



## Highlights 2016 Canadian Energy Industry: Updates and Insights February 2, 2016, Westin Hotel, Ottawa

This report provides the highlights and observations from the Energy Council's *Updates and Insights* event held on February 2, 2016. This event is typical of each of the events and activities hosted by the Energy Council of Canada, aiming to contribute to achieving our vision and fulfilling the four strategic goals adopted by the Board of Directors in November 2015.

The program for the *2016 Canadian Energy Industry: Updates and Insights* event provided the latest information, trends and insights on components of Canada's energy system involved in energy supply. Policy-makers, representatives of the diplomatic corps, and the Ottawa energy community learned about the latest developments, issues and opportunities in Canada's energy sector from the leaders of industry associations. Recent reports issued by the World Energy Council were profiled which offer information on recent energy trends and issues, including: the *2015 Energy Trilemma Index: Benchmarking the sustainability of national energy systems*; *The road to resilience - managing and financing extreme weather risk*; and, *E-storage: Shifting from cost to value 2016*. Our members and energy associates gained significant value from the presentations, the networking opportunities, and from profiling their organizations through their roles as session chairs and moderators.

The first *Updates and Insights* event, held in February 2015, presented the latest developments, trends, and issues in Canada's energy sector from an industry perspective. The half-day program covered the entire "energy value chain" from supply through to energy end-use plus sessions on opportunities for partnerships with Canada's First Nations and on the views of industry on their human resources requirements such as critically-needed skills. The Honourable Kevin Lynch, Vice Chair, Bank of Montreal Financial Group presented his insights and thoughts in the closing presentation entitled *Trends, Troughs and Peaks: How Should Canada Adapt to the Transforming World of Energy?*

### 2016 Energy Industry: Updates and Insights – Focus on Energy Supply

The *2016 Updates and Insights* event focused on the supply segments of Canada's energy system: energy supply, transportation and transmission, energy storage, human resources, and issues related thereto. Keynote addresses opened and closed the program. Ms. Kim Rudd, Parliamentary Secretary to the Honourable James Carr, Minister of Natural Resources Canada set the stage with opening remarks on behalf of NRCan. Two sessions during the afternoon provided updates and insights from the leading executives of Canada's major energy associations, starting with the oil and gas sector, followed by the electricity sector. The highlights and impacts on the Canadian energy

#### The Energy Council of Canada

**Our Vision:** *An affordable, stable and environmentally-sound energy system providing for the greatest benefit for all Canadians*

**Our Mission Statement:** *The Energy Council of Canada acts to bring its Members and the energy stakeholders together to forge a better understanding of Canada's energy opportunities and issues with the aim to optimally shape an affordable, stable and environmentally-sound energy sector for the benefit of all Canadians*

**Our Guiding Themes:** The Energy Council of Canada and its members believe that the use of energy to produce goods and services and the production and delivery of energy must be managed sustainably. Four themes guide our activities to this end:

- **Energy security:** management of energy supply, reliability of energy infrastructure, and meeting current and future demand
- **Energy equity:** accessibility and affordability of energy supply
- **Environmental sustainability:** supply and demand-side energy efficiencies, development of energy supply from renewable and low-carbon sources
- **National competitiveness and prosperity:** innovative, robust, and flexible value chain for Canadian energy commodities and products destined for local, regional and global markets as key contributors to Canada's prosperity.

sector arising from the outcomes from the Paris Conference of the Parties (COP21) and actions underway across the oil and gas sector, were presented by Ms. Fiona Jones, General Manager Sustainability, Suncor Energy Inc.. Mr. Michael Cleland, the 2015 recipient of the Energy Council’s Canadian Energy Person of the Year Award, provided personal insights on emerging Canadian energy issues in the year ahead in a presentation entitled “Canadian Energy at a Crossroads”.

Session	Panel of Industry Associations, Speakers
Federal Perspectives on Energy in Canada in 2016 and Beyond	Ms. Kim Rudd, Parliamentary Secretary to the Minister of Natural Resources Canada
Energy Supply: Oil, Gas	CAPP, CEPA, CGA, CAODC, NOIA
Energy Supply: Electricity	CanCORE, CEA, CEPA, EHRC, ESO
Outcomes from COP-21, Implications for Canada, Industry Actions Underway	Fiona Jones, General Manager Sustainability, Suncor Energy Inc.
Closing Address: <i>Canadian Energy at a Crossroads</i>	Michael Cleland, 2015 Canadian Energy Person of the Year

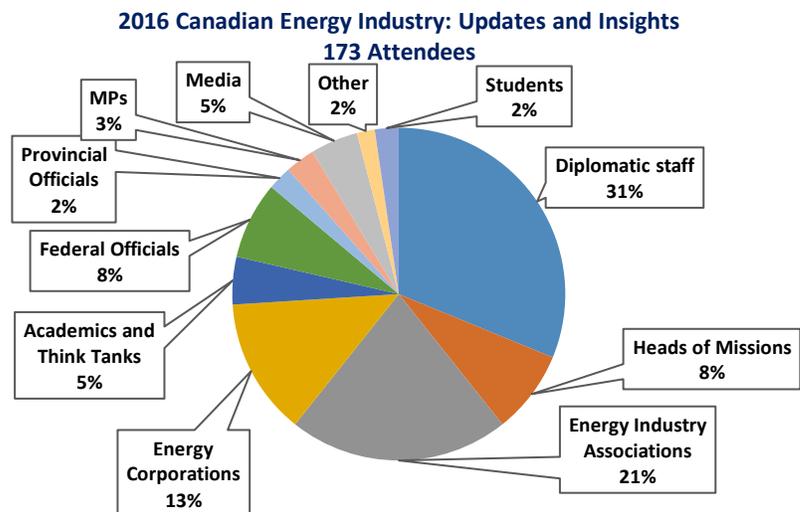
**Broad Cross-section of the Ottawa Energy Community in Attendance**

Bringing people with interests in energy together to hear and meet leaders from Canada’s energy sector is one of the Energy Council’s principal objectives for this annual event.

The event attracted 173 participants from 102 separate organizations. A highlight this year was the strong representation by the Ottawa diplomatic community. Representatives of 51 countries attended including 15 Ambassadors or High Commissioners.

**Highlights – Presentations and Dialogue**

The Energy Council provides reports on the highlights and main message from each of its events and activities. These reports aim to inform the energy community of what was said and what was of interest to the audience as evidenced by the dialogue following the presentations<sup>1</sup>. General observations from the presentations and the dialogue with the attendees concludes the report.



**Opening Remarks - Ms. Kim Rudd, Parliamentary Secretary to the Honourable James Carr, Minister of Natural Resources Canada**

Kim Rudd’s opened by passing along greetings on behalf of the Honourable Jim Carr, Minister of Natural Resources. Parliamentary Secretary Rudd discussed the opportunity to remake a stronger and more resilient energy sector from the challenging times that we are currently witnessing for energy producers and the rest of Canada’s economy, conveying a message of “cautious optimism”.

Minister Carr’s mandate and the Government of Canada’s vision is to ensure our energy sector remains a source of jobs, prosperity and opportunity while developing sustainable practices and low-carbon processes. Throughout her speech, Parliamentary Secretary Rudd emphasized the need to consult and collaborate with provinces, territories, Indigenous groups, stakeholders, and industry representatives, as well as invest in innovation, energy efficiency, and renewable energy. The Government of Canada has begun to strengthen the credibility of environmental assessments

<sup>1</sup> Each of the presentations and speaking notes are made available at [www.energy.ca](http://www.energy.ca) with the permission of the author.

and regulatory processes, and has introduced new processes to ensure that all projects are based on scientific evidence and clearly benefit the public. The National Energy Board will be refocused to include Aboriginal traditional knowledge, and the Government of Canada is committed to rebuilding public trust by improving transparency.

Ms. Rudd reminded us that on January 27, Ministers Carr and McKenna announced five principles that will guide decision making on major resource projects. These principles are: that no project proponents will be asked to go back to the starting line; decisions will be based on science and traditional knowledge of Indigenous peoples; indigenous peoples will be meaningfully consulted; the views of the public and affected communities will be sought and considered; and, direct and upstream greenhouse gas emissions will be assessed. These five principles will apply to the Trans Mountain Expansion project and Energy East Pipeline project. Ms. Rudd concluded by reassuring conference participants that together we will build a stronger, more sustainable energy sector.

### **Q&A Highlights:**

#### *Aboriginal Consultation*

The Ambassador to Peru asked how the consultations with Aboriginal peoples will be conducted, and asked whether these consultation processes will entail loans from the Government of Canada to Aboriginal peoples.

Parliamentary Secretary Rudd responded by highlighting the importance of negotiation on a nation-to-nation basis, given the variety of treaties and agreements that are already in place and which may affect the outcome of a project. Ms. Rudd also noted that for some Aboriginal communities to be able to participate in consultations, financial assistance for travel or other expenses may be needed, and the Government will provide resources for them to assist in these conversations. This is about respecting the rights of Aboriginal peoples and ensuring their presence at the table.

#### *2015 Paris Climate Conference*

The final question for Parliamentary Secretary Rudd pertained to the 2015 Paris Climate Conference. Elias Leon, from the UN Association in Canada, noted that Canada is in a new leadership position, and wanted to know what the role of Ministers will be to address the features of the agreement reached at COP21 in Paris.

Parliamentary Secretary Rudd replied by highlighting the importance of working collaboratively with all levels of governments and stakeholders and collecting data to establish a more credible knowledge base. Ms. Rudd noted that climate change and natural resources do not have to be at odds, but can work together. There are a lot of linked responsibilities in Ministers' mandate letters, and climate change runs through many of them. In order to make Canadians confident in the processes of the Government, Ms. Rudd reiterated the importance of collecting data by reaching out to partners. Many of the staff Natural Resources Canada are scientists who are very knowledgeable and are committed to contribution to government decision making with good science and facts.

### **Session 1: Energy Supply – Oil and Gas**

There is no question that this sector is under tremendous stress due to the drop in oil prices, the need for new infrastructure to access new international markets, and major challenges to earn public acceptance for major national energy infrastructure projects. The speakers presented insights on what the impacts are really like, how innovative companies are coming to grips with the challenges, and what's needed to enable the oil and gas sector to survive and thrive in an uncertain future.

Mark Sherman, Vice-President and Chief Operating Officer, Irving Oil opened the session opened with general observations on Canada's oil and gas sector, stressing that it has fallen on tough times but that the industry will be

able to cope based on experience from earlier boom and bust cycles. Irving Oil operates Canada's largest oil refinery, handles over 500 vessels a year in its Bay of Fundy Port, and is making investments to become a major energy exporting company. They have invested in and operate the first LNG receiving terminal in Canada, coming online in 2009, and have plans to add an additional export terminal to the project. Mr. Sherman outlined three positive features of the oil industry in eastern Canada: efficient access to crude from foreign markets; proximity to tidewater to ship refined products global markets; and, large-scale of refinery facilities. These opening remarks illustrated the message from many panelists: Canada's oil and gas sector needs the infrastructure to access global markets in order to remain competitive and grow. Mr. Sherman closed his presentation with a discussion on the Energy East pipeline, hailing it as "game changer" for the country. Irving Oil has the infrastructure in place to receive and refine Western crude via Energy East; it provides efficient and reliable access to crude leading to export of refined products.

**Alex Ferguson, Canadian Association of Petroleum Producers (CAPP)**

Representing the upstream production of oil and gas in Canada, Mr. Ferguson started his presentation with an overview of Canada's oil and gas sector and outlined its importance in the Canadian economy. Globally, Canada is the fifth largest producer of oil and gas. The sector employs 450,000 workers across the country and amasses \$17 billion in annual revenues. Private investment in the oil and gas sector totals \$ 48 billion, the largest investment of any sector in Canada. It is this private capital that drives the industry.

However, the recent commodity price drop has resulted in a 48 percent decrease in private investment in Canada. This has resulted in significant lay-offs and insurance claims in Alberta, but the effects are beginning to be seen across the country. While CAPP isn't in the game of providing long-term price forecasts for the industry, Mr. Ferguson believes that companies should expect oil and natural gas prices to stay low for some time, and the federal government should take the lead on helping the industry.

Mr. Ferguson closed his presentation with recommendations on how to help the hurting industry in Canada. By reminding the audience that oil and gas is an interconnected industry, a healthy and growing industry in Canada will depend on reliable access to transportation networks and exports to new markets to get hydrocarbons to tidewater. Moreover, it will be important to restore confidence in the regulatory process for major infrastructure projects, so that it will not be another 10 years until a major pipeline or LNG terminal is built. Panelists unanimously agreed that this will be an important first step in helping the industry grow and offset some of the damage experienced from the recent decline in economic activity.

**Chris Bloomer, President and Chief Executive Officer, Canadian Energy Pipeline Association (CEPA)**

Chris Bloomer's presentation emphasized the crucial importance pipelines currently play in Canada's energy sector. CEPA represents about 130,000 km of trans-boundary pipeline that collectively move 3 trillion cubic feet of natural gas and 2.1 billion barrels of oil a year. To maintain this vast network and its tremendous value, companies invest \$2.9 billion annually in maintenance and \$23 million on pipeline innovation.

Moving forward, Mr. Bloomer and CEPA see restoring public trust and confidence in pipelines as the biggest issue for new projects. CEPA actively tries to build trust and confidence through its membership, initiatives, and engagement activities. Even though over 99 percent of petroleum products are transported safely through CEPA pipelines, the association believes that the escape of any product is unacceptable. In 2015, there were zero incidences.

In that vein, CEPA is pushing several strategic priorities to meet this goal that focus on collecting and maintaining credible information and data from member companies. All member companies with CEPA have to contribute to this initiative, actively facilitate the exchange of ideas and best practices for pipeline safety, and meet the strict regulations developed by CEPA to maintain membership moving forward. Through these programs, CEPA hopes that

public trust and confidence can be restored to help the approval process of major infrastructure projects, and inform the ongoing public debate by emphasizing the economic, safety, and environmental aspects of new pipeline projects.

**Paula Dunlop, Canadian Gas Association (CGA)**

Ms. Dunlop continually stressed that natural gas has the potential to grow even further as a major energy source in the country. Future uses for natural gas are being driven by a myriad of factors, including: North America has low-cost and abundant long-term supply, environmentally natural gas is the cleanest burning fossil fuel, and innovation is driving down costs for new applications for the fuel in Canada.

Ms. Dunlop highlighted a few areas of strategic importance for end-use applications in Canada. First, many rural and Northern Canadian communities currently rely on diesel for their electricity and heat generation. Expanding pipeline infrastructure to displace diesel use in these communities will result in an estimated \$25,000 of fuel cost savings and 1.87 million tons of CO<sub>2</sub> emission reductions over the lifetime of projects. If pipeline expansion is not an option, LNG or CNG can be trucked into these communities. The economics of projects are still sound, as shown by the LNG plant in Montreal that services mining communities in the North of the province. The final innovative application for natural gas in Canada is the use of natural gas, LNG or CNG as a transportation fuel. When compared to oil, these sources burn cleaner with low particulates. GHG emissions are reduced by 25 percent at the point of combustion. As alternative transportation fuels, LNG and CNG are good options for city bus fleets and large vehicles. Compared to the diesel alternatives, the upfront costs for natural gas vehicles are higher, but the cheaper fuel source results in considerable cost savings over the vehicle's lifetime.

**Robert Cardigan, Newfoundland and Labrador Oil & Gas Industries Association (NOIA)**

Representing NOIA, Robert Cardigan added to previous discussions on the potential of Eastern Canada and the importance it will play in shaping Canada's oil and gas future. With a membership of over 600 companies, NOIA represents offshore production companies concentrated in Newfoundland and Labrador, which have a long history of bringing highly-skilled jobs to local communities and raising provincial revenue. Before the oil price collapse, the oil and gas industry accounted for 28 percent of provincial revenues in Newfoundland and Labrador. These revenues are now down to 9 percent, with the result that the government is running a \$2 billion budget deficit. Mr. Cardigan stressed that the oil and gas sector has been an economic boom for the province and wants it to continue, but to keep the industry on its feet there needs to be stronger support from the federal government.

Some of the future projects that Cardigan believes to be important for the area include the Energy East pipeline and LNG exporting facilities. He also provided valuable insight into the potential for further offshore drilling and extraction projects in the province, which potential oil resources estimated at roughly 1.5 billion barrels of oil. The potential area for exploratory drilling is enormous, with a total land area 45 percent larger than the prospective offshore basins in Norway. Mr. Cardigan indicated that change in the provincial government has fostered some uncertainty over the granting of exploration and drilling permits. In turn, this has resulted in low commitments from investors. While wanting government help to assist the industry, Mr. Cardigan recognized the importance of ensuring sustainability principles for future resource projects. Moving forward, he proposed an approach that balances economic and employment benefits in regions with natural resources with projects with low-carbon emissions, such as the Muskrat Falls hydroelectric project that will produce power with low emissions for the province and supply carbon offsets.

**Mark Scholz, Canadian Association of Oilwell Drilling Contractors (CAODC)**

Mark Scholz concluded the panel presentations by outlining the history and technology of land-based drilling and offshore drilling practices in Canada. Through standardization, unique business practices, effective communication and advocacy, oil well drilling in Canada is one of the safest in the world, and their standards have spilled over to

many American companies. Over the lifecycle of a well, 135 direct and indirect jobs are created for each rig, but to generate revenue new rigs must be continually contracted.

In today's low price environment, drilling and service contractors are facing difficulties; as a result, 28,000 layoffs have occurred in the sector. Mr. Scholz reminded the audience that the oil and gas sector is the biggest sector for private investment in the country, but when downturn comes into the sector there is a significant impact on local communities that depend on the industry for employment.

## **Q&A Highlights**

### *Concern of Foreign Investors/Buyers of Production in the Sector*

The first question, from the Japanese Ambassador to Canada, addressed an issue of interest to foreign investors and buyers of oil and gas in the Canadian energy sector. He questioned whether the prolonged regulatory approval processes for new energy projects take into consideration the interests of these foreign companies, and whether there is there a fear that delays in moving ahead with such projects will make these investors lose confidence in Canada's energy sector? Using Japan and the potential LNG industry emerging in British Columbia as an example, Mr. Monji noted that five Japanese companies have made major investments in the industry and that two LNG projects had been delayed due to the recent changes in the environmental review process. He stressed the importance of predictable timing of approvals and the changing nature of international energy markets that limit investment windows; lengthy regulatory processes may prevent companies from taking advantage of these opportunities.

This question addressed one of the major themes of the session: foreign investment and timely access to new export markets will be key for the continued growth of the Canadian oil and gas sector. The panelists agreed that this has been an area of major concern for some time, not just for LNG exports, but all major energy and infrastructure projects in Canada. There is a worry that Canada is being seen as a country that cannot get major infrastructure projects built. The federal government needs to do more to signal confidence to the international investment community that we can get our natural resources to market.

### *Examples of Innovation in the Oil & Gas Sector*

The panel was asked to highlight areas of innovation in their respective sectors, particularly given the breadth and impact of the downturn in oil and gas activity in Canada. Ms. Dunlop (CGA) reiterated many points from her presentation that the natural gas sector is experiencing technological innovation throughout the supply chain, but stressed the importance that enhanced distribution networks will be key in helping the sector grow. She also reminded attendees that innovation is much more than simply technological; new approaches to regulatory and financing methods will be equally as important to see new energy technologies from early stage research and development to commercialization.

Panelists agreed that this isn't a problem solely for the natural gas industry, but for entire energy industry in Canada. They stressed the need for further collaboration between industry and government to help bring new projects to market.

Mr. Scholz (CAODC) ended the discussion with three examples of technological innovation that have taken place in the design and operation of drilling rigs that have improved the economics/efficiency of resource extraction and reduced health and safety issues for crews. These include: the computerization of rigs; walking rigs that eliminate the need for disassembly of the rig between wells; and, the use of biofuels and natural gas to power rigs.

## **Energy Supply: Electricity**

The second session covered the current state of affairs in Canada's electricity sector. Session chair Colin Clark, CTO of Brookfield Renewable Energy Group, introduced and moderated a series of presentations by panel participants. Discussion ranged over major topics along the electricity value chain, including generation, transmission, distribution, storage, and human resources.

Mr. Clark opened the session with the reminder that although the Canadian energy sector "faces many headwinds", the Canadian electricity sector remains a vital source of industry opportunity, innovation, and employment. Electric technologies have increasingly proliferated into every aspect of Canadians' daily lives, so overall demand for electricity is likely to grow. Meanwhile, on the supply side, industry continues to embrace new clean generation technologies, with its promise of job creation and low emissions. It is also building new large and small-scale hydro projects, and is now, with the announcement of Bruce Power's intention to refurbish six reactors, re-investing in nuclear.

For Mr. Clark, these developments signal that the expansion and restructuring of electric power transmission is one of the most critical ongoing challenges for the nation's energy system. As with the more politically contentious issue of pipeline development for the transportation of oil and gas, the growth or hindrance of transport infrastructure for electric power will structure industry possibilities for the foreseeable future. Investment patterns therefore remain essential to progress: Canada's electricity sector must continue to invest to improve the performance, delivery, diversity and resilience of the country's energy system for consumers, all while addressing a changing economic, social, and environmental climate.

### **Sergio Marchi, President and CEO, Canadian Electricity Association**

Mr. Marchi began by stressing the importance of contextualizing any discussion of the electricity sector's trajectory within the recent Paris Agreement reached during COP21. He argued the Agreement could be a watershed moment for energy and environment policy. COP21 was a political opportunity for the new federal government to declare that "Canada is back". But for Mr. Marchi, Canadian electricity never left the scene: the industry has been tracking and participating in global developments surrounding climate, technology, efficiency, and more. Furthermore, with Alberta's plans to shut down coal generation by 2030 and the track record of reducing emissions by 30% since 2005, the Canadian electricity sector ranks as one of the cleanest in the world. Now that there is a renewed promise of federal involvement on the energy/environment and climate policy files, politicians will be looking to industry to operationalize its commitments under the Paris Agreement. However, political leaders need to develop a clear set of ambitions *before* asking industry to meet the new challenges these will create.

Mr. Marchi outlined four plans of action by which the Canadian Electricity Association attempts to conduct its operations and those of its industry members. First is collaboration. To reduce the country's carbon footprint and promote clean energy solutions, he suggested there is an urgent need for the development of a formal, national platform to structure society's response to the climate change treaty. Such a forum would foster communication between government and industry, and would also include non-governmental organizations (NGOs), indigenous groups, and other elements of civil society. Operating on a principle of inclusivity would allow for all concerns to be voiced and for common ground to be found. This kind of process should be the first order of business at the next first minister's conference, and would hopefully lead to a coherent, pragmatic, and realistic strategy to achieve national emissions reductions.

Second, the electricity sector requires investment in order to renew generation and transmission infrastructure approaching end-of-life. Billions are required to maintain the reliability and quality of delivering electric power as all provinces work to move away from coal and towards low- or non-emitting sources.

The CEA's third pillar is innovation. Mr. Marchi argued that utility members are driving the development of important new technologies. One example is SaskPower's investment to develop, construct and operate the world's first commercial-scale carbon-capture-and storage systems at its Boundary Dam facility. However, future green innovation will require a thriving ecosystem of entrepreneurs and a supportive regulatory regime that is focused on long-term quality and functionality, rather than merely on keeping costs to a minimum. While it is understandable that regulators want to keep costs low, we need to invest now. Faced with potential governance gaps between the federal and provincial governments, the industry must be prepared to build creative partnerships in order to pursue legitimate but potentially costly aspirations. Examples of forward-looking projects are experimental green pilot projects and projects to provide clean power to rural and remote communities that may not have a critical mass of ratepayers.

Lastly, the electrification phenomenon will be an important part of any emissions reduction plan particularly in areas such as transportation and personal vehicles, space heating, and other building energy requirements. The electricity sector has an important role to play in terms of ensuring that the increased loads are supplied from clean generation sources. Beyond working for a low-carbon supply mix, the industry must also position itself to take advantage of the new opportunities from electrification as the technologies associated with this trend become more and more mainstream.

#### **John Gorman, Canadian Council on Renewable Electricity**

Mr. Gorman represented the recently formed Canadian Council on Renewable Electricity, founded jointly by the Canadian Hydropower Association, the Canadian Solar Industries Association, the Canadian Wind Energy Association, and Marine Renewables Canada.

Like Mr. Marchi, he noted the importance of the COP21 meetings in Paris. He suggested that the global dialogue around the economy and climate change has fundamentally shifted, and that the agreement marks a long-term commitment to the total phase-out of coal-fired electricity generation and other fossil fuels. Similarly, he argued that any plan for deep decarbonization of the world economy could not be realized without a plan for deep electrification (including of transportation, buildings, and industrial applications). With the recent change in federal government and significant new climate commitments from major powers like the US and China, there is great momentum to shift the conversation. Mr. Gorman also reminded the audience of Canada's unique position from a global perspective: the country already has a very low-emitting electricity system, with roughly 80% of generated power currently coming from clean sources. Filling the remaining 20% gap represents a very different challenge from that faced by other national economies. For example, the US' electrical system is characterized by roughly the inverse shares: 20% clean power and 80% emitting sources. In surmounting the difficulties associated with meeting that challenge, Canada has the opportunity to become a world leader in GHG reductions to the electrical system. If it develops this expertise quickly enough, the country will create tremendous opportunities for exporting that knowledge and know-how internationally.

As it works to implement an innovation agenda that will allow it reach a 100% clean system target, industry and government should keep in mind the different possible supply mixes from renewable energy sources. They must also acknowledge the fact that most serious analysts, including the International Energy Agency, predict that solar, currently the fastest-growing source of renewable power, will ultimately be the dominant electrical generating technology. But the pace of growth in Canada will also depend on supportive public policy.

Other renewables also have significant growth potential in Canada. Mr. Gorman believes that hydro output can double, from Canada's position as the world's third-largest producer. There is significant potential for increasing hydropower exports to the United States as coal-fired generation is phased out. Hydro power facilities also have significant untapped potential for power storage.

Similarly, Canada is at the forefront in developing new marine power technologies, for example in harnessing the massive tidal power of the Bay of Fundy. We are also currently the world's 7<sup>th</sup> largest producer of wind, which is now cost-competitive. With a bounty of resources to electrify our economy, and the will to build out our potential in renewable generation, Canada and its electricity sector can make major contributions to the effort to address global climate change.

**John Barrett, President and CEO, Canadian Nuclear Association**

Mr. Barrett made a strong case for the role of nuclear electricity generation in achieving national GHG reduction targets. He argued Canada's climate change strategy should acknowledge the historical contributions of low-carbon nuclear technology to the clean energy supply, which have been very significant. He pointed out that nuclear plants are responsible for some 60% of Ontario's power. In this light, the signing of refurbishment contracts to extend the operating life of the nuclear plants at Darlington and Bruce represent some of the largest recent low-carbon investments in North America. Additional benefits of these projects include the creation of long-term jobs and the preservation of local air quality.

Mr. Barrett also suggested policymakers should leverage Canada's experience with nuclear innovation, specifically in reactor design, fuel design and delivery, manufacturing, and testing of new applications. Through export of the CANDU reactor, in particular, Canadian nuclear innovation has contributed to huge gains in GHG reductions around the world. It is also admired for the robustness of its nuclear regulatory regime, which gives the country international credibility and makes it an authority on issues of non-proliferation, safety, and security.

Mr. Barrett further argued that nuclear has a successful history of reliable electricity generation within a 'hybrid model' for the supply of clean energy. It works well in a true mix of generating sources, and represents about 20% of Canadian generation overall. While this is a significant amount in its own right, it is also an important 'strategic' portion of the energy mix: nuclear base load can ease the integration of new renewable energy sources onto the grid by helping to compensate for brownout and reliability/intermittency risks. In addition, nuclear will be an excellent way to manage the increased base load demand that will occur as the North American economy electrifies its vehicle fleet, which needs a reliable clean energy source in order to produce the benefits of avoided emissions.

Integrating nuclear with renewables is expertise that we already have in part, that we can improve upon, and that we can share. It is part of the country's competitive edge in low-carbon technologies. Furthermore, increasing the portion of nuclear energy on different regional/provincial grids will bolster our export capacity. This can in turn provide the opportunity for continental partnerships to reduce GHG emissions.

With the US government signaling its intent shift away from the most polluting electrical energy sources, the Clean Power Plan will create increased demand for low-carbon electricity. This is particularly relevant in Northeastern states that Canada, especially Quebec, Ontario, and Manitoba, is well-positioned to supply. Part of this expanded generation potential may come from the deployment of next-generation small modular reactors (SMRs), which several Canadian companies are currently developing. When it comes to bringing these new designs to life, the Canadian Nuclear Safety Commission is widely recognized as having a strong set of certification and licensing procedures.

Finally, Mr. Barrett also alerted the audience to the ways in which the nuclear industry is working to improve its view of the life-cycle of energy projects. It is studying impacts on local flora and fauna as well as the broader ecological benefits and risks of nuclear deployment. In particular, it remains conscious of the need to dispose of waste products securely, and of the importance of planning for safe, complete, and fully funded decommissioning processes.

**Nicolas Muszynski, Board Secretary, Energy Storage Ontario (ESO)**

Mr. Muszynski briefed the conference on the progress being made in energy storage technologies. He remarked that this was the first time Canada's sole association for the energy storage industry was asked to participate.

Having now "arrived in the market," the ESO is working through advocacy, education, knowledge-sharing, and networking to encourage Ontario electricity markets to realize the benefits of storage technologies at the scale of both homeowners and also at utility scale. The province of Ontario is already on track to have a total 50 MW of grid-connected energy storage by the end of this year. This is partly a result of better regulatory support, as the Ontario Energy Board has now established a new class of license, distinct from the conventional distribution license, for storage projects. Energy storage promises many advantages for electricity markets and for consumers, including flexible application in both rural areas with small grids and higher-density urban areas.

The storage industry is also rapidly evolving with the creation of innovative business models and services of interest to technology firms, service providers and utilities, investors, developers, and even NGOs. The sheer variety of promising storage technologies, along with their ability to be deployed at varying scales, makes storage research and development a highly dynamic—and potentially disruptive—portion of the overall energy industry in Canada. Current areas of R&D and prototyping activity include power to gas applications, direct electricity storage through batteries, and compressed air (underwater).

#### **Michelle Branigan, CEO, Electricity Human Resources Canada**

Ms. Branigan concluded the electricity panel by discussing the importance of the sector's workforce, which she dubbed the "engine of the electricity sector". The challenges that face this sector in 2016, such as infrastructure changes, refurbishment, hydro projects, and renewables, will demand a skilled workforce.

Canada's population is aging, and it is expected that by 2051, one in four Canadians will be age 65 or over. Most people in the electricity sector are baby-boomers. While the current economic climate has slowed down the rate of retirement, long-term planning must consider this aging population. Ms. Branigan discussed the importance of identifying which occupations will be hiring in the future so that this information can be communicated to job seekers. Close ties between employers and educators must continue, so that curricula can change and adapt to current and future labour market conditions. Well trained and knowledgeable people are required in this field; work in the electricity sector has public safety implications, and as this sector becomes more computerized, more issues will arise.

Ms. Branigan emphasized the importance of labour mobility, and suggested that this could be improved by having consistency in apprenticeship programs so that skills are recognized across the country. It was also noted that consistent, credible, and comprehensive labour market analysis is essential to guiding employers and policy makers in Canada. Finally, under-represented groups, including women, Aboriginal individuals, and internationally trained individuals, should be recruited in the electricity sector. Ms. Branigan concluded by urging the electricity sector to hire the best of the best, because without people there is no power.

#### **Q&A Highlights**

##### *Renewable Energy Integration*

The first question for the electricity panel was from Jacob Irving, who was interested in the integration of renewable technologies with the oil and gas sector. Mr. Irving noted that in Norway onshore hydropower is used tangentially to help produce offshore oil through the powering of supporting equipment, and was interested to know what the panel thought about integrating more renewable electricity into Canada's onshore oil development, particularly the oil sands. Sergio Marchi replied by noting that there is a possibility to harmonize renewable forms of energy with the oil and gas sector, but it will require a government mindset change. This mindset change will require

collaboration with the federal government and a renewed appreciation for the important role that the electricity sector plays in ensuring high standards of living and a competitive economy in Canada.

### *Canada's Energy Mix*

The second question to the panel came from the Austrian Ambassador, who was interested to know how Canada finds the right energy mix. The Ambassador also noted that as new types of energy are brought onto the electrical grid, a new transmission landscape is needed.

Nicolas Muszynski replied by saying that Canada's energy mix is becoming less diverse when looking from province to province. The Canadian market is looking at moving towards more interconnection between the provinces and a larger portion of inter-provincial transmission. The federal government will have a role to play in this shift. John Gorman also highlighted President Obama's Clean Power Plan, which may provide an opportunity to develop north-south transmission lines. A Canadian electricity strategy is being discussed, which will aim to electrify regions across Canada with non-emitting sources, providing Canada with an international advantage and national opportunities. Sergio Marchi suggested that we need to consider a regional east-west transmission connection. Mr. Marchi also reminded us that there is a need for clean electricity in the North to reduce use of diesel-fired generation, even though it will be expensive to electrify. Without electricity, economic development of the North will not follow. Generation infrastructure that does not involve diesel fuel must be brought to Canada's North.

### *Electrification of Transportation*

The final question for the electricity panel was posed by the Deputy Head of Mission for Switzerland who was interested to know whether electrification has been emphasized for private vehicles or public transportation. For electrification in Canada, the discussion has been around passenger and light-vehicle electrification. If we are to use electric vehicles, we need a clean electricity system, so Alberta's proposed shift away from coal will be an advantage for electric vehicles.

John Gorman noted that in the future, we can expect to see a shift away from massive centralized plants that are fueled by fossil fuels and towards microgrids, smart meters, solar panels on roofs, and electric vehicles in driveways. Vehicles in urban centers, such as fleets of cabs and construction vehicles, can be electrified. A partnership with big city mayors may be important in growing Canada's electric vehicle population.

### **Keynote Presentation – Fiona Jones, General Manager, Sustainability, Suncor Energy Inc.**

Fiona Jones, General Manager, Sustainability at Suncor Energy, spoke of the outcomes of COP 21 and the implications of the Paris Agreement for Canada's energy sector. She began by identifying that the 'bottom-up' approach to tackling climate change, involving companies from the outset, was the distinguishing factor that set this round of negotiations apart from previous attempts. Compared to the top-down strategy of the past, which had imposed global targets, this new method allowed countries to identify their own emissions reduction targets based on their environmental social and economic interests. This approach makes achieving agreement more acceptable politically and has facilitated bringing key actors, such as the oil and gas industry, back to the table.

COP 21, according to Ms. Jones, signified an important change in approach to how energy is produced and consumed, even though the pace of change will be gradual, analogous to changing the direction of a large tanker. In essence, the Paris agreement initiates a shift that starts with the recognition of the need to meet global energy demand in a world with rising population in a way that allows emissions reduction targets to be met. Each country's Intended Nationally Determined Contributions (INDCs) to also be met.

For Alberta, which understands the need for energy development at the same time as absolute emissions reductions, the importance of reducing emissions while achieving a secure and strong energy future for Canada, was recognized long before the December conference. The Alberta Climate Leadership Framework calls for a 30% reduction target and the capping of oil sands production emissions at 100 MT per annum by 2030. The key to coming to agreement was increased collaboration between private sector companies like Suncor, Cenovus, Shell and CNRL, the environmental community, First Nations communities, and the provincial government. The framework has given rise to greater predictability and longer term policy certainty. This has reengaged industry and businesses in climate actions who are now focusing on the opportunities ahead.

Despite the opportunities that exist, industry still faces a number of challenges; notably, finding how to remain cost competitive while becoming much less emissions intensive. Energy efficiency will only make an incremental difference, as businesses have already picked the low hanging fruit.

According to Ms. Jones, the transformation of the energy system transition, and mitigation of climate change, are major challenges. Achieving the change will require that we produce energy that is: clean and sustainable in environmental terms; cheap and affordable in economic terms; and, acceptable in social terms, and all in a vibrant innovative culture.

Oil and gas will continue to play a significant role in meeting demand even as we move toward greater use of renewable energy and a decarbonized world, as the IEA and NEB suggest. Suncor is considered to be well positioned to help address this problem. Significant reductions in greenhouse gases will not come from individual companies alone but from focused efforts and collaboration across the energy sector.

Do we need a different kind of national dialogue, and what have we learned from Alberta?

Ms. Jones replied saying that the industry tried to move toward a sustainable energy strategy five years ago. The process fell apart however, in part because key stakeholders talked past one another. Environmental advocates had come into the conversation with views of severe environmental consequences, while industry saw the future differently. We are now seeing the conversation emerge once again. At the provincial level, the strategy will be implanted over the next year or two involving a diverse cross-section of interest.

If we think about emissions reductions and look forward on the innovation curve, how does the involvement of companies in the Canadian Oil Sands Innovation Alliance (COSIA) and the fact that only a select few companies endorsed the Climate Framework fit together?

Ms. Jones replied that industry as a whole is very committed to emissions performance, as well as to the idea of a climate change framework that shows leadership and contributes to demonstration of sound environmental performance that will hopefully lead to favourable consideration of new pipeline infrastructure to access new export markets. The COSIA initiative is based on a commitment by more than a dozen companies to share their technologies and practices towards improving the environmental performance of the oil industry. The endorsement of the Climate Leadership Plan was by four companies which came together to change the conversation and engage with stakeholders to design climate policy. The outcome was a consensus amongst diverse stakeholders that will position the Alberta government to proceed with stronger, bolder steps towards reducing environmental impacts and strengthening Alberta's reputation in sound environmental management.

What lessons has Suncor learned over the years concerning the idea of developing a provincial and federal energy strategy, in addition to a climate strategy? Should we have a joint energy strategy that includes both the oil and gas sector and the electricity sector?

The energy strategy issued by the provinces represents a patchwork of goals and initiatives. In contrast, we must start migrating toward a more harmonized national approach. Even though it is faster to allow provinces to take alternative routes to addressing energy and climate issues, there is value in harmonizing policies across the country. For example, Suncor Energy has long supported an economy-wide carbon tax but understands the competitive issues and differing provincial views which exist.

Energy is a system and a future Canadian energy strategy should therefore be integrated. Already, we have started to see such integration occurring at the federal level, with the mandate letters to various ministers all referring to the cross-cutting issue of climate change.

Given the talent pool of an oil and gas company like Suncor, will making the transition by focusing more on green technology be easier?

Renewables should be seen as an integrated strategy rather than a bolt on to existing systems. At Suncor Energy, renewables are becoming much more a part of our business but we recognize the fundamental differences in what it takes to manage a renewables business.

We need to also consider the adoption of alternative energy sources, such as cogeneration for example, which has great potential in Alberta, from a stakeholder perspective.

#### **Keynote Presentation – Michael Cleland, 2015 Canadian Energy Person of the Year**

In his closing remarks, Mike Cleland reflected on the afternoon's sessions and presented his insights on emerging energy issues in Canada. He started by noting that several of the speakers had touched on the continuing need for a productive energy dialogue to get at the many issues facing Canada. His comments concluded with some of the tough questions that he suggested we need to be willing to ask if we want to make real progress in such a dialogue.

He started by focusing on four key factors that will likely shape our energy future: slow demand growth, carbon management, public confidence and technological change.

Respecting demand growth, Canadian suppliers of oil, gas and electricity face slow growing markets in Canada and North America. We are counting on faster growth in emerging markets to create new opportunities but what if economic growth in emerging markets turns out to be slower than we had been expecting?

On climate change and carbon, the critical question is whether we ever face up to the fact that our carbon reduction aspirations do not accord with energy realities. Unrealistic targets beget investor risk while weak policy responses simply kick the problem down the road. Together those describe the pattern of the past two and a half decades which in turn begets more citizen cynicism and reduced public confidence in both government and the energy industry.

Respecting public confidence, the old way of doing things necessarily had to change. Canadian communities are no longer willing to be passive hosts for energy projects whether pipes, power lines, power plants (of any sort) or oil and gas operations. But a necessary corrective risks turning into a rout in which "communities", however defined, become the granters of "licence", however defined, and traditional permission granting authorities – governments and regulatory bodies – are reduced to being observers or simply one of the steps along the way to a wildly risky future.

On technology, it is a fair bet that energy commodities including hydrocarbons will be with us for a long time to come. But the long trend is pretty clear. The combined effects of normal technological change as in all other industries, cost management, pollution management, GHG management and public resistance to traditional energy

developments will tend to work in one direction. As we see in the decline of energy intensity and in the emergence of renewable sources, local or otherwise, the energy service package will derive ever more from capital, technology and know-how and less from primary commodities.

Dealing with these sorts of forces is going to require a much more coherent energy dialogue in Canada. Here are a few of the questions that need to underpin that dialogue:

- How do we generate an honest public debate on climate and energy in place of the denial – of energy realities every bit as much as climate realities - that have characterized the past 30 years and may yet characterize the next decade?
- How do we overcome consumer resistance to the price increases that are inevitable from truly aggressive GHG emission reductions?
- Even in a recovered price world for oil and gas, Canada's inherent high cost structure and many future cost challenges probably mean that the goose that lays the golden eggs has flown. But many Canadian stakeholders and taxpayers seem to have missed the departure announcement and expectations remain high with respect to royalties, benefits and revenue sharing. What do we do to cool the ardour of expectant stakeholders?
- How do we manage the necessary corrective respecting the role of citizens and local communities in determining our energy future? Communities and citizens have to be more fully and effectively engaged. But at the same time we need to respect the bargain of Confederation. And we need to maintain public approval and regulatory processes that acknowledge that there will be some unavoidable disruption of the landscape and some risk and that respect the need to move energy over long distances, attract investment and get the job done in a timely fashion.
- How do we create more effective processes of policy and planning – at both urban and regional scales - that are essential to resolving many issues? These processes are inherently difficult in a market based economy and within Canadian cultural norms. The world of low risk tolerance, twitter speed communications and nine second attention spans does not make them easier.
- We talk a great deal about innovation and several speakers touched on that. But it is far from clear what we need to do to mobilize innovation in the Canadian energy space, fund that activity and ensure that Canada is a technology maker, not just a technology taker in the emerging energy world.

In concluding Mr. Cleland suggested that rebuilding public confidence in public institutions, sustaining investor confidence in Canadian energy resources, reducing greenhouse gas emissions and moving closer to the leading edge of technological change are actually mutually compatible objectives as long as we approach them with common sense and realism about what is achievable through deliberate policy and in various time frames.

### **Some Overall Messages and Insights**

Several observations emerged from the afternoon's keynote addresses, panel presentations, and dialogue with the attendees.

- The federal government's commitment to a more open and inclusive process in advance of decisions in the future on major energy projects is seen as a means to hear from all interested stakeholders, and in due course, earn public confidence in Canada's regulatory approval process. The key test which remains to be played out is if the new processes will enable the making of a decision that is in the best interest of the country as a whole on the basis of a better engagement and understanding with stakeholders who have both supporting and opposing interests.
- 2016 will be a year of major policy changes. New waves of policy thinking and policy initiatives, at the provincial and federal level, are focused on: climate policy involving carbon pricing and cap and trade requirements,

transformation of electricity systems through off-coal initiatives and aggressive targets for the share of generation from renewables; and, plans for stepping up government investment in clean energy technologies.

- There was a clear sense that the traditional features of Canada's energy sector are changing. Examples are opportunities to access new components of Canada's resources such as shale gas and oil, greener electricity systems as a result of small but growing share from renewables, greater electrification of end-use applications, closer integration between natural gas and electricity for electricity generations, refurbishment of nuclear power generation, emerging electricity storage capacity, etc..
- The clear evidence from the presentations in the Oil and Gas session is the breadth and severity of the impacts arising from the sharp decline in international oil prices. In addition to precipitating downturns in oil and gas activity, investment and jobs, the impacts include severe stress on the budgets of provincial economies which rely on oil revenues. The consensus view about price trends in the near future was that prices would remain low for at least the next 12 to 18 months, due in part to the large volumes of supply in global storage. The effect of oil prices on the Canadian economy as a whole, of the balance of trade, and the exchange rate clearly reveal the oil and gas sector's significant contribution to Canada's economic well-being. New pipeline infrastructure is needed in order to access new export markets for Canadian oil, particularly as a result of the rapid growth in oil supply in the United States and reduced demand for Canadian oil.
- The current situation and outlook for the electricity sector is more positive, seen as a vital source of opportunity, innovation and employment. The current developments to re-structure generation arrangements from centralized plant to a combination of centralized and distributed generation, together with introduction of smart grids, energy storage, and real-time grid management all illustrate the dramatic transformations underway at present. The future directions for policy-makers involved in the electricity sector has four key elements: collaboration amongst stakeholders to reduce the carbon footprint and advance clean energy; major financial investments in new infrastructure and rejuvenation of aging infrastructure; continued innovation to implement new technologies, grid management techniques and control practices; and accelerating the electrification of end-use applications.
- Given the challenges, complexity, federal-provincial roles, and multi-faceted nature of developing a plan of action to achieve major GHG reductions, one strong recommendation was to create a new formal national platform to develop society's response to the GHG reduction challenge. This platform would be designed to foster discussion and planning between governments, industry, Canada's First Nations and environmental groups.
- Building on Canada's current world-leading 80% share of electricity generation from clean sources, there is significant undeveloped hydropower potential across Canada, plus opportunities for tidal energy, more wind and solar power, nuclear generation from existing and refurbished plants, and geothermal applications. Canada's share of generation from clean sources could increase even further and enable expanded sales of clean power to export markets in the United States.
- Not to be overlooked are important human resource issues. For the oil and gas sector, the immediate concern is for the job losses for drillers and rig crews, technicians, production staff, and professionals across the industry. The impacts are being felt acutely in Alberta and also in eastern Canada. One important issue is whether people will be available when activity picks up with the required skills and experience. For the electricity sector, the key issue is the aging demographic profile of people working in this sector. Compounding this issue is the need for people in the future with the skills needed in a transformed electricity generation and distribution sector

characterized by smart grids, energy storage, and demand side management. Key solutions are: matching academic programs and training programs to emerging technologies and operating practices; improved labour mobility fostered by nation-wide standardized apprenticeship programs; and, ensuring public safety be engraining safety culture into corporate training programs.

- Today's energy issues are complex in nature and there are many vested interests ranging from First Nations, communities affected by the project, environmental groups, and the industry. The challenges are significant: production of energy that is clean and sustainable; the availability of energy to drive economic growth that is affordable; and, a vibrant energy sector capable of providing employment and revenues to support education, health care, and social programs. There are no simple, isolated linear problems and certainly no simple, single-faceted solutions. The key to finding solutions acceptable to all stakeholders is open dialogue with all parties at the table. The experience in Alberta arising from the preparation of the Alberta Climate Leadership Plan, which involved all key players, was cited as an example of such a process. This "road to Paris" dialogue and negotiation set the stage for Alberta's position on climate change at the COP21 conference.
- It is encouraging to note that there is renewed interest in the provincial and federal governments to work together to create a Canadian energy strategy, building on Council of the Federation's 2015 path-breaking strategy document.
- Looking ahead, there are four key factors which will shape Canada's energy future: slow demand growth, carbon management actions, finding ways to build public confidence and earn support for energy projects, and technological change. These are mutually compatible objectives.

## Appendices

### Bios of Session Chairs, Panelists, Keynote Speakers

[http://www.energy.ca/sites/energy.ca/files/ecc-16\\_insights\\_ottawa\\_bios\\_-\\_rev4.pdf](http://www.energy.ca/sites/energy.ca/files/ecc-16_insights_ottawa_bios_-_rev4.pdf)

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**IRVING**

This report was prepared with the assistance of Masters-level students from Carleton University and from the University of Ottawa. Each student has contributed to sections of the report and to the overall critique and editing of the contents.

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