The Empire Club Presents

ANTHONY HAINES
PRESIDENT & CEO, TORONTO HYDRO CORPORATION:

MANAGING DISRUPTIVE CHANGE IN THE ELECTRICITY INDUSTRY

June 2, 2016

Welcome Address by Dr. Gordon McIvor, President, Empire Club of Canada

Good afternoon, ladies and gentlemen. From the Arcadian Court in downtown Toronto, welcome, to this, the continuation of the 112th season of the Empire Club of Canada. For those of you just joining us either through our webcast, our podcast or on Rogers TV, welcome, to our meeting.

Before our distinguished speaker is introduced today, it gives me great pleasure to introduce you to our head table guests.

HEAD TABLE:

Distinguished Guest Speaker:

Mr. Anthony Haines, President and CEO, Toronto Hydro Corporation

Guests:

Ms. Tina Arvanitis, Vice President, Government Relations and Communications, Ontario Energy Association; Director, Empire Club of Canada

Mr. Bob Huggard, President & CEO, Ontario Energy Association
Mr. Faisal Kazi, Vice President, Energy, Siemens
Mr. Mike Kraljevic, President & CEO, Toronto Port Lands Company
Dr. Gordon McIvor, Executive Director, National Executive Forum on Public Property; President, Empire Club of Canada
Mr. Dan Seto, COO and Director, CircuitMeter
Mr. Todd Williams, Managing Director and Head of Navigant Energy Canada

My name is Gordon McIvor. I am the Executive Director of the National Executive Forum on Public Property and President of the Empire Club of Canada. Ladies and gentlemen, your head table.

We also have a group of students joining us today, ladies and gentlemen. Our students today are from Centennial College. Students, welcome.

Electricity and, more precisely, hydroelectricity has been something that the Empire Club has talked about since we were first set up 112 years ago in 1903. In fact, it is easily one of this Club's top ten subjects of all time. There have been literally hundreds of speakers who addressed this topic over the last century and a bit, and, while the issues have changed dramatically over the decades, the importance of the topic to the local, provincial and national economies has not.

Take for example, one of the most memorable speeches from 1906, 110 years ago, when the Chairman of Hydro-Electric Power Commission, Cecil B. Smith, came to the Club and addressed its members on "The Hydro-Electric Question." Back then, as you probably all know, Niagara Falls was the centre of the electricity universe, and it seemed that this form of energy was boundless for all time. There was already good recognition that the industry was at the heart and soul of any successful economy.

I would like to just read you a brief quote from that speech. We always try and put our guests in some kind of historical context. Here is what people were thinking about in the electricity universe in 1906:

> The distribution of electrical energy in a city is a great benefit. It is a natural monopoly. It should be done by one company, and the only question in your mind to decide is, *Do you decide to use your financial strength to go into the business for the sake of having that distribution carried on more cheaply than a company could carry it on?* And it iss self-evident that a company is there to make money and that a city, if it had the business, would be there to make the city grow. Therefore, that is the way I would like to leave it with you to consider, that there is an unlimited source of electrical power at Niagara Falls that the use of that power throughout this peninsula will maintain its industrial position and strength, and, I might say, if you do not use it, you will not maintain your industrial position. There are lots of towns and cities

> across Ontario that are into business, and they are going to have lots of electrical needs in the future for their manufacturers. If their manufacturers do not get that electricity, they will go elsewhere. I know of industries that are making preparations to move based entirely on the fact that they are going to get electric power, knowing that the city is going into the business of delivering electrical power to its manufacturers.

Obviously, back then, there was a very different context with the idea that electricity was endless; it was a resource that would never run out, but also with that ultimatum that "You had better pay attention, folks, because, if you do not do this, somebody else will and make a lot of money doing it."

Toronto and the future GTA area certainly did not elect to leave things as they were and, in fact, became a huge producer and consumer of electricity. Over the decades, we faced each new challenge from both a business and a societal perspective, ensuring the success of our metropolis as one of the world's great cities to live and work in.

Today, we continue to have many issues to discuss and work around, particularly, in the energy field, which is why we are so happy today to welcome the CEO of Toronto Hydro. To do the second half of this introduction and to introduce the man himself, I am very pleased to introduce to you to Faisil Kazi, the Vice President of Energy for Siemens, who will carry on this introduction.

Introduction by Faisil Kazi, Vice President, Energy, Siemens

Thank you very much. It is my pleasure and my honour to introduce Anthony Haines today. The Empire Club of Canada, as you all heard, has been recognized as one of Canada's oldest speaker forums, as it was established in 1903. Throughout the years, the Empire Club has hosted many influential Canadian and international professionals, providing thought leadership from many industries. Today, you will have the opportunity to hear one of them, Anthony Haines.

Anthony is the President and Chief Executive Officer of Toronto Hydro Corporation and its subsidiaries, which is one of the largest urban electricity distribution companies in Canada. He has 25 years of experience in the Canadian energy industry, including 15 years in various management positions in the natural gas industry.

Anthony currently sits on the Ontario Energy Association Board of Directors and is the incoming Chair for 2017. In addition, he served as Chair of the Canadian Electricity Association from 2013–2015. Despite all of his responsibilities, I am quite impressed that he is actively involved in fundraising efforts for the Ross Tilley Burn Cen-

tre at Sunnybrook Hospital. This is the largest and most advanced burn treatment centre in Canada, and it is a leading researcher on electrical injury rehabilitation.

Anthony is also the recipient of the Electricity Distributors Association's Chair's Citation Award, OEA's Leader of the Year and the Energy Council of Canada's 2014 Canadian Energy Person of the Year. Ladies and gentlemen, please, join me to give a warm welcome to Anthony Haines.

Anthony Haines

Well, hello, everybody, and, thank you, for coming out to hear a couple of comments from me today. Gord, that was a wonderful introduction to the sector and to some of the issues we are going to be talking about today. The piece I most appreciate about it is that I was reminded about some of our history of Toronto Hydro as you were giving some history of the industry. It was a number of years ago that I was standing in our foyer, and, in our foyer, we have a niche and inside that niche was a Board book. It was the Minutes of a Board meeting that had happened roughly 100 years earlier. I was standing around waiting for whatever I was off to do and got a chance to read these minutes. The discussion that the Board was having was whether they should refund the customer's bill for the month because the service was so bad. I am pleased to say that the service has gone up. You did not raise that as the example that you wanted to put to me this afternoon as to whether our service should be refunded or not. I appreciate the lovely context with which you start my comments.

It is truly a pleasure to be with you today. I am going to, I suppose, spend 20 or 25 minutes talking to you, and I hope that we will have a chance to take a few questions at the end. Those that know me and have heard me talk before, you will find that I tend to talk relaxed, without notes. There is something very unusual about my speech today, and that is because I come, actually, with some notes. I find that unusual, so I thought I would comment on that. Why does Anthony have notes today? The reason is I want to start talking to you about changes that have been going on in our sector just this year alone. I thought I had a pretty good memory, and I suddenly realized that there are so many that I had to write them down. Maybe that is a good starting point for us to think about all the things that are going on in this energy sector in Ontario.

What I am going to try to do with you is to put some context into them because, as I sit back and I hear from my friends and family and neighbours and colleagues, everybody generally asks me the same questions: "How does this all fit together? How does this all make sense?" There have been so many disparate pieces. If you will, today's talk is going to be taking these pieces of the puzzle and seeing if we can link them together in a story about energy in Ontario.

Let us talk a little about just this year alone, just this year, six months in the electricity and natural gas industry in this province. We started the year, January 1st, with a rate increase, which is a fairly large rate increase, 6%, 7% for our customers. We will talk about what that is all about. Then, a month or so went by and there was a report that came out by a very official-looking group that said that conservation programs are a total waste of money, that we are wasting billions of dollars because we are helping customers use energy more efficiently. A couple weeks later, the Ontario Energy Board puts an announcement out about commodity price increases because we are not using enough electricity. Wait a minute, are not we trying to use less?

I am just halfway on my list. Then we have some rate increases. Toronto Hydro's rate increase for '15 gets done. We are in '16. Then cap and trade comes along. What does that mean? How does that fit into the story? We are not even finished yet. A month ago, a document gets leaked. We are off of natural gas; we no longer like natural gas. This week, hang on a minute, we did not mean natural gas as in natural gas; we kind of like natural gas. Maybe there is a place for it. Of course, now, finally, there are rumours of shuffles, of Ministries, Cabinets and all the rest of it, so it has been kind of an interesting six months in the world that we live in.

How does all that make sense? How does it all fit

together? Let us talk about that a little bit. I hope some of you in the back are not going to be completely unable to see this, but I will do my best. We cannot have a conversation about electricity in this province without talking about price because it always ends up with price, does it not? Can we be candid? Price has been going up. The price has roughly doubled in the last ten years. I know you guys cannot see this, so let me just tell you why, for the students back there—although, you guys are young; you probably have good eyes. The yellow part is the commodity price. That is the price of electricity that is generated, that we all use. That has been the major contributor to the price doubling.

There is a piece up at the top there where new tax and policy regimes were being put in place. Let us just stop on these two points for a second and see if we can make sense of them. I want to talk about the first one, the introduction of an incentive program that came in force in January of this year, part of the reason for the increase I talked about. I, actually, agree with it. What it foundationally was doing was going from a system of rebate that we had that everybody got to one that was targeted for those that need it most. As a policy matter, I think that is good policy. In other words, there are so many of us that are so blessed and do not need those kind of programs, but, for those that do, that have a legitimate need to reprioritize that into that form, I think is a good idea.

Let us talk about the commodity price. This jour-

ney really starts a decade ago when the announcement to get off coal happened. You will remember some of the conversations at the time. In some ways, you will probably remember them in the sense that you read them in the newspaper in the last few days because some of the same language is being repeated. But you will recall that the conversation was that we have to do this as an imperative for our children and for our life, that we had simply to get out of the pollution that was being generated by coal. Remember the things that we talked about at the time? We said, "Okay, you're not going to be able to do that because coal is necessary as an alternative to nuclear." In other words, they have different attributes; we need it to fit inside there; it is low cost; it is in place now, and it is driving a major economic engine in this province with low-cost electricity. Do you remember all that talk?

The impacts of that are in that yellow region. But I think, in fairness, we have to also talk about the attributes associated with that. Do you know for the year of that announcement, how many pollution warning days there were? I know some of you heard me give this before. There were 32 that summer. In other words, 32 times that summer, we were advised as Ontarians not to go outside and breathe in. Do you know how many we had last year? Now, you may say that is a quirk. Do you know how many we had the year before? While there has been an increase in this policy, there have been some benefits that we all have to agree that we have realized. But there is a cost associated with it. So, now, we are talking about that we are targeting incentive programs for those that need them; we are cleaning up our fleet to have the environmental attributes that we want.

There is another side to the story because we are just talking about price. Price does not mean that is how much your bill is because its price times consumption. You know what is going on with consumption in the average household? Consumption has gone down by one third. Same houses. What the conservation programs fundamentally do is they encourage you to get rid of an appliance before the end of its life. It may be in a light bulb; it may be a furnace; it may be windows, doors and other things, but, foundationally, what it is doing is saying, "Get rid of that stuff because it is costing you too much; we are going to help you do it." There is the measure of success.

It is often said to me, "Well, it's back to this. Oh, no, it's a waste of money; it's run its course; we've now achieved the maximum available." We have looked at that. I am going to point out that, as a company with the smart meter programs, we have billions of pieces of data. When you overlay wherever you do the programs, you get a profile of customers. What you will find now is there are two kinds of customers: Customers that have adopted change and customers that have resisted it. The customers that have adopted change have brought their loads down, and the customers that have resisted it, have not. The question

is, *Have we reached the end of the journey?* We know well now what the trending is, what the programs will deliver and so, I am going to say to you that I think, on average, we are only halfway there. We actually have almost as far to go as we have travelled already. So, there are still massive opportunities ahead of us.

All of that starts, though, with a customer who understands what is going on. I hate to ask for a show of hands who understands their electricity bill because I do not, and I guess if somebody should, I guess I should. But it starts with information. Let us not use bill stuffers and bills to send out information. It is done through a more dynamic relationship, so customers can understand what they are doing and what impacts their life has on their bill. That is largely the key to success around these programs.

I have to confess something to you: When we started this journey roughly ten years ago in conservation, we had a program, these pigtail light bulbs, the low-efficiency lightbulbs and, of course, they were very well-meaning, but misguided people showed up in my office and gave me a box of these things and said it was my social responsibility to go home and put them in my house, which I did, being the sort who does what I am told to do. And they were awful. They were awful. It was that white light that made me think I was being interrogated. They burned out. They were supposed to last ten years, and they burnt out in ten minutes. I thought the most interesting thing about them was when I

was selling that house, my realtor—you know, the realtors kind of come through and do a little walk around—said, "Get rid of those lights. They're lowering the value of your house." Remember, I just handed out 5 million of them. Apparently, I, myself, am doing my best to keep real estate down in Toronto. The point being, they were so awful, I got turned off.

What happened? Here is my confession: I was doing some lighting work on some lights that I could not reach, and I had big pain, so I got somebody to do it and all this nonsense, and then somebody said, "Well, you should use an LED light."

"I've done them before; I hate those things."

They actually showed me some bulbs. Unbelievable. You can now buy them by colour bandwidth. They meet any configuration, but you know the two things that really blew my mind when I used them? I read the packaging and thought "Oh, this thing only uses 50¢ of electricity for the year, number one. And number two—and maybe this is depressing for me—I realized that the lightbulb is going to last longer than I was. They actually have, I don't know, 35,000 hours of life in them. I started thinking, "Oh, my goodness, my kids will change these lightbulbs; I will never change this lightbulb." My point being out of all of that—and it becomes relevant for us in a few minutes—is that I did not change because it was an incentive and I got a coupon in the mail. The product changed, so it was the best

thing for me. It came and met me; I did not go and meet it. That is what happened. I am thrilled by it. They light, when I turn the switch. It does not look like I have a wiring problem at home.

I have this little app. I am into your smart homes and all this kind of stuff. I put them in my devices, and, on my little app; it tells me how much energy I use. I could show you afterwards, but I will show you my house without and with. I would flip a light on; it would be like 1,300 watts would be getting sucked out of the system. I change the lightbulb, and it was, like, six watts. I thought there was a problem with the app. I thought it could not recognize the change in the technology, but, in fact, that is what was going on—no change in functionality! I still turn the lights on, and I get light, and it is quality light. My confession is that the market is moving. There are still massive opportunities ahead of us.

Let us put these two things together quickly. Rates are going up. We got that. Consumption is going down. What is the crossroads of all that? The media will leave you with that impression, correct? Correct? When you hear Toronto Hydro's rates went up by 1.7%, you think your bill is going to go up, but, in actual fact, because of all of this, that is largely what has been happening. We, as a city, have been offsetting all of the new loads with conservation programs. That means when a tower 70-storeys high gets brought onto the system, we have taken same volume off. Everybody says, "Oh, you must be getting massive new revenues." Actually, not true whatsoever. We are actually flat. The program has really been keeping up with pace. This is about to change, but that is what has been going on.

Let us move forward now into energy policy now in this province. Off of coal. I talked about it, right? It was not going to work—cannot afford it; needed the attribute. Policy needed to change there, and it did change, and it is done. This becomes our greatest opportunity.

Then we get the building code. It is not just the conservation programs that are going on, the building is getting better; the equipment is getting better; the manufacturing techniques are getting better. All of that has been legislated its way through. These things working in unison have really been what is driving that profile of the customer.

What has been going on with Toronto? This is such a cool slide. I love this slide! Can you guys see this back there? Because I want you to see. I will do this a couple of times. That is Toronto 15 years ago. That is three years ago. I tried to get one—I could not quite get the right angle. You cannot see the Rogers Centre anymore. Can I go back? There we are. That is in ten years. That is what is going on with this city. *That* is the service that we are trying to provide without adding any infrastructure to support it. We have been able to achieve that largely through conservation programs.

We move on, and we say, "Okay, we have a colli-

sion now of environment and energy." I personally think the two will never be pulled apart again or should never be pulled apart. You cannot talk about energy without talking about the environment. Fair? And when we look at the distribution of where the carbon is produced, there are two things: Heating and fuel now— transportation, gasoline. These become our next challenges, right, and they are huge challenges. What was the saying about change? Who are the only people that like change? Do you remember this one? The only people that like change are wet babies. We resist change as adults. It is our nature to feel comfortable in our place that we currently stand. Change is hard. We should recognize it. It is more about change management than it is about technology management.

Do we have a wet diaper? Are we ready for change again, or would we like to hold our ground and take a pause? I think that is the question that Ontario is asking itself now. What are the consequences? But the thing that I want to be careful about criticizing or being careful not to criticize is that the language I read in the newspaper around the question of the footprint with natural gas was exactly the same discussion and language that was used around coal: "Well, we need it because it is the fuel that makes sense when you have electricity. It is the right offsetting fuel." "It is a low-cost choice." These were foundationally the same language, but there is one fundamental difference: We are the consumer. It is at the other end of the system, not at the top end of the system that we were largely indifferent to. There is a foundational difference; I get that. But the question is how does this policy fit into place?

Let us start talking about that for a second. Natural gas. What should we do with natural gas? There is a draft leaked report out there that says it should be banned by legislation. Do we think that is a good strategy or not? Let us talk about these pieces that are going on here. Cap and trade—you guys know what cap and trade does? It puts a price tag on pollution. Why do you need a price tag on pollution? Because these fuels have got such abundance now, the pricing is so low, that you will not get fuel switching by natural economics. What you try to do is you put a price into it to reflect the footprint that it produces. How do you avoid paying that? You can go off; you can do one of two things: You can buy a credit, a pollution credit from somebody who has one. They did some work, and they get a credit, and they sell it to me, and I get to continue on polluting. Or I do some work myself, and I reduce my pollution. That is kind of how that cap and trade works.

There is a great conversation going on, because we, here in Ontario, have linked together with the model from Québec and California. *Is that the right linkage?* is the foundational question. There is a criticism of *What is going to happen here with this $2 billion a year, which will be basically taxed into the model? Where will that money go?* There is no doubt in my mind that it leaves Ontario.

Most of it will go to California. The question I have is *Is that a bad thing or not?* Certainly, as an Ontarian and Torontonian, I would have to say yes, but we have to step back and look at the objective that we are trying to achieve here. The objective is an environmental one. And *Is the environment a local issue or global issue?* I think, is the question that needs to be answered. I have this very crass way of describing this, so I apologize for anybody I am about to offend, but, to me, it is like the question of swimming in the no peeing end of the pool. Can you really achieve that objective? Well, of course you cannot. Is it so bad that we achieve a global environmental improvement regardless of where it is? It does not matter if it is in the urine end of the pool or the other end of the pool as long as it is achieved globally.

I am not as fussed, putting aside the economics of $1 billion, $1.5 billion leaving this province. I am not as fussed about that if we accept that everybody has got to get on the system. In other words, there must not be winners and losers associated with that model.

Fuel switching, natural gas, hey, this is the question of the century, as far as I am concerned. Natural gas on a peak day produces, from an energy point of view, three, four times what our electric grid produces. It is a high-capital investment industry. It is a lot like the electricity grid, and the assets are in place, and it is working, and it is working magnificently. The question is, *Is it going to be outlawed? Is it going to be an early transition? Does it have some applications that make sense and some that do not?* I will observe in my neighbourhood oil trucks delivering oil to furnaces. Wow, we are worried about natural gas? Have you seen Bunker C oil? That is that stuff at the bottom that we pave our roads with. That is going up the chimney. There is no question that there are opportunities, even within our own environment locally that we can still do good work in a natural gas environment. There is no question when we think about the distant communities in this province who are burning diesel fuel. Natural gas can play such a critical role. There is no question that natural gas is a feedstock for many important industries. It is an employer here that we cannot turn our back on. Not to make excuses, but this program, whatever program we have, has got to be orderly. I would propose that it should be voluntary because, when you get a voluntary incentive-based program, it will find its natural economic equilibrium. I think it is the right policy; it just needs a little tweaking.

I am going to just spend a couple more minutes with you on transportation. Did you see the Tesla 3? I gather that there are almost 500,000 orders now. Just to give you a sense of that, the biggest plants in GM produce less than half of that number of volume. That happened in roughly a week. You know what is really, really interesting that I am having some fun watching? When you look at what happened in the social media with this thing, it was

the most successful product launch in global history. And they did not even have a product. There is some genius inside there, because you know those that have ever spent marketing dollars, you get this how many hits you got, and it is all this fluffy stuff. They must be going crazy looking at the graphs. It had more hits than the iPhone when it was launched—an electric car. An electric car got more hits. For a weeklong period, it basically monopolized the social media.

Here is where I become sort of an analytical nerd. You know what they were talking about? They were talking about the affordability of the thing, the excitement about it, things like that. There is a major piece that was not on there that surprised me when I looked at this data because something had changed. Do you know what is not there when you think about the electric car? It is going to be interesting to see if anybody comes up with this here. Five years ago when we started our electric car program, we actually had a program where if your battery went dead while you were driving, we would come and pick you up, and then we would haul your car to a charger. You know how many times we used it? Zero. There is your hint. Do you see anything on there about range? It has gone out of the discussion of the electric car. There was no discussion about the range of the thing. It was about the affordability of the thing. We have just had an event, an elasticity event, for those economists in the room. We just found where price

crosses over. Why is that? What we know when we look at the electric car in Toronto, being used for years, is massive savings.

I gave a little talk, looking at these differences—it is about a $1,000 difference between the gasoline car and the electric car in an annual operating cost. If you bought an electric car, you would displace three quarters of your electricity bill. You would offset three quarters of your electricity bill if you just bought an electric car.

I want to go back to my comments that I raised with you about my LED lightbulb. Does this feel a little like that? When we started off on this journey, it was the Smart Car, and it was like driving a sewing machine—it had no range. Let us face it: At least as a guy, there were no women looking at me driving my Smart Car. Now, we have this beautiful new model, priced effectively and appropriately, massive savings and massive social benefit. Is not that what I just described with the LED lightbulb? It is all those attributes just playing themselves out in something with four wheels. I think we will never look back at this moment. We will never look back from this moment because this is our future.

Forget the numbers. It does not really matter. There are the sales in Toronto. You can pick whatever numbers you want. How do they charge? One of the things that Toronto is quite unique about is a huge volume of us, as a group of people, we have a huge volume of people that

have a parking place, an individual private parking spot, either a garage, pad, condo, et cetera. That makes us a bit unique in the world. Our thinking is it is going to be about 80% charged at home, meaning that you are more likely to just come home at night and plug it in. We actually know, now, that people generally park and plug about once a week. That whole anxiety of coming home every day and having to go through that: Gone; it is history. There has got to be multiple solutions. Volumes on these things when they plug in are through the roof. A bit techie, but the level three chargers now that some of the people are asking for in their homes charge the Tesla in half an hour. Of course, all their neighbours' houses dim, but it is sort of, like, instantaneously putting a couple more houses on the grid between you and your neighbour. The charging is advancing, but we know, the thing we know about it is it happens at the same time as the peak in your house. You come home; you plug in; you go in the house; you turn the dryer on, turn the range on, turn the TV on.

I do not know if you are like me, but what does Mayor Tory call it? An 'integrated transit strategy'? I think they had the latest announcement today. I am going to change the name of it to the 'integrated *electric* transit strategy'. That is what it is. All of those pieces—I think the little pink piece, the Relief Line, got announced today. On top of all these cars, there is the grid that is getting built, and these are huge loads. Let us talk honestly about our capacity as an industry to deliver a solution. I think the general consensus is that we are just idling and we have so much capacity—just plug it in. This is all coming at no cost, so let us talk about that.

Let me explain this complicated graph. The white part is how consumption looks in Toronto on a 24-hour period, so it has got a curve to it. If you look at that curve ten years ago, it would be very spikey. Now, through our programs, we have levelled it to sort of a nice wave. In other words, we have lowered the peak and raised the valley. But what we have also done, as I described earlier, is we have lowered the consumption overall. You see the blue? That is the capacity that is in our system, generally. It is not exact, so do not—for those people that are from the OAB or something—get cranked about my evidence here, but there is capacity in the system. That is the point.

The green, though—and do you see how we had to cut the green, because the scale would not work?—foundationally, is the big question, and it basically says that if we move to any kind of concentration of vehicles and home heating or heat pumps or other programs, we will conservatively go between three and four times the throughput on the system.

What I can tell you is our system does not sit at 25% capacity today. I am sure that is not a surprise to you. This is actually a graphic of our distribution system. This is in our evidence. There are 36 stations, transformation stations.

What the green is, is that we have got enough capacity sort of for normal life over the next ten years. The yellow is that we are getting some problems. The red is "Dream on," assuming no electric vehicles and no conversion of fuel from natural gas. Do you think that is a good working assumption? The question is, *How much is it going to cost?*

Listen, I have not had people work the numbers, because it is somewhat irrelevant at this point, but I think it is fair to say we will add numbers by five and six billions at a go. In other words, the costs to rebuild the backbone and the big delivery stations in the city will be enormous because we have stations; all of the stations are largely reaching 100%. If you have got to add four times—even with good management of loads and charging cars at night and all those good things at the end—very, very quickly you will simply run out of capacity. You will have to go through a substantial building program. It will take a long time. I think one of our executives said to me or reminded me the other day that our wires cross Canada five times. If two thirds of those need to be changed, you can start doing the arithmetic. It is a massive job ahead of us. It is my job to do that job, but my point about it all is that it should not be missed in the conversation, that there is no free lunch on this solution, and that we, therefore, have to be very measured in the way and the speed in which we move here.

So what is the answer? I always get the, you know—everybody likes the mousetrap and stuff. The answer is all of the above. There will be no single mousetrap that will work. There will be no one solution that will dominate. It must be a series of every single piece that has to be brought forward in unison at the right time to make this thing work. It is going to be a little precarious, to say the least.

I know many of you here are from this industry. Let me tell you this, candidly. I know when you think about this industry, you put that picture in your mind because we love that picture, do we not? Oh, you have generators and there are little boxes, and you have big wires, and they are on towers. We love that stuff. You could not be more wrong. That is so old-world thinking. My encouragement to us all, and including me, is get that model out of your head because what you have got to start thinking about is a new way of delivering energy that is different than we have thought about before—that energy comes in at different points, goes out at different points, is stored at different points. Fuels will be used differently, and all of it will be controlled by the customer. I can go on my phone right now and turn lights on and off and air conditioners on and off—my choice—or I can have, in my case, Rogers, do it for me through an algorithm. I am controlling the grid at my house. I want us to stop thinking about this industry as a straight line and start thinking about it as a web, a virtual environment that we are going to have to adapt around to make all of these pieces fit.

Let me see if I can make sense of all of this policy, then. I will admit that I feel a little like I am taking these

jigsaw puzzle pieces and, in some cases, hitting them a little harder than the puzzle maker intended, but I do think that there is a context here that is important. Let us think about what has been going on. We have helped the people that are most needed. Tick. Conservation is working and worth every penny. In fact, arguably, it is not what the report said that it costs $2 for every dollar of value; it is actually the other way around, if not more, so conservation is working. Yes, we are building out our grid, and there are new investments going on, but we see the attributes and the benefits associated with it, particularly, you can go outside right now and breathe. With respect to cap and trade, we are going to have to get used to the fact that we cannot swim in the no-peeing end of the pool. That is just the reality of what the problem is: It is a global problem; it is not a local problem. We have got to be very careful about fuel switching, because we could trip ourselves up in trying to get to something too quickly, but it is probably the right direction.

So that is my attempt at putting it all together, the pieces. I do not know if, honestly, there is a mastermind sitting, thinking these policies through, and it actually works that way. Nah, probably not, but, at the end of the day, I can actually understand that it can actually make some sense, and it is a vision. The question I am going to leave you with is *Are we wet? Are we up for the change, or are we going to resist it?*

I have been saying to so many of us in the industry, "Adapt or die." I, for one, want to accept that I am wet, and change will be okay, and so we will welcome it, but we have to be very careful as we move through these stages because there is going to be no free lunch, and there is going to be some struggles with it.

Thank you very much for your attention. Happy to take some questions.

Question & Answer

Q: I saw your future load projections, and you talked about electrical cars. Have you also considered data centers because, with the big data and degrees in data transmission, that leads us into some big loads?

AH: Yes, I mean, obviously, in this new economy, there are all kinds of new applications. Data centers are absolutely one that we need to coordinate around, but it is not just data centers, for sure. Some new applications that are coming into society have huge volumes associated with it. Toronto is, obviously, an area where there is a lot of data centers, so, yes, we do long-term planning, sort of 20 years' stuff, to make sure we are ready for that, but it is part of what has been driving some of those green to yellow to red. Those systems are coming on now. Thanks.

Note of Appreciation by Todd Williams, Managing Director and Head, Navigant Energy Canada

Thank you, Anthony, for a very captivating and entertaining discussion through policy. I am glad you brought your notes today because there has been a lot of change, and, actually, both your remarks and Gordon's remarks reminded me, back to 1903—that is a bit before my time—of the ongoing sort of policy discussion and debate that we have in this province about electricity that is sort of near and dear to everyone's hearts. And, certainly, in a way, that has not changed.

Anthony also reminded me—and I think a lot of us—about how things change and how the market is driving a lot of things, CFL to LEDs, for example, the change in sort of debate, the discussion about what is a Tesla versus a Smart Car. All of those reinforce, in my mind, kind of how the market is driving change and also how the industry has to respond. The fact that we have discussion now about cap and trade, comparing that say with the discussion about coal— obviously, things are different. Obviously, that discussion has to go on for a number of years. Anthony, you mentioned what I would call, what we would call at Navigant, the 'energy cloud', the whole thing about everything being all connected. That is, in our view, the biggest change in the industry in over 100 years, and it is coming a lot faster than a lot of us think. I do not know if I am wet or dry, but

I am, certainly, ready for the change.

On behalf of the Empire Club and everyone here, I would like to thank you for joining us today to share your thoughts, pull together your notes and try to connect all this together for us. Thank you very much.

Concluding Remarks by Dr. Gordon McIvor

Thank you so much, Todd, and by the way, thank you to Siemens and Navigant for being our event sponsors and making today possible. I would also like to thank the *National Post,* which is our print sponsor and Rogers Television, our local broadcaster. I would also be remiss if I did not thank Mediaevents.ca, which is Canada's online event space, for live webcasting and podcasting today's event. I am sure all of you know, that is how most people now actually see Empire Club events. Thank you, to everyone for being here today. Please, follow us on Twitter at @Empire_Club. You can also follow us on Facebook, LinkedIn and Instagram.

We have got some great events coming up between now and the end of our season, which is at the end of the June. Tomorrow, for example, we have the Chief Justice of the Supreme Court of Canada, Beverley McLachlin, who will be joining us in this very room to talk about the importance of keeping Canada's judicial system independent of government. Wonder where that topic came from. That will be very interesting. If anyone wants to buy a ticket to that, by the way, there are still some tickets left, so make sure to order this afternoon. We also have Premier Brad Wall, one of the big major Conservative voices in the country right now, from Saskatchewan, who will be here on June 14th, also in this very room.

Thank you, ladies and gentlemen, for your attendance today. This meeting is now adjourned. Thank you.