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Hearing to Examine the Impact of Low Oil Prices in the Western Hemisphere
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Thank you Chairman Duncan, Ranking Member Sires, and distinguished Members of the Subcommittee. I appreciate the opportunity to be here today to discuss the impact low oil prices have had on countries in the Western Hemisphere and ways the United States (U.S.) can enhance its energy security by assisting our allies and partners in the region.

Changed Energy Profile of the United States

A discussion of how the U.S. might help enhance energy security by assisting our allies and partners in the Western hemisphere (within the confines of free market principles and statutory authorities) must be placed in the context of both the opportunities and challenges presented by the changing energy profile of the U.S. These changes are detailed in a White House report, *The All-of-the Above Energy Strategy as a Path to Sustainable Economic Growth*, (July 2014), "Rising domestic energy production has made a significant contribution to GDP growth and job creation. The increases in oil and natural gas production alone contributed more than 0.2 percentage point to real GDP growth in both 2012 and 2013, and employment in these sectors increased by 133,000 between 2010 and 2013."

At DOE, we have done additional, more granular, analysis of energy jobs to inform the development of energy policy. According to DOE's *U.S. Energy and Employment Report* released in March of this year, as of the second quarter of 2015, 3.64 million Americans work in traditional energy industries, including production, transmission, distribution, and storage. Of these, 600,000 employees contribute to the production of low-carbon electricity, including renewable energy, nuclear energy and low emission natural gas. An additional 1.9 million Americans are employed, in whole or in part, in energy efficiency.

I will let my colleagues discuss the specific impacts of low oil prices on countries in the Western Hemisphere and the geopolitical strategies these suggest. I will focus on this changed U.S. energy profile and some the related policies and initiatives on which the Department of Energy is focused, including a new definition of energy security that reflects modern energy markets, systems and needs.

Oil. The US is now the number one producer of liquid fuels in the world and within the last two years began producing more oil than it imports for the first time in decades. Crude oil production in the U.S. rose from an average of 5.1 million barrels per day in 2008 to 9.4 million barrels per day in 2015; these production increases and relatively flat consumption have resulted in the lowering of imports of oil by 3.5 million barrels per day (or about 30 percent).

In 2014, the U.S. Commerce Department clarified that when liquid hydrocarbons, including condensates, have been sufficiently "processed through a crude oil distillation tower" to become a "petroleum product," these may generally be exported without a license, except to embargoed destinations. In August of 2015, the Commerce Department approved license applications to exchange U.S. crude oil for

similar quantities of Mexican crude oil. Later in 2015, the U.S. Congress lifted the statutory ban on oil exports that has been in place since 1975.
There have been relatively small changes in the flow of oil since the ban was lifted.

Natural Gas. The U.S. is also now the number one producer of natural gas in the world. The production of natural gas climbed from 21 Tcf in 2008 to 29 Tcf in 2015, which represents more than 95 percent of domestic consumption. The U.S. became a net exporter of liquefied natural gas (LNG) in March of this year and according to EIA, the U.S. will become a net exporter of all forms of natural gas by 2017.

Abundant natural gas resources and large production increases have created significant global, regional and domestic natural gas market opportunities for U.S. producers. Indeed, U.S. exports of LNG can make a major contribution to the evolution of world gas markets. Historically there have been three regional natural gas markets: North America, Europe, and Asia. But increased production in the U.S. and the Middle East and significant investment in LNG facilities in Australia and the U.S. are re-shaping the regional nature of gas markets, creating the potential for their globalization. The share of LNG traded through shorter-term contracts is an indicator of a more competitive and financially liquid gas market, increasing from 8% in 2008 to 29% in 2015. Also, oil-linked natural gas prices in Asia fell significantly in 2015 and some LNG importers were able to successfully renegotiate their contracts with sellers—adding more flexibility to the market.

Finally, it should be noted that the widening of the Panama Canal is taking place coincident to the growth of LNG exports from the U.S. This multi-billion dollar infrastructure improvement could help facilitate and lower transportation costs for U.S origin LNG trade with Asia and possibly to destinations on the west coast of South America. Also, the Panama Canal Authority (ACP) is interested in ways that U.S. LNG trade can provide energy to the region. Last year, the U.S. Trade and Development Agency awarded a grant to the ACP that supports planning for a possible LNG import terminal and increased natural gas utilization in the area. This holds promise for additional markets for U.S. LNG in Panama and other countries in Central America.

Electricity. In 2016, natural gas is projected to surpass coal as the most-used fuel for U.S. power generation on an annual basis. Between 2005 and 2015, net generation from natural gas increased by 75 percent, while coal generation fell by 33 percent. Recent generation *capacity* additions have been dominated by natural gas and renewables. Natural gas net generation has increased from 19 percent in 2005 to 33 percent in 2015. As a percentage of net generation, wind increased more than tenfold since 2005 to 4.7 percent of net generation in 2015. Non hydro renewables grew from 2 percent in 2005 to 7 percent in 2015, surpassing hydropower for the first time. Wind generation increases have been driven by improved turbine technologies, reduced cost of electricity production, and government policies that encouraged the development of renewable energy sources. Geography and physics are inherent limitations in electricity markets. As such, the Administration has focused on the benefits of the integration of U.S., Canadian and Mexican electricity systems (the details of related actions is discussed later in my testimony). Innovation, however, is freely traded throughout the world and the U.S. is a major hub for technology development. The Department of Energy is the single largest supporter of civilian physical science R&D in the country, and our system of 17 National Laboratories is an energy innovation powerhouse. The work of our labs and programs, including those that support many public-private partnerships, has helped develop technologies to lower electricity bills, enable and enhance a modern economy that heavily relies on electricity, reduce electricity demand and decrease carbon emissions from power generation. DOE's Advanced Research Projects Agency-Energy (ARPA-E) program supports significant innovation in the electricity arena, funding, for example, technology development

for dry cooling in power generation, a critical technology in water-scarce and drought-affected regions. Our technology programs support renewable and nuclear power generation and programs to decrease the costs of carbon capture technologies from coal and gas-fired power plants.

In addition, we strongly support international collaborations for technology development that can also create commercial opportunities for U.S. companies. The Clean Energy Ministerial (CEM) and Mission Innovation initiative, discussed below, could provide major opportunities for sharing best practices and collaboration on electricity-related research and development. DOE's FY 17 budget request for Mission Innovation includes several electricity-focused projects/programs such as increased funding for ARPA-E, two advanced carbon capture pilot plants, an additional advanced manufacturing institute, and an offshore wind consortium. Grid-scale and home battery storage are also critical electricity-related technologies. These and other focus areas may be appropriate for international collaboration, including collaboration with CEM and Mission Innovation members in the Western Hemisphere.

Energy Productivity and Efficiency Improvements. U.S. primary energy use peaked in 2007 and has remained largely flat since then. Also, GDP has grown faster than primary energy use since 1970. This means that U.S. energy productivity – the ratio of GDP to total primary energy use -- has been increasing and is expected to continue to do so. Two major factors have led to this extended period of relatively flat demand: structural changes in the U.S. economy and improvements made in energy efficiency. Both technological advances and energy efficiency policies -- such as fuel economy standards, building energy codes, appliance and equipment standards and labeling, and targeted incentives -- have played a significant role in slowing the growth of energy consumption.

North American Energy Market Integration. The value of energy traded between the U.S., Canada and Mexico is growing and has exceeded $150 billion annually in recent years. The three countries also share similar resource profiles, infrastructures and some regulatory frameworks. Three of the eight regional organizations that govern our electric grid reliability are shared with Canada, and the government of Mexico has increased its engagement with the reliability region covering southern California. Also, the dramatic increases in US wind and solar generation capacity, the potential of Canadian hydro as possible storage for US intermittent renewables, COP 21, Mission Innovation, and the recent statutory commitment of Mexico to renewables suggest new pathways for intense cooperation in clean energy fields.

There are major energy markets in Central and South America for energy supply, technologies and services that could benefit from collaborative development. The US, Canada and Mexico are also uniquely positioned in the Western hemisphere; each has significant energy resources, has committed to Mission Innovation, and has an east and west coast that enables access to both European and Asian energy markets. The economic dynamism of the other countries of the Western Hemisphere – most of which committed to deep carbon reductions in the Paris agreement and many with growing populations —present new energy market opportunities for the US, Mexico and Canada in the decades ahead.

New Energy Challenges. Challenges remain, however. Many of them have direct implications for our energy security and some were simply not contemplated or understood when many of our energy laws and regulations were enacted.

The April 2015 Quadrennial Energy Review (QER) concluded that in key areas, our energy and related infrastructures have not kept pace with changes in the volume and geography of oil and gas production. We are already seeing a rise in extreme weather events that are projected to increase in frequency and

intensity, and have regional and possibly national-scale impacts. These include more heat waves, coastal flooding, regional drought, and wildfires that can have significant impacts on energy systems. For example, extreme heat reduces the efficiency of electric generation and transmission while wildfires and flooding can damage electricity infrastructure.

There are also new non-weather related vulnerabilities for our energy systems including cyber and physical attacks on infrastructure. In addition, all of our critical energy infrastructures are reliant on electricity, placing a very high premium on a reliable, modern and hardened electric grid and raising new concerns about low probability-high consequence events such as electro-magnetic pulses and geo-magnetic disturbances.

Integrated North American grids and energy markets have increased the need for joint grid security strategies. The U.S. has new responsibilities for protecting LNG export supply chains. We also remain a large oil importer, and are large oil product exporters and new crude oil exporters; this directly ties us to world oil markets and global oil price volatility. Finally, our allies and other key partners have significant energy supply and infrastructure vulnerabilities, some of which was addressed in the Third Energy Package, and a concern that was fully exposed by the 2014 Russian aggression in Ukraine.

Energy Prices and the U.S. Economy

Over the past several decades, oil and natural gas prices have changed dramatically. Real oil prices fell from over $90/bbl in the late 1970's to $30/bbl in the 1990's, rose to over $100/bbl in 2008, and have since fallen to less than $50/bbl. Similarly, real natural gas prices in the U.S., as measured by the Henry Hub spot price, rose from less than $2/MMBtu in 1999 to over $10/MMBtu between 2006 and 2008, and have since returned to levels near $2/MMBtu.

In general, economic analyses from, for example, the Congressional Budget Office (CBO), conclude that the U.S. GDP receives a boost from low energy prices. CBO noted that "the declines in oil prices for immediate and future delivery that occurred between August and December 2014 will raise real GDP in the U.S. by 0.3 percent at the end of 2015. The decline in expected future oil prices will also raise GDP during the 2016–2019 period, but by less than in 2015 because of the anticipated partial rebound in those prices."

Lower energy prices give U.S. consumers more disposable income for other goods and services, although these benefits are not uniformly distributed. In its 2015 report, CBO noted that "...the drop in oil prices has several positive effects. It has lowered the prices of petroleum products, including gasoline." I note that on June 6th, Federal Reserve Chair Janet Yellen said that low oil prices have "likely been a positive influence on the US economy overall, [but] they also have had a negative side: as energy –sector employment has been negatively impacted while the effects have also spilled over to businesses that serve the energy sector. It's worth noting, however, that benefits from lower gasoline prices are not, however, evenly distributed. Vehicle miles traveled (VMT) and the associated costs of gasoline, for example significantly vary by state. In 2013, the average VMT per capita for light duty vehicles in 14 states exceeded the national average by 15% or greater (AL, AR, MS, KY, IN, GA, MO, MT, NM, ND, OK, TN, VT and WY). The highest average VMT in Wyoming was more than double that of Rhode Island, the lowest. In June, 2013, the national average gasoline price was $3.49 per gallon; on June 4, 2016, it was $2.35. Assuming the average light duty vehicle gets 21 mpg (the figure for 2013), and the average VMT is sustained over the time period from 2013 to 2016, this dramatically lower gasoline price in 2016

would translate into savings over that period of $842 for the driver in Wyoming and only $389 for the driver in Rhode Island.

Low energy prices also contribute to boosting U.S. GDP by attracting industries that use energy commodities in the production processes. That has proven particularly true with respect to low natural gas prices. The availability of lower-cost natural gas and natural gas liquids (NGL) provides an advantage for U.S. manufacturers using natural gas or NGL for heat, power, or feedstocks. As NGL costs have decreased, process costs for U.S. petrochemical manufacturing, which commonly uses NGL as a feedstock, have also decreased. This has enabled some U.S. petrochemical facilities to gain an export advantage over other parts of the world. As a result, many expansions and additions to the U.S. petrochemical manufacturing sector have been announced.

On the cautionary side, low prices can adversely affect some investments. The previously referenced CBO report noted that there were GDP losses associated with lower investments by oil producers, particularly as low oil prices make some domestic production less economic, even though the overall impact of low oil prices on GDP was positive. Low energy prices can also reduce incentives to improve energy efficiency especially if they are expected to stay low over an extended period. Lower oil and natural gas prices might also induce households and businesses to increase their reliance on energy. In particular, if the U.S. economy becomes more reliant on oil, we increase our exposure to disruptions in the supply of oil. Serious oil supply disruptions hurt the U.S. economy by suddenly raising U.S. fuel prices (our petroleum product prices are directly affected by the world price of oil).

According to the 2014 White House report referenced earlier, "Historically, temporarily high oil price shocks arising from foreign supply disruptions have cut GDP growth and reduced employment. This link is not perfect, and not every oil price shock has led to an economic slowdown, but … the empirical evidence points to a negative link between oil price spikes and economic activity." Consequently, it would be prudent to continue to improve energy and fuel efficiency to reduce our reliance on oil and lessen the impacts of oil price spikes though cost-effective regulations including the DOE's appliance efficiency standards and the fuel efficiency regulations administered jointly by the Environmental Protection Agency and the Department of Transportation.

Energy Security in the 21st Century

All of these trends, actions and incidents, including the Russian aggression in Ukraine, have underscored the need for a modern approach to energy security to help guide U.S. domestic and foreign policy. Until recently, the U.S. definition of energy security has been oil-centric, a narrow view that provides an inadequate framework for U.S energy security policy in the 21st century. In June, 2014, the G-7 leaders and the EU noted that "energy security is not only domestic — it is dependent on interaction in the global interconnected market." In an effort to articulate "a modern and collective definition of energy security," the leaders endorsed a set of seven energy security principles, summarized as follows:

1. Development of flexible, transparent and competitive energy markets, including gas markets.
2. Diversification of energy fuels, sources and routes, and encouragement of indigenous sources of energy supply.
3. Reducing our greenhouse gas emissions, and accelerating the transition to a low carbon economy, as a key contribution to enduring energy security.
4. Enhancing energy efficiency in demand and supply, and demand response management.

5. Promoting deployment of clean and sustainable energy technologies and continued investment in research and innovation.
6. Improving energy systems resilience by promoting infrastructure modernization and supply and demand policies that help withstand systemic shocks.
7. Putting in place emergency response systems, including reserves and fuel substitution for importing countries, in case of major energy disruptions.

Putting Energy Security Principles into Practice

These principles, with their focus on well-functioning and competitive energy markets, diverse sources of energy supply, environmental protection, efficiency and infrastructure improvements, energy innovation, emergency response, and resilience are guiding the work currently being done by the Department of Energy in cooperation with the Department of State in response to Congressional language in the FAST Act (PL 114-94). For that analysis, DOE and State are evaluating modern energy security of the U.S. and its allies with the intent of ensuring that government review of actions that affect energy security accurately capture their full benefits and costs.

These principles also have relevance to today's discussion and are guiding our approach to energy security of our allies around the world and in the Western Hemisphere. The Department of Energy has already adopted several aspects of the G7 principles in our work as a founding partner of the CEM, which includes Canada, Mexico and Brazil and 20 other countries. The CEM focuses on three global climate and energy policy goals: 1) improving energy efficiency worldwide; 2) enhancing clean energy supply; and 3) expanding clean energy access. Large energy consumers such as the U.S. and Brazil can reduce the energy security challenges associated with energy consumption by leading efforts to reduce the intensity of demand for oil by enhancing fuel economy standards, updating appliance standards, and commercializing alternative fuel vehicles.

In addition to CEM, there are other multilateral forums where DOE is working to advance modern energy security principles:

- *Mission Innovation* is a global initiative of 20 countries committed to doubling government investment in clean energy research and development over five years. The first Mission Innovation Ministerial was held in San Francisco June 1-2 and included Mexico, Brazil, and Canada;
- *The Energy Climate Partnership of the Americas* is a primary multilateral mechanism for advancing the deployment of clean energy technologies and practices across the the Western Hemisphere. Focus areas include: renewables, efficiency, efficient use of fossil fuels, energy infrastructure, energy poverty, and adaptation;
- *The International Partnership for Energy Efficiency Cooperation* (IPEEC) is an autonomous partnership of nations founded in 2009 by the Group of Eight (G8) to promote collaboration on energy efficiency. Its membership now includes 16 of the Group of 20 (G20) economies, which represent over 80% of global energy use and over 80% of global greenhouse gas emissions;
- *The Carbon Sequestration Leadership Forum* (CSLF) is a Ministerial-level international climate change initiative focused on the development of improved cost-effective technologies for the separation and capture of carbon dioxide (CO_2) for transport and long-term safe storage. CSLF member countries represent over 3.5 billion people on six continents, approximately 60% of the world's population. Collectively, CSLF member countries comprise 80% of the world's total anthropogenic CO2 emissions; and

- Through *the G-7 and G-20 Energy Ministerials,* leading up to the Leaders Summits this year, DOE and the Department of State working to secure action by our partner countries to reduce fossil fuel subsidies, counter cybersecurity threats to our energy systems, enhance the safety of civil nuclear energy activities, and assist Ukraine's efforts to establish a greater degree of energy security.

Additional U.S. Contributions to Global Energy Security

Independent of the level of oil or natural gas prices, the changing energy landscape has prompted a variety of actions from the U.S. government and industry that have contributed to increased energy security for the U.S. Those actions are uniformly aimed at eliminating market frictions to allow for a more competitive and unrestricted market for energy commodities and developing the technologies that help to reduce the use, cost and environmental impacts of energy production, transport, processing and consumption. As a result, U.S. actions have also improved the energy security of countries around the world, including those in the Western Hemisphere. Examples are included below.

Strategic Petroleum Reserve. The Strategic Petroleum Reserve is an important insurance policy for the U.S. economy in the event of serious oil supply disruptions and the associated spike in domestic petroleum product prices. In spite of the changes in the U.S. oil production profile, the U.S. economy will remain vulnerable to significant international oil supply disruptions in the future, and the SPR will remain an important aspect of our energy security strategy. At the same time, changes in the U.S. oil production profile have reduced the ability of the SPR to respond to a future disruption. The changing geography of U.S. oil production has led to major changes in the domestic oil pipeline system and eliminated the use of overseas oil by inland refineries. Those new patterns of oil supply and demand among U.S. oil producers and refineries, along with associated changes in the U.S. midstream infrastructure, have significantly reduced the ability of the SPR to distribute incremental volumes of oil during oil supply interruptions. In response to these changes, the Administration recommended and Congress authorized an investment of up to $2 billion in pipeline and marine dock infrastructure to ensure that incremental oil from the SPR can enter the global market in sufficient volumes to minimize the economic harm associated with disruption-related price spikes.

These investments will also help the United States meet our International Energy Agency (IEA) treaty obligations to provide almost half of an IEA emergency release (because of our relatively high oil consumption among IEA countries), enabling a U.S. President to act decisively in response to a serious oil supply threat to safeguard economies in the U.S., the Western Hemisphere, and around the globe.

Natural Gas Markets. As noted, the increased production of natural gas in the U.S. has contributed in several ways to a more financially liquid and competitive international natural gas market, which has improved global energy security for U.S. neighbors, partners, and allies. The Natural Gas Act of 1938 (NGA) assigns the Department of Energy regulatory responsibility for the import and export of natural gas to or from a foreign country. The NGA, as amended, requires that any company that wishes to export LNG to any foreign country must first obtain authorization from DOE. For companies seeking authorization to export to non-FTA countries, DOE considers the economic, energy security, and environmental impacts of the proposed LNG exports, among other factors in order to make a public interest determination. As of June 2016, DOE has approved 19 LNG export applications for projects to export to non-FTA countries. By law, applications to export to FTA countries must be approved without modification or delay. Six projects (with authorization to export 10.93 Bcf/d to non-FTA countries) are

currently under construction or operational in the lower 48 states. By March of this year, US LNG producers had exported 11.5 Bcf of LNG to Barbados, Brazil, and India.

U.S. LNG producers are currently using innovative long-term contracts that increase the liquidity and competitiveness of the spot market. Specifically, U.S. contracts are structured to give buyers of LNG the option of paying only the liquefaction fee if they determine, based on market conditions that they do not need to actually take delivery of the natural gas. This differs from many traditional long-term contracts for LNG on world markets that do not offer this level of flexibility for buyers or sellers. The design of the U.S. contract provides greater protection for buyers from falling natural gas prices, reduces transaction costs of reselling unneeded LNG, and enables a more active spot market. In addition, U.S. LNG contracts are supplied at Henry Hub prices, the most competitive in the world.

Physical exports of U.S. LNG started in February of this year after completion of Trains One and Two at Sabine Pass in Louisiana; four more facilities are currently under construction. In the context of today's hearing, it is worth nothing that in the first cargoes moving from Sabine Pass were purchased by Brazil's Petrobras. The U.S. entry into world LNG markets in a significant way (volumes are only exceeded by those of Qatar), will also put downward pressure on European gas prices, and the competition for customers could constrain the non-competitive practices of Russia. The U.S. entry into world LNG markets is consistent with the G7 principles for increased energy security.

Elimination of Fossil Fuel Subsidies. The United States continues to support national and multilateral efforts to eliminate fossil fuel subsidies as a means for improving countries' economic and energy security. Fossil fuel subsidies make economies less efficient and more vulnerable to increases in oil and petroleum product prices. The recent fall in oil prices has allowed India, China, and other countries to reduce or eliminate some of their price controls and government expenditures on oil. President Obama called on Western Hemisphere leaders at the 2015 Summit of the Americas to aggressively phase out inefficient fossil fuel subsidies, and the Department of Energy, Department of State, and Department of the Treasury continue to work with countries in the region and around the globe to eliminate these market-distorting subsidies.

Reducing Oil Dependence. The U.S. plays a leadership role in developing and implementing clean and efficient transportation solutions. The U.S. maintains some of the most ambitious vehicle fuel economy standards in the world, which creates a regulatory model and a market for fuel-efficient vehicles that benefit consumers around the world. In addition, the Renewable Fuel Standard supports a robust and growing market for biofuels in the Western Hemisphere. Also, through our research programs, we are catalyzing the development and deployment of electric vehicles and other alternative vehicles.

Energy Innovation for Isolated Communities. Many isolated communities, such as those in the Arctic, Caribbean, and elsewhere depend on diesel as a fuel to generate electricity. Although diesel prices are lower now than they were two years ago, concerns about rising diesel prices in the future and the availability of more affordable and readily available renewable energy have created a strong interest transitioning away from diesel in isolated communities. The U.S. has committed to partnering with Canada and the Arctic Council to improve energy security for our northern communities. Since 2002, the Department of Energy has invested over $15 million in nearly 200 isolated community projects – $5 million in the last two years alone – through grants and technical assistance for renewable energy and energy efficiency projects that aim to address many of these high energy cost issues. During Prime Minister Trudeau's visit to Washington earlier this year, the U.S. and Canada declared an intention to deploy renewable alternatives to diesel fuel among indigenous communities. Some of the best practices

developed for Arctic communities will also be valuable for isolated communities not in the Arctic but facing similar challenges.

U.S. Energy Security Contributions in the Western Hemisphere

The strong standing of the U.S. in global energy markets has enabled us to play an important role in bringing stability and security to other countries, most notably through transfer of energy innovations and access to our energy resources.

North America. As noted, there is significant energy trade between Canada, the U.S. and Mexico. The first QER found that greater coordination, data exchanges, and regulatory harmonization will improve energy system efficiency and build resiliency to disruptions of the North American energy market. Toward that end, the Quadrennial Energy Review recommended actions that would further integrate North American energy markets. To identify gaps, best practices, and inconsistencies with regulations in the U.S., Canada, and Mexico, last October, the Department of Energy hosted two workshops focused on regulatory harmonization in the electricity sector. Stakeholders at these two meetings recommended specific actions, including a call for enhanced research and analysis on the value of electricity integration between our three nations. The next installment of the QER will make additional recommendations and provide some guidance for future policy actions with respect to electricity. An additional workshop will be held later this year to continue this effort and examine regulatory harmonization issues for the North American oil and gas sector.

Earlier this year, the energy ministers of the U.S., Canada and Mexico met in Winnipeg to discuss the importance of trilateral energy cooperation in North America and to initiate a Memorandum of Understanding Concerning Climate Change and Energy Collaboration. Areas of focus and activities agreed upon include:

- *Ensuring Reliable, Resilient and Secure Electricity Grids* by undertaking analysis of actions, policies, best practices and technologies that can enhance coordinated emergency response, protection against and mitigation of cybersecurity threats to energy systems, and grid resilience in the face of more frequent and severe natural disasters associated with climate change. Work is being conducted under several auspices: the QER, the US Grid Security Strategy, and the US-Canada Grid Security Strategy. Additional engagement of Mexico in grid security activities would help enable more robust energy infrastructure integration;
- *Expanding the North American Energy Data and Mapping* platform launched in February with the addition of renewable energy resource and cross-border infrastructure information on interactive maps in three languages;
- *Supporting Industrial Energy Efficiency* setting a North American target for industry implementation of latest energy efficiency standards (ISO 50001) , announced on June 2, 2016 at the CEM;
- *Enhancing Deployment of Low-Carbon Electricity by* conducting collaborative analysis to assess the impacts of increased integration of renewable energy resources across North American through the QER and the North American Renewables Integration Study. DOE has had formal QER stakeholder meetings in Mexico and Canada and both countries are contributing resources to the NARIS;
- *Accelerating Clean Energy Innovation and Development* through technology roadmap development for select focus areas to guide collaborative research and analysis. Areas include: smart grids, energy storage, carbon capture and unconventional natural gas; and

- *Reducing Methane Emissions through* collaboration on research, technology development, and operational practices to reduce methane emissions from oil and natural gas.

Later this month, the North America Leaders' Summit will take place in Ottawa. This meeting will build on long-standing trilateral cooperation between the U.S., Canada and Mexico on increasing collective energy security and addressing climate change through increased integration of our energy systems.

Caribbean and Central America. Many Caribbean and Central American nations face high energy costs driven by dependence on imported fossil fuels, and specifically diesel fuel for electricity and transportation. The Department of Energy has worked to address this challenge through information and best practice sharing, technical exchanges, stakeholder engagement, and government and investor roundtables. In addition, the U.S. supports the diversification of energy supplies in the Caribbean, including actions that will facilitate the introduction of cleaner forms of energy and the development of resilient energy infrastructure. Regional reliance on Venezuela's PetroCaribe financing has decreased significantly in recent years, as oil shipment volumes decline. Medium-term energy vulnerabilities from oil price volatility in the region underscores the importance of U.S. efforts to work with the Caribbean and Central America, fostering cleaner and more sustainable energy sectors.

South America. In South America, the Department of Energy is working to support a regional vision for energy security. After the President's visit to Argentina earlier this year, the Department of Energy met with Argentinian counterparts to discuss cooperation on unconventional shale resource development. In context of the International Framework for Nuclear Energy Cooperation, we have supported Argentina's leadership in the region on this topic. Despite the domestic challenges faced in Brazil, last November our Deputy Secretary of Energy Dr. Elizabeth Sherwood-Randall co-chaired a Strategic Energy Dialogue with her Brazilian counterpart to discuss opportunities for technical, regulatory and policy cooperation in clean energy, oil & gas development, the energy-water nexus and civil nuclear power. Most of the countries in South America signed the Paris Agreement in New York City. We are supporting these important partners on climate change issues as we move towards ratification this year.

Conclusion

We are committed to enhancing the energy security of our key allies and partners in the Western Hemisphere. As noted in the G-7 leader's communique in 2014, "energy security must be at the center of our collective agenda". The changing energy landscape in the U.S., the nature of global energy markets, and the need for accelerated innovation to transform global energy systems underscores the need for a broader, more collective approach to energy security. In this context, the U.S. is deeply engaged with our allies in the Western Hemisphere to promote energy security in a wide variety of ways, sustained over time, and irrespective of short term volatility in commodity prices.