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Electricity and the Energy Challenge

Atlantic Power Summit
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Introduction:

It is a pleasure to be here today as this region of the country considers its options for future energy supply. Atlantic Canada is in this regard not really different from other parts of the world who are also considering options. I had the pleasure of attending the International Electricity Summit in Japan in April and fully appreciate that the issues you are considering are roughly the same issues electric utilities from Europe, Japan, Australia, the USA and elsewhere in Canada are facing. The World Energy Congress held in Montreal in September revealed how energy challenges us in an interdependent world.

Electricity is widely expected to play a greater role in the global energy system and in meeting more societal needs than it has in the past. Electricity is seen as a critical wedge for reducing carbon in the transportation sector- plug in electric cars. But if electricity is to answer this call, it must also be given the authority to proceed and the means to succeed. These are the key messages discussed in Japan and in Montreal. I want to share with you today a few ideas on what can work in Atlantic Canada and in other parts of North America.

As the sole Canadian at the summit in Japan, I wanted to be sure to make two related points: **first**, governments must exercise more leadership in supporting and enabling a long-term policy path for electricity. Governments can help electricity secure its social license and its enabling capital.

Second, the electricity industry must focus as a community on some of the key issues it now faces – issues with important strategic and policy implications. In particular, five priorities have emerged for government and electricity industry leaders: (truly) integrated resource planning; low carbon electricity sources; carbon pricing; clean energy finance; and governance improvements.

Each of these priority areas gives rise to complex and important questions for governments and the electricity industry, the answers to which will help determine whether electricity can rise to the challenges I have mentioned. The question, we in the industry must ask is as follows: Is electricity ready for centre stage?





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Electricity: The Answer to our Energy Challenge

Electricity is emerging at the centre of energy and environmental policy.

Electricity has the potential to:

- Expand clean energy access
- Address growing demand
- Reduce carbon emissions through CCS
- Reduce carbon in the transportation sector





Slide 2

The energy system faces myriad challenges and risks in an increasingly interdependent world. Climate change is seen as a game changer- it redistributes wealth and forces fuel change. The developing economies of China, India, Brazil are a combination of strong energy demand, energy poverty, oil discoveries and resource depletion, and expanding nuclear technology in India, Brazil, China and Eastern Europe. Hydro in Brazil and China set a new standard. But let there be no doubt. They will grow their economies and will take up the resources and capital needed to do so. New ideas and new approaches from these economies will re-define energy.

In Canada where the self sufficiency of provincially owned and operated electricity grids has been the rule, the commerce of electricity between and among neighbors is growing. This is not to be confused with an East-West grid because there is no such thing. It exists in the minds of people who have read too many books by Pierre Berton on the national dream and railroads. The commerce of electricity occurs among willing partners. It is pragmatic and profitable trade where the technology allows, and where political boundaries are not a barrier. Just the other day I had a senior official from Finland in my office telling me his country wants to build more reactors so that they can sell into Russia and into the Nordic Grid. Finland has always depended on Russia for electricity but now for the first time, industry and government are working together and will reverse the situation.

Low carbon electricity will have a central and expanding role in global energy use. If one has non-emitting electricity such as **large** hydro, nuclear, or wind generation, it is likely that customers who do not have such options will want to purchase this electricity. While electricity is not a panacea and will not replace fossil fuel use, it is emerging at the centre of energy and environmental policy.

Governments and the electricity industry today must work to develop a long-term policy path and identify priorities in key transitional areas. A good example in Canada is the federal, Saskatchewan and Alberta investment in Carbon Capture and Storage (CCS). When Canadians work together, we usually accomplish great things.

It is now incumbent on governments and industry to think more ambitiously and systematically in determining how electricity can answer the expectations and hopes that are being placed on its shoulders.





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Electricity: The Authority to Proceed and the Means to Succeed

In order for Canada to economically invest in the Electricity Industry, we must enable:

- Cost Competitiveness
- Environmental Enhancement and Sustainability
- Reliability of Supply
- Long Term Policy Paths





Slide 3

The electricity industry must focus on key issues it now faces – issues with important strategic and policy implications. In order for Canada to economically invest in the Electricity Industry, we must enable:

Cost competitiveness: In a country of vast expanses and extreme temperatures, affordable electricity is essential for the competitiveness of Canada's businesses and the comfort of its families. Economies of scale, power plant location and use of regional resource endowments remain key drivers of the affordable electricity Canadians enjoy today.

Environmental enhancement and sustainability: These properties of electricity – affordability and reliability – are the pillars on which the Canadian electric power system was built and will remain regardless of the vision for the future that comes to be. However, a new “constant” of the electricity system in Canada is taking shape, as Canadians' expectations of *how* they want their energy needs met are evolving. **This third constant, *sustainability***, is one of the key driving forces behind the transformation that will occur in the decades to come. The electricity system of the future is expected to deliver on the pillars of affordability and reliability, while taking into consideration the balance of environmental, social, and economic impacts the system will have on Canadians. The extent to which this new constant can be addressed will depend heavily on the extent to which transformation of the electricity system can be achieved.

Reliability of supply: Canada's power system is made up of regional systems that are linked together in order to share generation resources and improve voltage stability. Meshing the systems also allowed generators to provide back-up power to neighboring systems, if needed..

Long Term Policy Paths: Governments must exercise more leadership in supporting and enabling a long-term policy path for electricity that will result in efficient, effective and timely investments.

Can we strengthen the interconnections? I say yes. We must. Like everyone else, we need options and transmission.





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Five Priorities for Government and Electricity Industry Leaders for a successful revolution

1. Integrated Resource Planning
2. Low Carbon Electricity Sources
3. Carbon Pricing
4. Clean Energy Capital
5. Governance Improvements





Slide 4

Integrated resource planning has been left at the side of the road for too many years. We must go back to it.

- Integration of energy efficiency, energy storage, and energy security.
- Integration of information technology, renewable integration and smart-grid mesh with customer education
- Opportunities and priorities for improving planning coordination across neighboring jurisdictions

Low carbon electricity sources: *There is a need to shift to a low carbon electricity source. We all know and accept that.*

There are two notable low carbon sources. They need to be economic at the scale required -Coal with CCS | Natural Gas|

Virtually non-emitting large hydro, and nuclear are proven baseload generation and we need more of what works well.

Carbon pricing: Determining the carbon price or signal it will take to drive the electricity sector transition to low-carbon? The signal can come in many forms. A clear set of regulations will do.

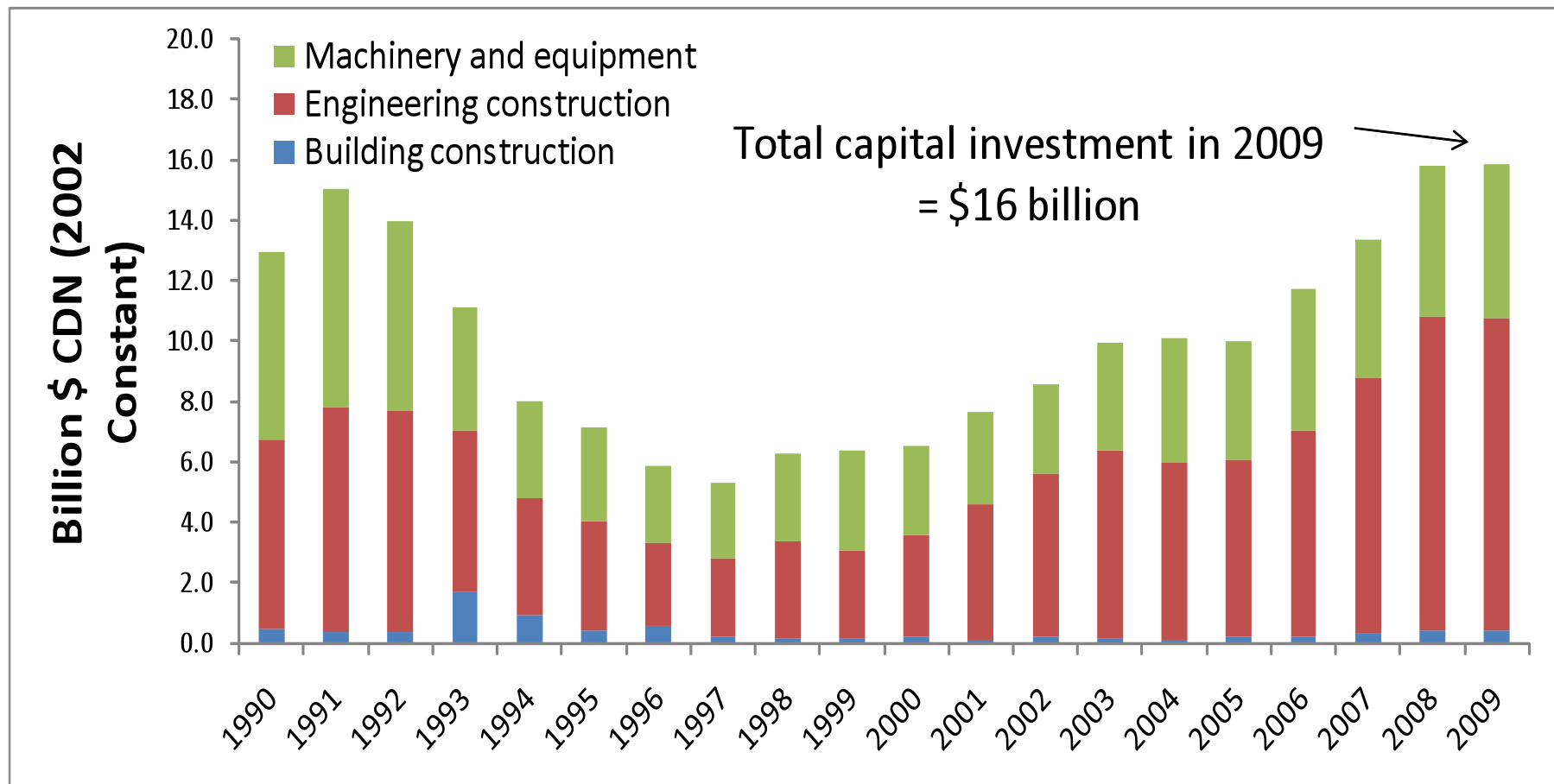
Clean energy capital: The industry will need capital for electricity projects, both for replacement infrastructure and to meet new demand.

Governance improvements: The world will need better regional, national and international governance – more effective and inclusive decision-making mechanisms and institutions. For Canada, we need to look at our needs and systems as well as those of our US neighbors.





Capital Investment in Canada's Electric Power Sector, 1990 – 2009 (billions of constant 2002 dollars)



Source: Statistics Canada, Survey 2820, 2010





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In order to move from our current capital investment to a \$238 Billion dollar investment, we require :

Favorable rates of return to guarantee access to capital

Effective policies (greenhouse gas policies) to direct efficient investment decisions

Increased regulatory efficiency to direct lengthy investment planning, deployment and development (improved environmental processes). This includes changes to the fish habitat management policies of the Fisheries Act.

Customer education- to communicate the broader understanding of the industry (rates, fuel types, trade-offs)

The really important requirement involves the federal government. We need Ottawa to help the public understand that energy, both hydrocarbon based and electron based , is a major driver of our economy and future prosperity.

Ottawa must start the investment cycle in electricity infrastructure by signaling loud and clear to Canadians that energy is bedrock important to our prosperity and that we must get on with building a stronger economy.

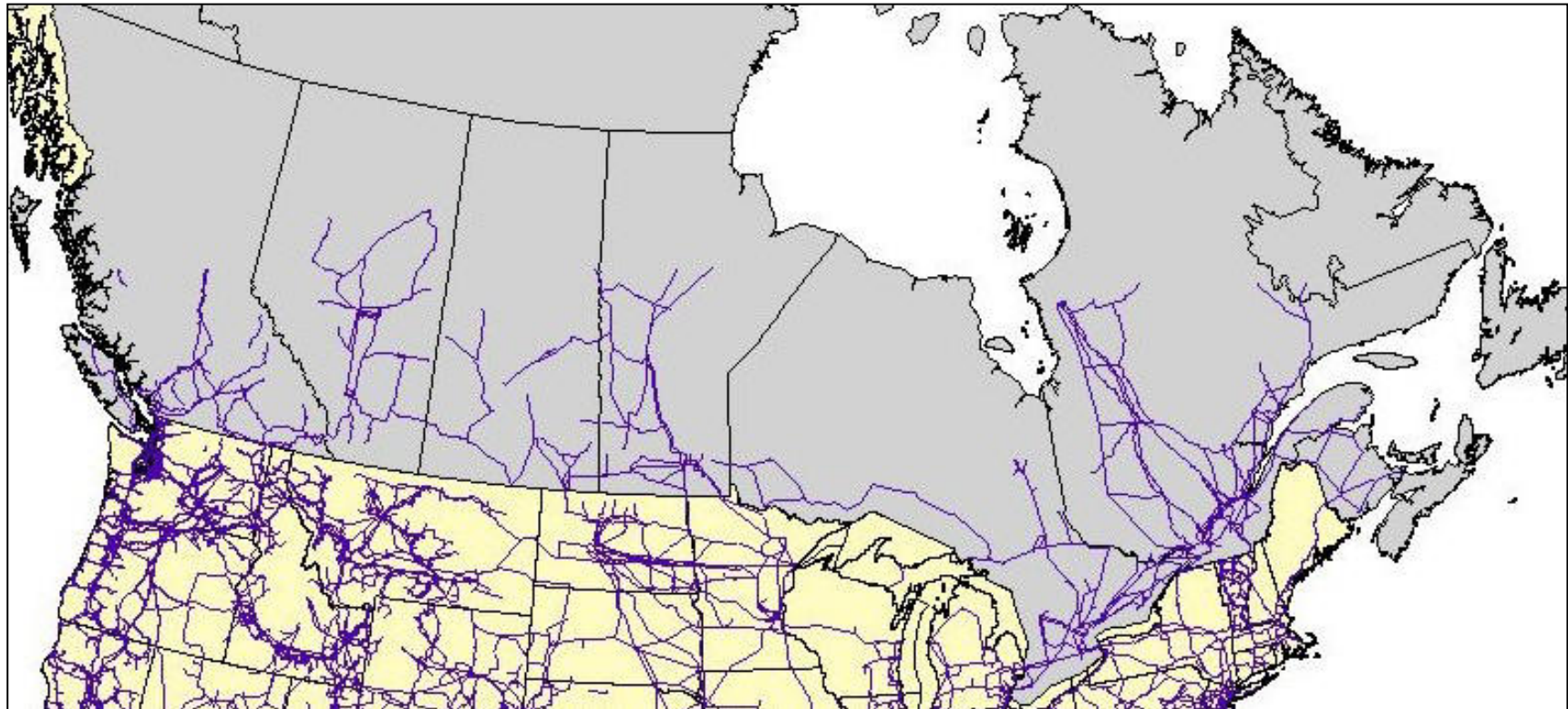




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Good Neighbours: North American Bulk Transmission Lines



Map Source: Global Energy Network Institute (GENI)





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We are interconnected with the very large US market. We buy and sell electricity across the border. The lines run north-south because that is how the economy works. The USA is spending billions from the recovery package to strengthen their grid. We need to do the same or face being seen as the unreliable partner to the north.

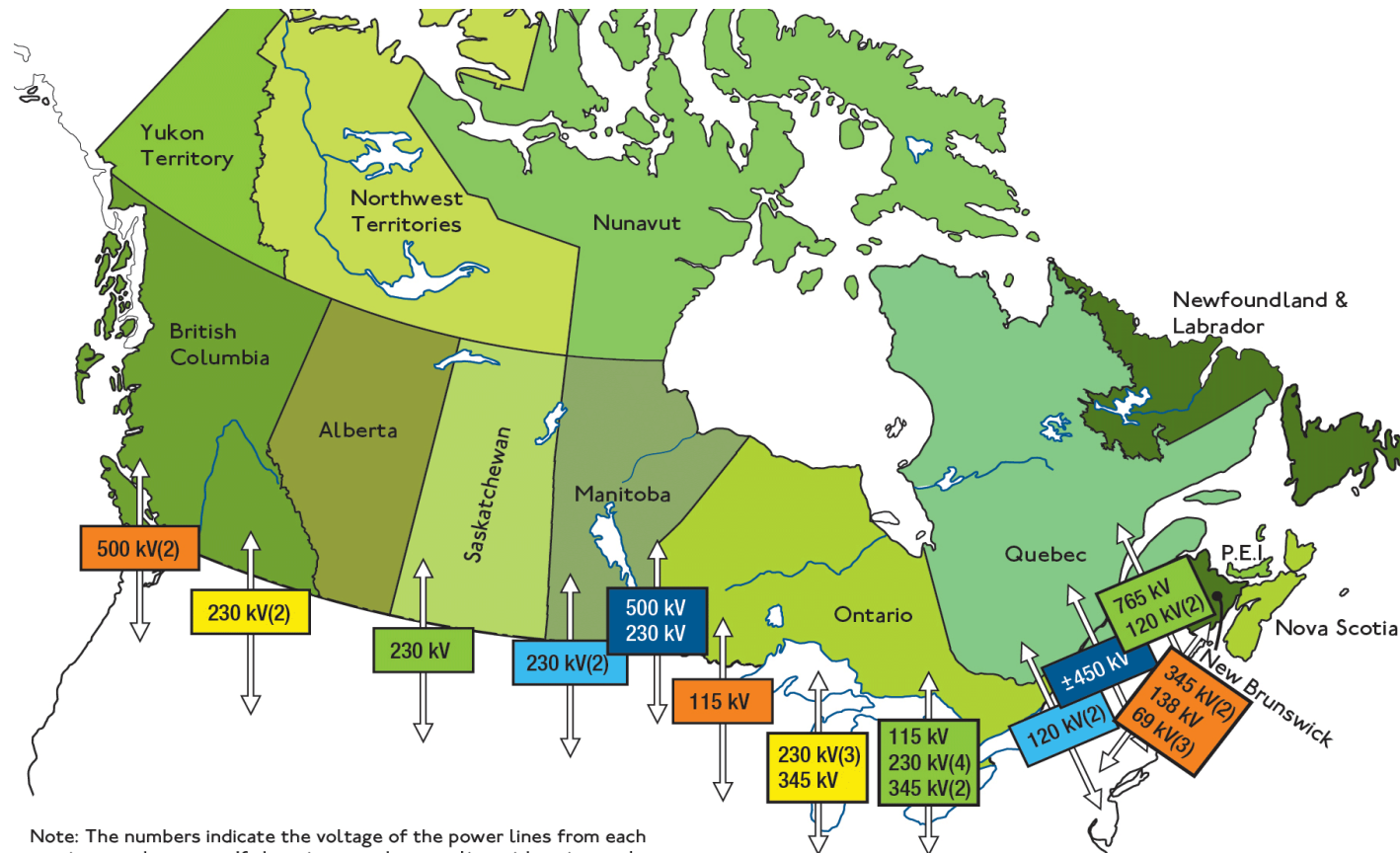
In Canada, we must get our energy house into order. We have quality projects being planned in generation, transmission and distribution. The key to launching the most extensive round of investment in electricity infrastructure that this country has ever known is transmission. Hydro projects are further afield and some offer more difficult engineering and financial challenges in that long transmission lines need to be built. Good projects with expensive transmission.

That speaks directly to the fact that Canada is a land of big geography - great vastness and distance. The lines you see on this slide were built and paid for by rate payers in the provinces. The next set of lines to be built, depending on where they are in the country, will also be built by the provinces but they **may need special attention to be economically sound.**





Good Neighbours: Major Canada-U.S. Interconnections



Note: The numbers indicate the voltage of the power lines from each province to the states. If there is more than one line with a given voltage, the number of lines is indicated in parentheses.
Source: NEB, Canadian Electricity Association and Natural Resources Canada.





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The industry will need capital for electricity projects, both for replacement infrastructure and to meet new demand. Several questions emerge in connection with the need for clean energy capital:

Are there alternatives to a rate base for long-term capital investments in generation, transmission and distribution? Are there other sources of patient capital we are overlooking which could complement ratepayer funding?

How can we ensure that the next generation of infrastructure investment avoids locking in emissions sources for another generation and instead goes towards clean energy investment? Will the global recession slow down, or help accelerate innovation in the electricity industry?

How can we increase the industry's relatively small investment in R&D, as well as early stage innovations that have not yet achieved commercialization and scale? I am thinking here of electricity storage technology.

Electrical utilities are chasing the same machines, copper wires, transformers, etc. Will there be adequate capital to pay for these needed materials – and what are we competing against in the marketplace? Will regulated return on equity be sufficient?

As mentioned earlier, China, India and other rapidly developing economies are building their bulk power systems and will draw on the same resources we need to invest in infrastructure.





Future Capital Investment Requirements

The Canadian electricity sector requires an efficient, effective and timely investment by the year 2030.

	(Billions of 2007 CDN dollars)			
	Generation	Transmission	Distribution	Total
2007 – 2015	40.3	15.2	32.8	88.3
2016 – 2030	93.7	17.6	38.0	149.3
Total to 2030	134.0	32.8	70.8	237.6





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Slide 8

An investment of **\$ 238 Billion** in the sector is required to replace the existing aging infrastructure and to increase the growing electricity requirements

Net Results from investment:

Generation: Investments will be determined by local resource availability- we need more options.

Transmission: Efficient market integration, more effective grid stability and renewable technology integration. We need transmission.

Distribution: Implement smart-grid technologies and facilitate customer choice and increased demand management. Plug-in electric cars are coming.

How does all this investment get launched? What is the starter pistol? When the investment gets going, the result will be electricity projects right across the country.

Imagine a Canada where investment in electricity infrastructure of this scale plus the investment oil sands are planning drive prosperity.

As mentioned earlier, other countries will be chasing the same equipment and I believe that the manufacturing base that serviced the electricity sector so well for so many decades can re-establish itself in Canada to supply North America as electricity gets re-launched on the build cycle.

More jobs for Canadians should be a tangible benefit of the re-launch. This is a case of jobs, jobs, jobs.





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Conclusion

As the stakes have risen and our fates have become more intertwined around global energy challenges, it is now incumbent on governments and industry to think more ambitiously and systematically in determining how electricity can answer the expectations and hopes that are being placed on its shoulders.





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The energy system faces myriad challenges and risks in an increasingly interdependent world, and these could become destabilizing factors in communities and regions. This need not apply to Canada.

Although there is now an expectation that a subset of energy - low carbon electricity - will have a central and expanding role in global energy use, many questions have yet to be answered in how this transition is to occur. And it will not happen by itself; if electricity is to answer this challenge over the next few decades, governments and the electricity industry today must work to develop a long-term policy path and identify priorities in such key transitional areas as integrated planning, low carbon supply, carbon pricing, clean energy capital, and energy governance.

I believe that investment in electricity infrastructure will bring lasting prosperity to Canada and will provide jobs and opportunities for the next generations of Canadians. Consequently, we must launch the build cycle now. When government and Canadians work together, we accomplish great things.

