growth in natural gas demand in the power sector, declining domestic production, and the lower prices of U.S. pipeline gas compared with more expensive LNG imports have all created an opportunity to increase energy trade between the U.S. and Mexico.

# North American Energy

## REFINED PRODUCTS

The United States, Canada, and Mexico form a highly-integrated products market, which allows for greater efficiency in responding to local advantages (such as lower cost energy sources) and constraints – both natural and artificial. For instance, access to abundant natural gas for refining and processing operations provides an advantage for U.S. refineries in the Gulf Coast, which are increasing diesel production for export to Mexico and to other South American destinations. The EIA reports the U.S. is the source for most of Mexico's refined product imports, and at the same time the destination for most of Mexico's crude oil exports.

FIGURE 3: NORTH AMERICA REFINED PRODUCT FLOWS, 2016

| Product, 1,000 b/d | U.S. to Canada | U.S. from Canada | U.S. to Mexico | U.S. from Mexico |
|---|---|---|---|---|
| Finished Motor Gasoline | 30 | 31 | 329 | - |
| Motor Gasoline Blending Components | 29 | 149 | 73 | 14 |
| Distillate Fuel Oil | 33 | 104 | 182 | 1 |
| Kerosene-Type Jet Fuel | 37 | 9 | 33 | - |
| Petroleum Coke | 22 | 1 | 62 | - |

New England relies heavily on imported energy. Shipping products from the U.S. Gulf Coast requires Jones Act vessels, which generally make these products more costly[4] than foreign imports. Canada's largest refinery, located 65 miles north of the border, sends over 80% of its production to the U.S., accounting for a large portion of U.S. gasoline imports. And most U.S. imports of distillate fuel are supplied into the East Coast from Canada.

## ELECTRICITY & LINKAGES TO NATURAL GAS

**The United States and Canada benefit from a relatively seamless border that allows electricity grid managers to optimize electricity generation assets on both sides of the border in order to improve electric reliability and efficiency.** Currently, there are more than 30 active major transmission connections (69 kilovolts or greater) between the two countries.

Although the predominant flow of trade moves from north to south, it is not entirely one-sided. Canada is an overall net exporter of energy to the United States, but the roles are reversed in certain regions, particularly where there are infrastructure constraints. The U.S. and Mexico trade a smaller amount of electricity currently along the border regions where Mexico imports some power from California and Texas. However, **Mexico's recent energy reforms present a huge opportunity for electricity and natural gas trade with the U.S.** Mexico's growth in its domestic electricity market has largely been met with generation from new natural gas-fired plants, driving the increase in U.S. natural gas exports to Mexico.

## NORTH AMERICAN ENERGY SELF-SUFFICIENCY

**North America is on the verge of achieving energy self-sufficiency with respect to liquid fuels,** when measured by production of liquid fuels exceeding consumption of the same across the U.S., Canada and Mexico. According to the U.S. Energy Information Administration 2017 Annual Energy Outlook, a benchmark publication of potential future energy needs, the quantity of petroleum and other liquid energy sources produced by the U.S., Canada and Mexico[5] will soon outpace the quantity of petroleum and other liquid energy sources that those countries will consume. In fact, according to the EIA, this will happen as soon as 2020.

TABLE 1: NORTH AMERICA LIQUIDS PRODUCTION VS. CONSUMPTION, 2015-2040 (Source: EIA, Annual Energy Outlook 2017)

| | Petroleum and Other Liquids Production | | | | | Petroleum and Other Liquids Consumption | | | |
|---|---|---|---|---|---|---|---|---|---|
| mb/d | United States (50 states) | Canada | Mexico and Chile | NAFTA Supply | NAFTA Supply - NAFTA Demand | United States (50 states) | Canada | Mexico and Chile | NAFTA Demand |
| 2015 | 14.69 | 4.95 | 2.56 | 22.19 | [illegible] | 19.55 | 2.39 | 2.30 | 24.24 |
| 2016 | 14.84 | 4.88 | 2.82 | 22.14 | [illegible] | 19.59 | 2.39 | 2.32 | 24.29 |
| 2019 | 16.84 | 5.33 | 2.52 | 24.49 | [illegible] | 20.19 | 2.39 | 2.38 | 24.99 |
| 2020 | 17.01 | 5.42 | 2.49 | 24.92 | 0.02 | 20.14 | 2.39 | 2.38 | 24.90 |
| 2025 | 17.61 | 5.38 | 2.44 | 25.43 | 0.93 | 19.77 | 2.38 | 2.36 | 24.51 |
| 2030 | 17.72 | 5.55 | 2.49 | 25.76 | 1.73 | 19.13 | 2.39 | 2.50 | 24.02 |
| 2035 | 17.34 | 5.73 | 2.69 | 25.87 | 1.76 | 19.00 | 2.44 | 2.67 | 24.11 |
| 2040 | 17.47 | 6.00 | 3.26 | 26.73 | 2.02 | 19.34 | 2.51 | 2.87 | 24.72 |

[illegible]

Mr. DUNCAN. Dr. Padilla, thank you. I like the words "North American energy renaissance"; great for saying that.

Dr. Wood, you are recognized for 5 minutes. Welcome back.

**STATEMENT OF DUNCAN WOOD, PH.D., DIRECTOR, MEXICO INSTITUTE, WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS**

Mr. WOOD. It is a great pleasure to be here.

Mr. DUNCAN. Is your mike on? There you go.

Mr. WOOD. Now I am on.

Thank you very much, Chairman Duncan, Ranking Member Sires, committee members. It is a great pleasure to be here.

I have been studying Mexican energy for more than a decade and been studying U.S.-Mexico energy relations throughout all of that period. I now have the privilege directing the Mexico Institute at the Woodrow Wilson Center, and a lot of my time is actually spent trying to understand the reforms that have taken place in Mexico and the path forward. And I will be talking about those in my comments.

There are three things that I want to get across to you today. One is the transformation of the government-to-government energy relationship that we have seen over the past 3 years. The second is the areas for collaboration that I see looking ahead that would be most productive for both sides. And thirdly, that question of political change in Mexico.

Throughout all of these points, I think that it is important to emphasize that dialogue and institutional cooperation are fundamental elements to preserve the prosperity and interests of both the United States and Mexico.

Let me begin by talking about the transformation of that government-to-government relationship. The Mexican energy reform of 2013 is a watershed moment in Mexican history because, of course, it pushes the possibility of Mexican cooperation with other countries and allowing for an investment.

We have seen, since 2014, regular meetings between the energy ministers of the countries of North America. And those meetings of the energy ministers have been enormously productive, bringing forth the North American Cooperation on Energy Information initiative, which produces maps of infrastructure and resources across the region, which allow us to understand the real potential of North America's energy markets. There has also been a process of harmonizing the statistical reporting from the three countries, which as nerdy as that sounds, is incredibly important in understanding how things can actually move forward.

On climate change, from Felipe Calderon's government through the Pena Nieto government, we have actually seen Mexico being a leader amongst emerging markets for climate change action, in particular, their legislation which forces Mexico to reduce its carbon emissions by 50 percent by 2050. We have seen that play out on the North American stage with cooperation on reducing methane emissions from the oil and gas industry, the Ottawa accord of July of last year.

When I looked forward to the future of energy cooperation between Mexico and the United States, I see that there are three

main areas in which this can happen. The first is the energy trade, which my colleagues have already talked about, but let me point out one thing that hasn't been mentioned. There has been a complete reversal in that energy trade over the past 3 years. It used to be that Mexico had a significant surplus with the United States. The United States now has a very, very important surplus with Mexico. That is because of the decline of Mexican oil production, the drop in the price of crude oil and, of course, because Mexico is seeing soaring demand for refined products from the United States and for natural gas.

The natural gas story is extraordinary. Because of the opening of Mexico's energy sector, in particular, electricity generation, we are seeing natural gas exports rising dramatically. They are currently, I think the numbers we have up on the board here, we have seen them peak at around 4.4 BCF. Some experts are predicting that within a few years they will get up to almost 10 BCF. That is predicted to be around 10 percent of U.S. production. So you can imagine the impact of that on prices of natural gas here.

Secondary for cooperation is regulatory cooperation. In particular, the question of regulatory simplification or efficient regulation. I know a theme which is dear to the heart of the current administration. Mexico desperately needs to eliminate repetitive paperwork. They need to improve interagency cooperation and they need to work on online compliance mechanisms. And these are things where the United States and Mexico can work together.

Lastly, infrastructure. Of course, when we are talking about cross-border infrastructure, be it pipelines or transmission lines, Mexico and the United States have to sit down together and talk these things out. And that is why the institutional mechanisms matter.

Let me say a few words about the future for Mexico. As most of you know, there is a Presidential election next year in Mexico. A lot of people are predicting that the far left candidate Andres Manuel Lopez Obrador will win. He has committed himself to repealing the energy reform that was passed in 2013. My own prediction on that is that if he does win, and that is far from guaranteed, but if he does win, he is going to face an incredibly tough time repealing the energy reform, because congress in Mexico will provide a barrier to doing that. He will not have the two-thirds majority that he needs in both chambers in order to revoke or repeal the energy reform of 2013.

So let me just close there and emphasize once again that I think the institutional mechanisms that we have existing between the two countries are vitally important and we need to focus on how we can preserve those. Thank you.

[The prepared statement of Mr. Wood follows:]


**Testimony before the U.S. House Committee on Foreign Affairs**
**Sub-Committee on the Western Hemisphere**
**Energy Opportunities in North America**

Duncan Wood, PhD
Director, Mexico Institute
Woodrow Wilson International Center for Scholars

**The New Vitality of US-Mexico Energy Cooperation**

Over the past three years, the United States and Mexico have deepened their cooperation on energy issues to an extent never before seen. By January of 2017, the NAFTA partners had developed complementary approaches to questions of energy markets, emissions controls, infrastructure planning and regulatory cooperation. Through bilateral meetings, and through the trilateral mechanism of the energy ministers meetings and the North American Cooperation Energy Information initiative, mutual understanding and shared interests were being discussed in ways that would have been unthinkable even five years before. Having approved a landmark energy reform in 2013, Mexico is now open and willing to cooperate with the United States in a wide variety of ways.

This testimony argues that the United States should embrace energy cooperation with Mexico on a wide range of issues, and must not abandon bilateral collaboration on climate change. Furthermore, the trilateral energy dialogue with Canada must continue through regular meetings of the North American energy ministers, which will bring mutual benefit, increased prosperity, and a stronger presence on the global stage. Particularly in the light of President Trump's decision to pull the United States out of the Paris Climate Accord, regional cooperation that is equitably negotiated will provide the three countries with a mechanism for continued emissions collaboration. The successes of the past three years in oil and gas, renewables and climate cooperation stand as evidence of the mutual benefits to be had from this process.

**Why this matters**

Before analyzing the progress that has been made in the bilateral and regional energy relationship, it is worth remembering why energy matters so much. Of course it is a major component of both countries' economies, responsible for wealth creation, innovation, and employment. Across Mexico and the United States, millions of people work in the traditional energy sector, and millions more are finding work in the areas of renewable energy and energy efficiency.

But secure access to comparatively low-priced energy is also crucial for economic competitiveness. For example, prior to Mexico's energy reform, high prices for industrial consumers of electricity compromised manufacturing competitiveness in the country, and natural gas shortages meant repeated stoppages at factories in the north of the country. Since the reform was passed, prices have been reduced dramatically in Mexico, falling by between 21 percent and 30 percent for industrial consumers between September 2014 and September 2015. This has significantly improved the economic competitiveness of Mexican manufacturers, in turn improving the competitiveness of the North American manufacturing platform.

**Recent patterns of cooperation**

For decades, Mexican sensitivities regarding the connection between energy and national sovereignty prevented the development of a modern and multifaceted dialogue over energy cooperation between the two countries. The 2013 reform, however, opened the way for comprehensive interaction on energy policy. In February 2014, only two months after the reform was approved, the three North American heads of government met in Toluca, in the State of Mexico, to discuss the future of regional integration. Energy featured high on the agenda, and it was agreed that the energy ministers of the three countries would begin a regular dialogue. The first meeting took place in Washington, D.C., in December 2014, and agreed on an agenda for cooperation on three specific points:

1. Publicly available collaboration on North American energy data, statistics, and mapping;
2. Responsible and sustainable best practices for unconventional oil and gas developments; and
3. A modern, resilient energy infrastructure for North America, including policies, regulations, workforce, innovation, energy efficiency practices, and sustainable technologies.

The breadth of this agenda helps to emphasize the potential for collaboration now that the Mexican energy system has been transformed. The memorandum of understanding signed by the energy minsters institutionalized an information-sharing framework for participants to promote dialogue and cooperation. Under the North American Cooperation on Energy Information initiative (NACEI), the three ministers agreed to set up a working group that would facilitate this coordination, combining the efforts of the three countries' energy departments and information agencies, statistics and census bureaus, and national energy control and regulatory boards. The group was specifically tasked with comparing, validating, and improving respective energy import and export information; sharing publicly available geospatial information on energy infrastructure; exchanging views and information on cross-border energy flows; and harmonizing terminology, concepts, and definitions of energy products.

The NACEI immediately began to gather statistics and map resources. The result is an impressive resource that allows for a truly regional understanding of energy

resources for the first time. The maps created thus far are an extraordinary visual resource of energy infrastructure across North America and expand the potential for cross-border cooperation and planning in a way that had not been possible before. What is more, the harmonization of statistics from all three countries allows for meaningful and simple comparisons. In this way, the North American energy dialogue has opened the way for deep long-term collaboration.
The leadership role played by the United States in this regional approach was underlined by the 2015 Quadrennial Energy Review (QER), which focused extensively on the opportunities for energy cooperation in North America. The QER chapter on North America concluded that the United States has significant energy trade with Canada ($140 billion per year) and Mexico ($65 billion), yet greater coordination is needed to improve energy system efficiency and build resiliency against disruptions of the North American energy market, data exchanges, and regulatory harmonization.

In 2015, the U.S. Energy Information Administration (EIA), Canada's National Energy Board, and Mexico's Secretaría de Energía (SENER) produced a Trilateral Energy Outlook. This report established projections for crude oil, refined products, and natural gas and electricity markets across the region to 2029. Although the report's authors emphasize that "it does not reflect results of an integrated North American energy model" nor should it "be construed as an official outlook for any of the Trilateral members," there is, for the first time, the possibility of a more holistic approach to planning the future of North America's energy sector.

The December 2014 meeting of the energy ministers was followed in May 2015 by a meeting on the margins of the Energy and Climate Partnership of the Americas and the Clean Energy ministerial meetings in Mérida, Mexico. The three ministers agreed to form a new Working Group on Climate Change and Energy, involving regular interactions between teams from all three countries. The agenda that was laid out in Mérida included reliable, resilient, and low-carbon electricity grids; more focus on clean energy and energy efficiency, including energy management systems; carbon capture, use, and storage; climate change adaptation and resilience; and oil and gas sector emissions, including methane and black carbon.

The energy ministers praised the new initiative. Mexico's Pedro Joaquin Coldwell emphasized that its agenda demonstrated a commitment to "a path to achieve deep de-carbonization." United States Energy Secretary Ernest Moniz emphasized the initiative's potential for "facilitating cooperation to deploy innovative renewable energy technologies, modernize the grid, and increase energy efficiency to combat climate change and reach greenhouse gas targets while growing low-carbon economies in North America."

This institutionalization of a regional energy and climate agenda is a prerequisite for meaningful and sustained cooperation. Building on the experience of the North American Energy Working Group (NAEWG) in the early 2000s, the new working group will coordinate its efforts through socialization and harmonization. The first

process has already shown its value: the meetings of the three energy policy representatives have encouraged mutual understanding and increased interaction between their ministries. The second process will take longer, and we should not expect it to be a linear or an even process. It makes more sense to harmonize regulations and standards in some areas than in others, and sometimes the harmonization should be bilateral rather than trilateral. In most areas, the goal should be compatibility and coordination rather than full homogenization.

Another area that has progressed impressively since 2013 has been regulatory cooperation. As Mexico has opened its sector to private participation, its regulatory agencies have been strengthened and their power expanded. The CNH has been charged with running the bidding process for oil blocks in Rounds 1 and 2, and the Comision Reguladora de Energia (CRE) has overseen both the opening of the electricity market alongside SENER and the CENACE, and the regulation of transportation, storage, and distribution of hydrocarbons, including natural gas. Furthermore, the reforms created a new environmental regulatory agency, the Agencia de Seguridad, Energia y Ambiente (ASEA), to oversee the industrial safety and environmental protection aspects of the hydrocarbons sector. Operating under the control of the environmental ministry (SEMARNAT), the ASEA has had to progress rapidly since its inception in 2015. In fact, all three regulatory agencies have had to adapt to dramatically altered circumstances during the first three years of Mexico's new energy model. To do so, they have made a concerted effort to acquaint themselves with international best practices, and Mexican contact with U.S. and Canadian regulators has been an integral part of that process. Regulatory exchanges with California and Texas (and Alberta) have been particularly significant, as have exchanges with U.S. federal organizations such as the Bureau of Safety and Environmental Enforcement, the Bureau of Ocean Energy Management, the Bureau of Land Management, the Environmental Protection Agency, the Federal Energy Regulatory Commission, and the Pipeline and Hazardous Materials Safety Administration.

**U.S.-Mexico Climate Cooperation**

Mexico has long been recognized as an emerging market leader in international climate change negotiations. Beginning with the presidency of Felipe Calderón, Mexico has attempted to develop an aggressive approach to global climate talks that is backed up by progress on climate mitigation and renewable energy policy at home. President Peña Nieto's continuation of this policy surprised some who had predicted a hydrocarbons-friendly approach, and has even strengthened Mexico's global climate position by securing legislation in Mexico's Congress for a 50 percent reduction in carbon emissions by 2050, alongside ambitious targets for electricity generation from renewable sources. Mexico was also the first developing country to declare its Intended Nationally Determined Contribution for greenhouse gas reductions under the Paris Accord process in April 2015, and has undertaken a commitment to reduce its black carbon emissions by 51 percent by 2030. Largely thanks to this commitment, Mexico and the United States became partners in

pushing the Paris Accord in December 2015, setting the stage for further regional cooperation.

The North American energy dialogue has also been an important force driving cooperation on climate issues. In July 2016, at the Ottawa North American Leaders' Summit, Mexico agreed to join the existing U.S.-Canada agreement on methane emissions reductions. The trilateral accord commits the countries to reducing methane emissions from the hydrocarbons industry by up to 45 percent by 2025. Mexico had previously resisted a commitment to reduce its emissions, partly because of opposition from Pemex and partly because of the energy reform's already overwhelming agenda. Alongside pressure from the Canadian and U.S. governments, extensive efforts by civil society groups, including the Environmental Defense Fund (EDF) to promote the emissions reductions were successful in convincing the Peña Nieto administration of the importance of a trilateral accord. The EDF, quoting Mexican government figures, estimate that methane emissions from the hydrocarbon industry make up 19 percent of total methane emissions in the country. Trilateral cooperation can also be credited with 2016's most important global climate accord, the Kigali Agreement on phasing out hydrofluorocarbons (HFCs) in October. In 2009, during a meeting of the Montreal Protocol, the United States, Canada, and Mexico (plus the Maldives) pushed for international cooperation to reduce HFC emissions as a crucial component of fighting climate change.

**Prospects for cooperation**

Given the energy policy priorities of the current U.S. administration, there are three areas that would be of considerable mutual interest:

- Energy trade
- Regulatory simplification
- Infrastructure

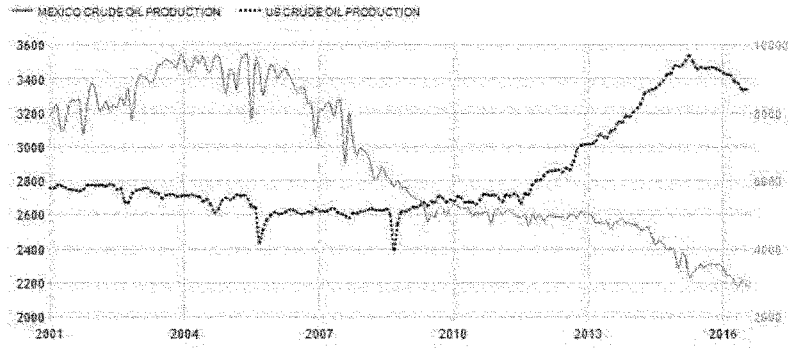
To collaborate effectively on all of these areas, it is imperative that the North American Energy Ministers Dialogue is continued. The regional cooperative mechanism that has been developed over the past three years will prove to be of great utility in identifying future challenges and working effectively to resolve them.

*The two-way energy trade*

Mexico is an important partner for the United States in the energy trade, serving as both friendly oil supplier and a growing market for U.S. exports. It has long been recognized that ensuring "friendly suppliers," such as Canada and Mexico, should be a goal of U.S. energy policy, and indeed then-candidate Trump made this part of his energy election platform. What's more, although U.S. energy independence will take a long time, most experts recognize that North American energy independence is an achievable target at which to aim. This means that the United States should recognize the importance of ensuring the long-term success of Mexico's energy reforms.

Two factors make this point particularly relevant. First, Mexico has seen a prodigious decline in oil production in recent years and the reforms are the best hope of reversing that decline (see figure 1). Secondly, the reform has come under attack from opposition parties in Mexico and, with the possibility of a shift to the left in the 2018 presidential election, there is a risk that the reform will stall or be rolled back. This would be an alarming prospect for both the United States and for a number of its companies that have been successful in first-round oil contract bidding.

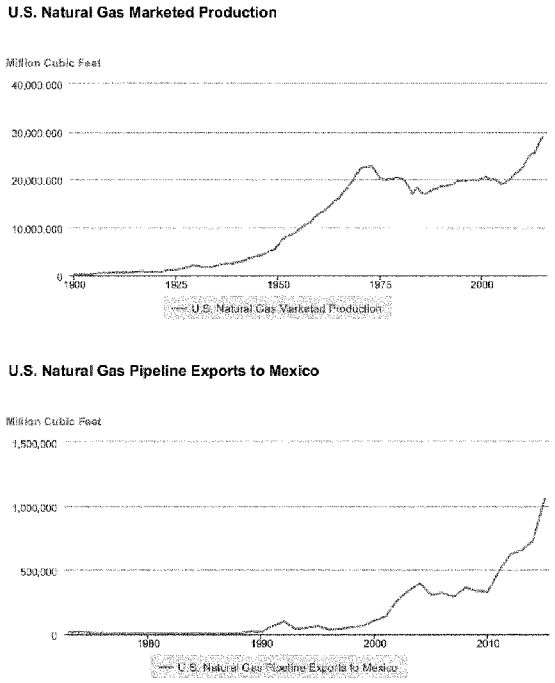
**Figure 1: Mexican vs. U.S. Oil Production, 2001–16 (thousands of barrels per day)**




Source: tradingeconomics.com

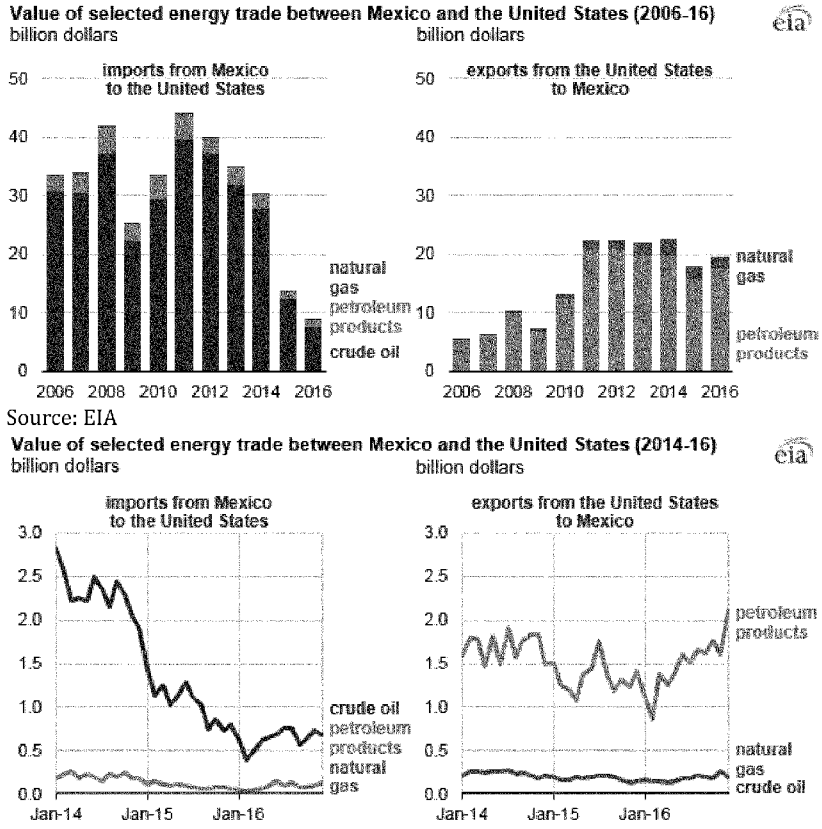
It is also worth focusing on the Trump administration's goal of boosting natural gas production and use. If gas production is to grow in the United States, new consumers will be needed to sustain a price that allows for investment in the sector. Fortunately for gas producers, it is expected that Mexico will see its demand for natural gas grow rapidly, and it is estimated that exports to Mexico will soon reach between 8 and 10 percent of U.S. production (figure 2). Mexico plans to dramatically boost its internal natural gas pipeline network over the next few years, and it is expected to grow more than 90 percent before the end of the decade. In addition to satisfying demand in Mexico, in the long term there is the opportunity to export U.S. natural gas via pipeline to Central America and through liquid natural gas facilities built along the Mexican coast. Although this could also, of course, be achieved in the United States, zoning restrictions and social license problems often make these projects costly and difficult to complete on time. In Mexico, there would likely be an easier path to construction, though social opposition to energy projects has been a growing problem in recent years.

**Figure 2. U.S. Natural Gas Production and Exports to Mexico**




There is also a growing market in Mexico for U.S. refined products. After the country's 2013 energy reform, there has been a liberalization of Mexico's downstream and retail markets, driving a growing demand for imported gasoline and other products from the United States (which is also due to the sorry state of Mexico's refining and petrochemicals industry at the present time). According to the EIA, the value of U.S. energy exports to Mexico are now more than twice that of imports from Mexico. This growing market provides both prosperity and price support for U.S. producers. What's more, it is a trade surplus for the United States that is likely to grown in years to come.

**Figure 3: U.S.-Mexico Energy Trade**




Source: EIA

*Regulatory Simplification*

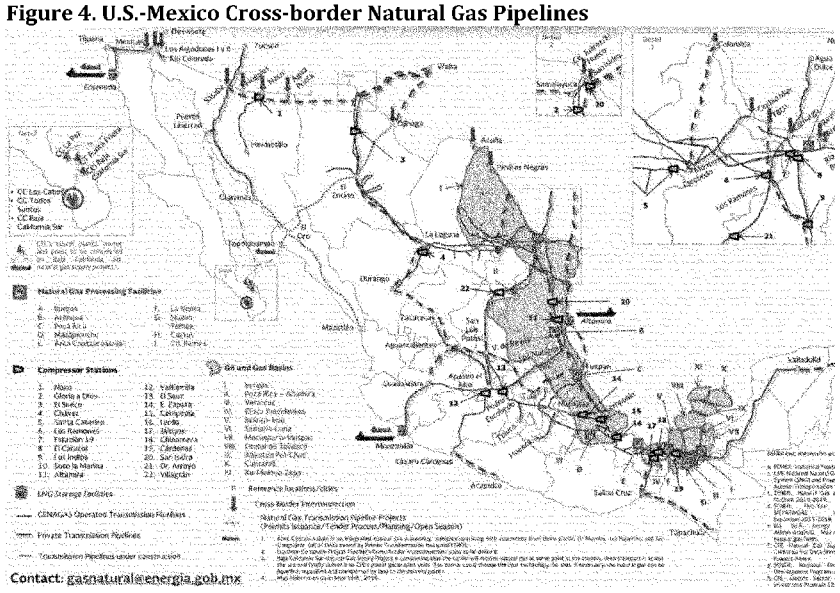
The second element, regulatory simplification, provides a compelling opportunity for Mexico to work with the United States to reduce the burden of its own regulatory system for energy firms. Although its regulations and regulatory bodies have seen substantial progress since the 2013 reforms, Mexico still has a regulatory system in place that seeks to prohibit, rather than facilitate, activity by the energy industry. The change of tone in the U.S. administration provides an opportunity for Mexico's regulatory agencies to develop a dialogue with their U.S. counterparts that focuses on efficient regulation, something that the emerging private oil and gas industry is crying out for in Mexico. Critical issues concern repetitive paperwork, interagency coordination, permitting, and the use of online compliance mechanisms. If the United States is about to see a concerted push toward more efficient regulation, then it behooves Mexico to follow suit, to maintain competitiveness and to facilitate the

integration of energy markets. Existing dialogue with state regulators in Texas have already emphasized the importance of a paradigm shift in Mexican regulation; the approach of the new U.S. government offers a chance to take that conversation further, in forums such as the existing North American dialogue. This agenda becomes doubly important in the light of prospective political change in Mexico in 2018.

*Infrastructure*

There are ample opportunities for ongoing energy infrastructure projects that take into account the increasingly integrated nature of U.S. and Mexican energy markets, from oil and gas pipelines to cross-border transmission lines and a coordinated approach to refining capacity. A crucial element of the success of the Mexican energy reform has been the arrival of natural gas from the United States through cross-border pipeline projects (see figure 4). These pipelines took years to plan and build, and it is vital that future Mexican demand is considered with enough anticipation to ensure that pipeline capacity exists to carry gas to market.

**Figure 4. U.S.-Mexico Cross-border Natural Gas Pipelines**




Source: SENER

Mexico's refineries are likely to see an overhaul in the next few years as Pemex seeks partners for its refining division that consistently loses around US$9 billion a year. If Mexico plans to invest in building new refining capacity, it would be wise to consider the current and future state of the U.S. refining sector, which is aging and has limited capacity. Once again, institutionalized cooperation between the North

American energy ministers is an excellent and existing option for analyzing the case for new infrastructure planning.

**The outlook for Mexico's energy reform**

The extraordinary successes of the past 3 and a half years have transformed Mexico's energy sector from an almost entirely closed model to one of the most open in the world. Mexico is benefiting from growing foreign and national investment in the sector as well as competitive prices for electricity. But the new energy model in Mexico continues to face serious challenges. According to public opinion polls, the reform is still deeply unpopular, and rising gasoline prices due to currency volatility and the removal of subsidies has turned more people against the reform.

This is feeding into growing support for parties that opposed the reform process and have committed themselves to repealing it. Andres Manuel Lopez Obrador's (AMLO) MORENA party will fight the 2018 presidential and congressional elections on a platform that includes overturning the opening. Were he to win the presidency, it is highly unlikely that he would be able to generate the two-thirds majorities in the Mexican Congress (plus a majority of state-level legislatures) required to repeal the reforms. Instead, he has promised a referendum on the future of the reform. Although legal specialists argue that a referendum would be insufficient for repealing the reform (due to the fact that it directly impacts state revenues), the commitment is indicative AMLO's antagonism to energy liberalization.

This suggests that a MORENA government in Mexico would take other steps to neutralize the reform, including attacking regulatory agency autonomy, enacting less business-friendly fiscal terms, or simply refusing to offer new oil and gas blocks for investment. Such measures would be highly detrimental to U.S. public and private interests and would be deeply negative for Mexico's future energy production.

**Conclusion**

By early 2017, the energy relationship between Mexico and the United States had reached a historic high point. Mexico's new energy model, based on market dynamics and attracting private and foreign investment, has opened the way for a highly constructive and productive dialogue between national authorities and their U.S. and Canadian counterparts. Regular meetings of the energy minsters of the three NAFTA countries have helped deepen mutual understanding and further energy cooperation at both the regional and global levels.

Our two nations have an unprecedented opportunity to build an even stronger energy relationship. Existing North American cooperation, the progress seen under the energy reform and the interest of the U.S. administration in helping the energy sector to grow, provide the ideal platform for a vibrant dialogue on these issues, one that can drive prosperity and employment creation in both nations.

Mr. DUNCAN. Thank you, Dr. Wood.

I will recognize myself for 5 minutes for questioning.

And it is interesting that the events in Qatar, with what the other Arab nations have done to try to isolate Qatar to some degree, will have an impact on global natural gas primarily, but possibly global energy prices altogether. I say that because it is important and it shows the need for this trilateral cooperation between the North American countries and the energy sector to lessen the volatility of what goes on in the Middle East in so many other ways, other than just the Qatar happenings of this week.

One other thing I want to mention before I get into questioning is, we talk about this trilateral opportunity and the energy sector. It is more than just the resources that are going back and forth, oil and gas; it is the technology. And we can learn from the Canadians from how they extract oil from the oil sands, the technology they are using there. The fracking technology that we have here, horizontal drilling as well.

As Mexico tries to reengage and attract more private sector investment based on the 2013 energy reforms that Dr. Wood just mentioned, they are just opportunities for American businesses in the oil and gas industry to bring that technology to bear. And I think, you know, I am going to expand a little bit beyond the three countries here, but Venezuela, assuming the political situation down there changes, there is opportunity there for that technology to improve and bring in the 21st century the oil and gas sector there. I think this applies all across Latin America as well. People, jobs, and technology are a big component of what we are talking about here with the three countries.

We have got opportunity abounds beyond Canada and Mexico. I think Mr. Yoho mentioned the Caribbean Basin. Relying on Venezuela right now, there is opportunity for American LNG to be exported from Florida into the Caribbean to lessen their dependence on the volatility of a country like Venezuela. There is opportunity there as well.

I appreciate Dr. Wood mentioning Mexico. How effective do you think Mexico's energy reforms have been thus far? You touched on that a little bit. I watched that debate in the Mexican Congress. You know, people were stripping clothes off to make points. And that was a political debate unseen in Mexico or in congress in a very long time. I am not talking about stripping clothes off, but I am just talking about the heated debate that went on about what is the right role of the government in the nationalization of the energy sector or the privatization of the energy sector? What investment may or may not come, and what it meant for long-term viability of Mexico's energy sector in 2013. Then we saw the lease sale and the first one kind of stumble along. We have seen more robust lease sales after that.

So I would like for you to just talk a little bit more about Mexico. You mentioned that they may try to reverse some of that. That is the first I have heard, honestly. So if you could just expand a little bit about that, Dr. Wood.

Mr. WOOD. Sure. Thank you for the question. The first thing is, is that nudity is a recognized form of political protest in Mexico,

and most of the people who do it should never, ever be seen naked in public; I can say that.

Secondly, that debate in Congress recognized the deep divides in Mexican society over a liberalization of the energy sector. And still today, the energy reform is deeply unpopular amongst the Mexican electorate. That is why the far left party has seized upon that issue for its campaign platform for 2018.

Now, as I said, there is no guarantee that the—Andres Manuel Lopez Obrador, the leader of the Morena party, will win in December of next year. Currently, he is at the top of the polls, but not by very much. This is his third time running. In previous years, he has been out in front at this point in the campaign process by a much bigger margin. However, there was an election this weekend in the state of Mexico, and his candidate there failed to win, but came very, very close. And the Federal Government used a lot of resources to support their candidate in that state. So we are going to have to follow that over the next 12 months.

If he does win office, though, as I said in my statement, it is basically an impossibility for him to repeal the energy reform through Congress because of the need for a two-thirds majority and the majority of the state legislatures. And his party will not have that. So his answer is actually to go to a national referendum. And based upon a political reform that took place a few years ago in Mexico, a referendum has the possibility of reversing or enacting new legislation. However, there is a caveat. Money bills are not included in that. And the constitution—the legal interpretation of the energy reform is that it affects Federal revenue because, of course, Pemex, the national oil company, and the oil royalties are directly affected by the energy reform.

So constitutionally speaking, I don't think that referendum would actually be successful.

The other part of the question, is this actually a successful energy reform? It is deeply successful, and the reason is because of the diversity of companies that have come in and invested, the amount of money that has come in, the resources that are going to be released on the oil and gas side, and secondly, on the electricity side. The electricity story is an extraordinary success. We have seen massive investment producing very, very low generation prices which will lower the cost for industry and for the Mexican consumer.

Mr. DUNCAN. Thank you for that answer.

I want to talk about Section 123 for just a minute. And before I do, let me preface it with South Carolina is one of the southeastern States that is expanding its nuclear power with the nuclear power plant in Jenkinsville on Lake Monticello, right in Fairfield County. And one of the main contractors to provide the reactor was Westinghouse. Westinghouse just filed bankruptcy and has basically put the completion of that project in jeopardy. Not only the site there in South Carolina, but Southern Power has a site just across the Savannah River in Georgia around the Augusta, Georgia area. They have got a little different contingency there, but Westinghouse bankruptcy could impact what we are talking about with Section 123.

There are other vendors out there that can provide those components, but I am going to ask and, Ms. Ladislaw, if you could talk about Section 123 nuclear power in Mexico, possibility inject Westinghouse bankruptcy into this and what that means for U.S. contractors possibly providing components in the Mexican nuclear sector, and how that might affect competition of other international firms. So if you could touch base on 123, please.

Ms. LADISLAW. Sure. I think the way that you have characterized it is really helpful, because I think one of the things we are looking for in the global nuclear energy market is more markets where nuclear can succeed. And one of the real difficulties that we keep experiencing is if you don't have regulated guaranteed return on electricity prices, plus some financing, it is really hard to make nuclear work. There are some markets where it is working, there are some markets where, like the U.K., where they are really trying to create new nuclear opportunities. But as we are seeing in a wide variety of instances in places where you don't have a guaranteed return on electricity pricing, where you don't have advantageous financing, a lot of the plans are still running over cost and over time. And that is not something that you can't work out of the system, but it is certainly something that is hurting sort of, you know, the environment around nuclear.

I think it is one of those issues where it will actually be quite helpful for the North American dialogue to talk about nuclear and to talk about the opportunity of nuclear in Mexico. I will be honest, I do think, as you brightly pointed out, it does save some headwinds, not only in the sort of commercial industry infrastructure with the challenges that we really won't know where Westinghouse ends up until we understand where Toshiba stands as well. And so we have got to sort of let that process work its way out.

But I think that when you look at everything that Mexico is doing to try and incentivize nuclear power, and then you look at all of the things that they are also doing to incentivize renewable energy, the fact that we are trying to sell a lot of U.S. low price gas into the Mexican electric power system, I think you set up a pretty competitive dynamic for nuclear power to succeed. And so if we are to really want to create a market for nuclear in the United States, we are going to have to understand what kind of support that is going to require in a North American basis, but also for the existing plants that we have in Illinois and New York and Pennsylvania, Three Mile Island didn't pass their capacity market bid round.

So nuclear, even existing nuclear is being challenged by some of the changing electricity dynamics. I think the same thing will be true in Mexico, and so I think that the nuclear energy industry, quite frankly, globally has to think about how it is going to be more competitive. Is it through existing technology? Is it through a next version of nuclear energy technology, something smaller, more modular? Or do you just really have to make sure you have the system of financial incentives and the return on investment on a guaranteed rate for electricity prices that protects nuclear within your market? Because it does have advantages. It is base load. And it is really hard to envision a future where you don't have any nuclear power whatsoever. And so I think there is a lot to work out.

Mr. DUNCAN. So I am glad you mentioned SMR, small modular reactors, and I think that is a viable option going forward. When I hear about nuclear energy in Mexico and expansion of nuclear power production there, one of my gut reactions is that we have seen nuclear components, whether it was low-level waste from a hospital or whatnot, disappear for a period of time, stolen, mishandled; they have had to find it, get it back in their possession. The possibility of proliferation, the possibility of terrorists getting their hands on that for a dirty bomb of some sort on a country that is on our southern border. They are very close to home. It is not like it is overseas. So that is a gut reaction I think a lot of my constituents would even have if they follow those type issues.

So with that, I will turn to the ranking member for 5 minutes.

Mr. SIRES. Thank you, Mr. Chairman.

With the emergence of Lopez Obrador, obviously, he wants to revert to get rid of this 2013 agreement. So that makes him a little bit popular in Mexico.

How about the rhetoric coming out of this country? How is that impacting also this emergence from this candidate?

Mr. WOOD. It is a very, very important question. And at the beginning of the year, it was clear that the breakdown in bilateral relations, the increased tension, the conflict, in particular the communications between the two Presidents, were causing a highly nationalistic reaction in Mexico. All politicians across all party lines were moving toward a more nationalistic perspective.

In recent times, things have calmed down a great deal. And the reason for that, I would argue, is that the institutional mechanism between the two countries are working. Mexico has been very, very smart about how it has approached the United States, it has laid the entire relationship on the table, and said you need us for lots of reasons: For export markets, for integrated production, for security on your southern border, for controlling Central American migration. And, of course, the energy piece is there as well. Mexico has been putting that forward over and over again.

But the effect of the election campaigns last year and the volatility of this year so far is having an effect on the Mexican election. It is not as dramatic as we feared it might be, but there is clearly an anti-Yankee sentiment among certain sectors of the Mexican electorate, and that will help Andres Manuel Lopez Obrador.

Now, he is putting himself forward as a candidate who is much better equipped to negotiate with the United States than the current government. And he has said that if you really want to renegotiate NAFTA, if you really want to reestablish—or establish equality between Mexico and the United States at the diplomatic level, then he is your man. Mexicans are not completely convinced by this.

So the energy reform process, as it stands right now, although it is unpopular, will begin to deliver a lot of the benefits in a couple of years' time, as oil production increases, as royalties start to come in, and as Mexicans begin to reap the benefits of having a liberalized downstream and retail market in Mexico. As you may have seen, a lot of U.S. firms are opening up gasoline stations in Mexico right now, and Mexicans are flocking to them because they recognize that, although the price is probably the same as they are going

to pay at the Pemex station, the quality of the product and the fact that they are probably not going to get ripped off in terms of the amount of fuel that is being put into their gas tank is a big advantage.

So we are actually seeing one gas station in the state of Mexico which was recently taken over by a U.S. firm saw its sales double the month after a U.S. firm took it over. This is a huge opportunity, and Mexicans are beginning to understand those consumer benefits of the reform.

Mr. SIRES. Thank you.

Venezuela is obviously a disaster. And the political on Venezuela used to be oil. How do you see America playing a role in substituting Venezuela in the region, especially in the Caribbean? Dr. Padilla, can you talk to us about that? I know you mentioned a little bit about export to the Caribbean.

Mr. PADILLA. Yes, thank you. You are right to bring the conversation back to Venezuela. The conditions there are very unfortunate. I would say that the primary way in which the U.S. can continue to exert some influence with regards to global oil markets is through the energy renaissance here in the U.S. So our growing production of oil in the United States has had significant effects on global markets and driven down prices globally, which has had an impact on states in Venezuela that depend on oil revenue.

So the primary way which we have already had an impact on Venezuela and its role in energy markets is through our increasing production here. We just had that effect on global energy markets.

With regards to the Caribbean, the U.S. also stands ready with its increased production in natural gas to offer an alternative and more diversified supply to Caribbean countries that have previously relied on crude oil imports from Venezuela. So we already see U.S. LNG exports that are going from the lower 48 in the United States to the Dominican Republic. We see ISO container LNG exports that are going from Florida to Barbados.

So these are examples of how the United States and its exports in oil and natural gas can have impacts on global markets that affect Venezuela and can have an effect on providing alternative sources of fuel to Caribbean nations that have previously depended upon Venezuela.

Mr. SIRES. Thank you.

Would you like to add something to that?

Ms. LADISLAW. You know, I agree with everything that Dr. Padilla just said. I would also say that we have a lot of renewable energy technologies that we, under the last administration, were also using within the region to—diversity is the source of security. And so really being able to try and help those countries attract those technologies as well so that they have a number of different energy resources to rely on as well.

Mr. SIRES. Thank you. I was going to go bring the renewable question up. With all this growth and all this different energy, how are we integrating in North America the renewable energy part? I mean, what part does it play?

And since you brought up renewable energy, can you——

Ms. LADISLAW. Well, it really is the funny thing about talking about energy in a continental basis is the continent is very big, and

all different states and regions and provinces have different approaches. I think one of the things we have seen, and maybe Dr. Padilla wants to talk more on the renewable fuel side of the equation, but on the electric power side we are seeing markets all over the continent really grappling to deal with the fact that things like solar power, in particular things like wind, are not only competitive with conventional energy sources, but they have to figure out how to integrate them into their energy system in a way that utilities continue to make a return on the investment.

People always will ask me, when will renewables pass a tipping point where they are actually competitive? I think we are well past that point. I think that when you look at places that have net metering policies or when you look at, even in Mexico, recently starting a lot of their renewable energy policies under their electricity reform and already having to ask themselves, how is our electric power system going to integrate more and more of these resources, not just from utility scale solar farms or wind farms, but also from people's homes through distributed energy resources?

I think you are starting to see folks used to think that renewables would have to get to 30 to 40 percent penetration within the electric power mix for it to really start to cause some questions about how utilities make a return on their investment and how we manage those electric power systems, we think about things like reliability to realizing, no, that is actually here today.

And so I think there is actually a renaissance going on in the electric power sector in North America that if you talk to anyone who is in a public utility commission at a State or regional or local level, they are grappling with each and every day. And when you add low natural gas prices onto that, for some regions of the country, it just becomes more and more profound. So I actually think we are in the midst of a transition from just trying to figure out how to build more renewable energy generation into the electric power mix to actually scaling those up to higher levels and figuring out what that mix looks like going forward.

Mr. SIRES. Thank you. Thank you, Chairman.

Mr. DUNCAN. I thank the ranking member.

And the chair will now go to the Republican side, to Mr. Yoho.

Mr. YOHO. Thank you, Mr. Chairman. Sorry, I had to step out. We appreciate you guys being here.

When you look at the situation, with our natural energies that we have here, the abundant resources, and I am particularly focused on LNG, when you look at the feasibility of exporting that, do you see any restrictions on that as far as the mobilization of that or the transportation of that to taking it down to the Caribbean and what we could do to expedite that?

Mr. PADILLA. Thank you, Congressman, for the question. LNG exports are a great potential for the U.S. with our rising natural gas production. I would underscore a couple of things, I think, that can help in terms of facilitating policy.

The first is understanding the important role that free trade agreements play. Free trade agreements, when they are in place between the U.S. and another country, automatically liberalize LNG exports to that country by the provisions of the U.S. Natural Gas Act. So that is certainly a priority for the U.S. oil and natural

gas industry, for example, with regards to NAFTA in the way that it provides that automatic liberalization of LNG exports and the growing market that Mexico represents.

And then another policy priority for API member companies and natural gas producers is expedited approval of permitting and determinations by the Department of Energy with regards to nonforeign trade agreement partner countries. We welcome the most expedited process possible to approve those exports to non-NTA countries so that they too can enjoy the benefits of the abundance of natural gas production here that allows us to also export the LNG.

Mr. YOHO. Okay. And does anybody else want to weigh in on that?

Mr. WOOD. The only thing I would like to point out here is that I think that very often we think too small about these issues. There are possibilities for exporting U.S. natural gas and LNG through Mexico. In many cases, it may be easier to build an LNG plant in Mexico than it is here in the United States, which will provide an outlet that would otherwise not be possible here in the United States because of zoning and permitting.

In the same way, we need to think seriously about getting U.S. natural gas to Central America, which means working very closely with the Mexicans on building out that pipeline network in Mexico and making sure it gets southwards. I think that those are the ideas that we need to put forward on the table. And I would even stretch it further.

I recognize your question is about gas, but think of the possibilities, and the Mexicans have begun to talk about this, of building transmission lines in Mexico to move U.S. electrons from one U.S. State to another; in other words, go south from Texas, along northern Mexico, back up into California where the demand is. It will be easier to do it that way than it is to do it in the United States.

So I think we need to think bigger, we need to think much more outside of the box than we are doing at this point in time.

Mr. YOHO. I assume you say that because it would be easier regulatorywise in Mexico than here.

Mr. WOOD. Yeah. And it is not because their regulations are more lax; it is because they have a unified regulatory system for zoning and permitting for these things. Whereas here in the United States, of course, you have to go through the Federal, the State, and the local.

Mr. YOHO. Right. You know, I also have the honor and the privilege of being the chairman of the Asia Pacific Subcommittee on Foreign Affairs, and we hear probably weekly from Ambassadors from different countries around that region how they want to start importing LNG from the U.S. And this is something that it would be great for our economy, it would be great for using our natural resources, and it would be great for building that stability around the world. And we have got companies that can do this.

And our focus in this hearing is obviously the Western Hemisphere. And my goal is for our own territories. You know, why should we be a U.S. territory buying oil from Venezuela that is bolstering up a regime that is not friendly to this country? So anything that you can do as far as ideas and how to expedite that and help the commercial companies in the islands, whether it is Puerto

Rico or the U.S. Virgin Islands, how we can help transition them from using number 2 petrol to LNG?

And I think Puerto Rico is in the process of doing some of that, but the U.S. Virgin Islands, we need to do that, and along with wind and solar, absolutely. And if there are any ideas that you have, we would sure love to hear them.

Do you have any comments, Ms. Ladislaw?

Ms. LADISLAW. Ladislaw, just like it is written.

I think the only thing I would say is I think we in the U.S. are really taken by the fact that we have a lot of natural gas. But we have got to really watch out, because a lot of times the midstream infrastructure to get that gas to export, as we consider to do more of this, as we are attracting more petrochemical investments in certain regions, we are not immune to the sort of complications that come from growth. And I would just point to the recent experience in Australia. Australia built out a huge amount of LNG export capacity, and they didn't consider all the domestic politics and infrastructure around being able to make sure their own industrial consumers were paying a low enough price for the gas that they needed and they started to curtail their exports. I am not saying that is going to happen here, but I think that those are things that, as we think about building out all these opportunities, we have got to make sure we have got the midstream infrastructure.

Mr. YOHO. That is why we depend on experts like you. Thank you guys.

I yield back.

Mr. DUNCAN. Thank you. We will now go to Ms. Torres for 5 minutes.

Mrs. TORRES. Thank you, Mr. Chairman. I just got back from a trip to Mexico with an interparliamentarian group of 11 members. Chairman McCaul was leading that delegation. And while I think it is true we found—I mean, we were there during the gubernatorial election on Sunday. We actually landed on Sunday. It was very interesting to see how, just like what is happening here with a very populist agenda, the Morena party was able to garner a lot of support. However, they were still within three points behind and finished further than they expected.

So I found that a little bit concerning, specifically as it relates to the comments that have been made by our President against Mexicans, against the Mexican people. They are certainly very angry about that. They are even more angry, or upset, that we have withdrawn from the Paris Agreement. They are feeling that they have been left out. America has, in the past, been a great leader to them, and they look to us for forward-thinking policy, so they are extremely disappointed.

However, I heard something about an anti-American sentiment, and I did not find that, not within the people, not within the comments of their local media, and certainly, not from the representatives of both houses that we met with.

On the issue of nuclear plants, I just want to caution you as your State looks at that. In California, we had to recently shut one down because we found an earthquake fault beneath that. So as you are looking to build out on nuclear facilities that we look at climate

change and issues of tornadoes and earthquakes that are now not limited to the State of California.

My question to Dr. Wood is following the withdrawal from the Paris Agreement, where do you think Mexico and Canada will look for leadership on climate change? California, for example, Governor Brown was just in China, and certainly, California, and other mayors and other governors across the U.S. are stepping up. What role can they play since the Federal Government has really left them behind?

Mr. WOOD. It is a terrific question, and we were discussing this actually just before we came into this room.

Back in the period from 2000 to 2008, Mexico's Government began to collaborate increasingly with U.S. States on questions of climate and renewable energy, because there wasn't a great enthusiasm at the level of the Federal Government. That is where we are going to go back to, that is where we are going back to. Already we have seen extraordinary energy diplomacy from the States of California and Texas, interestingly enough, as well as some others who are—Arizona, for example, is engaging very, very actively with the State of Sonora. They are talking about an Arizona-Sonora megaregion.

Mrs. TORRES. Right.

Mr. WOOD. One of things—just a tangential point here—one of the things that is remarkable about this period of volatility is that people have realized how important, how vital Mexico is to the United States' national interest. Friends that we didn't know existed have come forward and said Mexico matters. Friends who didn't even know they were friends of Mexico have come forward and said, oh, my goodness, I have just realized that Mexico matters.

Mrs. TORRES. And they recognize that we recognize that.

Mr. WOOD. Absolutely and that is it. So I think what we are going to see is a lot more cooperation between Mexican Federal Government and Mexican states and cities and their counterparts here in the United States. Cities are going to matter more than ever, and as I said, there is a precedent for this happening, and I think it is going to be very, very productive.

Mrs. TORRES. Thank you. I have two more questions and very limited time, so I am going state them, and I hope you will have an opportunity to follow up with my office.

Should renewable energy be included in the NAFTA agreement, and certainly, from their perspective, they absolutely believe that it should be part of what we discuss. And I want to further tease your intelligence on the issue of transportation as the Federal Government is looking at an infrastructure bill.

In California, I have been talking to our State Department about a highway of things. Is this something that is possible as we look to continue to trade and expand our highways within Mexico, and as Mexico looks down to Central America for renewal energy? Is that something that could be possible, a highway of things, meaning fiber optics, gas pipes, in addition to vehicle traffic. And I understand I already extended my time, but I would love to hear your follow-up and ideas on how something like that could be possible?

Mr. DUNCAN. I thank the gentlelady, and the chair will now go to Mr. Castro.

Mr. CASTRO. I am fine.

Mr. DUNCAN. No questions there. We can go through a second round if the ranking member would like.

So there was an interesting article in The Wall Street Journal recently about peak demand, okay. So when I was growing up in the 1970s, we heard peak oil, that the world had found all the recoverable oil resources, and that we were going to see the amount of oil available for production decline. It has never done that. It has only gone up.

But the article in The Wall Street Journal, was interesting because of peak demand, and focusing really on the U.S., and I don't disagree with the article that we may be at peak demand for fossil fuel usage, just to shift into renewables and that sort of thing. But I disagree with The Wall Street Journal in that peak demand has been met globally, because we have got a lot of countries around the world that are emerging, and they are going to use energy, energy for manufacturing, energy for heating and cooling homes. I am one that believes that energy is a great segue to improve the quality of lives of people all over the globe, especially in Third World countries where they can't keep food fresh for very long because they don't have electrical power, or even propane for refrigeration. You still have a huge threat of dengue, yellow fever, malaria, Zika and other mosquito-borne illnesses in areas of the world that don't have air-conditioning, because they don't have electrical power and they have to leave the windows open. There is just that sort of threat.

You have got poor air quality in homes around the globe because no electricity. They are having to heat their homes with wood or charcoal. They are having to cook over wood and charcoal. There is just a lot of things that are putting particles in the area that folks are breathing. So electricity is a life changer for many people. You run into what is the source of electricity is a nuclear power hydro—there is this battle in Patagonia for more hydro. The environmentalists don't want that. Huge hydro area possibly, the potential there is immense. Africa, you just don't have a whole lot of hydro that hadn't already been put in place, and then you have a lot of logistics there for transmission lines and country boundaries and instability.

And when you talk about nuclear power, then you have got proliferation issues, you have got nuclear waste issues, you have got a threat of terrorism. So when you talk about energy globally from the peak demand aspect, peak demand has not been met globally. There is opportunity globally. There is opportunity within Mexico. There is opportunity within North America in general, and Latin America. So I wanted to touch on that.

We heard a lot in the last 4, 6, 8 years about Keystone Pipeline. Keystone Pipeline was a vital component to refining Canadian oil. And the argument was, well, they can ship that oil somewhere else. Well, you got logistics across the continent of Canada, but there was a reason that oil was slated to come to the United States. That oil is very similar to the oil coming out of the Middle East. Our refineries are set up to handle that type of oil.

I have made or had the discussion with the energy sector about retooling America's refineries to meet the needs for American oil produced in the Bakken and the Permian Basin and other places, that is very costly. It is more attractive to U.S. energy producers to export that crude which is light sweet and bring in that heavier Canadian oil that resembles the oil coming from the Middle East that comes to U.S. refineries and is refined into all the different components that a barrel of hydrocarbon is refined into.

So, that was never talked about enough, I don't think, in the whole Keystone Pipeline debate about why it made sense to bring that Canadian oil to U.S. refineries. At the same time, we were exporting American produced oil, crude oil, to other parts of the globe that were set up to refine that type of oil. So there is a lot of dynamics there.

Let me get to a question real quick. We talked about Keystone, I did all the talking, but NAFTA, you know, President Trump has talked about a lot of terrorists and people in Mexico are concerned about a border wall and all this is going to be injected into the NAFTA debate as NAFTA is renegotiated, which I think it should, and I think the energy sector, as you heard in my opening comments, ought to be a big part of that NAFTA debate to bring NAFTA into the 21st century. We see on the chart the changes in energy trade. We are now importing less crude oil from Mexico, and we are exporting more refined products to Mexico, as I think one of the panelists mentioned.

So let me just get your take, and we may have talked about that earlier, but your take on NAFTA, NAFTA renegotiation and energy in general in regard to that. You can talk about tariffs, you can talk about trade issue in general, but NAFTA, and I will just ask all three panelists, and then I will go to the ranking member. So, Ms. Ladislaw.

Ms. LADISLAW. I think on NAFTA I think there is two approaches. One is do no harm. So NAFTA has done some great things for the energy sector without actually dealing with energy too terribly directly, right? So when we negotiated NAFTA, Mexico actually didn't insert much about energy because it wasn't able to do that. But the energy sector benefited from a lot of the trade protections that we talked about earlier and the other benefits that come with those sorts of trade agreements.

And so, I think one of the big concerns in the energy sector is because everybody feels like the dynamic on energy has changed in North America, that within the context of NAFTA renegotiation, energy could be held hostage, right? If you don't like what you are getting back on lumber or autos or some other segment of the trade agreement, you can say, well, maybe I am going to treat my gas differently or maybe we will treat out oil trade differently. And I think we really have to be very careful to say we have had a really big boost from all of this energy trade in North America, we don't want to do any harm on that side of the equation.

And the other part is modernization, right? Can you embed some of the progress that has been made in Mexico into the trade arrangement? Can you modernize it to reflect the kind of things that you might want in a trade agreement that is coming with an energy sector that is much more digitized, that is going to be auto-

mated, that is going to have these new sort of ideas and concepts that just didn't exist in 1994 in a way that you had to deal with. And so, I see it as first do no harm, second modernize to be able to prepare for the challenges of the future, and embed some of the progress we have made over the last several decades.

Mr. DUNCAN. Mr. Padilla?

Mr. PADILLA. I think we can think of the benefits of NAFTA with regards to energy in a few key dimensions. The first is that NAFTA enhances energy security of the United States. So as the world's energy super power, we enjoy the benefits of that to an even greater degree due to the integration that we currently have with Canada and Mexico with regards to oil and natural gas markets.

NAFTA also supports U.S. jobs and manufacturing here in the U.S. The examples that you were referencing around importing crude oil from Canada, which flows to refineries in the United States and supports the production of fuels that we use here and even in export, there are jobs that are produced at those 69 refineries that import crude oil from Canada, those 12 refineries that import crude oil from Mexico.

And then NAFTA also helps to enhance the energy security and affordable energy for our allies. So the benefits that accrue to us here in the United States are the same for Canada and Mexico. So it is a classic case of mutual benefits. And then, also, NAFTA enables U.S. companies to compete and win in the oil and natural gas bid rounds in Mexico and increasingly, as they have undertaken investments in Canada as our markets have become more seamless and integrated.

So there are a few key provisions in NAFTA that I think we would want to preserve in order to maintain the continuation of all these benefits. The first is euro tariffs on few key oil and natural gas products. The second is the automatic liberalization of natural gas exports, for example, that a free trade agreement affords. And then another is market access. The NAFTA agreement, while it originally excluded the Mexican hydrocarbon sector from investment by foreign investors, now the constitutional reforms that Mexico has undertaken on its own have triggered a ratchet clause in NAFTA which solidifies those and makes that part of the agreement and opens that up to U.S. investors.

And then, finally, there is also investment protections in NAFTA that underscore U.S. firms' investments in Mexico and protect them from extreme cases of potential expropriation, and act as a deterrent for some of the fears that we have seen and the realities that we have seen of U.S. investments in oil and natural gas in other places people are. So all of those are the elements of NAFTA that have underscored the benefits that we get from the agreement.

Mr. DUNCAN. Dr. Wood, quickly.

Mr. WOOD. Thank you, yes. Just on the question of peak demand, the most aggressive scenarios that I have seen suggest that demand may fall down to 75 million barrels a day by 2040. To maintain 75 million barrels a day is going to require many, many billions of dollars of investment just to keep that up. The oil industry is not going away any time soon. There is going to be a need for a lot of investment in a lot of jobs there.

Secondly, on the question of refineries, we need to think about where we place refineries in North America, not just in the United States or in Mexico, because there are complementarities there, and we have already seen this. The case that you used, Canadian oil being refined in near the Gulf of Mexico in the United States, but there are Mexican refineries that are well-equipped to refine U.S. crude as well. We have to think about moving the product around a lot better.

On NAFTA, all of the points that have been raised already, I absolutely agree with. The Mexican reform actually allowed for energy to be included under the existing NAFTA, because there is a clause in NAFTA which says any sector which is currently closed and excluded once it is opened will be covered by the provisions of NAFTA. That is where Chapter 11 comes in. And the crucial point, I think here, is that the last thing that any of us want to see is any kind of extra costs on cross-border movements of energy in North America. It is a fundamental source of our competitiveness as a region.

Mexico has become more competitive because of lower energy costs, which means that Mexican components that are part of the U.S. production process here that makes U.S. products competitive in global markets, all those prices have come down. We need to start thinking about this very much in regional terms, not in national terms.

Mr. DUNCAN. I tend to agree with you, and that is one of the messages I will have with USTR. I hope they get it. We don't need to add more costs to this. It actually benefits all three countries, and I think that is one benefit of NAFTA in energy sector, and I look forward to how they negotiate that. I turn to the ranking member.

Mr. SIRES. Thank you, chairman. You know, so I hear all these tariffs. I think businesses in this country, they panic, because I don't think when you talk about these tariffs, I don't think people realize how much economic activity goes between Mexico and the United States, especially on the border, and the jobs that are created there on both sides of the border. So sometimes people speak without really knowing the facts.

But if we do put a tariff, I think the energy sector in America is going to get hurt worse, because we are now currently exporting more into Mexico than we actually are importing. And if we put something on the imports from Mexico, you know that they are going to retaliate. You know that this is going to happen.

So I hope that that goes away, quite frankly, and we just continue to promote this harmony between North America, quite frankly, because I think it is only to all our benefits, not just one country or the other.

And, I was curious what you mentioned about we have to think about where we place our refineries. I couldn't agree with you more, coming from New Jersey. You know, the refineries were placed there years ago, and what has happened is people have moved all around it, so now it is like the railroads. The lines went through there, there was nobody there. Now people have moved all around it. So I think that is a very key question. If we are ever going to build new refineries, where are we going to place the refin-

eries because we are growing and growing, and people are moving to these areas, and the first thing they want to do is get rid of these things. They were there before you got there. You know, the railroad lines were there before you got there. And I am constantly struggling with, you know, with this.

You know, I represent Bayonne, New Jersey. They have a—it is not a refinery now, but it is a repository. I think they move up to like 50 million gallons of fuel a day. Luckily it is not refined there. It comes in already refined and it is moved, but even with the tanks, people are still saying, well, can we get rid of these tanks because they want a view of New York.

So I couldn't agree with you more about where we have to—we have to really think in terms of where we are going to place these refineries. And I really don't have a question. You answered most of my questions. Thank you, chairman.

Mr. DUNCAN. Thank you, ranking member. I will now go to Mr. DeSantis from Florida.

Mr. DESANTIS. Thank you, Mr. Chairman. Thank you to the witnesses. The energy sector in Canada, oil, gas, electricity, the exports are 25 percent of Canada's exports of goods to the U.S. while agriculture is only about 7 percent, yet as I understand it, energy was excluded in the original NAFTA agreement. Since the north American energy market is so interconnected, do you think energy should be included in any renegotiation of NAFTA?

Mr. PADILLA. We believe that the integrated and interdependent markets of North America should be borne in mind by the negotiators as they seek to modernize NAFTA. The way in which you may do that in terms of the architecture of the agreement will be determined by the course of those negotiations, but all of the ways in which our markets are connected are really what is at stake when NAFTA is being modernized. And I think we want for there to be key aspects of a new NAFTA that preserve the provisions of the current NAFTA that have worked so well that underpin and underscore the ways in which our markets have become increasingly interdependent and integrated.

One way to think of this is that when NAFTA——

Mr. DESANTIS. Well, before you do that, and I will let you finish, but so your concern is more renegotiation would hinder the interconnected markets, rather than facilitate it?

Mr. PADILLA. That is correct. And I was just going to say that in the last generation under the current NAFTA, the free market and free trade of trade and energy between the U.S. and Canada has really made that a very seamless and integrated market. We have the opportunity in the next generation to achieve that with Mexico.

So by preserving what has worked so well in NAFTA to underscore that for the U.S. and Canada trade, we have that opportunity in this next generation to achieve that across all three countries.

Mr. DESANTIS. Anyone else?

Mr. WOOD. Yes, if I may. First of all, I would just like to emphasize the point that Ranking Member Sires made earlier on about the employment dimensions of this. A recent study that was produced in the Wilson Center showed that 4.9 million jobs in the United States depend upon that economic relationship with Mexico.

It is partly the exports, but it is also the imports from Mexico that make U.S. industry more competitive.

In terms of whether energy should be included in the negotiations, it is very clear that the Mexican Government has been very enthusiastic about putting energy on the table. One of the deep concerns that I have about that is that both governments are now talking about a very short timetable for getting the negotiations done. If they want to get this wrapped up by December of this year or January of next year, which is the kind of time frame they are talking about, then there is going to be very little time to talk through all of this.

There also seems to be an emerging idea that they don't want to have to present this to their respective Congresses, which suggests that the changes they are going to make are minimal. Now, that is fine, but if you start talking about energy in there then you open up an entire can of worms, and that is going to be very, very complicated.

So I actually think that the current existing NAFTA works incredibly well. One reason why the Mexicans are enthusiastic, however, is because of the prospect of electoral change next year, and they want to have an extra guarantee that the energy reform enacted in 2013 will be respected so that free energy markets become part of an international treaty that is enshrined in Mexican law.

Mr. DESANTIS. North America has become an energy super power accounting for 72 percent of Western Hemisphere oil production, and 85 percent of natural gas production in 2015. Both Canada and Mexico produce heavy crude oil, which is well suited for U.S. refineries. New technologies in the U.S. such as hydraulic fracturing and horizontal drilling, and in Canada, as well as Mexico's energy reforms, have enhanced opportunities for further trilateral trade and energy cooperation.

Is North America-wide energy security and independence an achievable goal in your view, whoever wants to take that?

Ms. LADISLAW. Yes, I will take it. I mean, I think as we noted, I think we are closer to self-sufficiency on a North American basis than we have ever been, and I think that that is wonderful, but I think we also have to recognize that that comes from open trading relationships with other countries around the world. And so even though we have this advantaged position, it has come from interdependence. We get a lot of economic efficiency and a lot of security from that.

So I think that if we want to focus as a continent on growing those advantages to create more jobs and to create more economic growth and to insulate ourselves, I mean, the chairman brought up the incident in Qatar in the last several days. There is a period in time not too long ago where even small incidents like that would really cause us to be concerned, and we are not sweating it really hard on the energy side, right? So we are deriving some benefits in the fact that we have a little bit more strategic latitude in what we would like to do on energy, but we can't ever assume that that means we can be isolationists or it leads us to think that we are okay in and of ourselves. So I think, yes, we are in a much better position, but we have got to think about growing it.

Mr. DESANTIS. Can he answer my——

Mr. WOOD. Very, very quickly, I think there is something we often neglect, which is complementarity of resources. Many of you may know that Sweetwater, Texas has an extraordinary wind resource, but, of course, the wind only blows certain times of the day and not always when Texas needs that wind the most. In Tamaulipas, there is a very similar quality resource which blows at a different time of day. You think about linking those two resources together. You think about linking solar resources together across the width of the continent so you are actually able to overcome a lot of the intermittency problem, or even an easier example what already exists where wind power in the U.S. is used to pump water back up into Canadian hydroelectric dams at certain parts of the day, so you are essentially storing that energy.

That interconnectedness, I think, is one way in which we are really going to achieve North American energy autonomy.

Mr. DESANTIS. Well, thank you. I yield back.

Mr. DUNCAN. I thank the gentleman. You are right. I mean, one of the battery storage issues is—or solutions right now is to pump the water back up, use the water to generate electricity as a normal hydroelectric project and during peak wind or peak solar, use that energy to pump the water back up and just continue the cycle. We have something similar in South Carolina, although they use regular energy production, had a Bad Creek project, release water during peak demand and produce electricity, and then use reversal of the turbines, which are electric generated, to pump the water back up.

They could use windmill or sun power for that, but that is one of the holdups, hangups for renewables is just holding that power to be used when it is necessary or needed. We don't have that capacity or capability right now to hold large amounts of energy for a long period of time to be used when the sun isn't shining or the wind isn't blowing. But reservoir storage is one battery, so to speak, capacity.

So, Ms. Torres, if you have another question we will recognize you for 5 minutes.

Mrs. TORRES. Thank you, Mr. Chairman. I want to say that certainly from the Homeland Security perspective, the economic stability of our closest neighbors to the north and the south has to be a priority for U.S. policy, and I am not just speaking to Mexico, but, you know, within Central America, I think that those governments have worked very closely with us to ensure that the people that want to come through that migrant path to hurt us here in the U.S. are detained, and they have great partnerships with our law enforcement here in the U.S.

I wonder if we can go back and maybe talk a little bit about the last question that I asked on this highway of things, how we can create those opportunities, and then on going back to the NAFTA agreement, I think you answered that question, that energy certainly has a role and could be integrated in a new, improved agreement.

Where do tribal governments, and what sort of role could they play in that, not just in the U.S., but the indigenous populations within southern Mexico in looking at areas that have not been developed within Mexico?

Mr. WOOD. Thank you. It is an incredibly important question, simply because of the diversity of Mexico's indigenous peoples, and because there is a long tradition there of protesting any major infrastructure project. So the question of——

Mrs. TORRES. Because it has been at their cost, the cost of their natural resources.

Mr. WOOD. Absolutely. And the case that you mention of Southern Mexico, both in Oaxaca and in Chiapas, we have seen local communities including indigenous communities rise up against energy projects, and not just oil and gas, against renewal energy projects as well when they feel that they are not being treated with fairness.

This is a learning process for the industry, I think, and I am actually very, very encouraged to see how seriously the industry is taking this in Mexico. They are required by the law, including the energy reform of 2013, is a need to do a social impact evaluation in any community, whether it is going to be in an energy project, in addition to an environmental evaluation. There is a booming industry right now in these kind of evaluations. But most importantly, the industry has recognized that it is in their long-term interest to actually carry out smart investment strategies to make sure that they are not going to run into problems down the road so they won't be able to open their energy projects when it comes out. They can build them, but they won't be able to actually open them. This is the case that we have seen in the state of Oaxaca.

In the State of Chiapas, I think what we are going to see is that there are a lot of prospective oil resources there on land. It is a very divided political space already. Of course, we all know about the zapatistas who continue to play a big role there. But also, I think we have to see that this is an area which is desperate for development.

And picking up on your point about Central America, we have to recognize that one of the best ways to get economic development to Southern Mexico and to Central America is to make sure that natural gas goes down there. Let's get that down there as a driver of economic growth, and hopefully that rising tide will lift everybody's boats.

Mrs. TORRES. So do you think that within a renewed NAFTA agreement, we can focus on areas of the U.S. such as the Rust Belt and areas of Southern Mexico where—these are areas that have not seen, and have, in some way, feel that they have been hurt by these trade agreements, and what sort of possibilities exist there, opportunities for us to do that?

Mr. WOOD. So first, if we don't focus on those areas which haven't benefited and feel as though they have been hurt by it, then in a few years' time we are going to have this conversation all over again. So this is fundamentally important, I think. And in terms of policy proposals, one of the things that we are working on right now at the Wilson Center is a proposal for workforce development at a North American level. We have to recognize that the economy is changing. It is actually not trade that is pushing people out of jobs, it is, of course, the economic transformation, the fourth industrial revolution, and we need to focus on the ways in which we can educate, train, and retrain the workforce. We need to focus

on ongoing workforce development plans, and government needs to think about how it can actually help businesses to do that, whether it is through tax incentives or some other scheme. And doing this on a North American basis makes perfect sense. Because of the educational and training resources that exist in certain parts of the continent, and the demand for those skills in others, we need to think about how we can get workers to benefit from those things.

Mrs. TORRES. Thank you. My time has expired, but I do want to remind you, I would like to hear your opinions on this highway of things.

Thank you. I yield back.

Mr. DUNCAN. I want to thank the members' participation. I want to thank the panelists for their participation today. Excellent testimony. Excellent answers to the questions. I think we have just scratched the surface really in the potential for the three nations here in North America working together in the energy sector. We talked about technology. We talked about brain power. We talked about the resources themselves. We talked about some challenges. It is a changing world, and I think energy is going to be a big part of that change, the industrial revolution that you talked about. I think energy renaissance and what we do with manufacturing where products are manufactured, whether it is consumer goods or whether it is energy.

So I thank you all for being here. I think it is great. And pursuant to Committee Rule 7, members of the subcommittee will be permitted to submit written statements be included in the official hearing record. Without objection the hearing record will remain open for 5 business days to allow statements, questions, extraneous materials subject to the length limitation in the rules.

There being no further business, we will stand adjourned.

[Whereupon, at 11:35 a.m., the subcommittee was adjourned.]

# APPENDIX

## Material Submitted for the Record

**SUBCOMMITTEE HEARING NOTICE**
**COMMITTEE ON FOREIGN AFFAIRS**
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515-6128

**Subcommittee on the Western Hemisphere**
**Jeff Duncan (R-SC), Chairman**

**TO: MEMBERS OF THE COMMITTEE ON FOREIGN AFFAIRS**

You are respectfully requested to attend an OPEN hearing of the Committee on Foreign Affairs, to be held by the Subcommittee on the Western Hemisphere in Room 2172 of the Rayburn House Office Building (and available live on the Committee website at http://www.ForeignAffairs.house.gov):

**DATE:** Wednesday, June 7, 2017

**TIME:** 10:00 a.m.

**SUBJECT:** Energy Opportunities in North America

**WITNESSES:** Ms. Sarah Ladislaw
Director and Senior Fellow
Energy and National Security Program
Center for Strategic and International Studies

Aaron Padilla, Ph.D.
Senior Advisor
International Policy
American Petroleum Institute

Duncan Wood, Ph.D.
Director
Mexico Institute
Woodrow Wilson International Center for Scholars

**By Direction of the Chairman**

*The Committee on Foreign Affairs seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202/225-5021 at least four business days in advance of the event, whenever practicable. Questions with regard to special accommodations in general (including availability of Committee materials in alternative formats and assistive listening devices) may be directed to the Committee.*

# COMMITTEE ON FOREIGN AFFAIRS

MINUTES OF SUBCOMMITTEE ON *Western Hemisphere* HEARING

**Day** *Wednesday* **Date** *06/07/2017* **Room** *2172*

**Starting Time** *10:05 AM* **Ending Time** *11:35AM*

**Recesses** *n/a* ( to ) ( to ) ( to ) ( to ) ( to ) ( to )

**Presiding Member(s)**

*Chairman Jeff Duncan*

*Check all of the following that apply:*

**Open Session** ☑
**Executive (closed) Session** ☐
**Televised** ☑

**Electronically Recorded (taped)** ☑
**Stenographic Record** ☑

**TITLE OF HEARING:**

*Energy Opportunities in North America*

**SUBCOMMITTEE MEMBERS PRESENT:**

***Chairman Jeff Duncan, Ranking Member Sires, Rep. DeSantis, Rep. Yoho, Rep. Castro, Rep. Torres, Rep. Espaillat, Rep. Kelly***

**NON-SUBCOMMITTEE MEMBERS PRESENT:** *(Mark with an * if they are not members of full committee.)*

*n/a*

**HEARING WITNESSES: Same as meeting notice attached? Yes** ☑ **No** ☐
*(If "no", please list below and include title, agency, department, or organization.)*

**STATEMENTS FOR THE RECORD:** *(List any statements submitted for the record.)*

***Question For the Record, Chairman Duncan***
***Question For the Record, Rep. Torres***

**TIME SCHEDULED TO RECONVENE** _____
or
**TIME ADJOURNED** *11:35AM*

**Subcommittee Staff Associate**

**Questions for the Record**
**Sarah Ladislaw**
House Committee on Foreign Affairs' Subcommittee on the Western Hemisphere Hearing
*"Energy Opportunities in North America"*
June 7, 2017 at 10:00 p.m. in Rayburn Room 2172

**Chairman Jeff Duncan**

TO: ALL WITNESSES:

1. NAFTA / Mexico / Canada: Mexico is the fourth-largest producer of petroleum in the Americas and an important U.S. energy trading partner. In 2015, Mexico accounted for 688,000 barrels per day or 9% of US crude oil imports. Canada's oil, gas and electricity exports also are nearly 25 percent of Canada's exports of goods to the U.S. Energy was also excluded in the original NAFTA agreement. Now that Mexico's energy sector has changed so significantly and the North American energy market is so interconnected, what would a good energy deal in a renegotiated NAFTA agreement look like for U.S., Canadian, and Mexican interests?

The United States has signaled its intent to reopen the North American Free Trade Agreement (NAFTA). North America's energy sector has benefitted from but is not overly impacted by the provisions within NAFTA. An excellent paper written by Laura Dawson of the Woodrow Wilson Center points out that oil, natural gas, and electricity are traded duty free, and products related to energy have relatively low tariffs. NAFTA affects rules governing investment, services, government procurement, and rules of origin, which in turn impact the energy sector but more tangentially. When it comes to energy and NAFTA a "do no harm" approach should be taken, recognizing that free trade in energy across borders is still in North America's interests.

A "do no harm" approach is important because of the level of interdependency that exists in the trade of energy products. The U.S. exported 564 kb/d of petroleum products, 300 kb/d of crude oil and 2.11 bcf/d of natural gas to Canada in 2016. In addition to this, the U.S. exported 879 kb/d of petroleum products and 3.79 bcf/d of natural gas to Mexico in the same year. On the reverse side, the U.S. imported 542 kb/d of petroleum products, 1,190 kb/d of crude oil and 7.98 bcf/d of natural gas from Canada in 2016 and the same year imported 87 kb/d of petroleum products and 582 kb/d of crude oil from Mexico. The gas trade relationship is particularly noteworthy. The U.S. imports over 10 percent of its daily consumption of natural gas from Canada, which services many areas which U.S. pipeline infrastructure cannot currently reach. While U.S. LNG is opening new destination markets, 60 percent of total natural gas exports went to Mexico alone in 2016. The trade relationship that exists with Mexico is vital for many producers in South Texas, allowing for rapidly growing levels of production to find export markets that are in close proximity.

Additionally, the electricity trade and interconnectedness of the power system of the U.S. and Canada and Mexico is an important part of the nation's grid reliability and security. The U.S. and Canadian grids are well-connected, with over 30 major transmission connections between the two countries. Due to economic growth, the U.S. has been a net importer of electricity from Canada with imports increasing

from 18.1 TWh in 2006 to 59.8 TWh in 2015. The North-Eastern U.S. is the largest recipient of Canadian electricity exports, and benefits from being able to take advantage of cheap hydroelectricity. On a national basis, these Canadian imports are small, equivalent to less than 1.5% of total generation. In terms of Mexico, trade of electricity is confined to a few places mostly in California and overall trade with Mexico is also small comprising of one-tenth of the volume of trade with Canada. However, the U.S. benefits from the reliability of the U.S.-Mexican transmission connections as in the case of Texas where trading mostly happens during periods of constrained electricity supply.

Following the reforms of Mexico's electricity market in 2014 there are new opportunities for a unified North American grid and for increased electricity trade between the U.S. and Mexico. The cost of electricity for Mexican residential and business electricity consumers is among the highest in the hemisphere, on average 25 percent higher than in the U.S., creating opportunities for U.S. power generation to supply the Mexican market. There is also potential for greater electricity exchange from natural gas-fired or renewable generation on both sides of the border. Similarly, new transmission projects with Canada may enable access to new, existing, or expanded hydropower projects, the use of Canadian hydroelectric generation and pumped hydropower storage which would help states better meet their renewable portfolio standards and address the intermittency issues of renewables.

2. Mexico / Ethanol: Recently, Mexico has devised a plan to raise the amount of ethanol that can be blended with gasoline. While some argue that this would promote job growth and lower air pollution, critics say that ethanol production has negative environmental implications and that other fuel additives are better at reducing air contaminants. What is your view on the use of ethanol in gasoline in Mexico? Should the U.S. generally support this plan? To what extent would an increase in ethanol or an ethanol mandate impact air pollution and ozone in Mexican and US cities?

   I do not have the expertise to answer this question.

3. Mexico / Gasoline: Mexico has begun to slowly privatize its energy sector, and the Mexican gasoline market will be open to foreign suppliers for the first time since 1938 when the energy sector was nationalized. To what extent is PEMEX refinery infrastructure and gasoline distribution system compatible with increased ethanol production or an ethanol mandate? What new infrastructure costs will be needed to transport and blend ethanol into Mexican gasoline at refineries?

   I do not have the expertise to answer this question.

4. North American Impact from Venezuela: Venezuela holds the largest proven oil reserves in the world and the second-largest natural gas reserves in the Americas after the U.S. Yet, the country is a mess. The national oil company, PDVSA, is exploiting its reserves so slowly that some experts render them worthless. If the U.S. were to impose crude oil restrictions from Venezuela as a result of the political situation in the country, what would be the impact in Venezuela, to U.S. companies, and to U.S. refineries? What impact would such an action have on the North American energy market?

The U.S. is Venezuela's largest crude oil export market. Venezuela produced 2.27 mb/d in 2016, of which 30-35% was exported to the U.S. (0.7-0.8 mb/d). This represents approximately 5% of U.S. demand. Over half of these imports go to CITGO's refineries at Corpus Christi, Lake Charles and Lemont. The majority of the rest goes to Valero Energy, Phillips 66, and Chevron Corp. The grade of oil that the U.S. imports from Venezuela is predominately extra heavy oil. An embargo would force Venezuela to find logistical work arounds in the export of its crude oil. In absence of a U.S. market these 0.7-0.8 mb/d would likely be redirected to Asia, which would increase crude shipping costs, which in turn would reduce PDVSA's profits. This would also reduce CITGO's profits, who would no longer be able to purchase from its parent company, PDVSA, and would be forced to pay more in turning to the spot market. Crude oil restrictions would also increase costs for other refiners who would need to purchase heavy crude from further afield (likely the middle east). Increased costs for CITGO and other domestic refiners, would in turn be translated to higher gasoline and diesel prices, with the consumer footing the bill.

**Rep. Norma J. Torres**

TO: ALL WITNESSES:

1. NAFTA / Indigenous Communities: If NAFTA is renegotiated, what is the best way to ensure that any agreement addresses the needs in those communities, including Native American tribes; the residents of the Rust Belt in the United States; and indigenous communities in Chiapas and Oaxaca in Mexico, which may have been adversely affected by the original NAFTA?

While many of the concerns related to NAFTA have little to do with the energy sector, energy trade can be held hostage to other contentious issues or can be affected by other trade-related measures like the various Buy America proposals being discussed in the United States today. There are things that can be done to address the economic dislocations being experienced in many parts of North America and ways to build additional energy advantages among the three countries, but few of these lie within the context of renegotiating NAFTA.

Chairman Jeff Duncan
Questions for the Record for Dr. Aaron Padilla
House Committee on Foreign Affairs' Subcommittee on the Western Hemisphere Hearing
*"Energy Opportunities in North America"*
June 7, 2017

1. **NAFTA / Mexico / Canada: Mexico is the fourth-largest producer of petroleum in the Americas and an important U.S. energy trading partner. In 2015, Mexico accounted for 688,000 barrels per day or 9% of US crude oil imports. Canada's oil, gas and electricity exports also are nearly 25 percent of Canada's exports of goods to the U.S. Energy was also excluded in the original NAFTA agreement. Now that Mexico's energy sector has changed so significantly and the North American energy market is so interconnected, what would a good energy deal in a renegotiated NAFTA agreement look like for U.S., Canadian, and Mexican interests?**

   For API and its industry members, there is a strong desire to see the provisions of the current NAFTA remain in place. The overall functionality of the current NAFTA agreement works for the oil and natural gas industry. API and its industry members therefore wish to ensure that as NAFTA is modernized, the provisions of the current agreement remain in place in a new NAFTA. Please find attached the comments by Kyle Isakower, API Vice President for Regulatory and Economic Policy, submitted on June 12, 2017 in response to the Office of the United States Trade Representative's request for comments on "Negotiating Objectives Regarding Modernization of the North American Free Trade Agreement with Canada and Mexico."

2. **Mexico / Ethanol: Recently, Mexico has devised a plan to raise the amount of ethanol that can be blended with gasoline. While some argue that this would promote job growth and lower air pollution, critics say that ethanol production has negative environmental implications and that other fuel additives are better at reducing air contaminants. What is your view on the use of ethanol in gasoline in Mexico? Should the U.S. generally support this plan? To what extent would an increase in ethanol or an ethanol mandate impact air pollution and ozone in Mexican and US cities?**

   We would encourage a free market in Mexico and allowing up to 10% ethanol in Mexico would enable that market to work and allow transparent movement of fuels across the borders. We do not support a mandate to use any fuel including ethanol.

   Due to concerns regarding ozone, the government of Mexico prohibits the use of ethanol in motor gasoline (per Mexican Official Standard NOM 016-CRE-2016) in three of the most densely populated metropolitan areas, Mexico City (MCMA), Guadalajara (ZMG) and Monterrey (ZMM), which together account for over 10% of the population of the country.

   Vehicle emissions of total hydrocarbons, acetaldehyde, ethanol and nitrogen oxides (NOx) may increase and emissions of carbon monoxide (CO) may decrease when fuels blended with ethanol are used (based on recent research conducted by the US EPA and available here). Both acetaldehyde and NOx are important contributors to photochemical air pollution and ozone (O3) formation. Recent research published by the Coordinating Research Council (available here) also suggests that gasoline containing 10 % ethanol by volume contributes to increased emissions of particulate matter (PM) from light-duty vehicles.

   A report on the environmental and economic impacts of the US renewable fuel standard that was issued by the National Research Council in 2011 (and available here) includes the following statement on the air quality impacts of ethanol:

   > *"Air quality modeling suggests that production and use of ethanol as fuel to displace gasoline is likely to increase such air pollutants as particulate matter, ozone, and sulfur oxides. Published studies projected that overall production and use of ethanol will result in higher pollutant concentration for ozone and particulate matter than their gasoline counterparts on a national average. Unlike GHG effects, air-quality effects from corn-grain ethanol are largely localized. The potential extent to which the air pollutants harm human health depends on whether the pollutants are emitted close to highly populated areas and exposure."*

   It is important to recognize that (a) the fleet of vehicles on the road in Mexico is several years older than that in the U.S., and (b) there are differences in the historical stringency of environmental and other vehicle-related regulations in Mexico versus the U.S. These have contributed to differences in the technology and performance characteristics of the Mexico versus U.S. vehicle fleets which consequently influences a determination of the relative impacts of an increase in ethanol or an ethanol mandate on air quality in Mexican and US cities.

3. **<u>Mexico / Gasoline</u>: Mexico has begun to slowly privatize its energy sector, and the Mexican gasoline market will be open to foreign suppliers for the first time since 1938 when the energy sector was nationalized. To what extent is PEMEX refinery infrastructure and gasoline distribution system compatible with increased ethanol production or an ethanol mandate? What new infrastructure costs will be needed to transport and blend ethanol into Mexican gasoline at refineries?**

We are encouraged by the Mexican government's movement to a free market and believe the citizens of Mexico will benefit from this arrangement. While we do not have specific information regarding the gasoline distribution system in Mexico, we would offer that compatibility of retail infrastructure is critical to prevent environmental releases of fuel that might contaminate drinking water and streams. Further installation of the distribution infrastructure can be challenging. For example, the above ground storage tanks, piping and loading rack arms must be proven to be compatible and modified as appropriate to ensure the proper storage, mixing before being pumped into the truck to take to the retail station. Not to be overlooked, ethanol is incompatible with pipelines due to its affinity for water and for various other reasons. Thus the product must be transported by rail and/or truck to the terminal as it cannot be added at the refinery. Therefore a free market creates the best mechanism to determine where and/or if ethanol should be added to the distribution system. Other concerns with mandating volumes of ethanol to mix in the product could also have negative economic impacts. To the extent ethanol costs more than gasoline or its mandated use requires costly infrastructure upgrades, it could result in increased costs for consumers

At the retail station, the U.S. EPA's Office of Underground Storage Tanks (UST) finalized a rule addressing compatibility in July 2015. If equipment was not built for ethanol blends it can damage equipment and as mentioned above, it can result in releases that harm the environment and potentially drinking water. The preamble to the EPA's final regulation finds:

> "**EPA understands that the chemical and physical properties of ethanol and biodiesel can be more degrading to certain UST system materials than petroleum alone.** As the use of ethanol- and biodiesel-blended fuels increases, EPA is concerned that not all UST system equipment or components are compatible with these fuel blends. For purposes of compatibility, EPA uses the term equipment to mean a group of components assembled together by the manufacturer. Compatibility can be determined for all components of a piece of equipment. Compatibility determinations for equipment are typically useful when an UST system is newly installed or when a complete piece of equipment is replaced. Examples of equipment include the piping system, STP assembly, and automatic shutoff device assembly. A component is considered an individual piece of an UST system and is typically a single piece of the equipment. **Component compatibility is determined on a piece by piece basis.** [Emphasis added.] A component compatibility determination is typically needed when performing repairs on an UST system where only parts of a piece of equipment are replaced. Examples of components include gaskets, seals, and other individual pieces that form a piece of equipment.
>
> Gasoline containing 10 percent or less ethanol (E10) has been used in parts of the

United States for many years. UST equipment and component manufacturers accommodated the E10 market by producing compatible equipment and components."

[The EPA established a requirement to address compatibility.] Owners and operators of these UST systems must meet one of the following options:

- Use equipment or components that are certified or listed by a nationally recognized, independent testing laboratory for use with the fuel stored
- Use equipment or components approved by the manufacturer to be compatible with the fuel stored.

In addition, owners and operators may use another option determined by the implementing agency to be no less protective of human health and the environment than the methods listed above.

**Many pieces of UST equipment and components in the ground today were manufactured before regulated substances containing ethanol or biodiesel existed and are not approved by nationally recognized, independent testing laboratories for use with these fuel blends.** [emphasis added] Currently, certain tanks and piping have been tested and are listed by UL for use with higher-level ethanol blends. However, many other pieces of equipment and components of UST systems, such as leak detection devices, sealants, and containment sumps, may not be listed by UL or another nationally recognized, independent testing laboratory for use with these blends."

[**41602-41603 Federal Register** / Vol. 80, No. 135 / Wednesday, July 15, 2015 / Rules and Regulations]

4. <u>North American Impact from Venezuela</u>: **Venezuela holds the largest proven oil reserves in the world and the second-largest natural gas reserves in the Americas after the U.S. Yet, the country is a mess. The national oil company, PDVSA, is exploiting its reserves so slowly that some experts render them worthless. If the U.S. were to impose crude oil restrictions from Venezuela as a result of the political situation in the country, what would be the impact in Venezuela, to U.S. companies, and to U.S. refineries? What impact would such an action have on the North American energy market?**

   We recognize the crisis in Venezuela and the potential issues it could raise, specifically for the oil and natural gas industry. In the short-term, limiting crude oil imports from Venezuela may impact production of refined products at several U.S. refineries, which support American workers and produce refined products for U.S. consumers and international customers. Venezuela is the third largest exporter of crude oil to the United States behind Canada and Saudi Arabia. In 2016, 13 U.S. refineries imported 271 million barrels of crude oil from Venezuela, representing approximately 10 percent of all crude oil imports.

   Should the United States impose crude oil restrictions from Venezuela, these U.S. refineries would need to find alternative sources of crude oil. However, those refineries are specifically configured to efficiently process that heavy crude oil from Venezuela, requiring them to identify alternative supplies and negotiate new purchase contracts. These refineries also may have to re-configure operations to meet the physical characteristics of the new crude oil.

   While U.S. refineries in the Gulf Coast import and process Venezuelan crude oil, we believe that market forces are best suited to address any potential reduction in Venezuelan imports. As you know, private enterprise and market forces dictate the level of oil and natural gas production and where energy flows based on demand. For example, the U.S. energy renaissance increased supplies and put downward pressure on global crude oil prices, impacting production decisions and government revenues around the world. That is why it is so important to maintain and enhance the robust North American energy market, which facilitates the flow of energy across our borders with Canada and Mexico and helps to insulate American families and businesses from potential supply disruptions from other regions.

Representative Norma J. Torres
Question for the Record for Dr. Aaron Padilla
House Committee on Foreign Affairs' Subcommittee on the Western Hemisphere Hearing
*"Energy Opportunities in North America"*
June 7, 2017

1. **NAFTA/Indigenous Communities – If NAFTA is renegotiated, what is the best way to ensure that any agreement addresses the needs of communities, including Native American tribes, rust belt residents, and indigenous communities in Chiapas and Oaxaca in Mexico that may have been adversely affected by NAFTA?**

   The safety, health and protection of people, the environment and communities are the top priorities for the natural gas and oil industry. For development to be a positive experience for communities, it needs to be aligned with community concerns and priorities while remaining grounded in responsible practices. The industry has worked to gather and share best practices for community engagement and to encourage widespread company adoption as part of its commitment to the communities in which it works. The industry's commitment to being a good neighbor throughout the full project life cycle requires integrity, transparency, consideration of community concerns and ongoing dialogue with local communities and other key stakeholders. These principles form the basis for American National Standards Institute (ANSI)/ API Bulletin 100-3 *Community Engagement Guidelines* (First Edition, July 2014).[1] The guidelines outline what local communities and other key stakeholders can expect from operators, so both sides can refer to it. The industry strives to be aware of and sensitive to community, cultural, economic and environmental context. That means considering the norms, values and beliefs of local stakeholders and how they live and interact with one another.

   The 21st century energy renaissance has created unprecedented opportunities for Americans of all backgrounds. The potential is outlined in a study conducted by IHS entitled "Minority and Female Employment in the Oil and Natural Gas and Petrochemical Industries, 2015-2035."[2] The study estimates that nearly 1.9 million job opportunities could be created through 2035 in America's oil, natural gas and petrochemicals industries. This includes nearly 244,000 job opportunities in the East North Central and Middle Atlantic states. These are good-paying careers that pay an average of nearly $50,000 higher than the U.S. average. The report also estimates there are nearly 707,000 job opportunities projected to be filled by African American and Hispanic workers, and 290,000 projected to be filled by women. In addition, the study states that "Growth in the oil and gas and related industries has been significant in regions where American Indians and other Native populations constitute a larger portion of the population, such as Alaska (20 percent of the population), Oklahoma (13 percent of the population), and the Dakotas (8 percent of the population). Further, in 2011 an estimated 20% of known U.S. oil and gas reserves were beneath

[1] http://www.api.org/~/media/Files/Policy/Exploration/100-3_e1.pdf
[2] http://www.api.org/~/media/Files/Policy/Jobs/16-March-Women-Minorities-Jobs/Minority-and-Female-Employment-2015-2035.pdf

tribal lands; according to the Department of the Interior (DOI), Indian lands could produce up to 5.35 billion barrels of oil and 37.7 trillion cubic feet of natural gas."

Questions for the Record
Duncan Wood
House Committee on Foreign Affairs' Subcommittee on the Western Hemisphere Hearing
"Energy Opportunities in North America"
June 7, 2017 at 10:00 p.m. in Rayburn Room 2172

**Chairman Jeff Duncan**
TO: ALL WITNESSES:

1. NAFTA / Mexico / Canada: Mexico is the fourth-largest producer of petroleum in the Americas and an important U.S. energy trading partner. In 2015, Mexico accounted for 688,000 barrels per day or 9% of US crude oil imports. Canada's oil, gas and electricity exports also are nearly 25 percent of Canada's exports of goods to the U.S. Energy was also excluded in the original NAFTA agreement. Now that Mexico's energy sector has changed so significantly and the North American energy market is so interconnected, what would a good energy deal in a renegotiated NAFTA agreement look like for U.S., Canadian, and Mexican interests?

   In my opinion, the best deal is one that achieves several goals:
   i) Free trade in energy and energy products between the three NAFTA nations: this means free flow of electrons and molecules and energy services, which will greatly benefit US producers
   ii) A process of regulatory convergence for industrial safety and environmental protection
   iii) Strong investor protections and effective dispute settlement mechanisms

2. Mexico / Ethanol: Recently, Mexico has devised a plan to raise the amount of ethanol that can be blended with gasoline. While some argue that this would promote job growth and lower air pollution, critics say that ethanol production has negative environmental implications and that other fuel additives are better at reducing air contaminants. What is your view on the use of ethanol in gasoline in Mexico? Should the U.S. generally support this plan? To what extent would an increase in ethanol or an ethanol mandate impact air pollution and ozone in Mexican and US cities?

   The use of ethanol in Mexico is severely hindered by supply problems, largely because Mexico-s production of ethanol is insufficient. Mexican corn is ill-suited to produce ethanol and alternative sources have not been developed yet. Increased ethanol use in the gasoline mix in Mexico would be a good thing if it resulted in a cleaner mix and if the ethanol could be produced in an energy/carbon efficient manner.

3. Mexico / Gasoline: Mexico has begun to slowly privatize its energy sector, and the Mexican gasoline market will be open to foreign suppliers for the first time since 1938 when the energy sector was nationalized. To what extent is PEMEX refinery infrastructure and gasoline distribution system compatible with increased ethanol production or an ethanol mandate? What new infrastructure costs will be needed to transport and blend ethanol into Mexican gasoline at refineries?

   Mexico's refinery system is aged and desperately in need of new investment and technology. On its own, Pemex cannot hope to meet these needs. Partnerships with the private sector could make it happen, but at the present time there is not a huge interest in such partnerships

4. North American Impact from Venezuela: Venezuela holds the largest proven oil reserves in the world and the second-largest natural gas reserves in the Americas after the U.S. Yet, the country is a mess. The national oil company, PDVSA, is exploiting its reserves so slowly that some experts render them worthless. If the U.S. were to impose crude oil restrictions from Venezuela as a result of the political situation in the country, what would be the impact in Venezuela, to U.S. companies, and to U.S. refineries? What impact would such an action have on the North American energy market?

   I do not have a response to this

**Rep. Norma J. Torres**
TO: ALL WITNESSES:

1. NAFTA / Indigenous Communities: If NAFTA is renegotiated, what is the best way to ensure that any agreement addresses the needs in those communities, including Native American tribes; the residents of the Rust Belt in the United States; and indigenous communities in Chiapas and Oaxaca in Mexico, which may have been adversely affected by the original NAFTA?

   What is needed is a fully inclusive and ongoing consultation across the three countries and special mechanisms to ensure that the renegotiated agreement offers opportunities for all such communities to benefit from trade. Workforce development is an issue that has been proposed by the Mexican government and that we should consider at a regional level

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