

EU-CANADA ENERGY CONFERENCE 2016

FINDING ANSWERS TO THE ENERGY CHALLENGES OF TOMORROW

(22 September 2016, Ottawa)

SPEAKERS

- **Mr Graham Campbell**, President, Energy Council of Canada (conference moderator)
- **H.E. Marie-Anne Coninx**, EU Ambassador to Canada
- **Mr Christopher Jones**, Deputy Director General, Directorate-General for Energy, European Commission
- **Mr Jay Khosla**, Assistant Deputy Minister, Energy Sector, Natural Resources Canada
- **Mr Rocco Delvecchio**, Vice-President, Government Affairs, Siemens Canada
- **Mr Tim McMillan**, President and CEO, Canadian Association of Petroleum Producers
- **Mr John Rathbone**, Senior Consultant, Energy Systems Division (North America), Ramboll
- **Mr William Powell**, Editor in Chief, Natural Gas Europe
- **Mr Shawn McCarthy**, National Business Correspondent, the *Globe and Mail*
- **Mr Gaëtan Thomas**, President and CEO, New Brunswick Energy
- **Mr Douglas MacDonald**, Senior Lecturer and Associate Professor, University of Toronto, School of Environment

INTRODUCTORY REMARKS

In his introductory remarks, **Mr Graham Campbell** listed the main energy challenges as being 1) 'making the most of energy as the driver of economies and as a source of support for social services (healthcare)'; 2) 'finding answers to the perplexing challenges of climate change and the broader impacts of energy on the environment'; 3) 'providing affordable and secure energy for [all]'; 4) 'tackling the

geopolitical issues [we face]'; and 5) 'working to ensure that the public understands and supports energy issues and the jobs and benefits that arise therefrom'.

Given the rapid transformations of the energy sector in both Canada and the EU—due to the outcomes of COP21, a 'new push' on environmental technologies, sustained low prices for oil and gas, increasing calls for public involvement in energy-related decisions, the implications for the growth and supply of fossil fuels of the emergence of new technologies (fracking) and of more cost-effective technologies for wind and solar power, energy and electricity storage, new opportunities for energy production and usage, the much greater involvement of 'nimble and technology-savvy SMEs'—Mr Campbell thought the agenda quite formidable, 'particularly for government at all levels... federal, provincial, Commission, municipal'.

He also saw many parallels between the EU and Canada—notably in terms of their similar federal and national/provincial structures, of their energy transitions (in which 'climate is at the top'), and of increasing public engagement in energy policy. Mr Campbell also underlined the complementarity of Europe's concerns regarding the security of its energy supplies with Canada's search for new export markets, and noted a shared concern about cyber-security 'and what it might mean for our energy systems'.

After replacing this conference in the context of the 40th anniversary of relations between the EU and Canada, **H.E. Marie-Anne Coninx** began by explaining that, considering the Commission's current plans for the creation of an EU Energy Union, energy as an issue has regained a level of importance within the union not seen since its origins in the European Coal and Steel Community of the 1950s. Expressing her belief that the planned Energy Union would be 'a real revolution... creating a real energy market for the EU', Ambassador Coninx explained that its great importance for Europe springs from the fact that, unlike Canada, Europe is heavily dependent upon energy imports and therefore vulnerable; energy security is thus a very important part of the planned Energy Union. She then added that energy in the EU 'is very, very expensive'—mainly because of the lack of market integration—and noted that the Energy Union is also trying to create 'a real, interconnected and more competitive energy market across the EU'. Ambassador Coninx also underlined the fundamental importance to the EU of measures to improve the efficiency and saving of energy—both in order to compensate for its lack of resources and to fight climate change and meet its environmental targets.

So what is in it for Canada?, she asked rhetorically. How will energy integration across Europe affect Canada? Ambassador Coninx returned to the Energy Union Strategy published in February 2015, noting that it explicitly calls for a binding energy partnership with Canada. But this is nothing new: the implications of a globalized energy sector were, according to her, already recognized during the previous EU-Canada energy summit in 2014—whose joint statement referred to a common determination to revitalize co-operation in this area. Furthermore, she noted that the EU and Canada also 'share the same fundamental approach to the global energy market', both recognizing the importance of 'open, competitive and

transparent energy markets [as well as] the need to actively support and promote energy efficiency and clean and renewable energy’.

In light of all this, Ambassador Coninx said that the EU and Canada need to deepen and expand their co-operation across the entire spectrum of energy policy. She then informed those present at the conference that all these issues had been discussed during a high-level EU-Canadian dialogue on energy which had been held the day before. More specifically, she mentioned that both Brussels and Ottawa wished to ‘deepen and expand’ their co-operation in the gas and oil sector—‘particularly LNG: the European Commission has been presenting a very important communication, strategy paper, on LNG, and we see Canada as a potential [supplier of] the EU market’. In terms of renewable energy, Ambassador Coninx mentioned a ‘very clear interest in exchanging experience on the integration of energy sources [into] the grid’, existing EU-Canada co-operation on research and innovation (notably carbon capture and “smart grids”), and joint efforts within supranational organizations such as the G7, G20, IEA and UN. She noted that the booming renewable and clean energy sector in Europe has already created ‘over one million jobs’, and that Canadian researchers and companies have also made very impressive progress in this field. The EU, she felt, could benefit and learn from the Canadian government’s experience—notably Natural Resources Canada—and that the EU’s member states have much to share in terms of best practices.

Finally, Ambassador Coninx noted that energy and climate change are very closely linked, and that COP21 in Paris was a very important milestone. ‘Fighting against climate change is not an option: it’s a must.’ As far as real action is concerned, she added that the EU has a ‘most ambitious climate and energy plan for cutting at least 40% of [its 1990] greenhouse gas emissions by 2030’ and that it has ‘very ambitious targets for renewable energy and energy efficiency’. She had no doubt that Canada would contribute to this global effort.

I. 1st PLENARY SESSION — Energy policy in Canada and the EU: differences, similarities and common interests.

After recognizing the enormous similarities between the energy policies of Canada and the EU, **Mr Christopher Jones** noted that several facts were vital to an understanding of the EU’s energy policy: 1) Europe is not blessed with natural resources, and things are going to get worse, which is good for Canada, already an actual and potential supplier; 2) between 2000 and 2006, all of Europe, politicians and citizens alike, recognized climate change as one of humanity’s greatest challenges; 3) the EU has an energy security challenge (Gazprom), which between 2000 and 2006 led to the formulation of an EU energy policy.

He compared this policy to a triangular framework whose angles represent the three essential goals of sustainability, competitiveness and security. In 2006, it was decided that the ‘key deliverable’ of this policy would be the ‘20-20-20 strategy’ (by 2020: 1) cutting CO₂ emissions by 20% compared to 1990 levels; 2) ensuring that

20% of the total energy supply is renewable; and 3) improving energy efficiency by 20% compared to 1990 levels—resulting in a 13% reduction in overall energy usage compared to 1990 levels).

Speaking now of what Canada could learn from the EU's experience of trying to meet the second goal, Mr Jones began by explaining that each EU member state had a legally binding target for a 20% reduction which rendered them liable to prosecution at the European Court of Justice and a fine if they failed to meet it. This committed the EU, only 8.5% of whose energy consumption in 2008-2009 came from renewables (and 82% of that from 'large hydro' alone), to a 'toe-curlingly ambitious' project. The extraordinary achievement, he now noted, was that the EU was on track to meet this goal by 2020, but he warned that the journey has been difficult and that it has led to a number of challenges—citing subsidies which have increased consumer prices for electricity, and cyclical spikes in the supply of renewable energy which are hard to manage. But Mr Jones was emphatic: 'the EU is immensely proud at having taken this initiative'—largely because it has led to the global mass-production of photovoltaic and wind-power technology.

In terms of the target for increased energy efficiency, he began by extolling the latter as 'the best type of energy you can produce'—noting that it was the "cleanest", the most likely to create jobs, and that meeting this target 'can be done in a way which makes your economy more competitive and your citizens more wealthy'. Driven to realize this potential, the EU, Mr Jones noted, has adopted 'gold-standard legislation' which follows the 'golden thread of "What can we do to save our citizens' money, reduce our CO₂ and make our industry more competitive?"'

The first issue which, according to him, Canada would be confronted with over the next few years when trying to meet its targets is energy efficiency during the construction or refurbishment of buildings: given global commitments to target climate change (2% above pre-industrial levels), 'if you don't start knocking the carbon out of your buildings today, by 2030 you've got yourself a hell of a problem'. EU measures have primarily led to new regulations and labelling, which have resulted in improved building codes, in more energy efficient electronic goods and cars, in consumer savings, &c.

Mr Jones maintained that the EU's efforts were ongoing, and that both it and Canada had a lot to learn from each other for the future. His absolute conviction is 'energy efficiency first': wealthier citizens, cleaner air, job creation.

Focusing now upon energy security, he noted that past problems have led to the political will to create an EU-wide interconnected energy market which will prevent monopoly suppliers (Gazprom) from taking advantage of differences among individual member states, and to greater efforts towards diversification (gas from Azerbaijan via the Southern Corridor, and perhaps 'Iran, in the future... Libya... Iraq... Who knows?') Efforts to diversify include an LNG strategy, offering Canada the possibility to supply an additional market.

In terms of what the future holds, Mr Jones noted that 2020 'is tomorrow'—adding 'Hell, 2050 is tomorrow when you think about it'—offering very little time indeed in which to decarbonize entire economies (zero-carbon electrical grids, mass

transport systems, housing). But the EU, he emphasized, 'is not standing still', and he was absolutely confident that it will not only meet the 'hugely ambitious' targets it has set itself, but also that it will do this 'in a way that will benefit our citizens'.

He concluded by noting that the EU and Canada have much to learn from each other and much to gain from doing so, particularly in terms of carbon capture technology ('I don't see how we'd do it without carbon sequestration by 2050,' he candidly added), of energy efficiency, and of energy security.

Mr Jay Khosla, in an enthusiastic and wide-ranging talk, began by underlining the degree to which the energy agendas of both Canada and the EU complement each other. Citing the need to decarbonize fossil fuels by 2025-2030 as an example of their shared outlook, he referred to innovations in carbon capture and storage as an integral part of the agenda and as a clear area for Canadian and European collaboration. He felt that Canada's 'richness of supply and diversity' in terms of energy was a most important point which needed to be 'framed around international and domestic'—particularly as '[the world] is calling out to Canada [to play] a much bigger role in energy diplomacy'. This, according to Mr Khosla, required Canada to 'emphasize all facets of what we do well', working across the entire spectrum of the energy sector ('everything from hydro and renewables, electricity, nuclear to oil and gas') instead of focusing upon individual areas or matters.

As far as Canada's international role was concerned, he cited the example of his country's recent work in Ukraine alongside the United States and the EU, 'trying to help [Kiev resolve] the Gazprom issue', develop Ukraine's indigenous sources of supply, energy saving, mapping, trade barriers and tariffs, 'how can we achieve market access in Canada to provide them with [supplies] of gas?', &c. Mr Khosla was adamant that Canada needs to leverage its 'richness and strength' in the international community. Speaking of domestic 'richness', he was of the opinion that Canada's energy sector would do well to study the ways in which energy efficiency is financed in the EU and is being turned into a competitive business. After underlining once again the importance of Canada's international energy relationships with Europe and Asia, Mr Khosla remarked that surely Canada herself was worth investing in as well? ('We have 700 billion dollars of potential projects sitting right underneath our noses that require capital.') 'Internationally, we need to achieve market access while playing a primary role on climate change and reducing our carbon footprint.'

In terms of how the Canadian government would attempt to achieve this domestically, he pointed to the country's energy strategy, noting that the current federal government was absolutely determined to 'catch up' with the provinces and work with them on a 'national perspective'. 'The [overall] vision,' he explained, 'is to develop our assets taking into account low-carbon transition but also the need to have good economic returns.' In order to achieve this, he said that Canada would follow a more asymmetrical path than Europe's choice to set itself 'massive targets', but noted that more time, thought and calculations were needed to prepare for a course of action towards a clear set of goals.

Mr Khosla then listed the five priorities of Canada's energy strategy: 1) the above-mentioned domestic policies and strategy; 2) investment in 'clean' technology and innovation, as it is important to show 'how we can do [energy] well as Canadians' while reducing the country's carbon footprint; 3) relations abroad and with the U.S.; 4) working with indigenous peoples ('absolutely primordial') in order to convince them that 'projects will happen'; 5) new regulations building upon the country's existing regulatory strength in terms of environmental protection in order to ensure development is sustainable. Mr Khosla noted that these priorities dovetailed with Europe's ambitions, and that both parties had much expertise to share on a variety of issues (e.g. financing energy efficiency, carbon capture and storage).

In conclusion, he spoke of the pan-Canadian framework on climate change, recognizing that Canada has a lot to learn from its partners abroad 'to make sure [the country] is kept in check and that it's doing everything it can to effectively implement its transition to 2040'.

Q&A

Mr Campbell: Is the Canadian government successfully engaging with its citizens in order to ensure popular support for its energy policies?

In terms of engagement, **Mr Khosla** explained that recognition of the fact that public confidence rests upon people feeling 'that they have been heard' has led to the adoption of 'a whole new set of [regulatory] principles around resource development'—the largest of these being consultation and engagement. This effort to foster public confidence (lest a polarized public opinion 'kill all [of] this') is 'modernizing' both regulators and legislation (e.g. the National Energy Board, the 'Environmental Assessment' and 'Navigation Protection' acts, &c.), and the federal government has also adopted 'a ton of legislation' strengthening safety and security regulations (e.g. the 'Pipeline Safety' and 'Energy Safety and Security' acts) in order to secure public confidence. **Mr Jones** then gave the example of the Finnish government's decision to break free from its energy dependency on Russia and 'go nuclear' at a time when many European countries were deciding to close down reactors. This political decision, he claimed, largely succeeded thanks to a thorough public consultation which made clear the pros and cons of the country's various alternatives. 'That's the [kind of] debate you have to have.'

H.E. the Swiss Ambassador: When are we going to see the Canadian energy strategy?

Mr Khosla was blunt: 'There is a Canadian energy strategy, [but] at the moment it doesn't fully include the federal government.' He saw an urgent need, driven domestically by the imminent Pan-Canadian Framework on Climate Change, to construct a national framework around the various energy strategies of different

Canadian provinces. He also underlined the need for Canada to adopt national targets, as this will 'create the impetus for an overarching plan and implementation plan towards a low-carbon future'.

H.E. the Costa Rican Ambassador: How can we further collaborate in support of Costa Rica's efforts to decarbonize?

After answering 'it's not a question of "when?" [but] more of a question of "let's do it"', **Mr Khosla** argued that Canada and the EU are already collaborating 'across the board—internationally, domestically—to make sure that happens'. More specifically, in reference to Costa Rica's ambitious electric vehicles programme, he claimed that 'we have lots to learn from you'. At the same time, he noted the importance of recognizing the need for a long-term transition which includes all sectors, and wondered whether in the transport sector the solution was to electrify or instead to reduce the 'fossil-fuel footprint' of existing vehicles?

A municipal employee of the city of Ottawa: How will the federal government help municipalities to increase the energy saving rate and efficiency of existing and future housing stock, particularly considering increased demand from "climate refugees" and the fact that municipalities do not want to 'be the bankers'?

Mr Jones, referring to the absolute need for 'zero-carbon buildings by 2050', said that the EU is finding it 'one of the toughest [problems] to crack', as it is 'terribly difficult to convince [people]' of the clear benefits of investing in measures to improve the energy efficiency of their homes and businesses. Municipalities must 'be the bankers' (financing, subsidies, working with local banks) and must intervene proactively (publicity, awareness-raising, &c.). There is simply no choice, 'and there [are] no easy answers'.

Mr Khosla pointed to the urgency of addressing this problem and to the work building up to the Pan-Canadian Framework on Climate Change, which involves municipalities 'as part of the solution'. He also underlined the importance of the concept of 'first fuel': 'we have to stop thinking of energy efficiency as just demand: it's a fuel source... and we need to be thinking [in terms of] "negawatts" [sic.] as we go forward.'

An employee of National Resources Canada encouraged all present to respond to a 'massive consultation' on energy efficiency by going to 'letstalkcleanresources.ca', as the conference's participants 'have a lot of ideas that can very much inform our policy directions'.

II. 2nd PLENARY SESSION — Economic growth, energy security and climate policy: a contradiction? The industry view.

Mr Rocco Delvecchio began by speaking about the challenges ‘that we see within Siemens’: the importance of energy efficiency to the competitiveness of companies; the challenge of ensuring reliable supplies of power during a transition towards renewables; the overarching pressure of climate change and the question of how to adjust to it; how best to optimize the production and distribution of energy with the introduction of more advanced energy systems; the need for ‘broad public understanding and acceptance’ of these measures.

In terms of the trends which Siemens sees, he noted the global trend of significant amounts of growth in the renewable and “unconventional” [*sic.*] energy sectors; the increasing focus on electrification in the industrial and transport sectors, which enables the development of more advanced systems and therefore the increased optimization of emissions; a lasting trend towards more decentralized power generation; the fact that advanced technologies such as modular “smart grids” are key to an uninterrupted supply of reasonably priced and reliable power.

Mr Delvecchio then listed several trends of Siemens’ ‘Vision 2050’. Regarding renewable energy (‘a huge part of the solution, going forward’), he once again noted the strong growth which this sector is experiencing, spoke of Siemens’ important role within it, and saw prospects for further reducing its cost. As for increased energy efficiency, he believed that the economic incentives were ‘really quite significant’. Moving on to intelligent power systems, he noted that intelligent grids ‘are a critical part of any energy system going forward’ considering the need to ensure both the stability of power supplies despite the fluctuations of renewable power as well as the security of these supplies. Mr Delvecchio then spoke of power transmission as another area in which Siemens sees investment leading to significant increases in energy efficiency. He then mentioned electrification as ‘one of the four pillars of [the company’s] core strategy going forward’, and noted that in combination with intelligent energy systems (‘smart grids, smart vehicles’) it enabled ‘much greater control over virtually all aspects of power utilization’. Finally, he argued that the business models which underpin the modern energy and utilities sector are ‘really very, very different’: ‘It’s less about building very large central generating stations and long transmission lines [and] more about distributed power [and] demand management [software].’

After a ‘quick snapshot of Canada’ (6th-largest producer of oil, 5th-largest exporter of natural gas, 3rd-largest resources after Saudi Arabia and Venezuela, 300 years’ supply of gas at current technological levels), **Mr Tim McMillan** began by speaking of the surge in supply over the past two years, dramatically driving the price of oil down and causing producers in Canada, like the rest of the world, to ‘pull back on [their] capital expenditure’. But even at 31 Bn dollars (down from 81), the industry is ‘still the biggest investor in the Canadian economy [by far]’. Production is up (oil

sands are long-term projects and investment plans stretch over 5 or more years), but there have been job losses and 'deficit budgets' in many provinces. Canada now has the largest trade deficit in its history.

Yet Mr McMillan thought there were 'some real reasons to be optimistic in Canada for our energy sector': 1) it is driven by some of the most advanced technology in the world ('to the industry of the 1980s it would seem like science fiction'); 2) it has a 'mature workforce'; and 3) world-class resources. Given the growing importance of the Indian and Chinese markets, Mr McMillan argued that the sector needed to 'have a plan on how we move forward... and meet our objectives in regards to the [future] climate'.

Most of the recent growth in Canada has come from its oil sands, he noted, which have added 1 million barrels per day (bpd) in the last decade. The industry has plans to increase production by 1.5 million bpd over the next 15 years—an important increase for Canada but relatively insignificant globally (current total: 94 million bpd), he argued.

Moving on to the question of Canada's pipeline network, Mr McMillan noted that it was working at full capacity and that the industry was having to resort to rail transportation (less efficient, more greenhouse gas emissions and more expensive). He also pointed out that the network faces south to the United States, whereas 'growth in the world is going to be east and west, to India and China... and Europe'.

'On the natural gas side,' Mr McMillan continued, the status quo is a progressive decline: Canadian gas, he explained, is less competitive as a result of carbon taxation and world-leading yet more restrictive safety and environmental regulation—unlike American shale gas, he noted, which is free from such costly restrictions and is gaining market share in Canada herself. The gas industry is banking on exports to Europe, a growing fleet of gas-powered vehicles and the need for gas to generate electricity as nuclear is phased out.

'To put this in relevant terms for the Europe conversation', he pitched Canada as the only oil producer (among Russia, Saudi Arabia, Libya, Nigeria, Kazakhstan) which is 'solving climate issues, investing in technologies to lower greenhouse gas emissions per barrel, [and] looking to enable renewables on the electrical grid'. Moving to natural gas, Mr McMillan hoped Europe would 'look at Canada as a supplier of choice [which is investing] in technology, advancing policies that are driving innovation'. The oil sands industry, he pointed out, is reducing its emissions in various ways and funding a 20 million dollar prize to '[find] new and innovative ways to take carbon out of the energy stream'.

Ultimately, he concluded, the biggest obstacles to exports of Canadian energy to Europe were the lack of LNG facilities and the lack of a pipeline. 'These are internal challenges... and a partnership and a push from Europe... would certainly be very helpful for us domestically.'

After a brief introduction to his employer, Ramboll (a Danish engineering consultancy firm), **Mr John Rathbone** began by arguing that 'district energy'—essentially a network of water mains supplying customers with hot water from a

central heating plant—‘ticks all the boxes’ of economic growth, energy security and climate policy. He pointed out that converting the heating plant to run on renewable energy (biomass, for example) automatically converts the entire community to renewable energy in one single step; that this flexibility is compounded by the durability of the network of pipes, which is designed to last 50-100 years; and that the heating plant can run on a combination of fuels (e.g. renewable with a natural gas back-up ensuring peak demand is met).

Mr Rathbone then explained that ‘district energy’ rested upon Denmark’s decades of experience of this technology and if combined heat and power plants, and that the sector in Canada was growing and creating jobs. Ramboll’s view, he concluded, was that simultaneously achieving economic growth, energy security and climate policy was not a contradiction, and that ‘district energy’ was a perfect example of this. ‘We do district energy projects that secure energy flexibility for our clients [and] which provide more options to achieve economically viable energy projects, while achieving security within climate policy... [And] this is not something that we’re planning on doing or theorizing about: we’re [already] doing this right now [in Canada].’

Q&A

The moderator, Mr Campbell, asked Mssrs Delvecchio and McMillan to name some key areas of their respective fields in which they ‘would really see the potential for terrific gains in order to meet [the] challenges’ which forthcoming radical new energy policies will set.

Mr McMillan named carbon capture and listed two projects which are to inject carbon ‘into a mature oilfield for enhanced oil recovery’ as a ‘great example of very meaningful amounts of carbon reduction’. With regard to Canada’s oil sands, he also mentioned research into methods of reducing the emissions (e.g. solvents, radio waves) generated during the industrial process of separating the oil from the sand. ‘More work to be done, but important opportunities.’ Firstly, **Mr Delvecchio** chose energy efficiency as a ‘grossly underestimated’ tool to reduce energy consumption and emissions and as an opportunity that was being wasted, particularly considering the financial gains to be made by investing in domestic energy efficiency. His second choice was renewable energy, of which ‘there is an infinite amount’ and whose capture is becoming increasingly cost-effective and efficient. **Mr Rathbone** spoke of the ‘absolutely critical’ importance of achieving greater energy efficiency and of combined heat and power (CHP) plants, which by generating both electricity and hot water achieve a rate of 80-90% efficiency ‘if done properly’ compared to the 30% efficiency of standard gas-powered plants.

Mr Art Hunter from the Canadian Association for the Club of Rome (to Mssrs Rathbone and Delvecchio): How does the fact that public utility companies are

often reluctant to adapt their business models to more distributed energy sources affect their businesses?

Mr Delvecchio, noting that transition inevitably implied sometimes painful structural changes, argued that ‘the world is changing very dramatically, and [it’s] up to the utilities to figure out how to adjust’ their business model to the ‘huge challenge’ posed by the ‘democratization’ and greater distribution of renewable sources of energy. **Mr Rathbone** spoke of the difficulties posed by the ‘very complicated relationship’ between local governments and local utilities and by the great diversity of their opinions. ‘There’s really no rulebook yet,’ he noted, ‘on how to negotiate [the] really very difficult challenges’ posed by distributed energy generation without undermining traditional providers. ‘I experience this difficulty every day.’ **Mr Delvecchio**, as a ‘supplementary comment’, argued that “smart grids” were the ideal solution for utility companies, as these would enable them to connect to any distributed source of power and to manage consumption and distribution.

A senior fellow of the University of Ottawa (to Mr McMillan): Have you given any thought to refining the [sand] oil in Alberta before it’s shipped across the country or to the United States?

With reference to the Keystone XL project in particular, **Mr McMillan** pointed to the hypocrisy of American criticism of the emissions of Canadian oil producers (noting *en passant* that many American producers are actually exempt from carbon tax), and claimed that Canada is actually a ‘net exporter of refined product’. Several companies are investigating the possibility of refining in Alberta or on the coast, he continued, but noted that ‘there’s no silver bullet’. ‘Should we do more [to export more refined products]? Maybe.’

A representative of Canada’s Building Trades Unions and the local Building and Construction Trades Council: Could the three panellists, each representing their own company, formulate a strategy to look at how Canada could once again begin to export her technology and labour as she used to?

Mr Delvecchio cited, as a ‘concrete example’ of exporting technology, a software team which Siemens has established in Fredericton, New Brunswick in partnership with a local electrical utility and which is the ‘global centre of competence for Siemens in demand management software for utilities, and we are now exporting that to the rest of the world’. **Mr McMillan** saw natural gas and co-ordination between sectors as crucial to renewables, and argued that exporting technology was Canada’s ‘largest single component [as] part of a global solution to a constrained-carbon world’. **Mr Rathbone**, in turn, explained that Canada, which merely has second-generation ‘district energy’ technology (‘hot water networks’) compared to Denmark’s third and fourth generations, will have to import the necessary technology: ‘we’re looking to learn... rather than export’.

An employee of TorchLight Bioresources, 'contracted by the Climate Change and Emissions Management Corp.': How can we come up with a Canada-specific plan that specifically targets the sources of our emissions—transportation, space heating, heavy industry and the oil sands—rather than one which (as usual) just focuses on wind and solar power?

Mr Rathbone noted that in his company's experience, 'energy master-planning' is being done at 'more of a municipal level and with [insufficient] structured guidance'. The lack of government pressure to formulate such 'master-planning' from the top down has led Ramboll to seek out and help only those municipalities which are 'more forward-thinking', many of which are already designing strategies for reducing carbon consumption and energy usage and diversifying their sources of energy. **Mr McMillan**, noting the global scale of the challenge of climate change, pointed to the fallacy of focusing upon local or even national levels, and argued instead that 'we have to have Canadian solutions in a global world, and our solutions may need to be bigger than just Canada'. **Mr Delvecchio** saw regional solutions as the way forward rather than a national approach, and suggested focusing upon identifying—locally, nationally and internationally—and targeting 'the biggest emitters' and finding the technology to reduce their emissions.

III. ARMCHAIR DISCUSSION

Mr William Powell began by reminding those present that for various reasons (historical, geographical, political) Europe was far from being a homogeneous single market for natural gas, with the largest differences being between its western and eastern halves. He then spoke of the 'three pillars of maximum security, cheapness and reliability' as posing a 'trilemma' to policy-makers. Noting that 'the population as a whole have sort of bought into this', he pointed to the problems caused by subsidies, which by skewing the market in favour of renewables force long-established energy companies to undergo profound and often painful restructuring. Finally, Mr Powers claimed that the price of carbon is simply too low to encourage research and investment in the (theoretical) potential of carbon capture and storage.

Noting the scale of the challenge at every level—provincial, national, global—**Mr Shawn McCarthy** thought that it was important 'recognize from time to time what a mammoth [and all-pervasive] task' the fight against climate change was, implying as it does the complete transformation of society away from fossil fuels. He noted that Canada was committed to producing a '2050 plan' for decarbonizing electrical power and shifting more efficient consumption towards electricity by the end of the year, and spoke of the challenge facing governments caused by 'the disconnect between elite conversation... and the great unwashed out there who don't think about climate change on a regular basis', who stand to face 'real-world impacts' on their

everyday lives. 'How do you sell [a climate strategy] so that you have a political constituency that's willing to buy it?' Mr McCarthy opined that the Canadian government would face a difficult uphill struggle, particularly in energy-dependent provinces.

A question from the moderator: Considering on one hand the dire effects of climate change and on the other energy's great economic importance in terms of jobs, investment, &c., what examples could both panellists give of key measures that would 'square that circle'?

Mr Powell repeated that the main problem was that 'carbon is just too cheap': a way should be found to get companies and countries to agree to a higher price, 'then we could meet our Kyoto agreements just by replacing coal with gas'. A real market trading carbon at a higher price, he felt sure, would serve as an incentive to 'squeeze out coal' and would encourage research into carbon capture and storage. In terms of public sensitivities to the cost of energy, he argued that 'power prices aren't enough of an issue [in the UK] to make people change their habits', and pointed to the fact that the market, despite its apparent competitiveness, has provided far too few incentives for them to do so. **Mr McCarthy** spoke of the financial community, which 'from now on is going to be looking at carbon risk', as an example of the profound changes already underway. In terms of public acceptance, he thought that people for the most part '[want] to elect governments that will do things to advance this issue', but he pointed to the challenge of confronting the real cost of such policy. He added that the province of British Columbia, for example, mindful of public opinion, favoured a 'revenue-neutral' approach whereby increased taxation in some areas would only be imposed alongside reductions in others. In conclusion, he argued that climate change and the extreme weather it causes would speak for itself, and pressed for more media coverage of climate change and energy-related issues.

A question from the moderator: In the course of a transition from a carbon-based energy model to a renewable one, what mechanisms are needed to ease the way in which the transition 'plays out' for traditional assets (e.g. oil pipelines or coal-burning power plants)?

Mr McCarthy began by speaking of the Financial Stability Board's work to develop 'standards for [long-term] carbon risk', which besides companies is of great interest to pension funds, institutional investors and insurance funds, but he felt it was inevitable that many companies, their assets 'stranded' by new energy policies, would disappear. **Mr Powell** spoke of the current distortion of the energy market in Europe, where energy providers require government 'bribes, although you might call them capacity mechanisms' as an incentive to build new power plants. He also noted the distortions and difficulties caused by lower tariffs within Europe's new unified network of pipelines. The financing of LNG terminals too, he saw as problematic given price fluctuations and capacity issues: 'whose gas will flow through this, and

who's going to pay for it?' The transition from a free market to a regulated market, he noted, 'is very, very painful, and it's got to the point where you need to be [guaranteed] money in lieu of output'.

A question from the moderator: Have you seen evidence in Canada or in Europe of companies being nimble, strategic, recognizing the way the wind is blowing and changing either their character or investment profile or technology mix? Or is the growth of companies providing innovative, renewable energy services 'bottom-up'?

Mr Powell listed a number of companies (British Gas, Eon, &c.) which since deregulation and unbundling have ventured into new sectors such as trade and supply, pipelines, international exploration, new energy business models, battery back-up for electrical grids, buying-up other companies, &c. in order to diversify their risk and restore or increase their profitability through new technologies, 'because they know ultimately that if they don't then [their] assets in the ground will forever stay there and [their] shares will just become confetti'. **Mr McCarthy**, however, was of the opinion that these new directions were, for many traditional energy companies, 'compared to their core business, small potatoes', and pointed out that companies often invested in renewable energy for the purposes of acquiring environmentally friendly window-dressing rather than real profitability.

A question from the floor: Ensuring that consumers experience new energy supplies (e.g. solar) for themselves is important as a means of involving them in the transition, but can the traditional energy suppliers be expected to enable this consumer-based experience of decarbonization?

Mr McCarthy felt that, on the whole, the responsibility to consume less and cleaner energy lies with the consumers themselves, and opined that the transition would likely take place from the ground up, but noted that 'local utilities are certainly looking for ways to deliver' and that some have 'very robust programmes' to promote greater energy efficiency. While recognizing the value of a lot of consumer technology to reduce energy consumption, **Mr Powell** returned to the reality of many consumers 'just not [seeing] the value of it', and pointed to the fundamental challenges and inconsistencies of trying to manage "smart" energy demand on a national scale.

Mr David Plunkett, the former Canadian ambassador to the EU: Could the panellists please share their thoughts on what potential changes the next American (Trump?) administration would be likely to cause?

Assuming Mr Trump's various declarations were truthful, **Mr McCarthy** foresaw 'a lot less' climate policy and international engagement, and doubted that a Trump administration would ratify the Paris commitments. 'Removing regulations from all sorts of energy production' would in a way be a return to the 'classic Republican' pro-

energy policies of 2012 or 2008 ('drill, baby, drill'), he thought, but then underlined the unpredictable importance of energy markets. Despite the fact that some Republicans support the idea of a revenue-neutral carbon tax, Mr McCarthy thought it was almost impossible to predict what a Trump administration would do.

Mr Alex Bettencourt, MD of SmartGrid Canada: With reference to the fundamental need to ensure widespread public support for climate policy, what examples could the panellists give of positive public opinion being 'brought on board' by a political leader or campaign?

Mr McCarthy cited the Obama administration's positive messages and its work to regulate carbon in the United States, and noted that several Canadian provinces (Quebec, Ontario, BC and Alberta) already have (or plan to set) a carbon price without there having been 'a huge groundswell against' this policy. Although he was of the opinion that 'policy is often way behind reality and there can be huge cock-ups', he pointed to Paris as proof of the existence of a truly global effort among 195 individual governments ('many of whom are at war with one another') to combat climate change. After remarking upon the lack of examples in Europe (and the interesting contradictions in Germany in particular—viz. no more nuclear, subsidies, still using coal, &c.), **Mr Powell** argued that energy prices were still too low for people to 'really worry'.

IV. CONCLUDING PLENARY SESSION - Wrap up of the breakout sessions

Breakout session:

How to be ready for the energy needs of tomorrow: clean, competitive and efficient – The role of innovation, research and smart infrastructure

Panellists:

- **Geoffrey Murphy**, Director of Partnerships and Outreach, Policy and Planning Branch, Natural Resources Canada,
- **Alex Bettencourt**, Director, SmartGrid Canada
- **David Hickey**, Vice-President, Wind Power and Renewables, Siemens Canada
- **Ahto Oja**, Renewable Energy, Energy Saving and Audit, Biomethane and Energy Cooperative expert

The moderator of the breakout session, **Mr Gaëtan Thomas**, with reference to the 'trilemma' of economic growth, energy and climate policy, noted the fundamental importance of technological innovation but perhaps too narrow a focus on wind and solar power, which caused the audience to list many other renewable sources of energy e.g. fuel cells, hydrogen, &c. Most of the panellists apparently agreed that

their companies could be 'part of the solution' within ten years, which led to the panel's second focus: regulation and policies. The consensus was the need for broad, flexible regulation that neither subsidises nor favours a particular technology and promotes the introduction of various technologies (e.g. "smart homes", hydrogen fuel cells). The panel then agreed that, for companies and utilities alike, rapid technological change made long-term planning very difficult, and that a lot of nimble efforts would be required to 'balance the grid'. Mr Thomas was of the opinion that the best of both worlds would perhaps be a combination of 'synergies from centralization' and the 'advantages of new technologies from decentralization'.

Breakout session:

How to translate COP21 into energy policy in Canada and the EU

Panellists:

- **William Amos**, Member of Parliament, Liberal Party
- **Matt Horne**, Associate British Columbia Director, Pembina Institute
- **Jean-Arnold Vinois**, Energy Advisor, Jacques Delors Institute
- **Sigurd Schmidt**, Special Adviser, Energy security, Economic and Global Issues Division, European External Action Service (EEAS)

The panel which **Mr Douglas MacDonald** moderated had been tasked with identifying and suggesting solutions to the major challenges both Canada and the EU face in order to 'implement the Paris agreement', and he began by speaking of two categories of challenge: 1) considering that, in both Canada and the EU, active government intervention is a prerequisite to the emergence of 'from-the-ground-up' initiatives (individual, municipal) to tackle climate change, the panel identified the challenge of a) allocating the costs of transition while fairly taking into account regional disparities in terms of economic priorities, and b) of creating an adequate framework of institutional rules and regulations; 2) regarding the question of carbon pricing: a) how to ensure 'public acceptance' when the carbon price begins to rise above current low levels, and b) the importance of financial mechanisms and of deciding what to spend the carbon tax coffers on (and how)?

Breakout session:

The role and potential of natural gas – The Canadian and EU perspectives

Panellists:

- **Terence Hubbard**, Director General, Petroleum Resources Branch, Natural Resources Canada
- **Jeffery Piper**, Senior Expert, Directorate-General for Energy, European Commission
- **Alfred Sorensen**, President and CEO, Pieridae Energy (Canada) Ltd.

Mr William Powell began by speaking of ‘two problems between the EU and Canada’: 1) Canada is as ‘long on gas (but sadly very short on delivery methods to the coast and liquefaction)’ as the EU is ‘short on gas if it wants to diversify its supplies’; 2) in the EU, despite various initiatives (Azerbaijan; Mediterranean, Baltic and Atlantic LNG terminals; new West-East[!] pipeline networks), the member states remain divided, and in Canada global prices for natural gas currently remain too low for investments in transport, liquefaction and export to Europe. Also, given Canada’s lack of ‘the wherewithal to support a home-grown LNG industry’, an additional challenge was persuading international lenders of the viability and security in terms of contracts, licensing, regulation and track record of large investments in the country’s gas sector (‘for the supplier to be considered reliable... [over] 10, 15, 25 years’ time’.

Finally, **Mr Graham Campbell** (the conference’s moderator) shared a few personal observations. He began by noting the ‘difference of pace’ between Canada and the EU: the latter has done much more by now to address the problem of climate change, and in Canada, unlike the EU, it is actually the provinces which have forged ahead individually, whereas the federal government ‘is trying to pull the strings together in order to meet our long-term commitments’. He noted, however, that both share a commitment to tackling climate change, and that over the past year Canada had done much to make progress across four mechanisms: carbon pricing (British Columbia), regulation (Alberta), investing in technology (Saskatchewan). Mr Campbell then noted that the Canadian ‘cap on trade’ model could learn much from the lessons of the ETS trading system in Europe—particularly in terms of expectations of revenues, in that the latter began with high prices and great ambitions before falling dramatically as a result of recession. He then argued that both Canada and Europe shared a similarity in the structure of their municipal authorities: as ‘the closest [level of government] to people’, they have greater opportunities to interact frequently with individuals, and they have been very active, in both Canada and Europe, in adopting environmental legislation and diversifying energy mixes. Lastly, he felt sure that everyone would agree that all the individual initiatives taken so far, ‘when added up in terms of the [greenhouse gas] reduction, still fall short of the desired target we have to meet’. All in all, Mr Campbell saw more common interests than differences between the EU and Canada despite ‘fundamental structural contrasts’, and urged both to collaborate and learn from each other.