

CONGRESSIONAL TESTIMONY

December 13, 2017

The Impacts and Future of North American Energy Trade

Written Testimony

Alan Krupnick

Prepared for the US House Committee on Energy and Commerce, Subcommittee on Energy

1616 P St. NW
Washington, DC 20036
202-328-5000 www.rff.org



TESTIMONY OF ALAN KRUPNICK, PhD
SENIOR FELLOW, RESOURCES FOR THE FUTURE
BEFORE THE ENERGY SUBCOMMITTEE OF THE
HOUSE COMMITTEE ON ENERGY AND COMMERCE¹

**Panel: North American Energy Trade:
Benefits and Opportunities for Improvement**

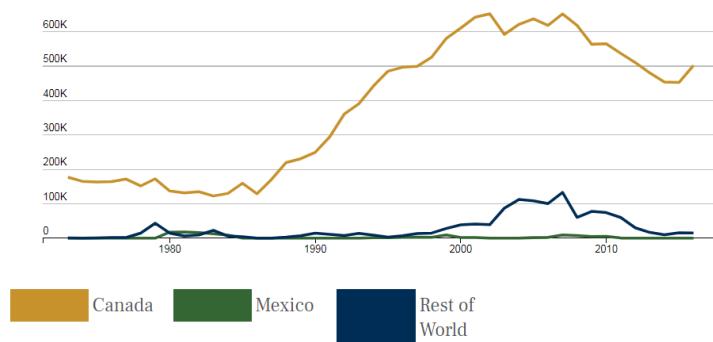
DECEMBER 13, 2017

INTRODUCTION

Canada, Mexico, and the United States have some of the most significant fossil energy resources in the world, both individually and even more so collectively. With technological advancements in unconventional gas and oil development, oil sands production, and offshore drilling, North America can be the new world energy powerhouse. As North American production has grown, so has the interconnectedness among the three countries' energy sectors—a change that has benefitted the three countries greatly in terms of environmental outcomes, economic outcomes, energy security, and more. Energy trade and regulatory alignment have allowed the three countries to reduce their dependency on energy from other regions, reduce energy and electricity costs, and affordably mitigate environmental impacts.

Figures 1 and 2 (illustrating US trade in natural gas with its neighbors to the north and south) give a snapshot of these connections. The US exports almost all of its natural gas exports to Mexico and Canada, while Mexican and Canadian crude oil has increasingly replaced US imports from other countries throughout the past two decades (Figure 3; note that the scale of volume differs across the three figures).

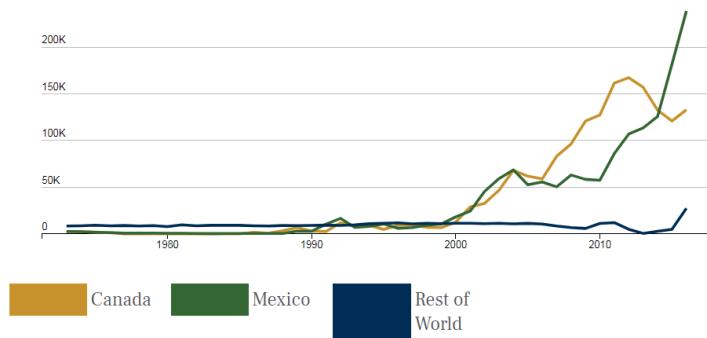
Figure 1. US Natural Gas Imports, 1973–2016



Note: Import volumes in MBOE (one thousand barrels of oil equivalent). Data from the US Energy Information Administration.

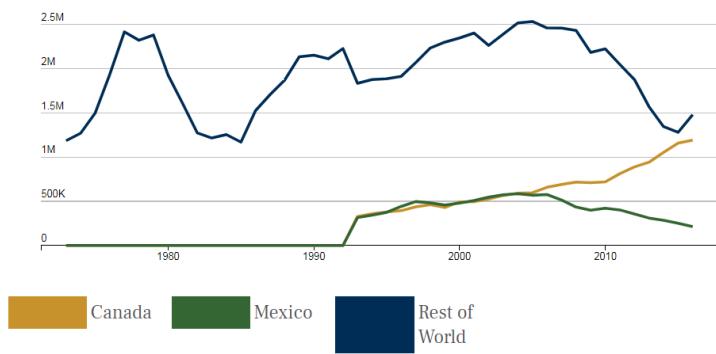
¹ Drafted with Isabel Echarte, Resources for the Future.

Figure 2. US Natural Gas Exports, 1973–2016



Note: Import volumes in MBOE (one thousand barrels of oil equivalent). Data from the US Energy Information Administration.

Figure 3. US Crude Oil Imports, 1973–2016



Note: Import volumes in MBOE (one thousand barrels of oil equivalent). Data from the US Energy Information Administration.

While private energy and capital markets throughout North America will drive the development of expanded continental energy and trade, there is a substantive role to be played by governments. Coordinated policies can effectively foster economic growth, technological development, and environmental protection, while meeting the political needs of each country. A more purposeful and formalized North American energy strategy would serve to shape a shared vision of the areas where government policy can effectively be deployed to coordinate infrastructure development and project financing; reduce barriers to trade, investment, and technology; and develop harmonized approaches to reducing continent-wide greenhouse gas emissions.

President Trump's commitment to become energy independent from "the OPEC [Organization of Petroleum Exporting Countries] cartel and any nations hostile to our interests" can also be seen as an opportunity for greater North American cooperation on energy of all types, which entails a buildup of transportation and infrastructure and provides incentives to

cooperate on environmental protection and safety.² These opportunities are particularly relevant in light of a number of changes taking place in North American energy production and consumption. Some estimates have North America becoming self-sufficient, in that the countries will produce more liquid fuels than they consume, by 2020.³ Given the shale boom, the United States will become a net energy exporter, possibly by 2026. Canada, however, will likely continue to be a major oil supplier for the United States, which imports oil on net. Mexico became a net importer of hydrocarbons in the second half of 2015, becoming particularly dependent on the United States for natural gas and diesel.⁴ Although Mexico's energy reform seeks to close this deficit in the long run, the country will remain dependent on these imports for the foreseeable future.

The three countries are positioned to further benefit from continued interconnectedness and coordination efforts in the energy and electricity sectors. With renegotiation of the North American Free Trade Agreement (NAFTA) underway, several opportunities exist to enhance trilateral, bilateral, and subnational energy-sector cooperation and policy alignment. Envision a world where the three North American countries act as a bloc to trade freely among themselves in all things energy, are regulated in a cost-effective and coordinated system—and rival every other nation or bloc in its ability to influence world markets for oil and gas. While an unlikely outcome given the current political context, the three countries have much to gain from increased cooperation and alignment.

With these potential gains in mind and before the 2016 presidential election, RFF – and its partners in Canada (International Institute for Sustainable Development), Mexico (Instituto Tecnológico Autónomo de México), and two host institutions (Boise State University and the University of New Mexico) with funding from the Department of Energy – held a series of workshops to identify opportunities to harmonize economic and environmental policies affecting electricity supply and interconnections as well as oil and gas production and its trade. These workshops were attended by government officials from the three countries, industry, environmental groups, think tanks, and academic experts. A background paper on current oil and gas policies with workshop recommendations was produced,⁵ and a report focusing on workshop recommendations for improving North American electricity is available as well.⁶

² White House. 2017. "An America First Energy Plan." <https://www.whitehouse.gov/america-firstenergy>.

³ American Petroleum Institute. 2017. "North American Energy."

<http://www.api.org/~media/Files/Policy/Trade/North-American-Energy-Onepager.pdf>

⁴ Lajous, Adrián. 2017. "Del oro negro al número rojo: La dependencia de las importaciones de hidrocarburos de México." *Nexos*, February 20. <http://www.nexos.com.mx/?p=31468>.

⁵ Krupnick, Alan J., Amin Asadollahi, Juan Carlos Belauste Guigoitia Rius, Kristin Hayes, Isabel Echarte, Philip Gass, and Daniella Echeverria. 2017. "North American Energy Integration: Assessing Oil and Gas Policy Issues ahead of NAFTA Renegotiation." RFF Report. <http://www.rff.org/research/publications/north-american-energy-integration-assessing-oil-and-gas-policy-issues-ahead>.

⁶ Krupnick, Alan J., Daniel Shawhan, and Kristin Hayes. 2016. "Harmonizing the Electricity Sectors across North America: Recommendations and Action Items from Two RFF/US Department of Energy Workshops."

<http://www.rff.org/research/publications/harmonizing-electricity-sectors-across-north-america-recommendations-and>.

Below, we describe energy and electricity policy harmonization and its benefits. We then highlight four areas where significant harmonization has occurred and should occur in the future. Last, we provide some of the most relevant recommendations from our reports.

WHAT DOES HARMONIZATION MEAN?

In recent years the governments of Canada, the United States, and Mexico have increasingly worked toward harmonizing energy-related regulations (including many on environmental safety and climate change) across the North American continent. This harmonization – and we use this term in the broadest sense – has taken a number of forms, ranging from data and technology sharing to full-fledged planning and policy alignment, and has been driven by a desire to reduce regulatory complexity, foster additional cross-border transport of resources, address potential economic complications due to unaligned markets, and collaborate on shared objectives. Collaboration has been driven by a desire to address any potential economic and market barriers due to an unaligned market and a desire to collaborate on shared objectives, such as the announced intentions to work together on the implementation of the Paris Agreement and on a host of climate, energy efficiency, pollution, and natural resource issues.

Harmonization is beneficial if it facilitates a worthwhile activity, such as power generation or emissions reductions, occurring where it can be accomplished at the lowest cost. Linking emissions cap-and-trade programs, enabling the free flow of power, and equalizing the marginal tax rate on generation, for example, are harmonization actions that can result in mutual benefit. Harmonization is also advantageous if it reduces transaction costs. If regulatory requirements are sufficiently similar on both sides of a border, for instance, companies can use just one set of procedures for complying with them, saving the expense of having to follow two different sets of procedures. Finally, harmonization can be constructive if it takes the form of coordinated decision-making that makes additional options possible. Considering the integration of assets and markets on both sides of the border through coordinated decision-making enables market access and system efficiency gains. For example, deciding to meet a system's needs with a new transmission line from across the border instead of a new power plant is possible only with coordination and very tight regulatory arrangements. These factors can contribute to improved outcomes for the three countries, including energy security, lower private sector costs, lower costs to consumers, and improved environmental and social outcomes.

Many examples of harmonization already exist in North America. For instance, in 2014, the three countries signed a memorandum of understanding on the sharing of energy-related data and definition of terms.⁷ The linked greenhouse gas cap-and-trade programs of California and Québec—soon to be joined by Ontario and Manitoba and discussions with Mexico ongoing—provide an example of broad policy integration. More complete policy harmonization is illustrated by Canadian automobile emissions and fuel economy policies, which mirror those of the United States in stringency over time, and railroad safety standards. Agreements for oil and

⁷ “Memorandum of Understanding among the Department of Energy of the United States of America and the Department of Natural Resources of Canada and the Ministry of Energy of the United Mexican States Concerning Climate Change and Energy Collaboration.” <http://www.nrcan.gc.ca/energy/international/nacei/18102>.

gas extraction along the Mexico-US Gulf of Mexico border likewise expanded opportunities for offshore drilling for both countries.⁸

THE BENEFITS OF HARMONIZING ENVIRONMENTAL POLICY

Over the past few years, Canada, Mexico, and the United States have cooperated on climate regulations in a number of ways, most notably through the commitments made in June 2016 as part of the North American Climate, Clean Energy, and Environment Partnership Action Plan,⁹ which includes commitments to reduce methane emissions from the sector by 40–45 percent by 2025 and collaborate on implementation of the World Bank’s Zero Routine Flaring by 2030 Initiative. Canada published its proposed methane regulations for the oil and gas sector earlier this year. And Mexico published regulations in 2016 for methane emissions in its upstream oil and gas operations, and addressed methane in recently published guidelines for unconventional oil and gas development. The US, however, has recently placed its attention on repealing its Environmental Protection Agency and Bureau of Land Management methane regulations, though a number of oil and gas producing states have sought to regulate methane, including Colorado, California, Wyoming, Utah, North Dakota, Ohio, and Pennsylvania.

US environmental rollbacks under Trump impose a number of risks on these trade relationships and their benefits. Methane policies, for example, will be imposed in different jurisdictions (states, provinces, and nations) at different times, creating market distortions as some areas will not account for the externalities—in terms of lost gas resources and revenue as well as increased climate impacts. Without more harmonized policies, the three countries forgo the potential to decrease transaction costs. Furthermore, Mexico and Canada may be hesitant to pursue these aligned policies in the future, as the US is unlikely to follow through. And the US position, which has created competitiveness issues with its neighboring countries as they implement carbon pricing schemes and methane regulations, may strain trade relationships and spur pressure within Mexico and Canada to pursue more protectionist policies.

Progress on continental-scale greenhouse gas emissions policies will be slow in the absence of US climate leadership. That said, there is no indication that the governments of Canada and Mexico will back away from the Paris Agreement or carbon policies, such as the existing carbon pricing system in Mexico, the announced federal carbon price backstop in Canada, subnational carbon taxes and caps in Canadian provinces and some US states, and tighter fuel economy standards in all three countries.

POTENTIAL FOR IMPROVING INFRASTRUCTURE PLANNING AND SITING

The shale gas revolution increased US production from 18.1 trillion cubic feet (tcf) in 2005 to 24.4 tcf in 2013 and is expected to increase to 35.5 tcf by 2040, under the AEO2017 reference case. This growth turned the US from an expected major net importer of gas to a net exporter, and has led to a decrease in natural gas prices of about \$2-4 per thousand cubic feet

⁸ See US-Mexico Transboundary Hydrocarbons Agreement.

⁹ White House. 2016. “North American Climate, Clean Energy, and Environment Partnership Action Plan.” <https://obamawhitehouse.archives.gov/the-press-office/2016/06/29/north-american-climate-clean-energy-and-environment-partnership-action>.

(mcf), against a price that would have been around \$6-8 per mcf. Getting all this gas to market has required its own revolution in pipeline use and construction – a revolution still on-going. New energy infrastructure—including pipelines, transmission lines, and more—is fundamental to the efficient integration of North American energy markets so the three countries can each see the benefits of the fracking revolution.

Localized and grassroots opposition to new pipeline infrastructure, in all three countries, complicates the issue of permitting and siting of infrastructure. And though many have construed pipeline construction to be a jobs versus environment issue, public participation and environmental and social outcomes can be enhanced alongside the improvements to the permitting and siting process. In fact, some of the issues that lengthen the permitting process result in adverse environmental outcomes—in previous House hearings, experts have testified that the Environmental Impact Statement (EIS) process has increasingly served to prevent litigation—by leaving no “pebble unturned,” conducting lengthy, unnecessary studies—rather than inform regulators and the public of actual environmental and health hazards of a project.¹⁰ The result, as was argued at the hearing, is a costly and lengthy process for companies and a convoluted and confusing process for the public.

Decisions about new infrastructure, built both within countries and across borders, should furthermore include a role for cost-benefit analysis, examining how infrastructure plays into the emissions of greenhouse gases, improves system affordability and reliability of electricity, and affects the well-being of those directly impacted by construction. Risks associated with infrastructure include those to health and safety, the local environment, and climate change, as well as whether and how to make infrastructure more resilient to worsening weather patterns, cyberterrorism, and physical terrorism. Creating better metrics for reliability and resiliency are necessary components for solving these problems.

Potential exists for the three nations to strike a balance among these competing interests by not only providing certainty for industry and regulators—in terms of the length and breadth required for environmental impact statements—but also conducting consistent and thorough reviews to ensure that environmental and societal interests are adequately taken into account. The FAST 41 process is just one example of methods for streamlining federal and state infrastructure permitting processes without sacrificing (and while perhaps improving) social and environmental outcomes.¹¹ At minimum, Canada, Mexico, and the United States would benefit from learning from each other’s best practices in this area, such as the US’s FAST 41 process. In the longer term, coordinating policies regarding environmental impact statements and public input could improve outcomes while decreasing the regulatory burden on the oil and gas industry.

¹⁰ Oversight Hearing, “Modernizing NEPA for the 21st Century” before the House Committee on Natural Resources, 115th Cong. (2017).

¹¹ In the Fixing America’s Surface Transportation Act (FAST Act), a section (referred to as FAST 41) was devoted to streamlining the interagency process by creating a Permitting Council to coordinate permitting decisions across multiple federal agencies for selected major projects, including pipelines. The Permitting Council also plays an arbitration role where there are conflicts between agencies.

SAFELY AND ECONOMICALLY DEVELOPING OFFSHORE RESOURCES

Mexico and the US have collaborated in recent years to improve the development of offshore energy resources in the Gulf of Mexico. The two countries have signed agreements that expand areas for drilling, have worked to jointly improve safety and align regulations, and have shared knowledge on regulating offshore oil and gas development.

The most prominent example of coordination and cooperation in this area is the US-Mexico Transboundary Hydrocarbons Agreement. A moratorium area existed—1.4 miles on each side of a 135-mile section of the maritime border—until the agreement became effective in order to prevent oil and gas development on one side of the border from affecting the other. If the host rock is sufficiently permeable, hydrocarbons can flow across political jurisdictions. In such a setting, extraction on one side of the border can adversely impact extraction on the other side. In the Gulf of Mexico, this is likely to occur. The agreement recognizes the possibility that a reservoir may exist across the continental shelf boundary in the Gulf of Mexico and establishes a framework for developing such resources cooperatively. The agreement encourages arrangements such as unitization agreements, under which the firms extracting from the pool—collectively referred to as the unit—all agree to have one party take charge of decisions regarding extraction by firms in the unit. Despite the perception that trade and policy coordination harms American businesses, the oil and gas industry has consistently proven that such relationships improve business opportunities.

The agreement furthermore spurred coordination between Mexico and the United States regarding offshore safety in the Gulf of Mexico. This agreement also provides for joint inspection teams to ensure compliance with safety laws and regulations, as well as joint review of and approval for agreement governing exploration and development of transboundary reservoirs. Such coordination is key in ensuring the safe development of resources as well as lower transaction costs for companies that might choose to operate on both sides of the border.

ELECTRICITY

Electrically, Canada and the US are highly interconnected and highly integrated. Most of western Canada and the US share a synchronous grid, i.e. one where electricity flows freely across the border and is inherently interdependent. These interconnections have become essential to the US bordering states in terms of reliability and emissions, and there are still opportunities for improvement of the harmonization of electricity systems between Canada and the US. Mexico and the US are much less electrically interconnected and integrated. The Mexican and US grids are not synchronous, and there are fewer institutions and traditions of shared grid governance between Mexico and the US than there are between Canada and the US. However, there is potential for Mexico and the US to become much more electrically connected and integrated, in part as a result of Mexico's current electricity sector reforms and in part because of Mexico's location being conducive to efficient wind and solar power generation.

In the US and Canada, the control area operators¹² are typically either regional transmission organizations or large vertically integrated utilities elsewhere.¹³ In the US, the California Independent System Operator is synchronously connected with northern Baja California. The Electric Reliability Council of Texas (ERCOT) and El Paso Electric are the other two US control area operators with high-voltage connections to Mexico. In Mexico, the control area operator is the Centro Nacional de Control de Energía (CENACE), which is now part of the Secretariat of Energy (SENER).

There are six kinds of harmonization required for minimizing the total cost of system operation: harmonization of operational decision-making, reliability processes, markets, taxes, transmission prices, and duties on electricity trade.

- 1) *Harmonization of operation decision-making.* Minimizing the combined generation costs across two or more control areas requires merging their operational decision-making because calculating the least expensive set of generators to use in each day, hour, and moment requires all of the generators (and other controllable elements of the grid) to be considered in the same optimization. This operational decision-making addresses not only the need for real power but also the needs for proper voltage, proper frequency, and crucially, reliability. The two international borders, so far, have impeded mergers of operational decision-making between the control areas on opposite sides of them. There have been no such mergers of decision-making for dispatch across either international border. In fact, current Canadian law prevents Canadian control area operators from participating in such mergers. A pair of neighboring control area operators that have not merged their operational decision-making can still reduce the combined costs of their operation by more closely coordinating it.
- 2) *Reliability Coordination.* Maximizing reliability requires coordination between control areas, including between those on different sides of the international borders. Coordination for reliability is similar to coordination for cost-minimization, but with more of a need for instant communication and instant coordinated action. One type of US-Canada reliability coordination that can be bolstered, according to the Canadian Electricity Association, is the sharing of information about natural and human-made threats to grid reliability.¹⁴

¹² The grid that serves most of Canada, the US and Mexico consists of dozens of what can be called “control areas.” Within each control area, an organization that can be called a “control area operator” or balancing authority decides how much power (real power) and voltage support (reactive power) each generator should provide at each moment in order to meet demand and maintain adequate reliability at approximately the minimum possible cost. However, the control areas, even the ones on opposite sides of an international border, are connected with each other, either synchronously or asynchronously. This means that they can harmonize, even merge, their markets and operation. A higher degree of such harmonization can reduce total costs. It can reduce generation costs, the frequency and duration of costly reliability failures, and the total amount of costly generation capacity needed.

¹³ North American Electric Reliability Corporation. 2014. “Regions and Balancing Authorities.” http://www.nerc.com/comm/OC/RS%20Landing%20Page%20DL/Related%20Files/BA_Bubble_Map_20140630.jpg.

¹⁴ Canadian Electricity Association. 2014. US Quadrennial Energy Review: Comments of the Canadian Electricity Association. September 2014.

- 3) *Integration of Markets.* In order for operational decision-making of two control areas to be merged, some of their markets too must be merged.
- 4) *Harmonization of Taxes and Externality Charges.* Minimizing the combined generation costs also requires harmonizing the taxes and externality charges on generation. The taxes on generation include those on fuel and on generator profits. The externality charges on generation include those on health and environmental damage, that may be collected via an emission fee or a cap-and-trade program. The portion of taxes not based on externalities (income and fuel taxes), should be equal on the two sides of the border to minimize combined total cost.
- 5) *Transmission Pricing.* The transmission price from any particular location on the grid to any other particular location on the grid should equal the difference in the locational marginal prices between those locations. In turn, the electricity price (locational marginal price) at each location on the grid should equal the current marginal cost of increasing the quantity of power supplied to that location. These prescriptions are standard because they induce generation to occur where it is least costly. However, the prescription for transmission pricing is often violated; additional transmission charges are imposed across some interfaces, particularly for flows that cross a boundary between adjacent control areas, including control areas in two different countries. This tends to increase the total cost of generation by causing higher-cost generators to be used in place of lower-cost generators.
- 6) *International Trade Duties.* International import or export duties on electricity are a special type of additional transmission charge. An example of such a charge is the Canadian Federal Goods and Services Tax that is imposed on imports of electricity from the US to Canada except if the electricity was originally sourced from Canada, is stored for example in a US hydropower reservoir, and then is reimported to Canada.¹⁵

RECOMMENDATIONS AND ACTION ITEMS

Oil and Gas

Below we include a number of recommendations from our 2017 report that we believe may be relevant to Congress for strengthening North American energy trade and its benefits.¹⁶ These recommendations stem from RFF research on North American energy issues as well as a 2016 workshop held at RFF. We include those recommendations we consider the most relevant for Congress to consider, though others were made in the report as well.

- *First, do no harm and maintain existing cooperation and coordination on energy trade and regulation.* Maintaining the progress the three countries have made will ensure continued success in North America's endeavor to become more energy secure.

¹⁵ Canada Customs and Revenue Agency. 2002. "Customs Notice N-438 Procedures for the Importation of Continuous Transmission Commodities."

¹⁶ Krupnick, Alan J., Amin Asadollahi, Juan Carlos Belausteguiotia Rius, Kristin Hayes, Isabel Echarte, Philip Gass, and Daniella Echeverria. 2017. "North American Energy Integration: Assessing Oil and Gas Policy Issues ahead of NAFTA Renegotiation." RFF Report. <http://www.rff.org/research/publications/north-american-energy-integration-assessing-oil-and-gas-policy-issues-ahead>.

- *Describe ways the three countries are already collaborating on energy and climate issues, and maintain all non-duplicative interactions.* Workshop participants were all aware of various information-sharing and collaborative forums across the United States, Canada, and Mexico, and subnational governments, but few, if any, participants (including the organizers) were aware of the full suite of conversations already taking place. Capturing this information in one place, and characterizing which collaborations are already happening in which venues, would be a valuable step toward understanding where the gaps are, which harmonization opportunities might need more conversation or structure and which, if anything, are already being addressed adequately. It bears saying that continuing these cooperative and collaborative interactions is important for each of the countries' economies and their environments
- *Define what constitutes a subsidy to the oil and gas sector, harmonize this definition among the three countries, and continue action to eliminate fossil fuel subsidies.* In June 2016 at the North American Leaders' Summit, the three countries agreed to end "inefficient" fossil fuel subsidies as part of G7 commitments. This work is difficult to move forward without clearer information about the types, costs, and performance of various subsidies, and generating this type of information is a seemingly necessary prerequisite for fulfilling this commitment.
- *Examine the extent to which infrastructure permitting processes are similar or differ across the three countries, specifically as this relates to EISs, with the longer term goal of harmonizing these processes to reduce regulatory costs and improve public participation.* These processes should be improved and better aligned to decrease transaction costs and delays, as well as to better address country and cross-border environmental and indigenous/First Nation concerns. These reviews should adopt consistent methods to account for the social cost of carbon.
- *Improve regulatory alignment and information sharing regarding methane emissions.* Workshop participants believed it is in the United States' interest to not only implement but expand its existing methane regulations. Regulatory certainty and alignment could help industry prepare and make appropriate technology and investment decisions. Governments can work together toward a common vision of reducing and eventually eliminating wasteful practices that vent or flare methane where it could be captured and sold. These aims create skilled labor opportunities while reducing the sector's environmental footprint.
- *Continue energy technology innovation exchanges such as on carbon capture utilization and storage (CCUS), methane measurements, and water-saving technologies. Leverage the three countries' investments through joint funding for research and development.* Improvements in technology can drive down both company and consumer costs. Joint funding would also go a long way toward decreasing the marginal cost of research and development, benefiting all three countries.
- *Provide Mexico with certainty regarding natural gas and oil products supply, and further policies that provide the three countries with increased energy and economic security.* The United States can maintain and perhaps expand its market for its energy products,

while Mexico can ensure energy and electricity reliability affordably. North America as a whole would benefit from its increased energy independence from the rest of the world.

Electricity

The electricity workshop attendees highlighted a number of areas which might benefit from legislative attention. We include those we consider the most relevant for Congress or the Administration to consider, though other recommendations were made in the report as well.¹⁷

- Assess whether US permitting of proposed cross-border transmission infrastructure investments can be streamlined.
- Examine whether disagreements over cost allocation may prevent beneficial future cross-border infrastructure from being built. If so, attempt to establish a process for determining cost allocation that will prevent such disagreements. Calculating compensation for those who are likely to be hurt by such infrastructure could further improve the effectiveness of such a process.
- Improve and apply benefit-cost analysis methods and standards for potential new transmission lines and other investments that increase cross-border transmission capacity.
- Consider funding the building of a North American energy market and policy model that incorporates an electricity sector and a natural gas sector, at a minimum. Such a model would be useful for infrastructure planning, and to test the costs and benefits of various policy proposals. Data needs for such a model are high.
- Analyze the possibilities of Clean Air Act section 115 language for incorporating another country's damages and costs into US benefit-cost calculus for rulemaking purposes. Look for similar provisions in Mexico's and Canada's statutes.
- Align (or eliminate) federal permitting requirements for electricity exports.
- Consider reducing the restrictions on participation by US federal entities, such as the Bonneville Power Administration, in open, competitive markets. Reducing those restrictions could reduce total system-wide costs and, for entities near an international border, make cross-border flows more economically efficient. An impediment is that such participation could subject these entities to US Federal Energy Regulatory Commission (FERC) regulation that they may wish to avoid.
- Foster closer coordination of electricity system operation and planning. Closer cross-border coordination would provide cost reductions and reliability improvements. Some specific targets include wide-area planning, improved benefit-cost analysis, streamlined project approvals, and an agreed-upon method of calculating cost allocations. In addition, regulators could enable greater coordination by modifying incentives for utilities.
- Develop a continent-scale plan for facilitating renewables. To make renewables as efficient and desirable as possible, such a plan could examine the locational advantages

¹⁷ Krupnick, Alan J., Daniel Shawhan, and Kristin Hayes. 2016. "Harmonizing the Electricity Sectors across North America: Recommendations and Action Items from Two RFF/US Department of Energy Workshops." <http://www.rff.org/research/publications/harmonizing-electricity-sectors-across-north-america-recommendations-and/>.

of such systems on a North American scale, accounting for transmission and possibly habitat issues.

- Create a North American energy security blueprint. Such a blueprint could have an outside component (e.g., how a North American energy bloc would be advantageous from an energy security perspective). It should also have an internal component (e.g., examining the risks to Mexico from much greater reliance on US natural gas).

CONCLUSION

Individually and together, Canada, Mexico, and the United States have much to gain from increased energy policy harmonization and coordination—including on other infrastructure and climate issues, electricity coordination, offshore drilling, and more. The three countries ultimately would best be served by continued and strengthened collaboration on oil and gas development and electricity capacity and reliability planning and institution building, while addressing environmental concerns. The ongoing NAFTA talks should aim, at the very least, to do no harm. But because the three countries stand to gain so much from strengthened coordination—including the potential for near-term energy independence—the United States should work to expand and improve on our existing successes in this area.

Existing relationships and the benefits they provide, however, are not a foregone conclusion, as the NAFTA re-negotiation process has highlighted. For example, trade with the United States may become an energy security issue for Mexico, as the country has come to rely more heavily on imports of natural gas and oil products (namely, gasoline) from the US. Without certainty from the United States regarding this supply, Mexico may seek to diversify its imports and increase production, decreasing the market for US energy in the long run. The United States would benefit by having a market for its energy products, and Mexico would benefit from reliable and cost-effective energy options. North America as a whole would benefit from its increased energy independence from the rest of the world.

As the US continues to roll back climate regulations, its neighbors may grow increasingly concerned about competitiveness issues, limiting potential future cooperation. Mexico and Canada may likewise become hesitant in efforts to align environmental policies—as the countries agreed to do regarding methane pollution—limiting opportunities that might improve environmental outcomes at lower costs to the private sector and consumers.

Despite the Trump administration’s actions and rhetoric, as well as related uncertainties about trade and hemispheric cooperation, a number of economic realities are likely to favor a free trade agenda—at least for energy commodities and related investments, which are likely to be resistant to political winds. Indeed, on the political front, the Trump Administration’s Summary of Objectives for the NAFTA Renegotiation (released ahead of the first round of talks) emphasized furthering energy-market access and “support[ing] North American energy security.” Where NAFTA is concerned, the growing mutual benefits derived from energy trade between the United States and Mexico as well as long-established relationships between the United States and Canada argue for a very careful and deliberate renegotiation of the

agreement—recognizing that the current accord has worked to the advantage of all countries with regard to energy.

Ultimately, the fates of the Mexican, Canadian, and US energy sectors are entwined and appear likely to be so for years to come. This interdependence comes with risks—but fewer than with isolation. The three countries would best be served by continued and strengthened collaboration on oil and gas development and electricity generation, providing all three countries with secure supply while appropriately addressing environmental concerns.