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ENERGY REVOLUTION IN THE WESTERN HEMISPHERE: OPPORTUNITIES AND CHALLENGES FOR THE U.S.

HEARING

BEFORE THE

SUBCOMMITTEE ON
THE WESTERN HEMISPHERE

OF THE

COMMITTEE ON FOREIGN AFFAIRS
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ENERGY REVOLUTION IN THE WESTERN HEMISPHERE: OPPORTUNITIES AND CHALLENGES FOR THE U.S.

THURSDAY, MAY 14, 2015

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

The committee met, pursuant to notice, at 2 o'clock p.m., in room 2200 Rayburn House Office Building, Hon. Jeff Duncan (chairman of the subcommittee) presiding.

Mr. DUNCAN. A quorum being present, the subcommittee will come to order. I would now like to recognize myself for an opening statement.

The Western Hemisphere is home to an abundance of natural resources, including nearly a third of the world's oil reserves. With their own U.S. supplies of oil, natural gas and shale gas resources, the capacity to export liquified and compressed natural gas and the option of offshore drilling in the Atlantic, we have many reasons to deepen our energy engagement in the region.

Such action would spur economic growth and energy security while reducing energy costs, which will go a long ways toward building a more stable and prosperous hemisphere. Currently, our top crude oil imports come from Canada and Mexico.

Yet, the Obama administration's policies, while seeking to appease dictators in Cuba, have refused to take common sense approaches with Canada and Mexico.

The Keystone Pipeline decision remains mired in White House delaying tactics and State Department bureaucracy while the U.S. continues to unfairly prohibit crude oil exports to Mexico, and it is unlike our treatment toward Canada.

So earlier this year, President Obama used just the third veto of his presidency to stop House- and Senate-passed authorizing legislation to finally begin construction of the pipeline, even saying at the time that the pipeline wouldn't actually create that many jobs for the U.S.

Approval of the Keystone XL Pipeline would not only inject over $7 billion in private investment into our economy, it would also create thousands of good-paying jobs for the American people. Energy security is a segue to job creation.

Keystone XL also represents an important piece of ensuring our national security interest. Reducing our dependence on energy from

unstable parts of the world and from regimes hostile to the U.S. interests has long been a crucial element in protecting our broader national security interests.

Canada and the United States enjoy a very close bilateral relationship with robust commercial ties. Our two countries enjoy the world's largest bilateral trade relationship, translating into over $1 billion crossing our shared northern border each day.

Moreover, Canada is the world's fifth largest petroleum producer and its reserves are believed to be third largest in the world only after those of Saudi Arabia and Venezuela.

Canada is already the United States' largest supplier of energy, and approval of the Keystone Pipeline from Canada to refineries in the Midwest and the Gulf Coast would translate into approximately 1 million additional barrels of oil per day, along with tens of thousands of high quality good-paying U.S. jobs.

It is telling when you remember that President Obama managed to force Obamacare onto the America people in just over 400 days, yet it has been over 2,000 days since the application for Keystone XL Pipeline from Canada was submitted to the State Department, and the administration continues to stall on approving or disapproving the project.

On this question I believe our treatment of our neighbor to the north, one of our best and largest trading partners and on so many other issues, is shameful.

So because of this, as chairman of the Subcommittee on the Western Hemisphere of the House Foreign Affairs Committee, I convened the first meeting of this panel earlier this year to host senior leaders from several Caribbean countries in conjunction with the administration's Caribbean Energy Security Summit.

These CARICOM countries suffer from some of the most expensive energy prices in the world, hampering the growth of their island economies.

Isn't it time that we figure out innovative and cost-effective ways to export our recently discovered energy abundance to help these small countries once and for all get off their dependence on subsidized energy from Venezuela?

Not only does this make economic sense, but it also might actually help the U.S. geopolitically when the votes are cast at the U.N. and the OAS.

Today, the Western Hemisphere has some amazing opportunities for deeper U.S. engagement with Mexico's energy sector reforms, energy revolutions in Argentina, Brazil, Colombia, Peru, offshore exploration activities by Caribbean countries, and potentially new resources in the Arctic.

In Mexico, the promise of opening Pemex to foreign investment will not only potentially benefit U.S. companies but will go a long way in improving the efficiency of Pemex while stabilizing, indeed, increasing Mexico's stalled oil production.

This will lead to a more prosperous Mexico and that, unquestionably, is in the national interest of the United States.

The imminent approval of the United States Commerce Department to allow Mexico to swap up to 100,000 barrels of heavy crude for similar amounts of lighter U.S. oil could yet be a milestone to-

ward eventual loosening of the four-decade-old ban on U.S. oil exports. This is truly a win-win.

In South America, despite simmering domestic political challenges with the vast offshore pre-salt oil reserves in Brazil and with Argentina sitting on the world's second largest shale gas reserves in the Vaca Meurta, opportunities for U.S. engagement abound.

The discoveries made in the pre-salt are among the world's most important in the past decade as the pre-salt province comprises large accumulations of excellent quality high commercial value light oil.

With elections set for this fall, it remains to be seen what the investment climate will look like in a post-Kirchner regime in Argentina. The world will be watching.

This hearing will explore how we can grow and enhance our existing partnerships with countries in this hemisphere, and preserve U.S. energy security, increase investment opportunities for U.S. companies and high-paying jobs for the American people.

Challenges for U.S. business investment remain in the region, but it is my hope that through hearings like this we will determine ways in which the U.S. can better engage on energy issues with our neighbors in the hemisphere.

Just returning from the Summit of the Americas, I really started thinking about hemispheric energy independence. If we think about some of the things I have talked about, whether it is Keystone Pipeline oil to U.S. refineries, whether it is the abundance of natural gas that we are finding in the United States, whether it is shale oil in the Bakken and our ability to extract that, possible energy exports of oil to the Caribbean nations limiting or effectively ending Petrocaribe's influence in the region, natural gas exports to Mexico, natural gas LNG and CNG through Central America and all throughout the hemisphere, working with our partners in Colombia and allies in Colombia and Brazil, expansions of possibly energy in Argentina, and what Peru and Chile are wanting to do, just so many different things that could happen, especially if political winds shift in Venezuela and that Venezuelan oil becomes more productive—oil fields become more productive and opportunity to utilize that oil in this hemisphere.

If you take every piece of that equation that I talked about—and there are others, I am sure, that we will hear from the panelists today—if you factor all those in to the Western Hemisphere and think about it in terms of hemispheric energy independence, then we negate a lot of the geopolitical concerns that are happening in other parts of the world.

So I look forward to today's hearing as we delve into this and I now turn to Ranking Member Sires for his opening statement.

Mr. SIRES. Thank you, Mr. Chairman, and thank you to our witnesses for being here this afternoon.

Today's hearing looks at both the opportunities and challenges enhancing our energy cooperation within the Western Hemisphere.

I believe integrating our energy interests in the region have been ignored for far too long. That is why I am encouraged to see the administration's recent efforts to deepen energy cooperation within the hemisphere.

The administration hosted the White House Caribbean Energy Security Summit in January and launched the Caribbean Energy Security Initiative to facilitate an energy transition for the islands that have been far too dependent on Venezuela's shaky energy sector for their needs.

While we continue to focus energy policy on the Middle East, taking a look at our own back yard shows the opportunity that exists right next door.

We get about half of our oil and petroleum from the Western Hemisphere, half of which is from Canada. Canada is the single largest foreign supplier of petroleum and natural gas to the United States, and after Saudi Arabia, Mexico is the United States' third largest supplier of petroleum.

Venezuela is home to 88 percent of the region's proven oil reserves. In regards to nontraditional sources of energy, Brazil is the world's second larger producer of ethanol after the United States.

In countries like Venezuela, Bolivia, Ecuador and Argentina, the troubling trends of the nationalization of private industry has become the norm rather than the exception.

Moreover, the region's trade relationships and increasing presence of anti-democratic actors such as Russia, Iran and particularly China, whose self-interests are counter to the strategic concerns of the United States, should not be taken lightly.

In January, China pledged $250 billion in investments in Latin America over the next 10 years, seeking to boost their influence in the resource-rich region.

The United States cannot fall behind, as the Western Hemisphere plays a critical role in our energy security. Specifically, it is clear that maintaining and strengthening our energy relationship with Canada and Mexico is in the national interests of the United States.

That is why I believe the proposed Keystone XL Pipeline and the Transboundary Hydrocarbon Agreement with Mexico are in the national interests of the United States. I am sensitive to the environment and the concerns associated with the development of the Keystone Pipeline project.

But the conversation has stagnated. The concerned parties need to avoid further delays of a constructive dialogue and chart a path forward.

This is true especially in light of declining foreign oil supplies from Mexico and Venezuela. Our national security requires that energy policy be a central component of our foreign policy.

Furthermore, we should build upon and expand our energy diplomacy efforts and mitigate the Caribbean's dependence on subsidized Venezuela oil and support the economic growth of the region in ways that are both relevant and practical to the needs of everyday people.

No one single project or initiative is a cure-all for energy security needs, and no proposal will satisfy everyone's needs or alleviate every doubt. But we must continue to work with our neighbors to develop a beneficial energy policy for the region.

I look forward to the hearing—to hearing from our panelists on how we can address these critical issues.

Thank you.

Mr. DUNCAN. I thank the ranking member, and other members are reminded they can provide written testimony for the record. In the essence of time, we are going to move on to the witnesses. They are thinking about calling votes around 2:30, possibly 3 o'clock.

We may get through all that. Before I recognize each of you, I want to explain the lighting system, and I don't know where the lights are right near the——

Mr. SIRES. One minute, 2 minutes, 3 minutes.

Mr. DUNCAN. One minute. Yes, that is right. So 5, 1—5 minutes we are going to start, 1 minute it will give you a warning.

At the end of that 5 minutes I am going to need to cut you off. I will give a little leeway but and before I recognize the witnesses we have got their bios in the books. So I am not going to recognize each of you but I do want to recognize Dr. Knapp, who is from South Carolina.

He has testified on the Hill a couple times for me in this committee and in Natural Resources as well. At the University of South Carolina, he is a professor training the new minds on geophysical and seismic and all the things that we are going to need to take advantage of energy security in the future and I appreciate him being here.

So Dr. Knapp, I am going to go ahead and recognize you for 5 minutes.

STATEMENT OF JAMES H. KNAPP, PH.D., PROFESSOR, DEPARTMENT OF EARTH AND OCEAN SCIENCES, UNIVERSITY OF SOUTH CAROLINA

Mr. KNAPP. Good afternoon, Chairman Duncan, Ranking Member Sires and esteemed member of the House Foreign Affairs' Subcommittee on the Western Hemisphere.

It is my great pleasure and high honor to be here today and I thank each of you both for your continued dedicated service as Members of Congress and for the opportunity to appear before you today.

For the record, I am James H. Knapp, professor in the Department of Earth and Ocean Sciences in the School of the Earth, Ocean and Environment at the University of South Carolina, and I currently serve as chair of the faculty senate at the University of South Carolina, Columbia campus. I will be summarizing my written testimony in these opening comments.

I am also taking the liberty to introduce some graphics here which, hopefully, will supplement the comments I will make.

By way of background, I was born and raised in California and have lived in six and travelled to 49 states and through my profession as an earth scientist have worked in or visited more than 40 countries, many of those in the Western Hemisphere.

I hold a Bachelor of Science degree with distinction in geological sciences from Stanford University and a Ph.D. in geology from the Massachusetts Institute of Technology, and from 1988 to 1991 I worked with Shell Oil where I participated directly in oil and gas exploration in the Gulf of Mexico.

For more than 20 years since then, my research team and I have carried out both fundamental and applied research in earth sciences including the design, acquisition, processing and interpre-

tation of seismic surveys both onshore and offshore and many of my former students are now gainfully employed in the energy industry.

Access to energy is and will for future generations continue to be an essential foundation upon which modern society operates.

On a personal level, one need only experience a prolonged power outage to be poignantly reminded of the ways in which we on a daily basis depend on energy to illuminate, heat and cool our homes and businesses, preserve and prepare our food, and of critical importance in this digital age, power our numerous IT devices.

As many have come to appreciate in recent years, we simply cannot turn off the power switch overnight regardless of the perceived societal imperatives.

Safe, efficient and environmentally responsible development of energy resources is critical for the long-term energy security of this country and the Western Hemisphere.

In all of the above energy strategy, which includes continued exploration for and development of conventional and unconventional hydrocarbon resources, as we develop economically viable technologies for alternative and renewable energy resources is clearly the best path forward. Much of the future promise of renewable and alternative energy sources awaits the capacity for efficient storage through research and development.

The title of this hearing is most appropriate. As many will know, for the better part of the last decade we have witnessed a global energy revolution led by the United States, which few if any could have predicted.

Harnessing the oil and gas potential of shale reservoirs through American technological innovation has practically doubled the estimated volume of undiscovered technically recoverable oil resources in the United States.

The most recent estimates from the energy information administration for proven crude oil reserves in the Western Hemisphere amount to approximately 550 billion barrels of oil equivalent with well more than half of those in Venezuela.

The countries of the Western Hemisphere combined represent approximately one-third of the proven global reserves. Clearly, the major players in terms of conventional production have been and will continue to be the United States and Canada with growing contributions from Brazil, Mexico and Argentina.

As seen in the figure on the screen, shale oil and shale gas potential is abundant throughout the Western Hemisphere from the North Slope of Alaska to the tip of Tierra del Fuego, and the offshore potential of such unconventional resources is yet to be evaluated in any significant way. Note that these are all onshore shale gas and shale oil plays.

The presence of this resource potential represents an opportunity to engage our hemispheric neighbors through both the public and the private sector.

Methane hydrates, or deposits of natural gas frozen into sedimentary deposits, represent a significant future resource potential.

Recent estimates from the Bureau of Ocean Energy Management suggest that more than 20,000 trillion cubic feet of gas, or as much as 35 times the inventory of conventional gas resources on the en-

tire U.S. outer continental shelf, are present on the Atlantic margin alone, as shown in this figure.

A similar reserve potential has been estimated for the U.S. waters of the Gulf of Mexico. We need look no further than the Atlantic shelf of the U.S. for other energy opportunities.

The Bureau of Energy—Ocean Energy Management is charged with periodic evaluation of the energy and mineral resource potential of the outer continental shelf.

Their most recent estimate in 2011 of undiscovered technically recoverable resources for the Atlantic OCS was 8.87 billion barrels of oil equivalent revised only a year ago up to 11.4 billion barrels of oil equivalent without any new data.

This is simply reevaluation of the existing data. Too often such reserve estimates are dismissed as unworthy of the investment required to produce them or the anticipated environmental disruption involved.

However, such volumes represent as much as a tenth of the combined estimated petroleum resource base of the United States.

In addition, as much as 80 percent of the Atlantic OCS territory currently under consideration in the draft proposed plan of the Bureau of Ocean Energy Management has never been evaluated with commercial seismic surveys. Only the shelf portions of the area under consideration have ever been surveyed.

So if we compare this with the entire remainder of the Atlantic Basin, essentially the entire Atlantic Basin is currently under exploration for oil and gas in offshore areas with the conspicuous exception of the Atlantic Margin and the eastern Gulf of Mexico of the United States.

In conclusion, I believe the U.S. can and must play a leading role in promoting energy security for our own citizens and for the hemisphere at large. In most cases, the biggest opportunities appear to be here close to home.

New opportunities exist to bring U.S. deepwater technology and experience to Mexico and the Gulf of Mexico. Additional steps should be taken to deepen our engagement with Canada by completing the Keystone XL Pipeline, bringing crude petroleum to excess refining capacity in the Gulf Coast region and removing the ban on crude oil exports from the U.S. helping to bring reliable energy to our neighbors from a stable economic and political base.

I yield the rest of my time. Thank you.

[The prepared statement of Mr. Knapp follows:]

Testimony of

James H. Knapp, Ph.D.

DEPARTMENT OF EARTH AND OCEAN SCIENCES
in the
SCHOOL OF THE EARTH, OCEAN, AND ENVIRONMENT
at the
UNIVERSITY OF SOUTH CAROLINA

before
THE SUBCOMMITTEE ON THE WESTERN HEMISPHERE
of the
HOUSE FOREIGN AFFAIRS COMMITTEE

on
"ENERGY REVOLUTION IN THE WESTERN HEMISPHERE:
OPPORTUNITIES AND CHALLENGES FOR THE U.S."

14 MAY 2015

Introduction

Good afternoon, Chairman Duncan, Ranking Member Sires, and esteemed members of the House Foreign Affairs Subcommittee on the Western Hemisphere. It is my great pleasure and high honor to be here today, and I thank each of you, both for your continued dedicated service to our country as members of Congress, as well as this opportunity to appear before you. For the record, I am James H. Knapp, Professor in the Department of Earth and Ocean Sciences in the School of the Earth, Ocean, and Environment at the University of South Carolina, and I currently serve as Chair of the Faculty Senate at the University of South Carolina Columbia campus. I will be summarizing my written testimony in these opening comments.

Educational and Professional Background

By way of background, I was born and raised in California, have lived in six and traveled to 49 states, and through my profession as an Earth scientist, have worked in or visited more than 40 countries. I hold a Bachelor of Science degree with distinction in geological sciences from Stanford University, and a Ph.D. in geology from the Massachusetts Institute of Technology. From 1988 to 1991 I worked with Shell Oil, where I participated directly in oil and gas exploration in the Gulf of Mexico. For more than twenty years since then, my research team and I have carried out both fundamental and applied research in the Earth sciences, including the design, acquisition, processing, and interpretation of seismic surveys, both onshore and offshore, and many of my former students are now gainfully employed in the energy industry.

Access to energy is, and will for future generations continue to be, an essential foundation upon which modern society operates. On a personal level, one need only experience a prolonged power outage to be poignantly reminded of the ways in which we, on a daily basis, depend on energy to illuminate, heat, and cool our homes and businesses, preserve and prepare our food, and of critical importance in this digital age, power our numerous IT devices. As many have come to appreciate in recent years, we simply cannot turn off the power switch overnight, regardless of the perceived societal imperatives. Safe, efficient, and environmentally responsible development of energy resources is critical for the long-term energy security of this country and the Western Hemisphere. An all-of-the-above energy strategy, which includes continued exploration for and development of conventional and unconventional hydrocarbon resources as we develop economically viable technologies for alternative and renewable energy resources, is clearly the best path forward. Much of the future promise of renewable and alternative energy sources awaits the capacity for efficient storage through research and development.

Western Hemisphere Energy Overview

The title of this hearing is most appropriate; for the better part of the last decade, we have witnessed a global energy revolution, led by the United States, which few, if any could have predicted. Harnessing the oil and gas potential of shale reservoirs

through American technological innovation has practically doubled the estimated volume of undiscovered technically recoverable oil resources in the United States.

The most recent estimates from the Energy Information Administration for proven crude oil reserves in the Western Hemisphere amount to approximately 550 BBOE, with well more than half of those in Venezuela, a member of the Organization of the Petroleum Exporting Countries (Figure 2.) The countries of the western hemisphere combined represent approximately one third of the proven global reserves. Clearly, the major players in terms of conventional production have been and will continue to be the United States and Canada, with growing contributions from Brazil, Mexico, and Argentina.

Shale oil and shale gas potential is abundant throughout the Western Hemisphere, from the North Slope of Alaska to the tip of Tierra del Fuego (Figure 3), and the offshore potential of such unconventional resources has yet to be evaluated in any significant way. The presence of this resource potential represents an opportunity to engage our hemispheric neighbors through both the public and private sector.

Methane hydrates, or deposits of natural gas frozen into sedimentary deposits, represent a significant future resource potential. Recent estimates from the Bureau of Ocean Energy Management suggest that more than 20,000 TCF, or as much as 35 times the inventory of conventional gas resources on the entire U.S. Outer Continental Shelf are present on the Atlantic margin alone (Figure 4.) Similar reserve potential has been estimated for the U.S. waters of the Gulf of Mexico.

We need look no further than the Atlantic continental shelf of the U.S. The Bureau of Ocean Energy Management is charged with periodic evaluation of the energy and mineral resource potential of the Outer Continental Shelf. Their most recent (2001) estimate of undiscovered technically recoverable resources for the Atlantic OCS was 8.87 Bboe, revised a year ago to 11.4 Bboe. Too often such reserves are dismissed as unworthy of the investment required to produce them, or the anticipated environmental disruption involved, however, such volumes represent as much as a tenth of the combined estimated petroleum resource base of the United States. As much as 80% of the Atlantic OCS territory currently under consideration for exploration leasing by the BOEM has never been evaluated with commercial seismic surveys (Figure 5), yet the entire remainder of the Atlantic Basin is currently exploration (Figure 6.)

Conclusion

In conclusion, I believe the U.S. can and must play a leading role in promoting energy security for our own citizens and for the hemisphere at large. In most cases, the biggest opportunities appear to be here close to home. New opportunities exist to bring U.S. deepwater technology and experience to Mexico in Gulf of Mexico. Additional steps should be taken to (1) deepen our engagement with Canada by completing the Keystone-XL pipeline, bringing crude petroleum to excess refining capacity in the Gulf Coast region, and (2) remove the ban on crude oil exports from the U.S., helping to bring reliable energy to our neighbors from a stable economic and political base.

Figures

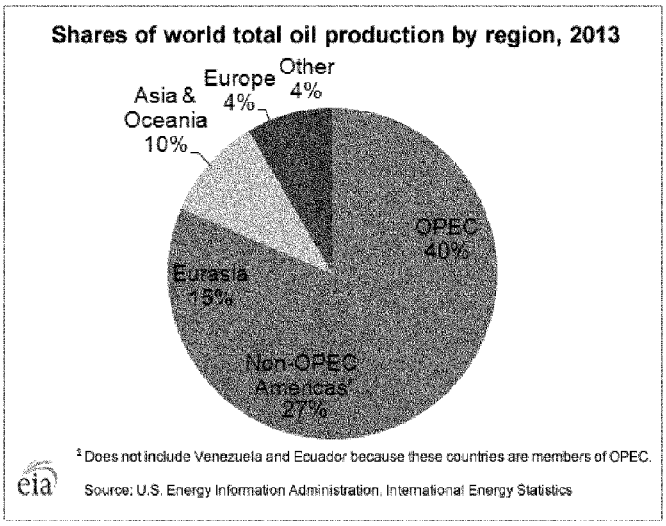


Figure 1. Global oil production by region (U.S. Energy Information Administration, 2013.)

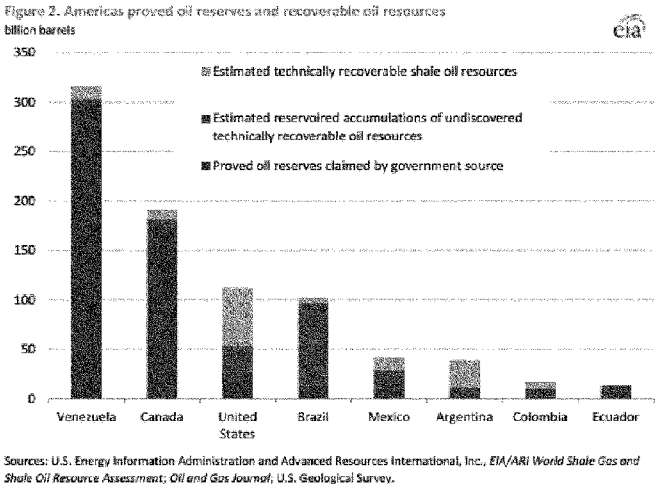
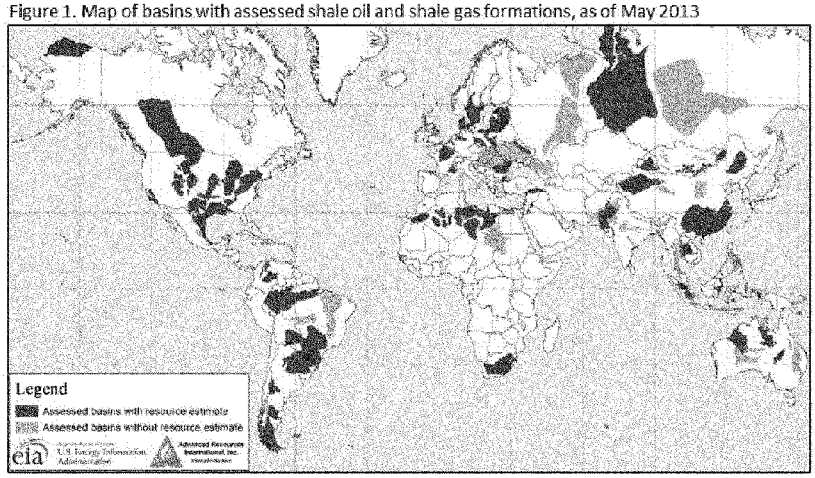


Figure 2. Summary of proven, and estimated technically recoverable resources for the top eight petroleum-endowed countries in the Western Hemisphere.

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013



Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

Figure 3. Global map of onshore shale oil and shale gas potential (2013).

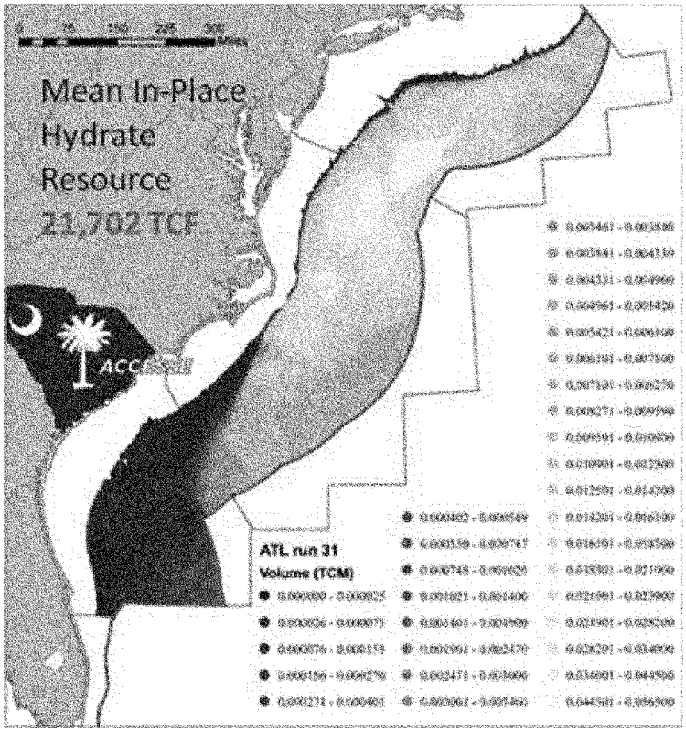


Figure 4. BOEM estimate of methane hydrate resources on the Atlantic margin (2013).

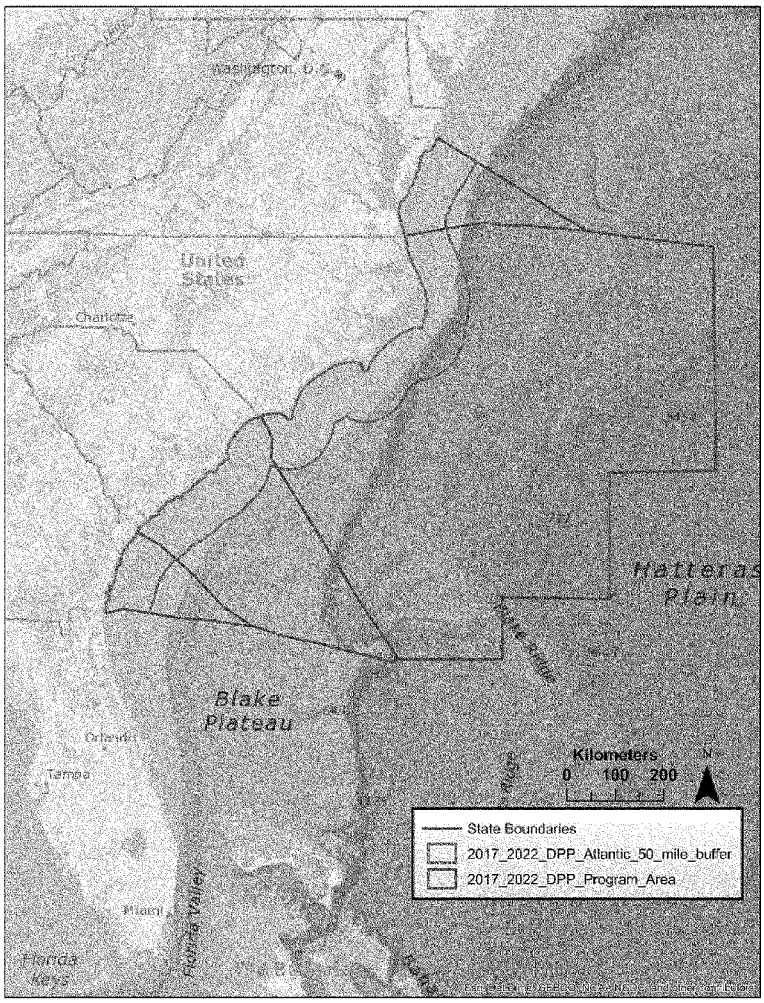


Figure 5. Area within Mid- and South Atlantic OCS Planning Areas currently included in the BOEM Draft Proposed Plan for 2017-2022. Red boundary represents 50 mile buffer zone from state waters. Fully 80% of area under consideration for exploration leases has never been the subject of commercial seismic surveys.

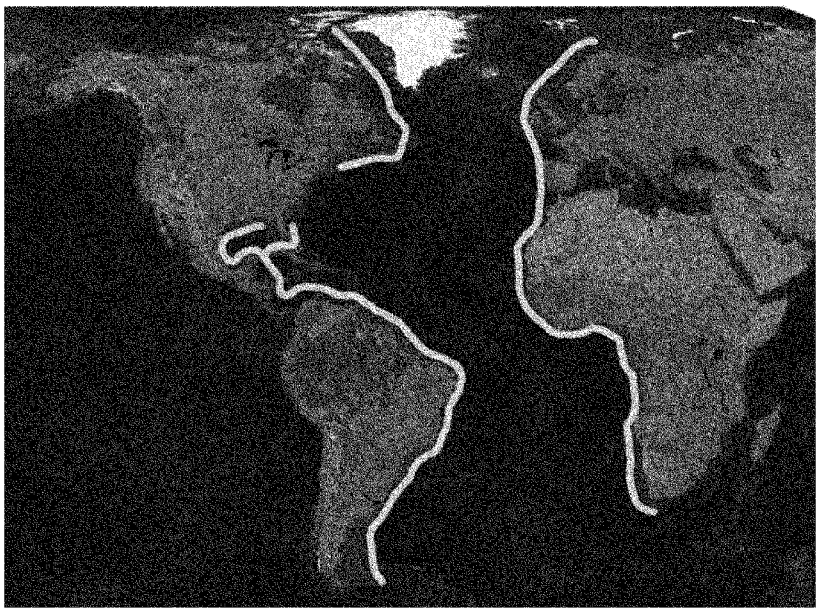


Figure 6. Map showing current offshore exploration efforts in the Atlantic Basin. Conspicuously absent are the Atlantic continental margin and Eastern Gulf of Mexico of the United States. (Courtesy of G. Steffens, Shell Oil Co.)

Mr. DUNCAN. Dr. Knapp, thank you, and I felt like I was in a classroom there with a slide presentation. But very informative.

Mr. Book.

STATEMENT OF MR. KEVIN BOOK, MANAGING DIRECTOR, CLEARVIEW ENERGY PARTNERS

Mr. BOOK. Thank you, Chairman Duncan, Ranking Member Sires and distinguished members of this committee.

Good afternoon, and I appreciate the invitation to participate in this important discussion about energy revolutions in the Western Hemisphere.

My name is Kevin Book. I head the research team at Clearview Energy Partners, LLC, a Washington, DC-based independent research firm. We serve financial investors and corporate strategists, and we look at macro energy trends.

Here is a trend. It is hard to miss the dramatic shift in U.S. energy security during the last decade. In May 2005, net petroleum imports accounted for 59 percent of our consumption, according to EIA data.

This fact linked our economic fate to the sometimes unstable political circumstances of foreign producers and the insatiable energy appetites of emerging economies. As of February 2015, the most recent month for which robust EIA data are available, net imports represented only about 26 percent of our petroleum consumption.

Much of this can be explained by the incremental production from shale and other type formations. We also reduced petroleum consumption by about 1.7 million barrels per day, or 8.1 percent.

According to International Energy Agency data, Canadian crude oil and natural gas liquids production grew by 47 percent between the first quarter of 2005 and the first quarter of 2015, which was from about 3 million barrels per day to 4.3 million barrels per day.

Last June, the Canadian Association of Petroleum Producers projected that production will rise to 6.4 million barrels per day by 2030. Although to be fair, that forecast preceded the recent price collapse.

In Mexico, where the last decade brought a bruising 29 percent production decline, constitutional reforms have ended the state oil company's 75-year monopoly. Pemex will retain 83 percent of Mexico's probable and possible reserves and 21 percent of prospective reserves.

But Mexico opened its first round of bidding for the remainder in December 2014. This week, bidding opened for the third of five first round tenders and the first onshore offering.

Brazil opened its oil and gas sector to foreign competition in 1997. In October 2006, a joint venture between Petrobras and private operators discovered Tupi, which is now called Lula, the first of Brazil's many promising pre-salt offshore finds.

In June 2010, Brazil amended its regulatory framework. The new regime gives state entities substantially greater control over the pre-salt fields. The first competitive auction in October 2013 attracted only one bid.

It remains to be seen whether, and to what extent, Brazil's tighter grip on the pre-salt might deter further foreign investment.

As the U.S. transitions out of an era of energy scarcity into an age of adequacy and, hopefully, abundance, we are likely to encounter new opportunities to contribute to the energy security of our regional neighbors.

For example, financial pressures forced Venezuela to pare back subsidized crude oil and products exports to Petrocaribe signatories.

The U.S. became a net petroleum products exporter in July 2011, which is if you look backwards 12 months an average as analysts are prone to do. Since then, average products exports to Petrocaribe member countries rose about 14 percent from 194,000 barrels per day in July 2011 to 221,000 barrels per day in February 2015.

U.S. exporters aren't likely to offer the same financing terms that Venezuela does. But U.S.-refined products can provide Caribbean importers with volumes to cover supply shortfalls.

Two U.S. policy changes—liberalizing crude oil exports and approving the Keystone XL Pipeline and any other southbound conduit out of the oil sands could contribute so similar cover for Petrocaribe's crude importers. U.S. natural gas provides another opportunity.

EIA's reference case for natural gas in this year's annual energy outlook projects net exports of a little less than half of 1 billion cubic feet per day in 2017, rising to almost 6 billion cubic feet per day by 2040.

Pipeline exports to Mexico appear likely to continue growing and LNG exports from the lower 48 have potential to enhance energy security throughout the Western Hemisphere. Liquefied gas has to be regasified to be used and the high total costs of onshore facilities may be out of reach for many nations, especially in the Caribbean.

Floating storage and regasification units provide a possible alternative at lower capital cost and with faster construction times, albeit with higher operating costs.

Completion of an offshore facility in Colombia will bring Latin American floating regas capacity to more than 2.8 BCF a day, most of it in Brazil.

Finally, Latin American electrification provides another opportunity. The IEA estimated that approximately 23 million people in Latin America lacked access to electricity in 2012.

My written testimony suggests that countries that cannot harness endogenous hydroelectric resources may short of fossil fuel baseload generation. Many of these countries do not rely primarily on natural gas generation.

With outside financing including facilities outlined in a bill that was passed by the House last year—the Electrify Africa Act of 2014—a number of them could theoretically operate new gas-fired turbines fueled by water-borne LNG imports.

The data on Latin America point to energy transportation challenges, in addition to generation capacity deficits. Simply put, the region needs pipelines and transmission lines, too.

That said, Latin America gets plenty of sunlight, creating an opportunity for distributive solar photovoltaic generation to supplement regions where economic development, population density, and/or topography might make the build-out of pipes and wires impractical or unfeasible.

Mr. Chairman, this concludes my prepared testimony. I will look forward to responding to any questions you might have at the appropriate time.

[The prepared statement of Mr. Book follows:]

Testimony of Kevin Book
Managing Director, Research
ClearView Energy Partners, LLC

Before the

House Committee on Foreign Affairs,
Subcommittee on the Western Hemisphere

May 14, 2015

Chairman Duncan, Ranking Member Sires and distinguished Members of this Committee, good afternoon and thank you for inviting me to contribute to your discussion of energy revolutions in the Western Hemisphere. My name is Kevin Book and I head the research team at Washington, D.C.-based ClearView Energy Partners, LLC, an independent firm that examines macro energy trends for institutional investors and corporate strategists.

It is hard to miss the dramatic shift in U.S. energy security during the last decade. Ten years ago, our nation was the world's largest net importer of oil and petroleum products. In May 2005, net petroleum imports accounted for 59% of our consumption on a trailing, twelve-month (TTM) average basis, according to data from the Energy Information Administration (EIA). This fact linked our economic fate to the sometimes unstable political circumstances of foreign producers and the insatiable energy appetites of emerging economies.

As of February 2015, the most recent month for which robust EIA data are available, net imports represented only 25.8% of our petroleum consumption on a TTM average basis. Much of this can be explained by the incremental production from shale and other tight formations that transformed the U.S. into the world's most prolific oil and gas producer. Not to be overlooked, we also reduced our petroleum consumption by 1.69 MM bbl/d, or 8.1%, between May 2005 and February 2015. China is now the world's largest net petroleum importer in our place (and, based on preliminary April 2015 data, the largest gross importer, too).

The U.S. wasn't the only energy story in the Western Hemisphere, however. According to International Energy Agency (IEA) data, Canadian crude oil and natural gas liquids (NGL) production grew by 47% between 1Q2005 and 1Q2015, from 2.95 MM bbl/d to 4.34 MM bbl/d. Most of that volume added to global supply. Data from Canada's National Energy Board (NEB) show that Canada exported an incremental 1 MM bbl/d between 4Q2009 and 4Q2014, with roughly 55% of that volume comprised of syncrude and blended bitumen. Last June, the Canadian Association of Petroleum Producers (CAPP) projected that production will rise to 6.4 MM bbl/d by 2030, although that forecast preceded the recent price collapse.

Mexico, meanwhile, weathered a bruising 29% production decline over the same ten-year interval. According to IEA data, Mexico's crude output fell from 3.75 MM bbl/d in 1Q2005 to 2.66 MM bbl/d in 1Q2015. In August 2013, to reverse this trend, Mexican President Enrique Peña Nieto proposed constitutional reforms that would end Petroleos Mexicanos' (Pemex) 75-year monopoly. Breaking a string of failed attempts by predecessors, Peña Nieto signed the reforms into law in December of that year. In August 2014, the Mexican Congress enacted secondary (enabling) legislation imposing a 25% local content requirement, and the government allowed Pemex to retain 83% of Mexico's probable and possible reserves and 21% of prospective reserves. In December 2014, Mexico announced bidding terms for its first round. This week, bidding opened for the third of five first-round tenders.

Brazil opened its oil and gas sector to foreign competition in 1997. That reform made possible the joint venture between state-run Petróleo Brasileiro (Petrobras) and private operators that discovered the massive Tupi deepwater field in October 2006. Tupi (now called "Lula") was the first of Brazil's many promising "pre-salt" offshore finds over the course of the last decade. In June 2010, however, then-President Luiz

Inacio Lula da Silva amended Brazil's concession-based regulatory framework. The new regime gives Petrobras and "Petrosal" – a new state administrator of production sharing agreements (PSAs) – substantially greater control over "strategic" resources, including pre-salt fields. An October 2013 competitive round for the Libra field attracted only one bid from a Petrobras-led consortium (the minority partners were two international supermajors and two Chinese national oil companies). It remains to be seen whether, and to what extent, Brazil's tighter grip on the pre-salt might further deter foreign investment, potentially compounding the challenges posed by the ongoing Petrobras corruption scandal.

As the U.S. transitions out of an era of energy scarcity into an age of adequacy – and, potentially, abundance – we are likely to encounter new opportunities to contribute to the energy security of our regional neighbors. For example, financial pressures have reportedly forced Venezuela to pare back its subsidized and payment-deferred crude oil and products exports to signatories of the Petrocaribe agreement forged in 2005 by the late Venezuelan President Hugo Chávez. Including Cuba, which receives in-kind crude and products from Venezuela under a separate agreement, Petrocaribe members imported approximately 212 kbbl/d of Venezuelan petroleum in 2012, corresponding to approximately 34% of their gross petroleum imports (see Figure 1). Venezuelan deliveries accounted for an even larger fraction – about 84% - of the gross crude imports received in 2012 by the five Petrocaribe members with refineries (Cuba, Dominican Republic, Jamaica, Nicaragua and Suriname).

Figure 1 – Petrocaribe Member Countries' Refining Capacity, Allotments and Total Crude/Products Exports

Member Country	Number of Refineries (2015)	Refinery Capacity (2015)	Gross Imports of Crude (2012), kbbl/d	Gross Imports of Products (2012), kbbl/d	Consumption (2012), kbbl/d	Petrocaribe Allotment (2012), kbbl/d	Total Petrocaribe Crude (2012), kbbl/d	Total Petrocaribe Products (2012), kbbl/d
Antigua and Barbuda	n/a	0.0	0.0	5.1	4.9	4.4		
Bahamas	n/a	0.0	0.0	64.4	22.8			
Belize	n/a	0.0	0.0	3.5	3.5	4.0		
Cuba *	4	121.4	120.1	24.6	170.1		85.0	6.0
Dominica	n/a	0.0	0.0	0.9	0.9	1.0		
Dominican Republic	2	50.0	26.1	90.0	115.6	30.0		
Granada	n/a	0.0	0.0	2.0	2.0	1.0		
Guatemala	n/a	0.0	0.0	72.2	70.2	20.0		
Guyana	n/a	0.0	0.0	10.8	10.8	5.2		
Haiti	n/a	0.0	0.0	14.7	14.7	10.0		
Honduras	n/a	0.0	0.0	62.8	51.2	20.0		
Jamaica	1	36.0	24.2	32.1	51.7	23.5		
Nevis and St. Kitts	n/a	0.0	0.0	1.7	1.7	1.2		
Nicaragua	1	20.0	18.7	19.8	30.2	27.0		
St. Lucia	n/a	0.0	0.0	3.0	3.0			
St. Vincent and Grenadines	n/a	0.0	0.0	1.5	1.5	2.4		
Suriname	1	7.0	0.0	10.1	17.2	10.0		
Total Petrocaribe		**414.4**	**197.4**	**420.1**	**572.1**	**162.3**	**80.3**	**40.7**
Petrocaribe + Cuba							**165.3**	**46.7**

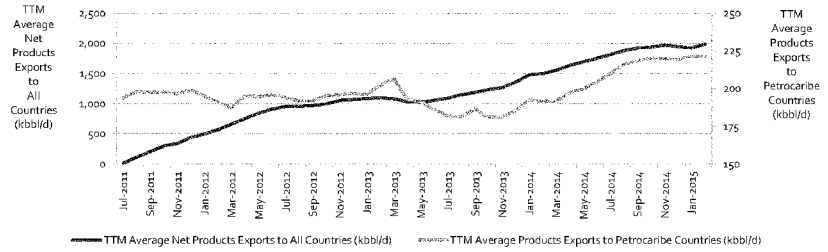
* Although it is a Petrocaribe member, Cuba receives in-kind crude and products under a separate agreement with Venezuela.

Sources
1 Oil and Gas Journal, *World's Refineries – Capacities as of January 1, 2015*, published December 1, 2014
2 Energy Information Administration, *International Energy Statistics*
3 Petrocaribe.org
4 Atlantic Council, *Uncertain Energy: the Caribbean's Gamble with Venezuela*, using data prepared by Jorge Piñon at U.T. Austin; individual country-level data regarding crude and products imports are not available.

Source: ClearView Energy Partners, LLC using sources noted above, accessed May 11, 2015

According to EIA data, the U.S. became a net petroleum products exporter in July 2011 (on a TTM basis; the first month of net exports in recent memory arrived in November 2010). As of February 2015, TTM average net products exports to all countries were nearly 2 MM bbl/d. During the same interval, TTM average products exports to Petrocaribe member countries rose about 14%, from 194 kbbl/d in July 2011 to 221 kbbl/d in February 2015 (Figure 2).

Figure 2 – U.S. Net Products Exports and Exports to Petrocaribe Countries, July 2011 – February 2015 (TTM Average kbbl/d)



Source: ClearView Energy Partners, LLC using EIA data, accessed May 21, 2015

U.S. exporters aren't likely to offer the same financing terms that Venezuela does, but U.S. refined products can provide Caribbean importers with volumes to cover supply shortfalls. In that vein, two U.S. policy changes – liberalizing crude oil exports and approving the Keystone XL pipeline (or another southbound conduit out of the oil sands) – could contribute to similar cover to Petrocaribe's crude importers.

The reference case in EIA's *2015 Annual Energy Outlook* (AEO) projects that the U.S. will remain a net petroleum importer through 2040, although the agency estimates that net imports will decline to 17% of consumption. EIA sees a different story for natural gas. The AEO reference case projects net natural gas exports of 0.46 Bcf/d in 2017, rising to almost 6 Bcf/d by 2040. With high oil prices, there may be even more to export; more than 50% of U.S. natural gas production is either directly associated with oil production or comes from unconventional wells where it may be produced along with higher-value liquids that price in line with crude. Pipeline exports to Mexico appear likely to continue growing, particularly in the even that low prices deter near-term shale development south of the border. Moreover, liquefied natural gas (LNG) exports from the Lower-48 have potential to enhance energy security throughout the Western Hemisphere.

The first new U.S. LNG facility is scheduled to come onstream as soon as 4Q2015. Ongoing construction and final investment decisions taken to date suggest that more than 6.6 Bcf/d of Lower-48 LNG nameplate capacity could be in service by the end of 2018. The Federal Energy Regulatory Commission (FERC) has finalized or scheduled environmental reviews for 11 facilities that have applied to the Department of Energy (DOE) for a total of 15.1 Bcf/d of non-FTA exports (exports to countries without free trade agreements with the U.S.). Current market conditions could complicate plant financing or cause project deferrals, but the midpoint of that range (about 10.9 Bcf/d) could represent a rational capacity expectation for the intermediate term.

The International Gas Union's (IGU) *2014 World LNG Report* estimated that capital costs for large-scale, onshore LNG import facilities averaged $192 per metric ton of import capacity in 2013 and could be as high as $274 per metric ton in 2016. For a 1 Bcf/d regasification facility, those figures would correspond to capital costs of between $1.44 B and $2.05 B, or amortized fixed costs of between $0.40 and $0.57 per Mcf (assuming a 50:50 debt-equity split, 6% cost of debt, 10% cost of equity, 42-month construction period, 85% capacity factor and 20-year financing).

The high total costs of onshore facilities may be out of reach for many Caribbean nations, but floating storage and regasification units (FSRUs) provide a possible alternative. The IGU estimated 2013 capital costs for FSRUs to be $145 per metric ton, or $0.27 per Mcf using the foregoing assumptions and an 18-month (rather than 42-month) construction time. Faster construction and lower overall costs come with a flip side, however: higher operating expenditures associated with diseconomies of scale (to say nothing of manning and managing a ship). With the expected 2Q2015

completion of a 0.067 Bcf/d FSRU in Colombia, Latin American floating regas capacity will total more than 2.8 Bcf/d, the vast majority of it in Brazil.

Reliable, affordable electricity facilitates development for all economic sectors and social strata. The IEA's *2014 World Energy Outlook* estimated that approximately 23 million people in Latin America lacked access to electricity in 2012 (see Figure 3). The fuel mix doesn't tell the whole story, but it does suggest that countries that cannot harness endogenous hydroelectric resources may be short of fossil-fueled baseload generation. Cross-referencing IEA data with EIA and World Bank generation mix statistics reveals a weak (0.33), positive correlation between electrification and hydroelectric share and an equally weak (-0.32), negative correlation between electrification and fossil energy share. Likewise, the relatively low electrification rates for natural gas exporters such as 62.5% gas-fired Bolivia (88.3%) and 33.7% gas-fired Peru (91.1%) point to energy transportation challenges in addition to generation capacity deficits. Simply put, the region needs pipelines and transmission lines, too.

Most of the countries listed in Figure 3 do not rely primarily on gas for power generation. With outside financing – including facilities outlined in the *Electrify Africa Act of 2014* (H.R. 2548) – a number of them could theoretically operate new gas-fired turbines using waterborne LNG imports. In addition, Latin America gets plenty of sunlight, creating an opportunity for distributed solar photovoltaic (PV) generation to supplement regions where economic development, population density and/or topography might make the build-out of pipes and wires impracticable or unfeasible.

Figure 3 – 23 MM People in Latin America without Access to Electricity in 2012

			Power Generation Share, Mix of Fuels						Net National Gas Imports as % of Cons. (2012)	Insolation of Largest City (kWh/m²)
Country	Population without Electricity (2012), MM[1]	National Electrification Rate (2012), %[2]	% Fossil (2012)[2]	% Hydro (2012)[2]	% Wind (2012)[2]	% Solar, Tidal or Wave (2012)[2]	% Biomass or Waste (2012)[2]	% Natural Gas (2012)[2]		
Argentina	1.5	96.4%	70.8%	22.7%	0.3%	0.01%	1.9%	51.4%	19.0%	4.42
Bolivia	1.2	88.3%	65.1%	32.7%	0.0%	0.04%	3.2%	62.5%	exporter	4.65
Brazil	1.0	99.5%	13.2%	76.5%	0.9%	0.00%	6.6%	4.7%	44.1%	4.55
Colombia	1.4	97.1%	17.6%	81.5%	0.1%	0.00%	0.9%	33.4%	exporter	4.61
Costa Rica	0.0	99.4%	7.8%	71.2%	5.3%	0.02%	1.8%	0.0%	n/a	4.18
Cuba	0.2	97.8%	96.0%	0.6%	0.1%	0.03%	3.2%	12.8%	0.0%	5.76
Dom. Republic	0.4	96.2%	86.2%	12.8%	0.7%	0.00%	0.2%	25.1%	100.0%	4.92
Ecuador	0.9	94.1%	43.6%	56.8%	0.0%	0.00%	1.3%	9.5%	0.0%	4.20
El Salvador	0.5	92.5%	39.3%	29.8%	0.0%	0.00%	6.1%	0.0%	n/a	5.16
Guatemala	2.2	85.7%	31.9%	48.1%	0.0%	0.00%	17.3%	0.0%	n/a	4.89
Haiti	7.3	28.0%	85.5%	14.5%	0.0%	0.00%	0.0%	0.0%	n/a	5.30
Honduras	1.1	86.1%	54.9%	37.7%	4.6%	0.00%	2.7%	0.0%	n/a	4.95
Jamaica	0.2	93.0%	90.7%	3.7%	2.6%	0.00%	2.9%	0.0%	n/a	5.70
Nicaragua	1.6	73.7%	58.9%	9.9%	7.9%	0.00%	10.9%	0.0%	n/a	5.20
Panama	0.4	88.8%	35.9%	63.8%	0.0%	0.00%	0.3%	0.0%	n/a	4.84
Paraguay	0.1	99.1%	0.0%	100.0%	0.1%	0.00%	0.0%	0.0%	n/a	4.82
Peru	2.7	91.1%	42.4%	55.9%	0.0%	0.05%	1.7%	35.7%	exporter	5.11
Trinidad/Tobago	0.0	96.6%	99.8%	0.0%	0.0%	0.00%	0.2%	99.7%	exporter	6.08
Uruguay	0.0	99.1%	37.0%	52.1%	1.1%	0.00%	9.8%	0.9%	100.0%	4.31
Venezuela	0.1	99.7%	34.0%	66.0%	0.0%	0.00%	0.0%	27.9%	7.6%	5.60
Other	0.2	91.2%								
Latin America	**23**	**95%**								

Sources
[1] International Energy Agency, *2014 World Energy Outlook*
[2] Energy Information Administration, *International Energy Statistics*
[3] World Bank, *World Development Indicators*
[4] Galsima.com, using data obtained from the NASA Langley Research Center Atmospheric Science Data Center; New et al. 2002

Source: ClearView Energy Partners, LLC using sources noted above, accessed May 11, 2015

Mr. Chairman, this concludes my prepared testimony. I will look forward to responding to any questions you might have at the appropriate time.

Mr. DUNCAN. Thank you, Mr. Book, and the Chair will recognize Mr. Webster for 5 minutes.

STATEMENT OF MR. JAMIE WEBSTER, SENIOR DIRECTOR, IHS ENERGY

Mr. WEBSTER. Thank you very much, Chairman Duncan, Ranking Member Sires and distinguished members of the committee.

I appreciate the opportunity to testify before you today on the immense changes in the energy market, its landscape, its impacts on the Western Hemisphere and the importance of crude exports in continuing this change.

I am Jamie Webster and I appear before you today in my capacity as senior director at IHS where I lead the company's oil markets practice.

In that role, I travel regularly, not just nationally in the United States but also internationally. I also attend the OPEC meetings and was at the OPEC meeting on Thanksgiving when OPEC took the historic role—the historic stance of deciding to stand down in the face of growing U.S. production. This provides me a unique view in terms of what is going on not just in energy today but where it may go in the future.

Today, I want to address a few issues. One, the recent changes that we have seen in the global oil market, North America's critical place in it and what it means for both energy security and energy independence.

I will address the crude export issue and market-related issues as they relate to Keystone XL, and given I am just returning from Mexico last night, a brief update on where I see the energy reforms there.

The catalyst for the oil price decline that began in June of last year was the restart of Libya production. But what really supported it underneath that was the huge growth that we saw in U.S. production from 5.6 million barrels a day to 9.2 million barrels a day here in the United States.

OPEC's decision on Thanksgiving was really about its recognition that it could not compete in terms of these volumes that were coming online incessantly, and its decision was really one to focus on volume since it could no longer focus on price.

This underscores a serious shift that you are seeing in the market that we have not seen since the beginning of the 1970s when we shifted from the power of the Texas Railroad Commission to OPEC.

The market balancer, as us market analysts call it, is that entity that is able to bring production on and offline relatively quickly to handle changes in demand.

The boom in U.S. production actually has the potential to, again, allow a shift in this market balancer, and it is not just about the volumes but it is about the character of those volumes and the scope of those volumes.

One, it is the time scale. U.S. production can come online in 4 months versus conventional production that can take years to be planned, financed, and allowed online. The other is the decline rates.

U.S. production brings oil out of the ground so quickly that it actually brings the decline rate down very, very fast, which essentially has the impact of being able to slow U.S. production by slowing down on investment.

This shift from OPEC to the potential for the first time, perhaps, to a market-driven oil-based economy by shale is far from certain and it is far from complete. One of the key policy changes that would actually help to continue this drive is actually allowing U.S. exports.

Energy flows out of the United States and the growth in U.S. production on oil has already shifted the world dramatically. Nigeria used to export 1.1 million barrels a day to the United States. It is now essentially zero and we are providing large portions of their refined products.

Additionally, Mexico is taking increasing amounts of natural gas from the United States in order to support its economy both on the industrial side and electric side.

LNG soon will be allowing our natural gas to reach parts around the world and we have also go an increased tie with Canada. While we are continue to receive increased volumes from Canada, we are now exporting about 490,000 barrels a day up to Canada. This is up from 30,000 barrels a day in 2010.

This tight interconnection between the countries extends from power lines to rail lines to pipelines. The Keystone Pipeline can help to economically move oil from Canada down to refiners that are ready to take it.

Our view is very much that this is a useful and helpful pipeline. While the slowdown in oil prices has impacted Canada, over the next several years it is going to be bringing on another 800,000 barrels a day of new production. The obvious home for this is in the United States Gulf system.

The decision on Keystone is really a decision between importing oil from our near neighbor, Canada—our largest trading—or Venezuela, whose hostility to the United States is manifest.

The competitive oils between these two countries has about the same carbon footprint. But that is about the only thing that is similar between Canada and Venezuela.

The U.S. liberal trade policy on natural gas, coal, refined products, and processed condensate also needs to extend to oil.

Eliminating this is even more important when prices are low, as producers are in a much more difficult position in order to continue this production going forward. Additionally, removing this ban would actually help to bring down gasoline prices in the United States because the gasoline price in the United States is largely set by the global marker Brent, and so by pushing more volumes into the global market we will actually bring prices down on—leaving everything equal.

This brings me to Mexico. This country is eager to extend its imports of U.S. natural gas to also include oil. While there have been discussions about being able to execute oil swaps with Mexico, in reality there are a number of commercial hurdles that must be surmounted in order for this to occur.

The easier thing would be to allow crude oil exports so that this can be done on a single transaction rather than having to get at

complex transactions to get around the current and outdated policy that currently exists.

Right now, Mexico, as Kevin mentioned, is undergoing a huge renaissance and a huge change in its energy reform, which is allowing a lot of opportunities for U.S. companies to participate, and I know they look forward to increased working with U.S. companies in the future.

Thank you very much for being here.

[The prepared statement of Mr. Webster follows:]

U.S. House of Representatives Subcommittee on the Western Hemisphere
Energy Revolution in the Western Hemisphere: Opportunities and Challenges for the U.S.
Testimony by:
Jamie Webster
Senior Director, IHS

May 14, 2015
Chairman Duncan, Ranking Member Sires, and members of the Committee, I appreciate the opportunity to testify before you on the immense changes in the energy market, its impacts on the Western Hemisphere, and the importance of crude exports in this change.

I appear before you in my capacity as Senior Director for IHS where I lead the company's short term crude oil markets team. In that role I travel regularly not only across the Western Hemisphere but also internationally, meeting global exporters and importers, plus participating in policy discussions in Washington, as well as OPEC meetings, provides me with a perspective on North America's changing role in energy and its global context. IHS is a global research and consultancy firm, with 9000 employees around the world, that specializes in energy, capital-intensive industries, data and analysis with a worldwide presence. My work through IHS has involved me in two landmark studies on crude oil exports.

Today I want to address the recent changes in the global oil market, North America's critical place in it, and what it means for energy security and energy independence. I will also address the importance of the crude export issue, the market issues related to Keystone XL, and given I am just returning from Mexico, a brief update on the ongoing energy reforms there.

The catalyst for the oil price decline that started last summer was the partial (and temporary) return of Libyan production. But it was the underlying growth in US oil production from 5.6 million barrels a day (MMb/d) in 2011 to the current 9.2 MMb/d that sustained this price drop. OPEC's decision last November 27 to not cut production in the face of growing volumes, not just from United States shale oil, but also the Gulf of Mexico as well as Canada further hastened the price decline. It seems unlikely that OPEC will reverse itself in its upcoming Ministerial meeting on June 5th. OPECs decision appears to have marked the beginnings of a serious shift in how supply and demand is balanced in the global market, potentially allowing the oil market to be a market-based system rather than relying on a balancer as has often been the case in the past. The purpose of the market balancer in concept is an entity that can quickly add and remove oil supply in order to balance it against changing demand.

The boom in US production has the potential to upend the need for a formal market balancer, leading to lower oil prices for consumers, while increasing energy security for not just the US but the world. This is possible not because of the large production volumes that US producers have brought to the market, but because of the character of those flows. Conventional production projects can take years to finance, plan and bring to the market. US shale producers can do it in 4 months. Globally, conventional production has a decline rate of 5-6%, meaning a project will be producing that much less each year. US shale production has an initial decline rate of about 50%. These two factors allow the US shale system to react quickly to market signals to bring more oil onto the market, and a lack of investment when prices turn downward can quickly reduce supply. This shift from OPEC to the market-driven forces of shale oil is far from certain and far from complete and it could be reversed.

One of the key policy changes needed to help support this shift is the liberalization of US oil exports. Energy flows into and out of the United States have already provided partial benefits to the region and the world. In July 2010, the United States imported 1.1 MMb/d of oil from Nigeria. Because of US supply, this has shrunk to nearly nothing, while at the same time we are providing a large share of their refined products (diesel, gasoline, etc) from the United States. In the same time frame, our liberal natural gas export policy has allowed us to further supply Mexico with fuel for industry and electricity, with volumes growing from 21.6 billion cubic feet a month to nearly 75 billion cubic feet a month. Soon the nation's burgeoning LNG infrastructure will allow this fuel to travel globally, providing an alternative source of supply and increasing regional and global energy security. Our energy ties with Canada have only deepened over this period. Although the majority of crude oil flows south, US has increasingly provided oil to Canada's central and eastern refiners, a trade that has grown from about 30 mb/d in 2010 to 491 mb/d earlier this year. Imports from Canada have also grown in recent years. Canada has been the single largest source of foreign imports to the United States just over a decade ago (2004). And as of September last year Canada overtook the combined imports from all of OPEC nations into the United States. And Canada supply is not anticipated to slow because of lower prices. We expect to see nearly 800 mb/d of new production by 2020 most of which could come to the United States through Keystone XL, one potential additional link in the tight interconnection between the countries, which extends from power lines to rail lines to pipelines. The Keystone XL pipeline can help economically move heavy oil to the Gulf Coast of the United States, home to the world's most sophisticated refining system, and an eager buyer of heavy oil. Given this is a natural buyer of this oil, we find that the vast majority of this oil will be refined in the United States, with at least 70% of the resulting refined produces being consumed in the United States, with the rest pushing into global markets, competing with now waning Venezuelan production[1]. The decision on Keystone is really a

[1] See: IHS 9 Mar 2015 report: "North America's Heavy Crude Future: Western Canadian access, the US refining system, and offshore supply"

decision between importing oil from our near neighbor Canada, our largest trading partner, or a Venezuela whose hostility to the United States is manifest. The competitive oils between the two countries have about the same carbon footprint.

The US has a liberal trade policy for natural gas, coal, refined products and processed condensate. It also allows oil exports to other countries in certain, very specific cases. Allowing US producers to seek out international markets for their product will allow them to receive global prices, keeping the "laboratory" of US shale technology and production fully open for business, while supporting job growth across many industries and in places far from the oil fields. It will also help to lower the price of Brent, much as the increase in production already has. Lowering the Brent price is the access point to lower US gasoline prices because U.S. gasoline prices are linked to the Brent world price, not the domestic WTI price.

Moreover, maintaining the ban increasingly undercuts U.S. credibility in its three-decades endeavor to persuade other nations to permit free flows of energy trade and not constrain trade in strategic commodities with political restrictions and resource nationalism. The United States, for instance, has launched numerous complaints under the WTO against China exactly because of these kinds of restrictions on natural resources that China imposes.
The IHS report, *Unleashing the Supply Chain,* [1] documents the benefits across the economy from 2016-2030:
$86 billion in additional GDP,
about 400,000 new jobs annually,
25% higher pay for workers in the energy industry supply chain – an additional $158 per household, and
$1.3 trillion in federal, state and municipal revenue from corporate and personal taxes.
The benefits accrue across most of the United States, not just oil producing states. States like Illinois, Washington State, Massachusetts, and Michigan – with little or no oil production -- also benefit substantially in terms of economic activity and jobs, owing to the interconnected nature of U.S. supply chains. The report affirms earlier research that eliminating the export ban would reduce gasoline prices by 8 cents per gallon.

Eliminating the crude oil ban proves even more important when oil prices are low. For example, if Brent crude (the international standard) trades in the range of $55/barrel and WTI trades in the United States at around $45/barrel, many companies will be on the margins of their new well investment breakeven point. In such a case, a small price change can have a major impact on supply because it can make or break the profitability of a significant share of tight oil producers. Crude oil production thus drops even more sharply when prices are low and producers must take further price cuts to sell to domestic refiners if they cannot export. A $3 per barrel change in a $50 per

barrel price environment can have the same effect as a $10 change in a $100 per barrel environment.

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

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

In this complex refining system, if the crude quality varies enough, the refineries cannot run optimally within their designed operating parameters. In the Gulf region, most refineries are configured to process heavy crude oil. When using light tight oil, Gulf refineries operate inefficiently.

Unfinished products are the result of this crude mismatch, which have a lower value because they require further processing to be upgraded into gasoline, jet and diesel fuels. In some cases the crude quality mismatch is large enough that a refinery will have to reduce the crude oil throughput to process additional volumes of light tight oil. As a result, there are limits to how much of the new, domestically produced light tight oil the refining system can efficiently and effectively process. To fully use light tight oil, many Gulf Coast refiners often require a price discount. Allowing crude oil exports would allow light tight oil (i.e., WTI) to sell at higher world prices. In *U.S. Crude Oil Export Decision,* IHS estimates that eliminating the WTI discount would incentivize nearly $750 billion more in investment from 2016 to 2030—and increase oil production by 1.2 million B/D.

This brings me to Mexico. The country is eager to extend its imports of US natural gas to include oil. For now, Mexican oil production is in decline and gaining access to US light tight oil will help boost those refineries supply options. Mexico could enter into a "swap" arrangement, providing some of its own heavier Maya oil in exchange for American light tight oil. However the constraints of the crude export policy as well as the commercial requirements to put in this specific swap are causing difficulties in effecting a trade that would benefit both countries. Liberalizing US oil exports would allow a more simple transaction, while retaining all the benefits. Mexico is working hard at its reforms, particularly as it relates to the upcoming bid rounds. The success of these reforms are very important to the United States, because they will make the Mexican economy stronger, which will bring many benefits to US-Mexican relations.

The Mexican prospects represent some of the last, attractive unexplored areas of the world and while the lower oil price does represent some near-term challenges, the government appears committed to delivering terms that will allow a successful bid round for all parties. While we are now contending with an over-supplied global oil market, additional volumes from countries like Mexico and Canada will continue to be important in the coming years particularly with supply from these nations potentially being heavier than US supply allowing it to be complementary to US production growth

I appreciate, Mr. Chairman, your leadership and that of this Committee to address these critical issues for US, regional and global energy security. Thank you for this opportunity to testify before your committee. I welcome the chance to respond to your questions.

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Mr. DUNCAN. I want to thank the gentleman. Great comments. We are going to come back to some of that.

Mr. Martin, whose parents are from South Carolina, a Citadel graduate, recognized for 5 minutes.

STATEMENT OF MR. JEREMY MARTIN, DIRECTOR, ENERGY PROGRAM, INSTITUTE OF THE AMERICAS

Mr. MARTIN. Oh, boy. Thank you, Mr. Chairman. Good afternoon.

Chairman Duncan, Ranking Member Sires, it is a delight and pleasure to be here. Flew in on a red-eye so I may be over-caffeinated, so bear with me if I blow through this too quickly.

Mr. SIRES. We want to thank you, all of you.

Mr. MARTIN. Thank you so much, Ranking Member.

Thank you all to the subcommittee. This hearing, obviously, all my colleagues here at the table have underscored how much the topic of energy is of relevance to the United States, but to our hemisphere.

And yes, my name is Jeremy Martin. I am the director of the energy program at the Institute of the Americas. We are based at the University of California San Diego out in La Jolla.

So second time I have been before this subcommittee, so it is a pleasure. I am going to summarize my written testimony and in doing so I would like to offer some insights on several of the most important energy-producing nations in the region, their production outlook, geopolitics and challenges and opportunities for the United States.

And in order to do so, I would like to discuss three main points. First, not all countries are the same, and it is important to distinguish between above ground and below ground issues.

Secondly, the lessons learned from the energy boom in the United States, particularly in terms of unconventionals, provide a major opportunity to export knowledge, technology goods, and services as well as energy to the region, as several of my colleagues have underscored.

Thirdly, Latin America offers important investment and energy diplomacy opportunities for the United States. So not all countries are the same.

In discussing major energy-producing nations in Latin America, a country's oil and gas potential, its resources in the ground, as Dr. Knapp put up on the screen, may be actually less important than what is occurring in Congress, the halls of government and in the geopolitics of the day, or, as I like to say, not all countries are the same.

From Canada to Argentina, as the chairman and ranking member underscored, our region has a formidable natural resource endowment.

But beyond the resource potential below ground, the above ground, or nontechnical risks such as political, financial, social, and environmental issues, are often just as critical to a project's success.

So how government, industry, NGOs, and communities engage and interact warrants increased attention by companies and policy makers alike. And, of course, as we have talked a little bit about already, volatility in international oil markets that we have seen

since last June and today's lower price environment demands even closer attention to these above ground ramifications.

So in a way of trying to talk about some of the above grounds, I wanted to talk about three countries in the region. I would like to start with Argentina.

And after a rocky decade for the Argentine economy and energy industry, the nation is now faced with the onerous task of restoring investor confidence damaged by years of political and institutional instability.

Many are hopeful, as the chairman mentioned, that the October Presidential elections will usher in a more business-friendly administration. The potential reversal of the nation's fortunes is rooted in its vast unconventional oil and gas potential.

Argentina holds the world's second largest shale gas resources and fourth largest shale oil. And Argentina, it should be noted, is one of just four nations to produce commercial quantities of shale oil or gas, along with U.S., Canada, and Mexico—excuse me, China.

I want to move on to Mexico. We have talked about Mexico. Mexico has entered a new energy era. In the years since the nation passed a constitutional amendment and major energy reform legislation, progress has been remarkable.

Round One, launched last December, is considered the first real opportunity in Mexico's new energy landscape. This year, the government will auction 169 blocks for exploration and production across a range of oil and gas prospects from mature fields to shale to deepwater.

The outcome of the Round One oil and gas auction as well as the creation of a wholesale electric market in Mexico by the end of this year will have a significant impact on determining the reform's durability and eventual success.

Venezuela, for my last country to talk about—Venezuela's woes are very, very well documented. We all have read the headlines and the stories. But, unfortunately, these woes have occurred during the largest oil-derived windfall in the history of the country.

Oil production has declined by more than 350,000 barrels a day since 2008 and more than 800,000 barrels a day since its peak level in 1998. At the same time, oil exports from Venezuela declined approximately 28 percent between 1999 and 2013.

But, again, talking about the below ground potential, despite this grim news, Venezuela has unbelievable energy potential. It has the hemisphere's second largest gas and natural gas resources, after the United States, and in terms of oil, holds 298 billion barrels of proven reserves, and Venezuela's famous Orinoco Belt contains one of the world's largest oil accumulations.

The next main point I want to talk about is exporting the lessons learned from the U.S. energy boom. Latin America has much to learn from the shale revolution in the United States but policy makers in the region must also understand the critical factors that drove this success and I want to highlight four of them—natural resource ownership, finance, technology, and infrastructure.

That is to say, who owns the right to the subsoil, the hydrocarbons in the ground, the ease in access to finance and risk capital and cutting-edge technology and the ability to use infrastructure to move the product to market.

A key hurdle for the region is to adapt innovative techniques developed in the United States to local conditions both above ground and below. Argentina is doing so to a certain degree.

For example, it is using technology to almost have unconventional well costs in the last 5 years. Firms, hopefully, will also have a similar opportunity in Mexico when they tender unconventional blocks as part of the Round Process perhaps later this year.

My third—my third and final main point—Latin America's investment in energy diplomacy opportunities, and let us start with U.S. energy exports.

The U.S. energy revolution in the United States has created an unprecedented opportunity for natural gas and crude exports to the region. Natural gas exports by pipeline to Mexico have more than doubled in the last 5 years.

At the same time, several liquefied natural gas projects along the coastal United States are nearing completion and will firmly plug the U.S. into the global gas market.

Countries from Central America and the Caribbean to Chile stand to benefit from greater access to the cleaner-burning fuel.

In the debate over exporting crude oil, it is important to appreciate how the boom in U.S. production has affected oil trade flows.

Oil that once flowed east to west is now flowing from west to east, and the shift in oil trade flows underscore how important it is to address this topic of the U.S. export ban, and I would suggest starting with Mexico and Pemex's request for an exemption.

However, the proposed oil swap is not just about the relationship between the U.S. and Mexico. It is also about North American energy integration. And another point I would make is that joint development of unconventional resources in North America and greater electric integration bring economic, environmental and political benefits to all three countries of North America.

Briefly, Central America and the Caribbean—for nations of Central America and the Caribbean, the possible arrival of an era of abundant and cheap natural gas propelled by the shale boom in the United States has greatly advanced the case for a natural gas market in those regions.

U.S. leadership and commitment to energy security in the Caribbean, as the ranking member talked about, has been extremely encouraging. The summit by the White House in January—the Caribbean Energy Security Initiative—are extremely important initiatives, trade finance initiatives.

But I would suggest they are only the beginning of what must be a continued, consistent and concentrated effort to provide an alternative to Venezuela's Petrocaribe.

Finally, very briefly, the role of China—the world's largest energy consumer, China has devised a strategy to deal with spiking energy demand and insufficient domestic production, and some have called that checkbook diplomacy.

And the point is that Chinese, state-owned enterprises have fanned out across the hemisphere with the support of Beijing to secure access to resources, to secure access to Latin America's oil patch.

Venezuela has been the largest beneficiary, but they have also made loans and invested in Argentina, Ecuador, Brazil, and the Caribbean.

So in conclusion, Latin America's importance to the United States makes it critical that we continue to engage, particularly with the largest oil- and gas-producing nations.

Without question, Latin America's outlook and opportunities are complex and at times challenging. But given the region's potential, the energy glass is at least half full over the long term.

Thanks so much for allowing me to testify. I look forward to the conversation.

[The prepared statement of Mr. Martin follows:]

Testimony by Jeremy M. Martin
Director, Energy Program, Institute of the Americas at UCSD

Hearing on “"Energy Revolution in the Western Hemisphere: Opportunities and Challenges for the U.S."
House Committee on Foreign Affairs, Subcommittee on the Western Hemisphere
May 14, 2015

Good afternoon. I would like to thank Chairman Duncan and members of the subcommittee for extending me the privilege to testify today. As this hearing underscores, the topic of energy is one of great relevance and importance for the United States and our entire hemisphere. It is an honor to be here today on behalf of the Institute of the Americas and to be able to draw on our 32 year history as one of the hemisphere's leading policy centers examining issues from energy to regional integration to economic development.

Through this written testimony, I would like to offer some insights on several of the most important energy producing nations in the region, their production outlook, geopolitics, and challenges and opportunities for the United States. In doing so, I would like to discuss three main points:

- Not all countries are the same – it is important to distinguish between above ground and below ground issues;
- The lessons learned from the energy boom in the United States, particularly in terms of unconventionals, provide a major opportunity to export knowledge, technology, goods and services, as well as energy to the region;
- Latin America offers important investment and energy diplomacy opportunities for the United States.

Not all countries are the same

In discussing the production profile and investment climate of the major energy producing nations in Latin America it is important to distinguish between above ground

and below ground issues. In many cases, a country's oil and gas potential, its resources in the ground, may be less important than what is occurring in Congress, the halls of government and in the geopolitics of the day. Or, as I like to say, not all countries are the same.

From Canada to Argentina, the Americas have a formidable natural resource endowment. But beyond the important resource potential "below ground" it is vital to consider and understand the "above ground" elements across the hemisphere. Indeed, the geopolitical conditions throughout the life cycle of energy investments and above ground or non-technical risks such as political, financial, social, and environmental issues are often just as critical and constitute key success factors for sustainable development and investment. How governments, industry, NGO's and communities engage and interact warrants increased attention by companies and policymakers alike.

Moreover, the return of volatility in international oil markets and today's lower price environment demands even closer consideration of above ground ramifications.

To better understand how this issue manifests itself in terms of opportunities and challenges for the United States in the Western Hemisphere, I would like to highlight three key markets in Latin America.

Argentina

Argentina's energy sector is headed towards an important juncture. After a rocky decade for the Argentine economy and energy industry, the nation's significant unconventional resource potential has revived interest. Argentina is now faced with the onerous task of restoring investor confidence damaged by years of political and institutional instability. Many are hopeful that the October presidential elections will usher in a more business friendly administration.

The reversal of Argentina's fortunes is rooted in its vast unconventional oil and gas potential. According to the United States Energy Information Administration,

Argentina's shale formations contain the world's second largest shale gas resources and fourth largest shale oil. This translates to 802 trillion cubic feet (tcf) of technically recoverable shale gas and 27 billion barrels of technically recoverable shale oil. Much of this is contained in the Neuquén basin in west-central Argentina, and in particular the shale formation known as Vaca Muerta. At this time, Argentina is one of just four nations to produce commercial quantities of shale oil or gas, along with the United States, Canada and China.

While Argentina's market fundamentals are relatively strong, some serious financial obstacles must be cleared before the nation can re-emerge as a major regional energy player. Chief among these are the issues of subsidies and a massive energy deficit, which is adding further pressure to an already strained fiscal outlook.

Mexico

Mexico has entered a new energy era. In the year since the nation passed an historic constitutional amendment and legislation, progress on the path to a major overhaul of the energy sector has been remarkable in both its speed and reach. As the country embarks on its first major tests – the Round One oil and gas auction and the creation of a wholesale electric market – the outcome will have a significant impact on determining the reform's durability and eventual success.

Success will take many forms, and in Mexico's case both short- and long-term benefits must be taken into account. In the short term, Round One will be judged based on the number of participating firms, company profile, and overall investment received. These figures will be influenced by global factors such as plummeting oil prices, and the contractual vehicle and tax and royalty scheme. But Mexico will also be assessed on a set of broader factors, including its handling of environmental and community issues and how the government manages and invests its eventual returns.

With the bulk of the energy reforms and implementing legislation now passed into law, new regulatory bodies established, and Pemex's so-called Round Zero out of the way,

Round One is considered the first real opportunity – and test – for private players in Mexico's new energy landscape. The Mexican government will auction 169 blocks for exploration and production across a range of oil and gas prospects, from mature fields to shale to deepwater. Round One is itself a series of smaller bids, set to span most of 2015. Thus far, three smaller packages covering 45 shallow water and onshore blocks have been released. The Mexican Energy Secretariat (SENER) expects Round One to raise $50.5 billion for the 169 blocks plus farm-outs by 2018.

Venezuela

Among the world's major oil exporters, Venezuela was probably in the most vulnerable macroeconomic situation when the price of oil collapsed in 2014. According to research by Harvard Professor Francisco Monaldi, even at peak oil prices, the country was running high fiscal deficits of 17 percent of GDP while foreign debt increased at an unsustainable pace and the domestic currency was severely overvalued. Meanwhile, shortages of everyday goods have been widely reported in the international media.

Venezuela's woes began during the largest oil-derived windfall in the history of the country and the increasingly problematic oil dependency during the boom cannot be overstated. Oil represented over 90 percent of exports during the last seven years, compared to 60-70 percent in the late 1990s. At the same time, oil exports (measured in volume) declined approximately 28 percent between 1999 and 2013, meaning revenues are increasingly dependent on the oil price.

Oil production in Venezuela has declined more than 350,000 barrels per day (bpd) since 2008 and more than 800,000 bpd since its peak level in 1998. Current crude production is estimated at 2.5-2.6 bpd and is comprised of increasingly heavier crude oil and thus less profitable. National oil company PDVSA's production is falling even more rapidly, and the portion that generates cash flow is almost half of the total production.

The country's net oil exports have also declined due to an increase in domestic consumption. Worse yet, exports that generate cash flow are being negatively impacted

by the heavily subsidized exports to other countries in the region, including 100,000 bpd destined for Cuba. PDVSA's cash flow is even further reduced by the barrels it has to send for repayment of the loans-for-oil deals, such as with China.

The trend lines for Venezuela were worrisome during a high price oil environment and ever more problematic given the current price volatility and forecast.

More recently, the power sector experienced outages as high temperatures caused demand to rise by 1500MW in a week. The government pledged to reduce its consumption by 20 percent, closing government offices early. Climate change induced drought and low electricity prices are partly to blame, as is underinvestment in the electricity system.

Despite all of the grim news, Venezuela has tremendous energy potential. According to the United States Energy Information Administration, Venezuela's natural gas reserves are the second largest in the Western Hemisphere after the United States, or 196 trillion cubic feet of proven reserves. In terms of petroleum, the nation holds an estimated 298 billion barrels of proven reserves. A 2010 US Geological Survey analysis noted that Venezuela had one of the world's largest oil accumulations in the Orinoco Belt with an estimated 513 billion barrels of technically recoverable heavy oil.

Exporting the lessons learned from the United States energy boom

On the back of a major innovation in how hydrocarbons are extracted and billions of dollars of investment, the United States has become the world's largest hydrocarbons producer. Indeed, US oil production in 2014 was the largest increase ever by a country other than Saudi Arabia. Shale oil production alone jumped from 600,000 bpd in 2008 to 3.5 million bpd last year.

Latin America has much to learn from the shale revolution in the United States. Policymakers in the region must also understand the critical factors that drove this success: 1) Natural resource ownership; 2) Finance; 3) Technology; and 4) Infrastructure

That is to say, who owns the rights to the subsoil – the hydrocarbons in the ground – the ease and access to significant finance and risk capital and cutting edge technology, and being able to use existing infrastructure to move the product to market are extremely crucial ingredients.

Latin America faces many challenges in adopting the shale model from the United States, not least on the issue of natural resource ownership. Most governments across the region fiercely guard their role and rights as the owners of the "subsurface" be that oil, gas, gold, copper or coal reserves.

Moreover, it has become increasingly clear that not all shales are created equal, and, indeed, all shale is local. A key hurdle for the region is to adapt the technology and innovative techniques developed in the United States to local conditions, both above ground and below.

Argentina offers an excellent lens through which to view how the lessons from the United States can be leveraged. For many years, the high cost of unconventional production in Argentina has cast a dubious shadow over its resource potential. As recently as 2011, the cost per well was around $11 million. National oil company, YPF aims to almost halve that figure to $7 million by the end of this year. These costs are being reduced through adaptations of US technology to local conditions.

Similarly, there are expectations that lessons for unconventionals and opportunities for US firms in Mexico will become a reality this year through a bid round offering blocks just across the border from some of the United States' more prolific shale plays.

Latin America's investment and energy diplomacy opportunities

United States energy exports

Over the last few years, there has been a debate over the possibility of the Western Hemisphere re-emerging as a global energy hub. This is in part due to the energy boom in

the United States, which creates a specific opportunity for US energy exports to the region – both natural gas and crude oil.

Natural gas exports by pipeline to Mexico have more than doubled in the last five years, from an average 0.9 billion cubic feet (bcf) per day to over 2 bcf per day in 2015. At the same time, huge progress has been made on exports of liquefied natural gas (LNG). Several projects along the coastal United States are nearing completion and will firmly plug United States natural gas exports into the global gas market. Countries from Central America and the Caribbean to Chile stand to benefit from greater access to cleaner burning natural gas.

To better understand the debate over exporting crude oil it is important to also appreciate how the boom in United States production has affected oil trade flows. Historically, oil flowed East to West, but trends are shifting to a West to East pattern. This is evident in Latin America where Mexico, Brazil, Colombia, Ecuador, Venezuela and Bolivia have all dramatically increased their shipments of oil to China, South Korea and India this year.

The shift in crude oil trade flows underscore how important it is to address the topic of the United States crude oil export ban, starting with Mexico. Mexico's national oil company, Pemex, has submitted a request for an exemption to the crude ban in order to complete a swap of crude oil with the United States. If approved, the swap between the United States and Mexico will allow the United States to export 100,000 barrels of oil per day to Mexico. The deal is historic for several reasons, not least of which the fact that so few exceptions have been made since the crude oil export ban went into place in the 1970s. The deal would bring relief to United States producers struggling with a light oil glut at home and for Pemex, which is hoping to mix the lighter crude coming out of US shale fields with its heavier blend.

However, the arrangement is not just about the relationship between the US and Mexico. It's also about broader North American energy integration. The oil swap with Mexico not

only makes economic sense but also political sense as the North American region becomes increasingly connected.

The North American Free Trade Agreement (NAFTA) celebrated its 20th anniversary last year to significant fanfare, but much remains to be done, particularly when it comes to energy trade and cooperation between Canada, Mexico and the United States. The United States and Canada already form the world's largest integrated energy market yet there are additional opportunities for cross-border cooperation, particularly with Mexico.

Joint development of unconventional energy resources and greater electric integration would bring economic, environmental, and political benefits. However, the continued saga of the Keystone XL pipeline underscores the challenges that remain for the transportation and transmission of energy across borders.

Central America and the Caribbean

For nations of Central America and the Caribbean, the deleterious economic and environmental effects of oil dependency are well known. The arrival of an era of abundant and cheap natural gas propelled by the shale boom in the United States has advanced the case for a natural gas market in the region. Add to the financial and environmental drivers the instability in the region's most regular oil supplier, Venezuela, and the impetus for change has never been stronger. Technological advances have made it easier and cheaper to transport and distribute natural gas, be it in a liquefied (LNG) or compressed (CNG) form. Moreover, natural gas burns cleaner than fuel oil and can provide the firm power needed as countries increase renewable deployment, at least in the electricity sector.

Historically, small market size has kept suppliers from focusing on the region; the power generation demand in most Central American and Caribbean nations does not reach the threshold for traditional LNG imports.

More importantly, in a global market where 'credit is king', it is not just market size but credit worthiness that has proved the steepest challenge and stalled natural gas development in Central America and the Caribbean.

United States leadership and commitment to energy security in the Caribbean has been encouraging, including the White House Summit in January and several initiatives to facilitate clean energy financing and promote technology and innovation in the sector. Still, they are only the beginning of what must be a consistent and concentrated effort by the United States in Central America and the Caribbean if it truly is to provide a needed alternative to Venezuela's Petrocaribe.

Role of China

I would be remiss if I discussed energy in Latin America and did not mention China. Now the world's largest energy consumer, China has needed to develop a strategy to deal with spiking energy demand and insufficient domestic production. The strategy is comprised of three parts: securing access to and acquiring material reserves, securing access to and gaining production positions in oil projects, and doing both with an overarching aim to diversifying their sources of supply. In simple terms, China is working to assure that all of its oil reserve and production eggs are not in the same basket. Across the Western Hemisphere, Chinese state-owned companies, directly supported by Beijing, have fanned out in search of access to Latin America's oil patch. In pursuing their goals of diversification and security of supply, the Chinese have been particularly fortunate in the last few years to be able to rely on the windfall produced from their economic boom. Many have called it Chinese Dollar Diplomacy.

Given its oil reserves and political profile, Venezuela is Exhibit A illustrating China's marriage of resource geopolitics and dollar diplomacy in Latin America. But Venezuela is not alone. China has also made major acquisitions, investments and loans in Argentina, Ecuador, Brazil, and the Caribbean.

Conclusion

Latin America requires massive investments in energy and infrastructure. And given its importance to the United States, we must continue to engage, particularly with the largest oil and gas producing nations. Without question, Latin America's outlook and opportunities are complex and at times challenging, but given the region's potential the energy glass is at least half full over the long term.

Thank you for your time. I hope that my remarks have been useful. I look forward to the opportunity to respond to any questions or comments that you may have.

Mr. DUNCAN. Thank you so much.

Great testimony, and I just want to reiterate a statistic that I think Mr. Webster threw out there. Twenty-three million people in Latin America lack access to energy or electricity. Is that the number you threw out there?

Mr. WEBSTER. It was a different number, Chairman.

Mr. DUNCAN. Twenty-three million?

Mr. WEBSTER. But that is—that is an accurate number, yes.

Mr. DUNCAN. It is pretty—I am all about improving the quality of life. I think electricity does that for so many people around the world. If there is a way we can electrify Africa or electrify more in Latin America, you improve quality of life.

If people are cooking over charcoal or other things, air quality issues, lack of education ability, having to stop reading or hurting your eyes reading by candlelight, or other things, there are just so many different ways. So I appreciate you bringing that up.

Question for Mr. Webster—there are two different types of oil, really—heavy and light crude—and I am generalizing, of course. We have talked a lot about Keystone Pipeline today.

What kind of oil is coming out of the ground in Canada? Isn't it the more heavy type?

Mr. WEBSTER. Thanks for your question, Chairman.

Absolutely. It is quite heavy oil and this is important because the U.S. refining in the Gulf Coast is what we call a world class refining system and when we say it is world class, that means it can take some of the toughest oils to refine, which include Canadian oil.

Mr. DUNCAN. We are set up—our refineries are set up?

Mr. WEBSTER. We are set up.

Mr. DUNCAN. Because it is very similar to the oil we are importing from Saudi Arabia.

Mr. WEBSTER. Actually, it is even heavier than what we get from Saudi Arabia, yes.

Mr. DUNCAN. And so the oil we are bringing out the ground, say, in the Bakken is a lighter, sweeter oil is my understanding.

Mr. WEBSTER. That is absolutely correct.

Mr. DUNCAN. So in order to refine that oil it takes retooling or actually new refineries or heavy investment in U.S. refineries to refine that end of the—all the hydrocarbon products?

Mr. WEBSTER. That is correct. That is correct, yes.

Mr. DUNCAN. That is missed in a lot of the debate on why bringing the Keystone Pipeline and bringing that Canadian oil down.

Our refineries are set up to handle it without a lot of significant investment on behalf of U.S. companies. So that is why it makes sense.

One thing that came to mind while one of you was speaking is some of the understandings that we have in talking with people in Peru and other South American countries is just private property rights, who owns the resources—a little different than the U.S. where we own air rights and mineral rights of a piece of property.

Down there you don't and, generally, ownership and surveys and deeded property and all that is not applicable in the jungles of Peru or a lot of indigenous people live in villages. The head of the

village knows well, that property belongs to that family, but there is no deeded record of that.

So you run into a lot of problems with energy exploration and leases. So we have learned a lot about that in the last year travelling down there and talking with folks.

I think that is going to provide an impediment in a lot of ways—and I think Mr. Martin was talking kind of along those lines—as energy companies continue to try to explore and produce in South America and possibly in Central America. But I think that is an issue that they need to address, and I will just raise that. So with falling oil prices in the world, who gets hurt the most in this hemisphere? Mr. Book.

Mr. BOOK. Well, the—you know, the problem with saying who gets hurt is that there is two groups of the United States that you want to think about.

The U.S. consumer is helped. The U.S. producer is hurt. And, arguably, the U.S. producer in some cases is being hurt very badly. In the Western Hemisphere, though, the greatest pain probably belongs to Venezuela.

Ultimately, their dependence on oil to fund their economy, the high breakeven price they need for all of their fiscal obligations and their lack of sourcing capital to produce that oil means that a low price really squeezes them hard.

Mr. DUNCAN. Do you think Pemex is hurt a little bit with U.S. and global investors looking to help them change their infrastructure and update and modernize?

Mr. BOOK. Well, it is a bad time to be selling. You don't want to auction off blocks at the bottom of the market, and I think Pemex isn't necessarily going to have as much competition as it might have had if we had been at $100 a barrel.

On the other hand, it seems like the petroleum industry in Mexico is rationalizing their auctions and trying to time for maybe right sizing it and timing it to not get totally burned.

Mr. DUNCAN. Right.

Mr. MARTIN. Mr. Chairman, if you don't mind, just a—there was an important deal about a month ago that I think also offers an alternative that Pemex, now more than ever, needs to partner with outside foreign private capital and there was a deal that First Reserve and Black Rock did about $900 million on the natural gas pipeline that some people considered the tip of the iceberg in potential partnerships. So I think that is one thing to talk about the block, talk about the government auctions.

But I think under the new restructure of Pemex, their ability to partner in that First Reserve/Black Rock deal could be important to watch.

Mr. DUNCAN. I think it is not unfortunate. The American consumer is definitely benefiting and, you know, we are going to see that trickle down in consumer goods and a lot of different things because transportation fuels are cheaper now.

But when Pemex is going through the reforms that I applaud, and I have made a lot of assumptions on what falling oil prices would have—the impact they would have on energy reforms in Mexico but offshore development not only here in the U.S. because we see a lot of production starting to fall off but also investment

in other countries—that probably may have taken place had energy prices, barrels of oil been a little bit higher.

So let me ask this, Dr. Knapp. Arctic drilling—in your opinion, what is the energy potential in the Arctic?

Mr. KNAPP. Thank you for your question, Chairman.

I think for a long time we have known that there is a very high potential of petroleum exploration in the Arctic and I was heartened to see the move by the administration earlier this week to approve the project that Shell has been pursuing in the Arctic of Alaska.

There, again, we really won't know for sure until we go up there and collect the data—the basic data that tell us what the geological conditions are.

But we can certainly speculate that it has got the right conditions for formation of oil. We tend to think of the Arctic as a frozen wasteland, but it actually has only been that for relatively recent geologic time and the time when the conditions would have been right for generating petroleum would have existed in the geologic past. So I think it is quite a perspective.

Mr. DUNCAN. That is an interesting map you've got up there where seismic work has happened all around the Atlantic, with the exception of a big gap there alone the Atlantic coast of the U.S.

Mr. KNAPP. Well, this reflects current activities, right, not even just historic ones but current ones. So yes, that is why I wanted to leave it up there so we got a good look at it.

Mr. DUNCAN. That is current drilling?

Mr. KNAPP. Well, yes, exploration, which would include both seismic and drilling of well, yes.

Mr. DUNCAN. Okay.

Mr. KNAPP. That is courtesy of a colleague from Shell Oil.

Mr. DUNCAN. I see a big gap off the coast of South Carolina where there are no production or activities happening. We would love to see that.

Mr. KNAPP. It is interesting that the area off of Florida that is actually being done by the Bahamas, Cuba, all the Caribbean nations are actively exploring.

Mr. DUNCAN. That is right. U.S. LNG exports—the Department of Energy approval process authorized that, has repeatedly got criticism by industry, experiencing lengthy delays. I think on May 7th the DOE granted final approval to a facility in Maryland. I am very bullish on exporting LNG.

I am talking with the folks in Latin America. They would love to see more U.S. exports of LNG. I think it is a win for the Caribbean nations that are struggling for cheap or affordable energy sources.

So what impact do you think would have—this would have on U.S. ability to export LNG, Mr. Book?

Mr. BOOK. The question, Mr. Chairman, is what ability would the DOE approvals have? What—I mean, there is really—the DOE is turning around their approvals pretty quickly right now, which is good.

What they did is they have essentially now taken a bunch of brownfields projects, which are relatively good bets, given the cost

of building one of these facilities, and they have said—they have given final approval to them.

This week they gave final approval to the first greenfields project, the Corpus Christi project. And now the question starts to become whether or not the investment decisions will get taken on some of these incremental projects.

But we are going to probably have—we have final investment decisions. We are under construction already, about 6⅔ billion cubic feet per day of LNG export capacity. We might end up having ten to 15 built.

Mr. DUNCAN. Right. You know, Mexico is looking to Eagle Ford in Texas to look for some pipelines that are in the works to bring natural gas into Mexico to assist them.

But in talking with the Panamanians, they would love to be that sort of natural hub for Central America. You know, ships are coming through the canal anyway—why not offload some LNG and allow that to be regasified and distributed by pipeline throughout some of the Central American countries? I think it is a win for the region.

I think there is a lot of opportunity not only for Panama but also for American energy companies. And so I have got a lot of questions, but my time is up, so in the essence of time I am going to yield to the ranking member.

Mr. SIRES. Thank you, Mr. Chairman.

You know, I listened carefully with the—all these unprecedented opportunities that we have, and I am always concerned about Petrocaribe—you know, Venezuela—because basically Petrocaribe has everybody by the throat in the Caribbean.

What percentage do you think of the LNG that the Caribbean needs that we can supply by us now opening up to export since last year, you said—last July, somebody mentioned here?

Mr. BOOK. I think—if you are referring to my testimony I was talking about July 2011 we started exporting refined products, not LNG, and——

Mr. SIRES. I thought energy and, you know, I am trying to get rid of this stranglehold that Venezuela has on these islands. So with the energy that we have, what do you think is the possibility of us basically getting rid of that, that Petro—the stranglehold that Petrocaribe has on these islands?

Mr. BOOK. Well, thank you for the question. It is a great question, because we are doing it right now.

We are actually already now supplying slightly more than Petrocaribe is to the destination countries—that Venezuela is to the destination countries, and part of that is because our refineries are, as Jamie mentioned, world class.

We have low feedstock costs, low energy costs. We are getting out there in the world. There is more we can do, though. Some of those countries are buying crude as well, and if we opened up our crude exports that could be a solution also.

Mr. SIRES. You know what? For example, I look at Dominican Republic. They are totally basically dependent on Venezuela for their energy. I was just wondering if you can answer that, Mr. Martin.

Mr. MARTIN. The good news is Venezuela paid off their debt to—excuse me, the Dominican Republic paid off their debt to Venezuela and Petrocaribe early part of this year.

So they don't have—and I agree with my colleague, this stranglehold is not a stranglehold anymore. It is a very loose grip at best. The Dominican Republic is bringing gas from Trinidad but what we could do is send some gas from the United States.

There are a lot of hurdles. In my full written testimony I have talked about some of the financial issues, the credit issues that smaller markets deal with when they need to import the scale of natural gas via LNG or CNG.

But the fact of the matter is via the fine product exports as well as Venezuela just destroying themselves in terms of their incapacity to export product we are loosening if not have completely loosened that stranglehold.

In the case like Dominican where they have paid off their debt they do not owe Venezuela any money and so therefore are in a position to completely move forward.

Mr. SIRES. And some of the islands are still dependent?

Mr. MARTIN. Yes. Other islands—it is a different—I mean, Dominican is very unique in a situation where for about 10 years they have had a liquefied natural gas importation terminal that American company AES based here in Arlington built and now that has been able to—at a period of time it wasn't doing so well but in the last several years it has been able to really move the Dominicans' power supply away from a fuel oil dependency, not to a natural gas dependency but to a diversified matrix.

Mr. SIRES. Thank you.

You know, the other day in the news I saw that Tesla had a battery for houses. You know how there are battery cars. How might oil prices affect the development of unconventional energy throughout the hemisphere? In other words, what other alternative—how are prices affecting the alternative energy industry?

Mr. WEBSTER. I will go ahead and take that. I will try that.

Mr. SIRES. I mean, these countries don't have the infrastructure.

Mr. WEBSTER. Thanks. Yes.

Mr. SIRES. Even if we send it to these countries they don't have the infrastructure to get it. We are talking about these 23 million people that do not have energy.

Mr. WEBSTER. Thank you very much for your question, Ranking Member.

So, you know, one of the big things that people who look at either battery power or renewable energies is, you know, when oil prices are higher than it makes more sense to start looking for alternatives.

Oil price is quite a bit lower now and you can see here in the United States we are starting to buy larger cars. But I think what is going to happen over the next couple of years is we are going to have quite a bit of volatility on oil prices and that volatility is actually going to be something that both consumers and producers are going to want to get away from, and so one of those ways to do that is this potential for battery technology.

So while in the short term this is not exactly what I would consider positive for moving towards, you know, electric cars and

things like that, longer term this up and down in prices and the desire to kind of escape that volatility so that you can have better planning for your budgets is actually going to favor other alternatives.

Mr. SIRES. Thank you.

And I read about a deal between Argentina and China just recently. Can you talk a little bit about the——

Mr. MARTIN. I am not sure, Mr. Ranking Member, what deal but there are several deals. China—I mean, a crude description of its checkbook diplomacy—China has financed billions and billions of dollars of loans to Venezuela are guaranteed by oil supplies.

In Argentina, it has been more in the investment in some of the local companies. They have bought stakes in companies through their national companies—you know, Sinopec.

So I am not sure exactly what deal you are referring to but there are—Venezuela is the number-one recipient of China's checkbook diplomacy but Argentina is obviously also an important target for what I call China's go out and secure access to the oil patch, in this case Latin America's oil patch.

Mr. SIRES. I really believe that one of the reasons that we are refocusing on this region is because China now is stepping into this region, and we just don't want to give this region to China.

I mean, I was in Colombia a few years ago, and I had dinner with one of the presidents of the colleges or the colleges there, and he told me that the second most studied language in Colombia today is Mandarin, after English.

So, you know, the wave is coming, and I think we finally realized here in this country that we just cannot surrender this region to China. So I think that is one of the reasons we are focusing more on these places.

Mr. MARTIN. Mr. Ranking Member, in terms of Argentina I think it is the perfect example. When I talked about exporting technology, goods and services, know-how, and the lessons we have learned from the unconventional revolution in the United States, there is no way China is going to do that in Argentina.

The United States is going to do that, is already doing that. We have helped them halve the cost of an unconventional well in Argentina through partnerships with Dow Chemical, Chevron.

There is a lot of other U.S. companies that are very interested in exporting all of those lessons and technology business services to really move Argentina from a 40,000 barrel a day of unconventional production to a real player.

Mr. SIRES. How does this scandal in Venezuela affect in the industry? Does anybody know? This energy scandal where the President is involved. There is a big scandal. Not Venezuela, excuse me. Brazil. In Brazil.

Mr. BOOK. I think——

Mr. SIRES. We visited—this committee, with Matt Salmon, the chairman, we visited Brazil. We visited that whole complex that they have, and all their plants that they have for, you know, working with us in terms of trying to get oil from the ocean, you know, and everything. But, you know, this scandal has paralysed, I think, Brazil.

Mr. BOOK. Thank you for the question, Mr. Ranking Member.

I think the answer is it is bad news not just for Brazil but for the world.

The pre-salt resources, as I mentioned, are—it is a way to think about—it is the oil the world needs in the next decade. What is not being invested in now is going to matter much more to us later.

We have seen a big surge in shale. That is great. But the world is declining at 4 to 5 percent a year that has to be replaced. This is that replacement. It is an amazing resource. It requires world class companies making hundreds of millions to billions of dollars of investment in each of the producing assets they put to work.

And so for two things that have gone wrong, one is that they have changed rules, and that may have had an effect of dulling some of the investment enthusiasm.

And the second thing is that the corruption scandal is going to result in significant delays, in all likelihood, and therefore under investment. So bad news, I think, not just for Brazil but for the world.

Mr. SIRES. And my last comment—this is a basic problem with these countries. You go there and invest and then they change the rules.

I mean, I don't get it where they think a company is going to spend hundreds of millions of dollars and then they say well, I don't think—the percentage you charge is too high—we are not going to pay you.

I think that is why they don't get any—you know, any real investment in some of these places. And that was the case in Argentina. They didn't want to pay.

So, you know, to me, making a large investment in energy and to have a country say, well, we don't want to do it anymore, and mark my words, this is going to happen in Cuba when people make investments there.

They will wake up one day and say, well, I don't think this deal is that good—we are going to take this back. And I don't know any company that is willing to take that risk.

I am sorry, Chairman. I didn't want to——

Mr. DUNCAN. It has happened before, and there are a lot of companies and individuals that have lost ownership. I think the ranking member is right about engagement in this hemisphere.

We have neglected, I think, as a nation and maybe even just Congress have neglected countries in this hemisphere way too long and we allow China or Russia to get a foothold.

But one thing that we are trying to do with this subcommittee is get re-engaged from the United States Congress with countries in the hemisphere and I think energy as a segue toward that re-engagement because I think energy is a win-win for everybody.

It improves quality of life. It helps electrify. It also helps U.S. businesses be able to export or to go down and invest in infrastructure. I just think it is a win-win. So we are going to continue with these type hearings about U.S. engagement in the hemisphere. Energy, I think, is the primary one right now.

I will turn to the gentleman from Florida, Mr. Yoho, for 5 minutes.

Mr. YOHO. Thank you, Mr. Chairman.

I appreciate you all being here and I share the chairman and ranking member's goal and my vision is to make North America energy secure, energy independent in this region in the Western Hemisphere, to bring stability to the fuel prices.

You know, we have seen the volatility and we saw a lot in the 2004–2008 area when it was just going up and I was paying $5 a gallon for diesel for my Ford Excursion. Luckily, it got 22 miles to the gallon.

But we saw that fluctuation, and when the fluctuation was there it was just—you know, it disrupts the economy, from the guy out there planting corn to the, you know, the cosmetics on the aisle that people buy. It affected everything—pharmaceuticals. And so there is no reason, with our natural resources—correct me if I am wrong—that we should be importing oil from anybody outside of the Western Hemisphere.

Would you agree with that? Is there a need to with the natural resources here?

Mr. BOOK. I would—Congressman, I think the good news is that we have everything we need in the Western Hemisphere. The bad news is that if you don't allow the world to compete the price might be too high.

Let me give an example. The Keystone Pipeline would bring Canadian oil down to the Gulf of Mexico. Right now, Venezuela and Mexico sell most of the crude that goes into those refineries from overseas, and Canada would democratize that market ever so slightly.

I think we might find that we get most of our energy from the Western Hemisphere, but we would always want to have somebody out there bidding against them just to keep the prices fair.

Mr. YOHO. No, I agree with that. But if we had enough production here—I don't want to control the oil market. It would be nice to stabilize it, you know, and if we stabilize it prices wouldn't show the volatility that they have, and I think if we work together as the Western Hemisphere we could accomplish that.

Let the Middle East, or whoever else wants to produce energy, do that but not to where it affects our market. And, you know, the competition is always good because it keeps the price down and the stable supply will stabilize, you know, the prices.

So with what we have in this hemisphere, I don't see why we are not doing that. And Mr. Sires brought up a perfect example of the geopolitical landscape.

When you have an unstable government or a government that doesn't follow the rule of law or civil society or property rights or they are corrupt you get what we see in a lot of the Latin American countries.

And if I was an oil company I would be hard pressed to invest there when I look at that map and I see what is in North America, and certainly there is a lot of resources off the coasts.

But with what is on the interior is there really a need to do deepwater exploration, deepwater drilling with the risks of that when we have so much on the interior. What are your thoughts on that? Get the low laying fruit?

Mr. KNAPP. I will take a shot at that. We currently produce more than a quarter of our domestic production offshore and one of the

issues about the offshore is that these are more complex longer-term projects.

So if we wanted to be developing that resource we are looking at a 10- to 15-year time frame from the time we start on that to before we could ever be producing the product.

The reality is that other than the unconventional play, which has really energized the market in the last few years, the conventional plays onshore are, largely, highly explored in North America and the only place where we are likely to find major new resources is the 87 percent of the outer continental shelf that we have never explored in.

So I think that still remains the big opportunity here in North America for new reserves that we might discover.

Mr. YOHO. Okay. On the Keystone Pipeline we get a lot of questions where people say well, it is not going to benefit America at all—all that product is going to be exported.

What are your thoughts on that? How much of that oil would be exported? How much would stay here? How much would be used domestically?

Mr. WEBSTER. So IHS actually conducted a study on this to try to better examine this and our view is very much that 70 percent of both the crude and refined products would be kept here in the United States.

The remainder of it would actually tend to back out to that Venezuelan oil and, again, it goes back to what the chairman's point was earlier, which is that the Gulf Coast refinery is perfectly suited to this oil.

So it actually doesn't make a whole lot of sense to bring that oil down to the perfect market for it and then say you are going to export it to someplace else. There is no better place for it.

Mr. YOHO. So 70 percent of that oil would stay here domestically and, you know, it is funny how many different things are out there.

When people say it is all going to be exported, it won't benefit America at all and, you know, you try to explain facts and people don't want to listen to that.

What would you recommend about removing our export bans on all petroleum or energy products? I mean, it sounds like you are all in agreement with that, right?

That would help our producers. It would lower prices. It would stabilize the region, and especially if we focus on the Caribbean and our allies with Mexico and any other country in the Western Hemisphere that wanted to be our friends.

I think it would just be a win-win situation and I don't see any reason not to do that. When you look at that possibility and you look at this body, Congress, what do you see as the biggest stumbling block? Is it just the political will? You are amongst friends.

Mr. WEBSTER. Yes, I will go ahead and try it. One, I would agree with you that crude oil exports is, to me—it is very difficult for me to come up with—as an analyst to come up with an intellectually credible argument on why you would not allow crude oil exports when petroleum products are okay, natural gas is okay, coal is okay, electricity is okay but crude oil is not.

Mr. YOHO. But not crude. Don't do—that is dirty oil.

Mr. WEBSTER. Yes. I would—my estimate would be that the reason why is because of a concern is that when people see the price on television they look at the oil price and so they often link oil price with gasoline price, not recognizing that actually exporting oil is actually going to increase the supply around the world and as I often say a free barrel of oil anywhere actually increases energy security everywhere. And so that actually would bring down gasoline prices.

Mr. BOOK. If I might add to that.

Mr. YOHO. Yes, sir.

Mr. BOOK. I have some sympathy for you and your colleagues who are addressing this challenge. You pay your utility bill usually about once a month. You fill up your tank 40 or 50 times a year, which is 40 or 50 times you are reminded how much you are spending. That makes it a much more emotional and politically volatile issue.

The American public on average is spending 6 to 7 percent of disposable income on energy writ large. Two-thirds of that is gasoline.

If you think about who it hurts when gasoline prices go up, it hurts the poorest the most, the people who drive longest distances inflexibly.

Mr. YOHO. Right.

Mr. BOOK. The problem then is that there is a perception risk. Right now, if you go back to January '14, gasoline prices are now down about 66 cents or so per gallon. On the other hand, they are up 62 cents per gallon from where they were January of '15.

So if—you know, if this is something that you and some of your colleagues are worried about in terms of the perceptions, the sweet spot is behind us right now. It shouldn't be there.

I think Jamie is absolutely right. What people need to be focused on is the broader economic picture. But I certainly understand what the concerns are getting to that focus.

Mr. YOHO. Mr. Chairman, can I add one more thing? When you—when you and I were in South America and we were sitting—I think it was in Colombia and the oil executives were there, they were talking about the world asset tax they had to pay. Have you heard of that? Good. Do you remember that comment?

I haven't been able to find it and I am, like, what is that, and I haven't been able to find it. So that is good that you don't know about it. Thank you.

Mr. DUNCAN. I will yield a little bit of time to the ranking member.

Mr. SIRES. Dr. Knapp, you know, I see this map and I see all these areas of exploration, and I remember a few years ago we had this big hoopla that Cuba was sitting on I don't know how many barrels of oil and everything else and there was, you know, Spain went in there and invested.

I think Italy went in there and invested. They didn't find a drop of oil. So where is all this oil that I see this line going through there?

Mr. KNAPP. Thank you for a question that I feel qualified to answer, Mr. Ranking Member. So much of this ultimately gets back to the geology and that is do you have the right geologic conditions,

first of all, to form the oil or gas and, second of all, to trap it in some geologic formation where you can then go and recover it.

And when we are in areas like the Atlantic margin, which is right out our door here, where we have basically what is called the passive margin, we have got areas where there is lots of marine sedimentation that takes place and we get sediments deposited on top of that that then mature into oil, and it is subsequently not disturbed in some significant way by geological processes then the oil is going to be preserved.

Cuba, on the other hand, sits on a plate boundary. It is the collision of the Caribbean Plate with the North American Plate and it has got faults all through it and it is highly deformed, and if the conditions ever were right for the oil to form there, chances are it has long since been released through geologic time.

So it doesn't surprise me. As geologists, we can have a fairly great insight in where we are likely to find oil and gas reserves and where we are not.

Mr. SIRES. People were talking about the rigs and the oil, if there was an accident it would go on the beaches in Florida. I mean, it went beyond.

Mr. KNAPP. Well, they are still doing that now in—down where we live.

Mr. SIRES. Thank you.

Mr. MARTIN. Ranking Member, if I could just add, I think there is three reasons why Cuba doesn't even need to worry about it right now.

Number one is the price of oil. Number two is the number of dry holes that—you could down the list of who has drilled a dry hole in Cuba. And number three is we talk about Mexico.

The enormous opportunity that Mexico provides I think makes anyone who might think Cuba is another opportunity to take a little back.

Mr. SIRES. But people will want to invest there because at the moment——

Mr. MARTIN. I think there's three reasons I can think of off the top of my head why it doesn't make a whole lot of sense in 2015.

Mr. SIRES. That's terrible.

Mr. DUNCAN. Why are—why did gas prices come down?

Mr. BOOK. Gasoline prices are mostly linked to crude oil prices. There is local—if you look at California recently you can see that when the refineries went out and just in general because they have a special blend of California gasoline the prices tends to be a bit higher.

It doesn't move necessarily the same direction all the time. But by and large, it was the collapse in oil prices that brought down gasoline prices.

Mr. DUNCAN. Okay. So why did—why did global oil—crude oil prices come down?

Mr. BOOK. Well, there is three easy explanations. Demand was weak, supply was long and OPEC decided that they wouldn't cut. Those are—each of those requires a Master's thesis to give you all the details.

The first one was the one that I think a lot of people didn't expect. We have seen effectively a low-energy recovery from the Great

Recession. Whether it is structural or whether it is just a slow recovery of consumer patterns is yet to be seen.

Mr. DUNCAN. Well, global—slow recovery globally, right?

Mr. BOOK. Basically, yes.

Mr. DUNCAN. So global demand was down. Supply was up.

Mr. BOOK. Supply was up and——

Mr. DUNCAN. You had the Bakken onlining, but you also had the Saudis and OPEC keeping production levels up?

Mr. BOOK. And the thing that broke the camel's back, Jamie mentioned, was Libya. Libya had been blinking on and off like a bad light bulb for a while at 300,000, 400,000 barrels a day. It suddenly shot up to 800,000, 900,000 barrels per day and shocked the market.

When you look down after you have run off the edge of the cliff in the Roadrunner cartoons there is a moment before you fall. That was the moment. When they looked down, that was when the market moved.

Mr. DUNCAN. Right. So just to simplify things, demand was down, supply was up. That affects prices. If the U.S. was able to export our crude oil on the global market then it would increase global supply to meet maybe a stagnant global demand, even decreasing—increasing global demand. But if you got more supply, then you are going to keep prices relatively stable or inexpensive.

Mr. BOOK. Well, there is good news out there, which is that if you put oil out there cheap enough for long enough, demands wakes back up and that is a good thing because with it brings economic opportunity.

What you have is most of the growth in oil demand right now is not coming from the OECD. The OECD is pretty stagnant, as you say, and very efficient. There's wing tips in all our planes. We are all buying new cars.

So when the price drops, it doesn't unlock a lot of new demand. Where does that demand come from? It comes from GDP growth in the non-OECD and that is where the flagging economic fortunes of the world have been a problem.

But if you see that oil price low enough for long enough, the investment that comes with it brings demand back, and I think we are starting to see that.

Mr. DUNCAN. Do you think there is demand in the Western Hemisphere for energy resources?

Mr. BOOK. Writ large, absolutely. Just the electrification issue I mentioned in my testimony that is a lot of—that is a big energy gap right there. But let us not kid ourselves. There is—even if we are driving cars less we want to fly planes and move trucks. There is freight and commerce to be done.

Mr. DUNCAN. Right. Exactly.

So talk about Colombia just for a minute. We were down there in November. Wasn't it November we were down? And FARC had just blown up a natural gas pipeline and it is a pipeline that they have attacked numerous times.

There is a lot of work on the Colombians' part just to keep that safe. Then you throw in the reduction in the price of oil. Colombia pulled back from its offshore development somewhat.

So I am not talking about global prices but just safety and security in the region is very, very important, I would think. I mean, I have—people contact my office that do business down in Latin America that are needing security and caravans just to go out and do exploration or even the hydroelectric projects that they are working on to replace turbines or work on turbines they have got to have a security team with them just for safety and security.

How do you—how does that factor into what we are talking about today, and that is energy in this hemisphere when you factor in a security threat like FARC or any others? Can you all talk to that?

Mr. WEBSTER. Well, one, it—you know, a lot of the companies that are looking at this in terms of energy they look at the risk profile for each of these countries, and one of the benefits of both the United States being a bigger producer of oil and gas is it gives them another safer opportunity that is certainly present within Canada and increasingly within Mexico.

What ends up happening is for these countries is they essentially, you know, either price themselves out of the market, so to speak, which then reduces the opportunity that the world has for those energy—additional energy supplies from those regions.

Mr. DUNCAN. So it is not—it is an impediment but it is not going to—that can't be overcome, I guess, is what I am hearing from you?

Mr. WEBSTER. That is correct.

Mr. MARTIN. Mr. Chairman, yes, I think that is exactly what I was trying to get at with my above ground—the concept of being sure you understand the above ground, the nontechnical risk, the political, the security.

Those things can all, as Jamie said, be mitigated or figured into the project life cycle—how do deal with them, community engagement. All of these things, all these nontechnical issues, have certain components and ways to deal with them.

The problem is you have to be aware, and you have to really understand where you are operating and where you are going into. And I would just say a final point about Colombia.

We talked about—I think the question from the ranking member which country is the hardest hit in our hemisphere by lower oil prices and Venezuela is, you know, surely a winner. But Colombia has been really hard hit by low oil prices as well.

Colombia was a wonderful story for 5 or 6 years in terms of rewriting their oil and gas investment framework, launching bid rounds year upon year, attracting billions of dollars of investment.

That has been paralysed, in part, because of some of the security issues, but the low price of oil has really impacted Colombia as well.

Mr. DUNCAN. Well, the last thing—they are going to call votes in just a second. It has been a great hearing. The last thing I want to—we have talked about the Caribbean and how we can lessen the influence of Venezuela in Petrocaribe by U.S. engagement in the Caribbean with the, you know, crude oil, with electrification and all that.

So the questions is, for each of you, how can countries in the Western Hemisphere work more closely together to achieve West-

ern Hemisphere energy independence and wean ourselves off the resources from the Middle East and Africa?

If you had to put your hand on one thing that we could do as a hemisphere, what would that be? How can we work together? And I will start at Dr. Knapp and work across.

Mr. KNAPP. Thank you for that question, Mr. Chairman, and I would say first and foremost the thing that we need to do is develop the resources that we have such that they are on the table for those partnerships with those other companies and to the extent that we have identified significant resources here in our own country that is where we need to begin.

Mr. DUNCAN. That is all countries need to develop the resources?

Mr. KNAPP. Sure.

Mr. DUNCAN. Yes. Mr. Book?

Mr. BOOK. Well, since Dr. Knapp has already picked the drill it, I am going to pick the ship it. The next—the next thing you might want to put on your list is removing the barriers to trade that we control.

We are the ones who have decided not to export our oil. There are other barriers we don't control, but this one is ours.

Mr. WEBSTER. Thank you for the question, Chairman. Since drill it and ship it have been taken, I will take share it, which is actually—and Senator Murkowski has put out some language on this—which is that you actually need to continue to increase the integration of both data, both—just in terms of flows and trade, but also in terms of technical data between these different countries to understand what those resources are so that you can then drill it and ship it.

Mr. MARTIN. I don't know if that leaves me to flip it or what here, but maybe we could say flip it in terms of the switch or what Petrocaribe is doing. But look, full liberalization of energy trade and everything that that statement encompasses is what I would say.

Energy diplomacy—the Caribbean Energy Security Initiative is a great start. It is a small piece. We need to do more. We need to export more and that is the way we have always, as the United States, been able to champion engagement, in this case, in energy diplomacy.

Mr. DUNCAN. Well, I want to thank the ranking member. I want to thank the members of the committee. I want to thank you for your great testimony and answering the questions.

We are just scratching the surface, really, of what we need to be doing about energy engagement and engagement all across the board on a lot of different fronts whether it is agriculture or other things in this hemisphere.

I am excited about the future. I think there is opportunity and I use that word in all caps. There is opportunity for American businesses. There is an opportunity for America and safety and security, national security, energy security.

But this is our neighborhood. It is not our back yard. I hate when people say well, that country is in our back yard. No, they are neighbors in this hemisphere. This is a Neighborhood.

We need to work with our neighbors in the Western Hemisphere to help everybody. I mean, a rising tide floats all boats and I think

energy is a segue to rise the quality of living and standards and other things in this hemisphere and it is a way for the U.S. to get engaged once again to thwart any efforts by China or Russia or Iran or others that may be sticking a toe in the water here in our neighborhood.

So I look forward to continuing engagement with you, and with nothing further, I will stand adjourned.

[Whereupon, at 3:24 p.m., the committee 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 2200 of the Rayburn House Office Building (and available live on the Committee website at http://www.ForeignAffairs.house.gov):

DATE: Thursday, May 14, 2015

TIME: 2:00 p.m.

SUBJECT: Energy Revolution in the Western Hemisphere: Opportunities and Challenges for the U.S.

WITNESSES:

James H. Knapp, Ph.D.
Professor
Department of Earth and Ocean Sciences
University of South Carolina

Mr. Kevin Book
Managing Director
Clearview Energy Partners

Mr. Jamie Webster
Senior Director
IHS Energy

Mr. Jeremy Martin
Director
Energy Program
Institute of the Americas

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 *Thursday* **Date** *May 14, 2015* **Room** *Rayburn 2200*

Starting Time *2:00 p.m.* **Ending Time** *3:24 p.m.*

Recesses ____ (____ 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 Revolution in the Western Hemisphere: Opportunities and Challenges for the U.S."

SUBCOMMITTEE MEMBERS PRESENT:

Reps. Duncan, Sires, Yoho

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

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.)*

TIME SCHEDULED TO RECONVENE ____
or
TIME ADJOURNED *3:24 p.m.*

Mark O. Walker
Subcommittee Staff Director