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Keynote Luncheon Address II

J. Michael Robinson

Carmine Marcello

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KEYNOTE LUNCHEON ADDRESS II

Introduction - J. Michael Robinson
Speaker - Carmine Marcello

INTRODUCTION

J. Michael Robinson

MR. ROBINSON: I am Michael Robinson,\(^1\) and I am doing something very minor, just making an introduction for Carmine Marcello,\(^2\) who is the Executive Vice President, Strategy at Hydro One, Inc., otherwise known in Ontario as WIRES.\(^3\)

At one time, a prior government in Ontario thought that WIRES should be all privatized—prospects were being drafted, and province citizens were going to own it.\(^4\) But then that all changed. Now, Hydro One is sort of half-pregnant; it is still fully owned by the Government of Ontario.\(^5\) There is also Ontario Energy Generation, which is also wholly government-owned.\(^6\)

I have a slight confession to make and a slight possible conflict. I do have an indirect role in Ontario's electricity generation policy because I am on a review board which hands out grants for community development of alternative energy sources. Ontario has advertised itself as being a leader in North

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America in this area because of our feed-in tariff in the Green Energy Act, but my task is very easy. The rules say that if you come in with a good idea, here is a check. So the Government is all for alternative energy.

Carmine is one of those executives who knows how to do things. He is an engineer. Of course, he has a Masters of Business Administration, as everybody has to have one of these senior executive jobs. But Carmine really knows how to make things. He has worked his way up for well over twenty years in many senior executive positions, using that engineering background, I am sure, and he started at Hydro One when it was quite a different beast way back in 1987.

So without further ado, I am going to let him explain what WIRES does and how it can perhaps get more involved in cross-border United States and Canadian electricity transmission.

KEYNOTE ADDRESS

Carmine Marcello

MR. MARCELLO: Thank you very much and I would like to thank Dan for inviting me. I fought it tooth and nail. I did not want to come and I will tell you a couple of reasons why.

As a starting point, I am an engineer and I like to get stuff done. I have heard a lot about policy and 900-page documents and all the rest. So part of the frustration was, how do you get all these policies aligned? And the last question from Governor Blanchard in the last session was, should we have a common approach? Al Monaco said, "No."

I will make a personal comment because I do work for Hydro One, an agency of the Crown. We are completely owned by the government of On-
tario. We answer to our bondholders, so we care about what Standard & Poor’s has to say and we do care about operating in a commercial manner, but these comments are my own.

Yes, we should have a common approach. When you think about electricity trade, water, and climate change, and then you take a regional entity, say the Northeast—and I am talking in terms of Québec, the Maritimes, the northeast United States, Ontario, and from a technical term, I will say the ECAR TJM—or the area we are in right now if you were to run this machine we call “the grid” in an optimal manner, the term “optimal” is very interesting.

If we had a common approach to what “optimal” meant, I would assume both price and reliability would be in included in that approach. Because, if I wanted to get someone’s attention, all I had to do was flip the switch in the control room and my lights would go out. Before you knew it, everybody is asking, “What just happened?” So we can turn the lights back on. Thanks for the drama.

You have to remember that keeping the lights on is what folks like me are all about. Everything else is nice and interesting. The second those lights go out no one cares about anything. But with that said, think about a common approach. We have all agreed on the definition of reliability. We have all agreed on what is affordable. We have all agreed on what mechanism we are going to use to talk about clean. Then you sit back and turn it over to a bunch of engineers and you tell them to run this system.

I would venture that the system would look pretty interesting. You would have Hydro-Québec with huge opportunities to store water. I know we cannot store electricity in real-time but we can store water. You have got huge interconnection capabilities between Québec and the Northeast, between Ontario and Québec, between the Northeast and Manitoba, and between Manitoba and the United States. This grid is a huge machine with a

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10 TREBILCOCK & HRAB, supra note 4.
14 See, e.g., Toward a Smart Electric Grid, PBS (Dec. 23, 2011), http://www.pbs.org/wgbh/nova/tech/toward-smart-electric-grid.html (explaining that electricity is hard to store as it can not be done efficiently or cost-effectively).
lot of capability. There is a lot of, I will say, green. There is a lot of clean north of the border, which now runs that system in an optimal manner. Think about all the policy things that would have to take place to get to a point where you can just turn it over to a bunch of engineers and say, “Just make it happen.”

The reality is that even a consistent definition of reliability does not exist. We do not know what a fair price is. We can keep debating it. I have been in conferences where nuclear is clean and where nuclear is the devil. I have been in conferences where big Hydro-Québec is the devil but coal is clean. You can understand it from local political reasons, but all those things need to be brought together. Again, that is my personal comment, and I am saying it for the record because in a minute I am going to get into some of the prepared text.

Back to my comment, Dan convinced me to come. I came reluctantly because I really did not know what to say from an Ontario perspective.

So now that I have said that, we do have a place in terms of energy trade. I do want to focus on what can be done when there is some clarity. I am going to talk about Ontario as a case study. You can extrapolate it if you like, but the one thing we do have in Ontario, I think, is a fairly clear policy when it comes to green. I do want to highlight some of the actions that we have been able to take with that clear policy. I am not making a value judgment on the policy. Some of you are going to say that was brilliant. Some of you are going to say that was just the craziest thing you have ever heard. But the fact is, it is clear and actions can take place.

This morning David Crane mentioned what we know and what we do. You cannot do anything if you do not know anything. So getting that common approach or that clarity, I think, is the first step and then everything else can fall into place.

At this point, I will probably move into the reason I was allowed to come, as I promised for our legal people. You guys will all appreciate this, that being an agency of the Crown and, yes, being an engineer, I will try to stick to the prepared text as much as possible.

You heard earlier the Feds are having an election and energy really is not on the table. Co-Provincially, energy will be an election issue and I would argue that the issue will be centered around price. Again, before I go on in
much detail, I do want to highlight a couple of stereotypes. Usually, stereotypes are very dangerous things to talk about but sometimes they are quite informative.

All my travels have been in circles with the North American Electric Reliability Council. Reliability is what we are all about and when we get there and talk, Canadians and Americans, a lot of times what we find is the inferiority complex that Al talked about. We will fly into a beautiful American city and sit in a room like this and talk about issues; and then you will realize it is a bunch of Canadians sitting in a room in the United States. You realize there is not a single American in the room and we are talking about working together. So the other reason I was happy to come here is we are actually going to have a meaningful dialogue. Yes, I think the Canadians might be outnumbered. We are outnumbered, which is great.

When you mention green in some of these reliability conferences and you talk about Canada, folks think environment. Canada is green. Hydro and electric clean, and I am talking in electricity context here. When you mention green within a United States context and you ask the Canadians, they think the dollar, maybe the environment, but more important than anything and, again from a grid transmission perspective, they think military green.

Following the blackout of 2003, the move towards cyber-security has been tremendous. It is back to my little joke here where I flicked off the lights. The second those lights go out all this policy talk about clean environment goes out the door, so keep in mind that security is front and center in all of this.

I think the energy industry as a whole, not only electricity but as a whole, have done such a tremendous job at keeping the lights on or delivering supply that people have taken it for granted. That is a good thing and that is the luxury that allows us to have some of the debates we are having today.

With that, I will start moving into some of the more prepared comments. A little bit about Hydro One. We are the WIRES Company. We move the power around. We will take anybody's electron. So if it is a nuclear one, if it is a green one, if it is a wind one, if it is a coal one, it is on our system and we move them around. We are indiscriminate. We take them all.

environmental-issues (last visited Nov. 6, 2011) (discussing how the candidates, if elected, will support Canada's energy industry through expanded incentives, capital, and investment).


See HYDRO ONE, supra note 3, at 4 (explaining Hydro One is a company that connects people by delivering the energy and its main responsibility "is to deliver electricity to industries, municipal utilities, farms and other customers in communities all across Ontario").
Our territory is quite big and that provides us some very unique challenges. We are roughly twice the size of Texas with our actual geography. We have 1.1 million direct customers, largely rural, and we have large cities like Toronto, which have their own infrastructure. We have car plants, oil plants, and all kinds of refinery and industry at one end. We also have Mom-and-Pop farms and roof top solars. We have huge wind farms as well. Enbridge has, I think, the largest solar farm in North America. We cover the gambit there, so the territory and the challenges are quite unique.

The other thing that is very important is that geography gives us a couple of opportunities. We are interconnected with Manitoba, Quebec, Michigan, New York, and Minnesota; those interconnections are tremendous. And now I am just going to focus on Ontario import and export, and we often talk in terms of the net number.

Last year’s net was something in the order of four terawatt hours. So what does that mean, four terawatt hours? Take the City of Cleveland, take the Greater Cleveland area, we can power that city for a year. So it is a big number. But what is more important is the ability to flow power in both di-

21 See The Hydro One Smart Network, TRILLIANT INC., http://www.trilliantinc.com/about/proven-solutions/case-studies/hydro-one (last visited Nov. 10, 2011) (stating that Hydro One’s service territory has a land mass twice the size of Texas).
24 See generally Sun Power Arranges Solar Power Leases, SUN POWER, http://www.sunpowergp.ca/ (last visited Nov. 10, 2011) (explaining that solar power leases are connected to a Hydro One Transformer Station).
25 GENC ET AL., supra note 23, at 21 (explaining that while OPG generates most of the electricity consumed, Hydro One transmits the power that stems from OPG’s three wind farms).
29 See generally Organizational Profile, CLEVELAND PUB. POWER, http://www.cpp.org/aboutus.html (last visited Nov. 17, 2011) (explaining that while four terawatts of energy is capable of powering the city of Cleveland for a year, Cleveland Public Power produces more than 414 kilovolts worth of electricity each year for Cleveland, Ohio).
rections. That is a net number. But at the same time in 2008, and I will pick this example, we exported fourteen thousand—almost fifteen thousand—terawatt hours, so three or four times as much.\(^\text{30}\) The opportunity for trade is tremendous. If we can get to that common platform and we can use Ontario’s infrastructure, Ontario’s WIRES, then there is an opportunity there.

I talked about some clarity around a policy and, within Ontario, a lot of that came about after 2003.\(^\text{31}\) There was the blackout, the lights went out, and everybody focused on reliability. In our industry, the focus was all about trees, training, and, ultimately, technology.\(^\text{32}\)

Those are the things that let us down, and a lot of effort was spent on fixing those things, and I have already talked about cyber-security as an emerging issue. But the other thing that happened was an awareness. All of a sudden in Ontario, and I think in the Northeast, people paid attention to the supply mix. We are going to run out of power. Growth is going like this and our infrastructure is getting old.\(^\text{33}\) We have to do something about it. The “something about it” was to push conservation as aggressively as we can. We have to have plants to convert old fleet into new fleet. What do we want that to look like? The debates started and what came out of it was the decision to shut down coal in Ontario.\(^\text{34}\)

So let us just put this in perspective. I am a transmission planner and I will take anybody's electrons, I really do not care about the color, but I care that the lights stay on. Today the mix in Ontario is roughly fifty-five percent


\(^{32}\) See id. at 3 (explaining that the Task Force’s recommendations include making reliability standards mandatory and enforceable, strengthening the institutional framework for reliability management in North America, and tracking implementation of recommended actions to improve reliability).


\(^{34}\) See Shutting Down Coal, GOV’T OF ONT., http://www.ontario.ca/en/initiatives/progressreport2011/ONT05_039158.html (last visited Nov. 11, 2011) (explaining that Ontario is on track to be the first place in North America to shut down coal-fired generation and replace it with clean, renewable power).
nuclear in terms of energy on the system, thirty-five percent hydro-electric, thirteen percent gas, two percent wind, and one percent renewables.

That is today and I have left out coal specifically. It makes up the last nine percent. It is a significant number, but when the journey started, coal was at twenty-one percent. Someone had the wherewithal, the vision to shut it down. And, believe me, engineers like me were pulling our hair out. We were going nuts. You cannot just pull a fifth of the fleet out of service and expect to keep the lights on. You need to do something about it. You have to have something to replace it, such as conservation.

A lot of push on a smart meter implementation came about. With a renewed look at the supply mix, we did not have a long-term energy planning function within the province. The Ontario Power Authority ("OPA") was formed and their job was to come up with a twenty-year integrated power system plan, integrated generation and transmission, and conservation and renewables. They developed a mix; part of that mix was no more coal and they have been working on it. You have heard comments

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35 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix nuclear accounted for fifty-two percent of the energy mix).
36 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix hydro-electric or "water" accounted for nineteen percent of the energy mix).
37 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix gas and oil accounted for fifteen percent of the energy mix).
38 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix wind accounted for two percent of the energy mix).
39 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix renewables or "bioenergy" accounted for one percent of the energy mix).
40 Id. (illustrating that in Ontario’s 2010 Energy Supply Mix coal accounted for eight percent of the energy mix).
42 See generally Smart Meters, Hydro One, http://www.hydroone.com/MyHome/MyAccount/MyMeter/Pages/SmartMeters.aspx (last visited Nov. 11, 2011) (explaining how smart meters allow customers to manage their electricity use and costs in order to reduce the need for additional power generation during peak periods and create supply and environmental benefits).
44 See id. (stating that as part of the coal phase out program, the Minister has directed the Ontario Power Authority to complete a procurement process for multiple natural gas-fired electricity generation facilities to support the province’s goal to replace coal-fired generation by 2014).
about the feed-in tariff already, renewables, wind, so we have gone from twenty-one percent to nine percent coal, and in another two to three years, we will be down to zero.\textsuperscript{45} We have to keep the lights on and we have to ensure that the technology is there to allow for new incorporation of renewable resources. It is not as easy as it seems. It is not as simple as “I took out a coal plant and now I am going to put something in its place.” It did not work like that.

Coal was shut down.\textsuperscript{46} A lot of gas plants came in, and when you look at the amount of gas, 5,500 megawatts of coal were removed.\textsuperscript{47} In the order of 2,500 megawatts of gas plants were added, lots of large wind farms and solar farms at one end, and on our distribution system the much more distributed resources were the roof top solars.\textsuperscript{48} All of those things presented technology challenges. But those did not stand in the way. They were challenges and they were understood. It would have been really nice to have all the answers first but the reality is that it does not work that way.

So what happens when the wind does not blow? What happens when the sun does not shine? Those are all questions everybody has and everybody looks at. The bigger issues for us were, if you pulled out a centralized plant with 4,000 megawatts at Nanticoke, the whole flow of the system changed. Constraints appeared where there were none before. Power quality and voltage problems appeared.\textsuperscript{49}

As the transmitter, Hydro One put together the plans working with the OPA to make sure that we would remain reliable. There has been a tremendous amount of investment to allow things like that to happen, not the least of which is a 120-mile, $700 million transmission line from the Bruce nuclear area into just west of Toronto.\textsuperscript{50}

\textsuperscript{45} Gov't of Ont., supra note 34 (stating that there will no longer be coal-fired generation in Ontario by 2014).

\textsuperscript{46} Id.

\textsuperscript{47} Ont. Power Generation Reviw Comm., supra note 41 (stating that, at the time of the report, the Ontario Power Generation operated five coal-fired plants that generated about 5,500 megawatts of power per day).

\textsuperscript{48} See Ontario Inches Forward On Energy Tightrope, Air Water Land (Dec. 13, 2004), http://www.airwaterland.ca/article.asp?id=341 (stating that Ontario planned to announce projects for natural gas-fired plants, along with other green power sources to supply 2,500 megawatts of power).


When you pull out a generation plant the size of Nanticoke, everything changes. That was something that needed to be built but that also allows for major wind farms to be built next to that nuclear plant, and those things are coming. The transmission issues, the big WIRES, are a little bit easier to deal with. And when I say easier, it is because there are fewer lines, the problems are easier to understand, and they are easier to get your hands around.\footnote{See generally Transmission Questions & Answers, AEP, http://www.aep.com/about/transmission/transmissionqa.aspx (last visited Nov. 16, 2011) (explaining that while electric generation and transmission is complex, it becomes much easier to understand when broken into its primary elements).}

Putting the same renewable technology out on a farm in rural Ontario presents a whole host of different challenges. You have gone from centralized big plants, even a big wind farm, to now hundreds of solar panels out on feeders somewhere in the country.\footnote{See, e.g., John Spears, Hydro One Swamped with Solar Proposals, THESTAR.COM (June 23, 2011), http://www.thestar.com/business/companies/article/1013569--hydro-one-swamped-with-solar-proposals (explaining that, under Hydro One’s MicroFIT program, to build small-scale renewable power projects, many farmers have applied to Hydro One with solar proposals).} People think, and engineers thought, that should not be a problem. Put a solar panel out on the skinny feeder, what is the big deal? It is like putting a solar panel out on my house. I will just use the power myself.

The reality was the economics started to dictate that those solar panels that farmers were putting on the end of their back were actually generating a lot more power than they could consume.\footnote{See generally Energy Grid Capacity Frustrates Solar Providers, CBC NEWS (Oct. 4, 2011), http://www.cbc.ca/news/canada/ottawa/story/2011/10/03/ottawa-solar-energy-microfit-program.html (explaining that Hydro One stopped approving MicroFIT projects because Hydro One could not safely handle the additional power the farmers were producing).} And when everybody along that same concession road decided to do the exact same thing, the road was designed for one-way power flow down. I will liken our territory in Hydro One, being very rural, as a one-way dirt road to the farm and you expect a tractor to go by every once in a while.

Now you have eighteen-wheelers trying to go the other direction. There is no traffic light or shoulder to cross on and you still have the tractor coming down. How are you going to make this work? We start playing with things like smart grid.\footnote{Press Release, Ont. Gov’t., Smart Grid Technology Coming To Ontario (Apr. 27, 2011), available at http://news.ontario.ca/mei/en/2011/04/smart-grid-technology-coming-to-ontario.html.} I should not say disparaging comments about people who sell technology but promote the smart grid. We need smarter grids to keep the lights on, and they are absolutely right.
But there is a bit of a disconnect. Our transmission system is smart. The big WIRES, the computer systems behind them, they work in a smart manner and it was designed to work that way. The distribution system, however, is not smart. It is actually, as I said, a dirt road and what we are trying to do and what we have been doing is building the technology and the communication channels that allow us to talk to the customer and the smart meter.

I have a meter at my house. I can get pricing signals. I can do time-of-use rates. I can start managing my load. I can manage my demand that is in place. In Ontario, there are roughly four million smart meters, and in our territory, there are about 1.1 million smart meters. Again, think of the geography we were talking about, two times the size of Texas—big. There is not a lot of broadband coverage or cell phone coverage, so how am I going to talk to that meter? That is a challenge we had to overcome.

Now that I have that communication channel, I can leverage it for the next piece of the puzzle. When I build my solar panel, can I talk to the grid and figure out an optimal way of sending my power back into the system without having to expand that road? Because the cost of expanding the road is enormous. It will never happen.

Again, all of these things came out of a policy decision to go green and to shut down coal. We started down that path and we knocked those things off. There were bumps in the road and some things took a little bit longer than we liked, but good things will come once those things get sorted out. I could go on and on but I really do want to leave it there because that is really the crux of my comments here.

If you look at Ontario as a bit of a case study, a lot of really good things have happened. Earlier, I heard someone talk about some of the associated trade issues, FIB, and domestic content. That is an issue. It has to be resolved.

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55 See Paul Jankowski, Hydro One Using This Area as Testing Ground, THE SUN TIMES (Apr. 2011), http://www.owensoundsuntimes.com/ArticleDisplay.aspx?e=3008216&archive=true ("Hydro One's transmission system is very smart. They can operate it remotely, they can see the whole system right across the province from our grid control centre in Barrie and it's highly automated.").

56 See generally Press Release, Ont. Gov't, supra note 54 (explaining how the smart grid will give families and businesses more control over how and when they use electricity by delivering electricity from the supplier to the consumer using two-way communications).


59 See generally Overview of Canada's Energy Policy, NATURAL RES. CAN.,
There are issues around the technical aspects of building all this stuff out. There are questions around battery storage and electric vehicles. All of these issues are coming but each one of them will get resolved. Ultimately, there is a price and the tradeoff is going to be the dollar, the green dollar, and the green environment.

Again, I will use the military as an example of security but it is much broader than just that. It is reliability. All of those things have to come together and they will. But the first step is to clarify what it is we are trying to achieve, I dare say, and again this is the personal part of it, on a continental basis.

So with that, I will take any questions anybody wants to throw out.

DISCUSSION FOLLOWING MR. MARCELLO’S ADDRESS

MR. ROBINSON: Before we take questions, I am going to abuse my privilege of just being an introducer and say in recognition of the difficult position Carmine is in because one of the political issues in Ontario’s decision to go greener than even California, the greenest jurisdiction in North America, is how much it is going to cost.61

The feed-in tariffs in Ontario are extremely attractive and, of course, they are guaranteed by the Government.62 So they are fully bankable. It is an AAA credit.63 It is like an Ontario Government bond and, having passed out

http://www.nrcan.gc.ca/energy/policy/1352 (last visited Nov. 15, 2011) (stating that energy is a globally traded commodity, therefore, trade issues are the subject of many international agreements).

60 See, e.g., Jerry Flint, What’s Killing the Electric Car, FORBES (Aug. 18, 2009, 10:45 AM), http://www.forbes.com/2009/08/18/electric-cars-detroit-business-autos-backseatedriver.html (explaining that a major problem with electric cars is the batteries, implying that more range requires significant battery storage).


62 See Joel Wood, FRASER INST., “FEED-IN” TARIFFS IN ONTARIO: AN UNFIT ENERGY POLICY 31, 33 (Jan./Feb. 2011), available at http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/articles/feed-in-tariffs-in-ontario.pdf (“A feed-in tariff is a guarantee from the government that any power generated from a government-approved, renewable-energy project will be purchased by local utilities at a fixed price that is above market value over a set time interval.”).

63 See Credit Ratings Definitions and Facts, STANDARD & POOR’S, http://www.standardandpoors.com/ratings/definitions-and-faqs/en/us#def_1 (last visited Nov. 11, 2011) (explaining that an obligor rated ‘AAA’ has extremely strong capacity to meet its financial commitments; ‘AAA’ is the highest issuer credit rating assigned by Standard & Poor’s).
these grants willy-nilly in my little role here on this review committee, you can see how sensitive the cost issue is.

Carmine cannot talk about that much because in October we are going to have an election.\textsuperscript{64} If the Ambassador could not come here and talk during a federal election, Carmine is not allowed to talk about things, like cost, that are going to come up in October in a provincial election.

But what I do think, and disagree with me if this is wrong, from the criticism on the Green Energy Act and the ramifications that have been circulating all around in the press in Ontario and elsewhere,\textsuperscript{65} is that we can cost how much all these solar panels on the farmers' roofs, the wind mills, some bio, and the little run of the river hydro things. We can cost how much they are going to add to the price of electricity to the consumer because there is a feed-in tariff.\textsuperscript{66}

However, we do not know how much it is going to cost to do all those really difficult things that poor old WIRES has been told to do, like hook up all those little wind mills and solar panels, especially when the power is going the other way.\textsuperscript{67} Is that a fair criticism that it has not been costed yet?

MR. MARCELLO: I think a lot of it is being costed. We put forward our plans in front of the regulator, the Ontario Energy Board, who ultimately will make a call.\textsuperscript{68} One of the things we have been very careful to separate out when we are pricing our part of the energy equation is the cost to keep the lights on.

Again, in all of this discussion, often you forget the infrastructure we are talking about was built over a hundred years ago, lapsed time, and a lot of it is forty, fifty, sixty years old and needs to be replaced.\textsuperscript{69} So our capital pro-


\textsuperscript{66} Wood, \textit{supra} note 62 (explaining that costs are predictable because the feed-in tariff is set at a fixed price).

\textsuperscript{67} See generally Press Release, Ont. Gov't., \textit{supra} note 54 (explaining that the smart grid delivers electricity from the supplier to the consumer using two-way communications).

\textsuperscript{68} See Ontario Energy Board, ONT. POWER. AUTH., http://www.microfit.powerauthority.on.ca/ontario-energy-board (last visited Nov. 12, 2011) (explaining that the Ontario Energy Board regulates the natural gas and electricity sectors in Ontario and protects the interests of consumers with respect to prices and service).

\textsuperscript{69} See Canada's Power Grid Needs $293B Infusion: Report, CBC NEWS (Apr. 7, 2011, 4:01 AM), http://www.cbc.ca/news/canada/story/2011/04/06/canada-power-grid-investment.html (stating that most of Canada's electricity infrastructure was built before 1980, and that a total investment of $293.8 billion is necessary between now and 2030 to service old
ograms have doubled to deal with not just that but also the need for enabling transmission and distribution to allow the Green Energy Act to be implemented. 70

We have priced those things out and I am comfortable commenting a bit on price because it is something that the Minister of Energy has said. 71 Over a twenty-year period, the projection is that electricity rates to end-use consumers are going to go up three and-a-half percent a year over twenty years on average. 72 It will probably be a little bit more front-end loaded, I think is the way he positioned it, but that is sort of the number. When you sit back and look at it, you are talking about renewing an energy sector and enabling a greener environment. That was the price tag.

I think ultimately, and again I am not going to get into too much debate, the Minister is on the record as saying that. That is part of the, I believe, Liberal Party’s election platform and we are waiting to see where that discussion and debate goes from here. 73 I do think it is fair to observe, again in some of my reliability travels, that the environment in the United States was front and center a couple years ago and that is obviously starting to shift. It really has turned more to the economics and we are sensing that in a lot of our discussions.

MR. ROBINSON: We should take some questions, I am sure. David?
MR. CRANE: I had two or three questions.

One question is on the security issue. You mentioned cybertext, but the vulnerability of a city, somebody blowing up a couple of transformer stations, I thought that would be pretty serious as well. To what extent is cross-border cooperation providing physical security to the system?


71 See Clean Energy Revolution Leading to Jobs, Cleaner Air, CHRIS BENTLEY MPP, http://www.chrisbentley.onmpp.ca/CentralNews.aspx?id=362 (last visited Nov. 15, 2011) ("To keep the lights on with energy powered by clean sources, residential and small business electricity bills are forecasted to increase by 3.5 per cent annually over the next 20 years.").

72 Energy Plan, supra note 70, at 59 ("Over the next 20 years, prices for Ontario families and small businesses will be relatively predictable . . . the consumer rate will increase by about 3.5 per cent annually over the length of the long-term plan.").

The second question is a comment: I have read that we talk a lot about smart metering but it is not really going to work well until we add fiber into the home. I do not know if you agree with that or not, but until we get high speed broadband into people’s houses, we are not really going to capture the potential benefits of smart metering. I was wondering if you could comment on that.

Finally, are you in a position to explain to us why, in the case of Ontario’s nuclear power, every time we do a refurbishing, the cost of refurbishing seems to be two or three times that which is estimated? I can understand being out by ten million dollars, but being out by one and a half billion dollars, how does that happen? There is so much discredit in the case for nuclear power when we see over and over again these huge cost overruns on refurbishing.

MR. ROBINSON: That is an engineer question.

MR. MARCELLO: I will start with that one, actually. No, I cannot answer you. But I can say when Hydro One takes on a project to build a transmission, we are generally on time and on budget. So Bruce-Milton has a project: a $700 million transmission line, 120 kilometers, issues of expropriations, and issues of dealing and negotiating with First Nations. All of those have been built into our plans. We are proud of our track record in getting

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74 See THE PROGRESSIVE STATES NETWORK, NETWORKING THE GREEN ECONOMY: HOW BROADBAND AND RELATED TECHNOLOGIES CAN BUILD A GREEN ECONOMIC FUTURE 15 (2010), available at http://www.progressivestates.org/files/greeneconomy/Networking-the-Green-Economy/report?q=greeneconomy/report (explaining that while currently it may be possible to get by with low-bandwidth communications, in the long-term, full broadband capacity is critical for the growth of smart meters because it "connects all localities to enable nationwide, interoperable communications and control of the electricity system at the same time that it provides high-speed capacity to maintain robust cyber security").

75 See, e.g., Nuclear Power in Canada: Reactor Refurbishment, WORLD NUCLEAR ASS’N (Dec. 2011), http://world-nuclear.org/info/inf49a_nuclear_power_in_Canada.html (discussing how the ‘Pickering I’ refurbishment in 2004-05 cost over double the original estimate and how the ‘Bruce A project’ was expected to cost $2.75 billion, which late in 2010 was increased to $4.8 billion).

76 See, e.g., Hydro One Invests $170 Million to Reinforce Greater Toronto Area Transmission Grid, TRANSMISSION & DISTRIBUTION (Dec. 15, 2004), http://tdworld.com/news/Hydro-One-invests-Toronto/ (“Hydro One staff continue to deliver projects on time and on budget, ‘explained Hydro One President Tom Parkinson.’

77 See generally HYDRO ONE, BRUCE TO MILTON CONNECTION: ONTARIO’S NEW CLEAN ENERGY CORRIDOR 10-17 (2008), available at http://www.hydroone.com/Projects/BrucetoMilton/Documents/Final%20EA/Appendix_E/Appendix_E_Community_and_StakeholderConsultation_Part4.pdf (discussing media coverage surrounding the Bruce-to-Milton transmission line, including issues with property owners affected by the line expansion and dealing with Saugeen First Nation chiefs over resistance to mineral exploration activity in their traditional territory).
those types of things done. But we do not play in the generation, and that would be a question for Ontario Power Generation actually.\textsuperscript{78}

Smart meter: if you cannot talk to the meter, it is a dumb meter. End of story. We have 1.1 million customers.\textsuperscript{79} When we started on the journey, we had no way of talking to them. Our transmission system is the largest, I believe, privately held telecom backbone in Canada.\textsuperscript{80} We deal with Bell and Rogers as well, but we have our own fiber network to ensure the reliability of our transmission.\textsuperscript{81} So we leverage that.

We worked with Industry Canada\textsuperscript{82} to get bandwidth for a new type of radio, called WiMAX, so you have your land-based technology in your house.\textsuperscript{83} Imagine a land that can go out about twenty-five kilometers. We are building that out in areas where it is not commercial to talk to the end-use. So you are absolutely right, you have to be able to get to that meter and talk to it or else you have nothing.

The North American Electric Reliability Council is spending an inordinate amount of time with the Department of Homeland Security and the Federal Energy Regulatory Commission on both physical and cyber protection systems and assets.\textsuperscript{84} You specifically identified a scenario where someone

\textsuperscript{78} See About OPG, ONT. POWER GENERATION, http://www.opg.com/about/ (last visited Nov. 13, 2011) ("Ontario Power Generation is an Ontario-based electricity generation company whose principal business is the generation and sale of electricity in Ontario.").

\textsuperscript{79} See CONTEXT, supra note 22.

\textsuperscript{80} See Quick Facts, HYDRO ONE, http://www.hydroone.com/OurCompany/ Pages/QuickFacts.aspx (last visited Nov. 15, 2011) ("We are the largest electricity transmission and distribution company in Ontario . . . [w]e own and operate substantially all of Ontario's electricity transmission system.").

\textsuperscript{81} See Partners, HYDRO ONE, http://www.hydroonetelecom.com/partners/index.html (last visited Nov. 16, 2011) (explaining that Hydro One Telecom has developed strategic partnerships with Bell and Rogers as regional service providers to expand their broadband network and service deployment capabilities); see also Network, HYDRO ONE, http://www.hydroonetelecom.com/network/index.html (last visited Nov. 16, 2011) ("Hydro One Telecom's fiber-optic network spans more than 5,700 kilometers with capacity being added all the time.").


\textsuperscript{83} See 2011 Finalists: Hydro One, UTC APEX AWARD, http://www.utcapexaward.utc.org/content/hydro-one (last visited Nov. 16, 2011) (explaining that Industry Canada made available a 30 MHz sub-band at 1800-1830 MHz to Hydro One, to be used exclusively for the management and operations of electricity supply across Canada to facilitate a wireless spectrum that would allow MiMAX to work).

\textsuperscript{84} See DANA A. SHEA, CONG. RESEARCH SERV., RL 31534, CRITICAL INFRASTRUCTURE: CONTROL SYSTEMS AND THE TERRORIST THREAT 15-16 (2003) (stating that The North American Electric Reliability Council has been working on a minimum cyber-security standard for the electricity industry, as well as guidelines for securing remote access to critical electric infrastructure while the Department of Homeland Security and the Federal Energy Regulatory Commission have been working on methods to protect industrial control systems).
could take out a substation as an example. From just traditional planning criteria within an urban setting, that should not be a big deal.

Concerning a coordinated attack that took out multiple targets, that is a discussion where we are sitting down with our counterparts in the United States and some of the military folks; that is the military’s job and the intelligence community’s job from our perspective. Again, when I am saying “our,” I mean the electrical industry.

But we have to be ready for a transformer to fail on its own or for the second one to trip or for a tornado to come through and take out a couple of lines. That level of detail and planning is built into a lot of our scenarios. We also run extreme contingency, and I would say coming out of the Japan experience, I am fairly confident that every single nuclear plant in North America is going to be reviewing its interaction with the grid and their internal power systems for opportunities to learn and improve.

MR. McILROY: My name is Jim McIlroy. During the election campaign, promises have been made by both the Prime Minister and the leader of the Liberals regarding the construction of some WIRES from Newfoundland into the Maritime provinces.\(^8\) Hydro-Québec has been very quick, and the Premier of Québec has been very quick, in stating this is not fair and it is going to adversely affect things.\(^6\) Will this have any impact on Ontario? And second, what will that do for exports of electricity into the United States?

MR. MARCELLO: I would think, and I am speculating a little bit here, but if Newfoundland were to build a line into the Maritimes and ultimately into the United States, there is a path for electricity to flow.

I think the other thing Newfoundland is doing is trying to access the Québec market and ultimately Ontario as well. So where that all plays out really comes down to some of the regulatory uncertainty and, again, I think the discussion and the premise that, if there was a common approach and a re-

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\(^{85}\) See Northeast Transmission Line Would Create ‘Energy Corridor’ That Could Boost Our Clean Power Exports, Liberals Say, CANADA.COM (Feb. 16, 2010), http://www.canada.com/vancouversun/news/westcoastnews/story.html?id=477ea498-5be9-4bf0-a3a7-a8a774ee62ec (stating that the provincial Liberals want to extend the power grid to the northeast as part of what they are calling a ‘northern energy corridor,’ and when asked about the proposed northeast transmission line, Energy Minister Blair Lekstrom said he was enthusiastic about making additional reserves of power available for the Horn River expansion).

\(^{86}\) See Les Perreux & Steven Chase, Sparks Fly in Quebec after Harper Backs Newfoundland Hydro Project, THE GLOBE AND MAIL (Mar. 31, 20011, 11:17 PM), http://www.theglobeandmail.com/news/politics/sparks-fly-in-quebec-after-harper-backs-newfoundland-hydro-project/article1964803/ (stating that Québec leaders have long opposed federal help for the transmission line project, saying Québec financed its own massive hydroelectric expansion over the past sixty years, and the deal would “put a dent in Hydro-Québec’s decades-long domination of eastern power export to the United States”).
regional look at this, you would probably come up with one answer, but on the other side economics are at play. There are different entities there and obviously they have their own mandate.

From an Ontario perspective, I will say it again, we will take anybody’s electron.

MR. McILROY: But Ontario has not complained like Québec. Is that a fair comment?

MR. MARCELLO: I have not heard anything but I would not be privy to it anyway.

MR. McILROY: It would be in the newspaper anyway.

MR. MARCELLO: From that perspective, I have not read it.

MS. LUSSENBURG: Selma Lussenburg, Ontario Capital Growth Corporation. This may not be a fair question to put to you, so I give you the option of batting it to someone else in the audience. As both the prior speaker, Al Monaco, and you have focused on the interdependence of the energy sector between Canada and the United States and you have gone, I want to say, one step further, and one of your comments was, ultimately, about the security council. Ultimately, we are looking at essential resources and I was extrapolating from your comments. Then I heard you say that the Department of Homeland Security is working with the energy distributors, or the reliability people for lack of a better word, to ensure that we have the right infrastructure in place in the event of a terrorist attack, et cetera. What has been going around in the back of my mind, and that is why I say this may not be the right person to ask a question of, is what about the movement we are seeing in terms of state-owned enterprises coming in and buying significant assets in the Canadian and United States economy or sovereign funds?

We have been through an era in Canada where we had foreign investment restrictions but it is not just foreign investment restrictions. I am thinking


88 See Matt Krzepkowski & Jack Mintz, Univ. of Calgary: The Sch. of Pub. Policy, Canada’s Foreign Direct Investment Challenge: Reducing Barriers and Ensuring a Level Playing Field in Face of Sovereign Wealth Funds and State-Owned Enterprises, 3 SPP RESEARCH PAPERS, no. 4, 1 (Oct. 2010) ("With emerging markets becoming an increasing source of international investment, many state owned enterprises and sovereign wealth funds are buying assets in Canada, a phenomenon that is not new but becoming more important than in the recent past.").

89 See generally Investment Regulation in Canada, GOV’T OF CAN., http://investincanada.gc.ca/eng/establish-a-business/start-business-canada/investment-
about things like coal security and the Office of Foreign Assets Control rules in the United States, which would be another layer of restriction on foreign investment in these kinds of assets, if you characterize it that way.

So I do not know what the dialogue has been in your industry, and I have sort of touched on a whole bunch of things, but, increasingly, I find myself thinking, where are we when we say this is so important and so fundamental to our economy? And I think it was Al Monaco that said that our economic wellbeing was really dependent on the energy sector, so I leave that for you or someone else to address.

MR. MARCELLO: I will leave the bulk of it to someone else to address.

MS. LUSSENBURG: I will let Michael address it, or Bill can.

MR. MARCELLO: Concerning electricity reliability, electricity is a critical resource and if I flick the light switch, I get everybody's attention. End of story. And at that point, if we were into rolling blackouts on a continuous basis for any reason, it is an issue of national security for everyone—international security in this case. Our grids are interconnected and it is a big machine that works well together.  

From that perspective, the North American Electric Reliability Council, Department of Homeland Security, and the Federal Energy Regulatory Commission are working on the standards that need to be in place to protect the system. That is an activity that has been going on since 2003 and it is ongoing and growing; utilities are making a lot of investments to comply with those new standards.

In terms of the foreign policy discussion, I am really in no position to answer any of that.

MR. ROBINSON: Since someone suggested, I will try and answer something. Even though I do not know anything about it, I will. I know a little bit.

regulation.aspx (last visited Nov. 16, 2011) ("[I]f you are not a Canadian citizen or not considered a permanent resident under the Immigration Act, you are a non-Canadian and must fulfill the requirements of the Investment Canada Act before doing business in Canada.").

90 *See North American Electricity Grid*, THE ENERGY LIBRARY, http://theenergylibrary.com/node/647 (last visited Nov. 16, 2011) ("The North American electricity grid is the world's largest and most complex system of power generation, transmission, and distribution...[t]he grid delivers electricity to almost all the people in the U.S., Canada and a portion of Baja California Norte, Mexico.").

91 SHEA, *supra* note 84.

92 *See John Shaw, NERC/CIP Compliance: Headache or Opportunity?, UTIL. AUTOMATION & ENG'G* (July 2007), available at http://www.garrettcom.com/nerc_cip_opportunity.htm ("The power utility industry is increasingly preoccupied with cyber security standard compliance...[t]he overarching reasons for cyber security investment are the real and perceived threats from current and former employees and contractors and from direct and indirect (i.e., non-utility specific) activities of cyber terrorists or 'hackers.'").
If the government changes after October in Ontario and the Conservative government tries to revise privatization, and China wants to buy Hydro One or Ontario Power Generation, then the whole thing kicks back up to Ottawa, which controls foreign investment.\(^\text{93}\) We go around in a great big circle and Ottawa is, to use the same metaphor, half-pregnant on what the Investment Canada Act\(^\text{94}\) means in connection with state-owned enterprises and even private enterprises versus strategic industries. So, you went pretty well 180 degrees around the circle and you still did not have the answer.

**MR. BARRETT:** Michael Barrett of Bennett Jones in Toronto. I have one comment and then an unrelated question.

My comment is on the pricing issue in the upcoming Ontario election. What I find with this particular issue is that if we did not pass the Green Energy Act, if we just did not have it, we are not building wind farms or solar farms. But we were building in 2010 and 2011, and we had to upgrade the infrastructure and the generation province and coal plants.\(^\text{95}\) We have not done a lot of things in a long time. We would be looking at significant price increases for electricity in Ontario simply because of that issue.

The addition of the Green Energy Act and those sources of fuels, while they will add an element to those increases, are just a little bit of it. Most of those increases are for reasons that have nothing to do with the red herring that has become the election issue that we are paying outrageous rates for solar panels and wind farms.\(^\text{96}\) That is a detail that gets lost in the discussion. It is very easy to categorize the whole thing as a reason for the increase and so I am hopeful, as that gets flushed out, that the specificity of that gets drilled down a little bit.

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\(^\text{93}\) See Claudia Cattaneo, *On Ottawa Watch*, FIN. POST (May 21, 2011, 8:00 AM), http://business.financialpost.com/2011/05/21/on-ottawa-watch/ (stating that under the act the Federal Industry Minister has final say over whether the investment meets Canada’s requirements, however, it is well-known the Prime Minister is also involved).

\(^\text{94}\) Gov’T OF CAN., supra note 89.

\(^\text{95}\) See generally Zach Dubinsky, *Major Changes in Works for Canada’s Electric Grid*, CBC News (Mar. 30, 2011, 6:04 PM), http://www.cbc.ca/news/canada/story/2011/03/10/f-power-structure-canada-overview.html (stating the International Energy Agency estimates Canada will require $10 billion a year in investments in its electrical infrastructure from now until 2030, and that the move away from coal will also be aided by the slew of gas-fired plants that have started up in the past decade).

Now, my unrelated question. There will be a lot of need for infrastructure upgrades in the province. Traditionally in Toronto, a lot of that has been a provincial Crown mandate to do the upgrades.\textsuperscript{97} I think going forward there will be a significant role for the private sector, particularly on transmission line builds, to play a part in that process. I am wondering if you could comment on Hydro One's expectation of what part of the investment will be sourced privately?

MR. MARCELLO: So there are a couple of points. When a generator wants to connect to a transmission system, the generator is actually responsible for the cost of the connection, so they can build it themselves or can ask us to build it on their behalf.\textsuperscript{98}

If there is a need to upgrade the interprovincial highway as opposed to just that little connection in which the big power system is the incumbent transmitter, the monopoly transmitter working on an existing asset to increase an interface lends itself to us doing it.\textsuperscript{99} There are going to be competitive transmission projects being put out by the Ontario Energy Board.\textsuperscript{100} I would say these are projects where you look at the ability to transfer large blocks of power between one zone to another and you can define a new asset as opposed to how it integrates into the existing assets. Those are going to go through a competitive process. This is actually on the verge of starting, and I know there are a lot of folks interested in coming to Ontario and seeing if they can participate in that part of the competitive landscape. Generation is already a competitive model in many respects.

\textsuperscript{97} Energy Plan, supra note 70, at 54 (explaining that the Ontario government has set mandatory priorities for Ontario to create a modern, clean, and globally competitive economy that includes transmission upgrades).

\textsuperscript{98} See Connection of Generation Facilities, HYDRO ONE, http://www.hydroone.com/Generators/Pages/Connecting_Facilities.aspx (last visited Nov. 17, 2011) (stating that generators are responsible for all costs associated with connecting a generating facility to Hydro One's system).

\textsuperscript{99} Richard Pierce et al., Commentary, Beyond Gridlock: The Case for Greater Integration of Regional Electricity Markets, C.D. HOWE INST. 13 (2006) (explaining that electricity flows across an integrated grid and any change in the conditions on one part of an integrated grid affects the operation of all other parts, therefore, horizontal integration of incumbent and monopoly transmitters permits transmission and network operations to be restructured).

\textsuperscript{100} See ONT. ENERGY BD., BOARD POLICY: FRAMEWORK FOR TRANSMISSION PROJECT DEVELOPMENT PLANS 7 (2010), available at http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2010-0059/Framework_Transmission_Project_Development_Plan_20100826.pdf (explaining that, as a consequence of the passage of the Green Energy and Green Economy Act 2009, there has been enormous interest in connecting renewable generation to both distribution and transmission systems, therefore competitive transmission projects may emerge in a number of different ways, such as increasing supply to new and existing load customers, facilitating interconnections, etc.).
MR. ROBINSON: I think we should thank Carmine for bringing a totally different perspective, not just strategy and policy, but he actually knows how to do it.

MR. MARCELLO: Thank you very much.

MR. ROBINSON: Thank you.