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THE STANDING SENATE COMMITTEE ON ENERGY, THE ENVIRONMENT AND NATURAL RESOURCES

EVIDENCE

OTTAWA, Thursday, September 29, 2011

The Standing Senate Committee on Energy, the Environment and Natural Resources met this day at 8 a.m. to study the current state and future of Canada's energy sector (including alternative energy).

Senator W. David Angus (*Chair*) in the chair.

The Chair: Good morning colleagues, ladies and gentlemen, viewers on the CPAC network and the internet.

I would like to welcome people visiting our special dedicated website for the study on Canada's clean energy future and strategic framework for a national consensus.

We are pleased this morning to have witnesses here from the solar industries. Part of our study into Canada's energy sector involves alternate sources of energy compared with traditional fossil fuels. We are extremely interested in what our witnesses have to say.

This is our second committee meeting since coming back from summer break. We were pleased to have the Honourable Joe Oliver, Minister of Energy and Natural Resources, on Tuesday evening. We will be hearing from his counterpart, the Honourable Peter Kent, Minister of Environment next Tuesday. The name of our committee, Standing Senate Committee on Energy, the Environment and Natural Resources, seems conflicting but in reality, our energy and environment issues and sectors are inextricably wound up together. We deal with both of these issues.

We had scheduled the Canadian Solar Industries Association to come at an earlier time this year. We had a general election and various other things, but this committee has been traveling across Canada to hear what Canadians have to say. I think we have successfully promoted a national dialogue and discussion about the energy sector and where our energy comes from. We had a view to dispel some myths that are clearly out there about energy. We also wanted to get Canadians involved in buying into the need for a more efficient, more sustainable and cleaner energy framework for our great country, that is blessed with natural resources and sources of energy.

My name is David Angus, and I am a senator from Montreal, Quebec and the chair of this committee. Also present are Senator Grant Mitchell from Alberta, who is the Deputy Chair, staff from the parliamentary library, Mark Leblanc and Sam Banks, Senator Peterson from Saskatchewan and Senator Paul Massicotte from Quebec. Senator Colin Kenny is here as a special senator representing one of our colleagues, Senator Tommy Banks, who had to be out of town. Senator Kenny is a very experienced in with the energy sector and a past active member of this committee. Senator, it is good to have you with us. Our wonderful clerk Lynn Gordon is here.

Senator Richard Neufeld is from British Columbia. Senator Judith Seidman is from Quebec. Senator Fred Dickson is from Halifax, Nova Scotia. Senator John Wallace is from New Brunswick. Last, but not least, we have our only elected senator, Senator Bert Brown, from Alberta.

Mr. Young, you are an executive with one of the members of the Solar Industries Association. I believe your company is Enfinity Canada, and you are the managing director there. Your colleague is Mr. Bateman, with whom we have been dealing in trying to set up these meetings for a goodly period of time. Mr. Bateman, I know you are a member of the CanSIA policy and research team and in your role you work with industry stakeholders, governments and bodies to strengthen and expand the market for solar energy technology in Canada. You hold a Master of Science in Renewable Energy from the University of Reading in the U.K, and a BSC in Environmental Biology from University College Dublin, in Ireland. Welcome gentlemen. I am sorry we are late in getting off the mark this morning. We are looking forward to a productive and interesting session. I know that you have opening statements. All of my colleagues on the committee have had the documentation distributed and we will have questions for you after

Mr. Young: Enfinity is one of the largest solar developers in the world, with over 3 billion dollars of projects under development. Here in Canada we have currently 150 million dollar construction project halfway between Ottawa and Montreal.

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Mr. Bateman: CanSIA is a national trade association that represents approximately 650 solar energy companies throughout Canada. Since 1992, CanSIA has worked to develop a strong, efficient, ethical and professional Canadian solar energy industry with capacity to provide innovative solar energy solutions and to play a major role in the global transition toward a sustainable and clean energy future.

On behalf of our membership we thank you for the invitation to appear before the Standing Senate Committee on Energy, the Environment and Natural Resources today.

We consider ourselves very privileged to be the first witnesses in this new session of Parliament and to be scheduled between the Honourable Joe Oliver and the Honourable Peter Kent, Minister of the environment.

Solar energy holds significant public support across Canada. Tuesday night, we became a national issue, as TV personalities Rick Mercer and Mike Holmes, in the company of David Suzuki, installed solar panels on a home in Oshawa, Ontario. Soon, solar technologies on the rooves of houses could be a widespread, regular visual reminder of Canada's global transition to, and position as, a clean renewable energy superpower.

Canada's solar industry is growing. It has made remarkable gains in its relatively short history, working from the ground up. While the individual successes of our members have hastened growth in solar energy in recent years, the pace is still too slow in global terms and our efforts too disjointed. If the Canadian solar industry is to build on our achievements and to compete globally, with all of the associated benefits flowing to Canadians, we must continue to increase collaboration between the Government of Canada, municipalities, provinces and territories.

The documentation circulated to the committee prior to this meeting, Solar Vision 2025, was a roadmap document prepared by Ernst & Young for the Canadian solar industry, plotting a path for our industry to the year 2025.

Our vision is that by 2025 solar energy will be widely deployed throughout Canada, having already achieved market competitiveness that removes the need for government incentives. It will be recognized as an established component of Canada's energy mix. The solar industry will be supporting more than 35,000 jobs and displacing 15 to 31 million tons of greenhouse gas emissions per year, providing a safer, cleaner environment for generations to come.

There is one thought we want to leave with the committee: This generation will witness solar energy technology becoming a mainstream and widespread phenomenon. Whether this occurs within the next decade or not relies in part on the nature of the decisions being discussed today. The Canadian solar energy industry wants to be part of Minister Oliver's common vision, shared principles and clear goals toward securing our position as a clean and renewable energy superpower.

During this presentation, we will provide a background to the common solar technologies that are being used in Canada today and an overview of their market status, as well as a description of what accelerating the deployment of those technologies would bring to Canada and Canadians.

Solar energy is Canada's largest proven energy reserve. As we can see from the map on this slide, derived from data from Natural Resources Canada, the solar resource throughout much of Canada is greater than that of Germany. Germany is the country that has 50 per cent more solar energy technology deployed than any other country.

Solar energy is vast, ubiquitous and virtually inexhaustible. It can be effectively harnessed with technologies available today, proven and reliable. Canada's winters are cold, but the sun always shines.

Wherever the sun shines, solar energy technology can be deployed to provide low-impact, high-value energy. In Canada, solar energy technologies typically include solar photovoltaics for the production of electricity and solar-thermal technologies for the production of heat and water. They can provide energy on a variety of scales, as we can see in the images on this slide, ranging from providing either heat or power for single residences, to larger commercial buildings, to entire communities.

Every unit of solar energy displaces a unit from another source that could be used to a better end, for a different end use, or at a different time.

Benefits of solar energy are well documented. We would like to discuss the benefits to our energy supply and to our environment during our discussion following this presentation. At present, we would like to focus on the scale of the opportunity for socio-economic benefits that accelerating the deployment of solar energy technology would provide Canada and Canadians.

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Canada's energy-resource base and human talent have proven to be one of our greatest competitive advantages and source of economic strength in the past. As the world looks toward Canada's stable financial system and superior economic potential for opportunity, the development, commercialization and deployment of solar energy technologies and services in Canada present significant opportunities for sustained economic growth, diversification, and the creation of skilled jobs and value-added business.

Renewable energy continues to attract increasing levels of investment worldwide, with 2010 being a record year and the first year in which new investment in renewable energy was larger than that in new fossil fuel plants. As with renewable energy as a whole, investment in solar energy is no longer a niche. The Canadian solar industry is expected to employ a Canadian labour force of over 8,000 and generate investment revenues approaching 2 billion dollars in 2011.

Gross global investment in renewable energy research and development jumped 40 per cent to 9 billion dollars in 2010, with solar energy technologies claiming 40 per cent of all renewable energy research and development dollars.

Solar energy patents registered in 2010 were second only to fuel cell patents in the clean energy area. Corporate R&D in solar was four times larger than that of the nearest competitor, wind energy. These facts reflect the pace of technological innovation and the race for market share as solar energy companies continue to focus on improving production processes and cutting costs.

Now we will give a brief overview of the different technologies in use in Canada and the status of the markets for them.

We will begin with solar-thermal technologies. These are technologies that harness solar radiation, extract its thermal value and transfer it to either heat or water for use in homes for domestic hot water, in commercial buildings for commercial hot water, and also for space heating and industrial processes. In the future, as new applications mature, the solar heat will be used to drive cooling engines to provide cooling for buildings.

The Chair: I see the flag is flying at half-mast there. Does that mean there was no sunshine that day?

Mr. Bateman: As we can see, from 2000 to 2011, the market for solar thermal in Canada has experienced continuous, year on year growth. Between 1995 and 2007 the market was in a state of immaturity, where the majority of the technologies being deployed were simple and of a low cost. Between 2008 and 2011, thanks largely in part to the Government of Canada's ecoENERGY program, the market became significantly more robust. With regard to other international markets, it became a significant player on the world stage.

Another thing to note from the second graph on this slide is that solar air technology is one of Canada's fortes for solar energy. We have the most innovative technology providers and the most innovative installations in the world today.

We would like to present one of the many success stories present here in Canada for solar thermal. This image is of Drake Landing Solar Community in Alberta. It is the first of its kind in North America. It is a master planned neighbourhood of 52 homes, served by a district heating network that is 90 per cent fuelled by solar energy. Heat harnessed during the summer is stored underground in boreholes and saved for the winter to serve the homes' space heating needs.

This project was, again, largely thanks to support from the Government of Canada. We understand that this will serve as a demonstration project for a project perhaps 20 times its size within the coming years.

The future of solar thermal technology is being significantly advanced in Europe, where they are exploring new applications for the technology and maturing new applications, whereby a small installation may serve a single family's hot water needs. Huge arrays, such as in Drake Landing in Okotoks, Alberta, can provide heat for an entire community, an entire city, perhaps for industrial processes of up to 250 degrees, which makes up a significant proportion of Europe's heating demands and could greatly contribute to Canada's energy demands also.

In the Solar Vision 2025 document I previously referenced, we spoke of our vision for 2025. For solar thermal, CanSIA forecasts that we reach 10 gigawatts of solar thermal technology in operation, driven by the sector's ability to continue to build scale and reduce costs through innovation and to design energy solutions to assist the industrial sector in replacing natural gas and enhancing its international competitiveness.

Mr. Young will describe the state of the solar power technology industry in Canada.

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Mr. Young: If you could turn to the slide entitled "Solar Power Technologies," please. Solar power is the collection of electricity from photovoltaic materials. As with solar thermal technologies, they are scalable and can be deployed to provide low impact, high energy value right at the point of demand.

You will note in the pictures that there is an open field with solar to your right and a commercial rooftop with solar to your left that can be scaled down to the residential level as well.

If you can turn to the slide, "Canadian Solar PV Market Trends." During the period 1995 to 2005 the Canadian market for solar PV grew at an average annual rate of 28 per cent. The market was dominated by remote and off-grid installations.

During the period of 2006 to 2011, as evolving energy priorities emerged, growing consumer awareness and rapidly decreasing costs triggered major market growth of an average of 2.8 times per year.

I would like to make a note of the graphs in this chart. If you look to the upper level, that is measured in kilowatts and the bottom is measured in megawatts. To convert the upper level to megawatts, it would be about 1 megawatt installed at that top scale. You can see that, over time, we have grown significantly in Canada, from about 2 megawatts to well over 100 megawatts this year.

If you can now turn to the next slide, "Canadian Solar PV Success Story." First Solar and Enbridge have a project in Sarnia that is 97 megawatts, which is the world's largest solar park of its kind and is located in Southern Ontario. It annually generates 120,000 megawatt hours, enough power for 12,800 households. The facility size is 950 acres with a solar panel surface of 966,000 square metres. This project created 800 jobs during construction.

Flip to "Canadian Solar PV Market," please. Thanks in part to the Sarnia solar project and a number of other multi-megawatt installations, contracts being developed in Ontario, the province has risen from obscurity to being North America's third largest producer of PV installations in 2009, and second in 2010.

I will ask you to turn to the "Future of Solar Technology." Solar photovoltaics are rapidly coming of age. Continued innovation and scientific advancements are driving solar photovoltaics to grid parity in many jurisdictions, and solar PV module costs in Canada are expected to decrease almost tenfold between 1999 and 2012.

Slide 19 is "Solar Vision 2025 Photovoltaics." CanSIA's vision is that by 2015 solar PV will be a strategically important industry in Canada, driving innovation at a global level. In 2025, solar PV will be 14.7 gigawatts, contributing 17.7 terawatt hours to Canada's energy supply. In this scenario, the assumptions used for calculation can be found in the document Solar Vision 2025.

Making solar mainstream is the next slide. The key to making solar mainstream is for all stakeholders within public and private sectors to collaborate toward mutual goals. Public bodies must commit to stable policy and program incentives to lay the ground work for the private sector to make long-term, sustainable investments. Industry must enhance productivity, drive down costs, collaborate to increase opportunities, and improve training and education as well as public awareness.

You can next look to "Making Solar Mainstream," slide 21. The priority for our industry to make solar energy mainstream is to continue to build scale and drive down costs. You can see that we are attempting to do that in the cost of generating electricity.

Slide 22 is "Canada's Solar Energy Future." Diversifying Canada's energy mix to include more solar heat and power will require the federal government to commit to a national strategy that attracts clean energy investors with a long-term outlook. The government should examine tax mechanisms and financial instruments to accelerate deployment and continue investments in research, development and demonstration.

Mr. Bateman: We would like to conclude our presentation by thanking you for the opportunity to participate in these important proceedings. We hope that the dialogue around Canada's energy future leads to solar becoming an important part of our growing renewable energy portfolio and our future sustainable prosperity.

We would like to leave you with the image at the back of the slide deck, which is a 23.4 megawatt solar park located only 44 kilometres from Parliament Hill. That is enough power for 7,000 homes annually. Mr. Young, myself and the association would like to extend an invitation to you all, at some stage in the future, to join us and visit some of the many solar installations in this area.

The Chair: Thank you both. That was a fascinating presentation. I have a list of questions here.

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Before starting, I would like to focus on slide 22.

The minister of NRCan has just told us what the government's strategy and policy is on these matters. You say that for solar heat and your industry to make further progress will require an articulated commitment as outlined on slide 22.

How is the government reacting at the present? Are you getting push back; are you getting enthusiastic support; are you getting the funding you need?

I ask that only as an introductory question because, of all the alternative sources of energy that are out there -- tidal, wind, solar, run of the river and the like -- we hear mixed reports on solar. We hope you will be candid with us.

Mr. Bateman: I believe we are in a transitional period at the moment. With regard to the Government of Canada's support for renewable energy generation, the focus has now shifted toward innovation and the deployment of innovative and demonstration projects. A number of CanSIA's members are benefiting from funds directed to those purposes, which is driving a very good culture of innovation and technologies, and collaboration between universities and industry, and we feel that that investment will yield significant benefits within the coming years.

However, at this time there are a number of market-ready technologies, and we wish to explore different mechanisms to accelerate their deployment so that when the new technologies come to market we have industry capacity in place to be able to deploy those at the rate that is consistent with what is being experienced in other global jurisdictions also.

The Chair: Thank you very much.

Senator Mitchell: Thank you, gentlemen. I am very interested in this side of the energy equation, and I am quite inspired by your presentation. As Senator Angus alluded to, every single solution to climate change is criticized and has some weakness, and it seems to me that the one that is always levelled against the solar industry is cost.

I would like to put this perspective. There is one element in particular of your presentation which caught my imagination. I think you said that by 2025 it will be self-sustainable. That is a lot like the oil sands industry. It took a lot of government investment and government tinkering with tax structure over 20 or 30 years, and it took oil prices to go way up before it ever got to be sustainable. You might be where the oil sands was in 1976 or even 1985.

Mr. Young: I think you are entirely on the mark. Electricity prices do have to go up, and in a global context Canada, and Ontario specifically, has some of the lowest rates in any of the G8/G20 jurisdictions. As we see installation prices fall, the real cost of electricity recognized and the consumer price go up, we will hit grid parity within the timeframe of 2025.

Senator Mitchell: Can you itemize the elements that will work towards that? One is the general increase in price of electricity. The second would be the economies of scale and savings you find from innovation. Are there other elements?

Mr. Young: There are a couple of elements related to the cost structure. Peak power pricing in Ontario could reach \$1.50 per kilowatt hour on a hot summer day. Right now in Ontario we are able to meet peak power at a cost effective rate. There has to be a recognition that electricity fluctuates with demand and that that price should be very transparent. I think that on balance we are competitive in certain instances on certain days.

Senator Mitchell: I think you said that the Arnprior project produces 23.4 megawatts of power. Could you indicate how that compares to a regular-sized, coal-fired electrical plant in production -- I am from Alberta -- and what the cost per unit is comparatively right now?

Mr. Young: I think some of the coal-fired plants that are coming off line in Ontario are in the order of 600 to 1,000 megawatts each. So 23 is a drop in the bucket relatively speaking.

However, if you look to Germany where there is 18,000 megawatts of solar installed, that makes a big difference. It is distributed. It is not one critical point of failure. That is very important because you have a very distributed the grid where you are not going to have major blackouts. You will have localized blackouts. If that grid is structured to be more flexible, we have much more security in our energy mix.

Senator Mitchell: And price per unit?

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Mr. Young: Price per unit is 42 cents a kilowatt hour on a utilities scale. Relative to coal, we are not there yet, but if you factor in the cost of health issues and related carbon costs, we would approach that.

Senator Mitchell: Do you have job creation comparisons?

Mr. Bateman: Recently CanSIA commissioned a study of the economic impacts for Ontario's solar industry for the period 2011 to 2018 and we found that solar energy technology creates more jobs per megawatt and more jobs per dollar invested than any other energy source. At present we have 8,000 people employed in Ontario's solar energy industry. This year we expect to have installed 300 or 400 megawatts by the end of the year. In comparison to any of the other technologies available, this is considerably larger.

In terms of per gigawatt hour produced, solar PV is approaching 1.6 jobs per gigawatt hour produced. Wind energy, which is the next largest job creator per gigawatt hour produced is less than .4. On the bottom of the scale, coal is 0.1 jobs per gigawatt hour produced.

Senator Mitchell: The other interesting feature of this is that this is regional development, rural community development, because these are all over the place. These jobs are not in one place in a central plant. They are spread out all through the rural areas that are diminishing and dwindling and we are trying to sustain. This might be a way to do it. Imagine that. I am sure you have.

Mr. Bateman: On the issue of cost, in remote and off-grid locations solar PV is frequently less expensive than the alternative fuels. Also, a number of our members are operating in American markets with solar thermal technology, and their price points are contractually related to the price of the alternative fuels. Many of our members have key purchase agreements for 5 per cent less than the going rate for heating oil, so there are other rates out there that solar is now more competitive than.

The Chair: In any of these documents that you have given us is there a list of your members?

Mr. Bateman: I can provide that to the clerk.

The Chair: In an order of magnitude, about how many companies are there?

Mr. Bateman: There are 600 to 650. That number has increased from less than 200 in the past three years.

The Chair: Thank you.

Senator Massicotte: Thank you for your presence this morning. I want to make sure I understand. Yes, we are all agreed, solar energy is clean. It brings many benefits to society, and so on, but the sensitive issue is the need for funding. I want to know the difference. Are we far from being profitable? Are we far from being profitable without subsidy? And the average cost of solar energy, is it at 42 cents per kilowatt? That's what you said? Is it possible to break this down? What does it cost and how does it compare on average throughout Canada versus Ontario, where the sector is very active?

Mr. Young: If I could speak to the photovoltaic electricity. Right now, there is a feed-in tariff set in Ontario. It will range between 44 cents and 80 cents per kilowatt hour. That rate is designed to provide a return on investment to the homeowner or business owner who invests in that capital, to get a targeted 10 per cent return on their investment.

In other markets and other jurisdictions, depending on sun and availability of equipment, the price to be profitable is less, or it could be more. Right now, we estimate the cost of nuclear electricity, for instance, unbundled, to be somewhere around 33 cents a kilowatt hour for new nuclear power.

One of the challenges we have in this country is that we have a number of established power plants whose costs have been amortized over a number of years. It is when the new plants get built that we get real, transparent pricing. I think it is entirely possible to deliver solar electricity in this country for 21 cents a kilowatt hour.

Senator Massicotte: I do not understand. There is talk of \$0.44 to \$0.80 per kilowatt in Ontario. However, in your last comment, you seem to indicate \$0.22?

Mr. Young: Yes. Ontario has a walled garden approach to the feed-in tariff, where content is required to be made in Ontario. This means that the equipment manufacturers are smaller -- they are not on the global scale -- and their costs are higher, and so the delivery of equipment into the Ontario market requires a higher feed-in tariff.

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To go into other markets where the sun is better, like Saskatchewan or Alberta, and without the need for a domestic content, it is entirely possible to be at that lower range.

Senator Massicotte: In comparison with other energy sources, what is the average cost for Canadians today? I note that Quebec is made between \$0.06 and \$0.08 per kilowatt / hour. What is the current average cost of energy for consumers in Canada?

Mr. Young: I can speak to Ontario, where consumer prices are about ten cents a kilowatt hour at the current energy mix.

On an installed capacity basis, the Province of Ontario, in 2009, was looking at new nuclear reactors priced at about 10,000 hours per kilowatt, installed. In solar PV, we are down around \$5,000 per kilowatt installed.

Senator Massicotte: I understand Canadians must pay twice in order to allow you to be profitable in the rest of Canada, and to be profitable in Ontario and allow non-competitive suppliers. Is this a good summary of the situation?

Mr. Young: It is a summary that is a delicate one to pursue.

We are in a situation where no one really knows the exact cost to generate electricity from an exact source, because it comes in a mix. Sixty per cent comes from hydro, a hundred per cent of hydro in Quebec, which were paid for a long time. We are talking about adding new capacity to a system that is rapidly aging.

To be fair to all industries, we should be looking at what is the cost of installing new capacity today and the levelized cost of electricity of that. In many jurisdictions, like Germany and Italy, they have found it is cheaper to put in solar than it is to add a new coal-fired or nuclear plant.

Senator Massicotte: I notice in your brochure you have a village in Ontario where, for a period of years, thermal energy is stored in a water well, if I understand correctly? One difficulty with the energy today is related to storage - otherwise we would solve many problems. Can you tell us about that? Is it possible to store energy efficiently?

Mr. Bateman: The community itself is in Okotoks, Alberta, and it has been inhabited since 2007. For the last four years, the ground has been continually charged to a closer and closer degree of its maximum thermal storage capacity. I believe after approximately three years, they reached the maximum thermal mass of the ground, and now each year they are achieving somewhere between 90 and 95 per cent of the total heating demand of every home with that system.

Senator Massicotte: The energy is stored in the ground? Is it heat that is stored in the ground at very low levels? Is it like thermal?

Mr. Bateman: It is thermal. I believe the boreholes are up to about 60 metres deep. There are a number of different heat exchangers running through the ground, which take the form of simple pipes where liquid is circulated through them. During the winter months, when the groundwater is at a higher level, the heat is recovered by circulating a colder fluid through the ground, which absorbs the heat.

Senator Massicotte: What percentage of the heat is recovered? If the number that was stored is 100, what percentage is retracted, is still there for retraction? What is the efficiency of recovery?

Mr. Bateman: There is a large amount of metering and monitoring going on at the moment, and the community itself has performed as to the specific engineering design. However, at this stage, there is not more than two or three years of in situ data to be able to fully describe not only what the efficiencies are today but what we can continue to expect to achieve over a longer period of time. We know that the Government of Canada departments that are involved, and their industry partners, are particularly pleased with the performance.

The Chair: I am glad you got on to that subject matter.

Senator Brown: I was going to ask basically the same question about the community in Alberta. Can you tell me the time frame to pay out the total cost and then start making cheaper power?

Mr. Bateman: The lifetime of the boreholes can be expected to be somewhere in the region of 60 to 80 years; and the collectors, perhaps 20 to 25 years. The largest part of the capital investment is for the boreholes, so it is a long-term investment in the community itself. I do not have the exact figures, but I think that, as a demonstration project, it would be close to perhaps 50 to 60 years. When the demonstration itself is

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developed at scale, as is the current intention to go to scale of 1,000 homes, they expect to decrease the capital cost through scale by approaching 50 per cent and that the payback time will come down again another significant order of magnitude.

Senator Brown: A particular high school was built near Tucson, Arizona, and they have 150 panels. They had a chance to get the cost down. They get quite a bit of sand and dust from dry parts of the desert, and I wondered what kind of servicing is required, or if anything is washed or brushed out.

Mr. Young: The studies for similar locations indicate that you get about 6 per cent loss a year because of dust and sand build-up, so the typical cleaning cycle may be once or twice a year, depending on seasonality.

If you are maintaining your system properly and you are mindful of it, you will keep it at peak performance just by simply washing windows.

Senator Brown: Using high-powered washers to clean them up.

Mr. Young: Yes, and a squeegee.

Senator Seidman: There is no question that, as you present, solar is a very attractive option in theory. At least, that is way I see it at this point.

As I look at your presentation, in your vision for 2025, you say clearly that you would like to achieve market competitiveness on a global scale. This is what I would like to discuss a little more with you, the issue of competitiveness as it relates to the cost effectiveness as you have already heard these questions around the table.

Recently, in Ontario, which has been the flagship in many respects for the development of solar, there have been some pretty discouraging headlines, shall we say, and it has been said that it would be very difficult for any start-up in Canada to compete against the cheaper Chinese producers. In fact, there was a very recent piece in the papers' report on business that a U.S. company that was held up as a flagship solar producer has now filed for bankruptcy. These issues keep resurfacing.

Would you please comment, if you can, on this whole aspect of being cost-effective and having an industry in Canada that could be competitive?

Mr. Young: I will speak first to the issue of the bankruptcy that is in the headlines.

I think that that firm in particular was a very niche technology. It was young. It was ambitious. It basically could not compete with the established approaches to the technology. They were approaching a very small segment of the rooftop market.

There was a flaw in the business plan. The venture capitalists who backed it and in turn got the government to put loan guarantees in place behind it did not really understand the nature of the market they were competing in. I have been to the factory and I know this technology.

In terms of other aspects of the Ontario market, there are 39,000 applications for solar in people's backyard, on their business roofs and in their farmers' fields. That is a testament to Ontarians that are keen to invest in infrastructure. This is an infrastructure investment that is being paid for by the citizens. I think that cannot be underestimated. A government organization with six people administering a program is overwhelmed, to put it bluntly. That is a testament to the interest in this technology at the consumer level.

How do we get competitive? We get there by streamlining approval processes, reducing costs in legal fees and connection costs. We have to understand the cost of new electricity sources. It is those costs that we are competing with, not Niagara Falls, which is 80 years old, or Chaudière Falls, which is 120 years old. Those have long been paid for and are essentially free.

We are adding new energy sources to the mix to address things like electric vehicles that are coming. You see these electric scooters all over town. What is going on here is a paradigm shift. We are moving to transportation by electricity.

Senator Seidman: You do say that provincial markets beyond Ontario are immature, and now you have brought up the issue of electric vehicles. I know in Quebec, for example, this has become a major promotion on the part of the provincial government.

Have you explored in Quebec? Have you had discussions about ramping up this option?

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Mr. Bateman: I could provide a written response to the clerk on that. I am not fully aware of the nature and degree of all the different government relations that have happened in Quebec to date.

Senator Seidman: I would appreciate that.

Have you had talks in any other provinces in the country? Could you please talk about how you are developing markets other than Ontario?

Mr. Bateman: Sure. Currently, Saskatchewan we view as being potentially a very strong market in the future, and the provincial government has a rebate program for solar PV, which they have recently extended for another year, due to significant consumer support.

That program offers a 35 per cent rebate for the system installation. In November, we hope to be able to hold a second round table after the one that took place in May to discuss future policy options.

We have good relations with SaskPower, the Crown corporation utility there, and we do hope that the government will continue to support the accelerated deployment there.

Saskatchewan's electricity rates are toward the higher end of the table provincially in Canada, so it will be one of the first provinces where solar PV could foreseeably come on par with the grid.

Also, in Alberta, we have recently had discussions with the Economic Development Alliance of Southeast Alberta. There are five different bodies there, including the cities of Medicine Hat and Lethbridge. They are, with the support of the Government of Canada, developing an investment strategy for solar energy and are currently in the process of retaining a consultant to examine their regional competitive advantages for solar energy.

At the provincial level in Alberta, we attended a round table with Alberta Energy about two weeks ago, in the early stages of developing a white paper looking toward a provincial renewable energy framework.

We also have a number of contacts with other municipalities and provinces, and ongoing dialogue. Alberta, Ontario and Saskatchewan are currently the provinces where the dialogue has come to a much greater level of maturity.

Senator Peterson: Most of the issues I have have been covered, but on the Drake Landing demonstration project, is there backup energy provided in those units as well, or is it all solar?

Mr. Bateman: There is a small amount of backup, and I am not sure exactly the source. I believe it would be electric resistance, but I would have to confirm that and reply.

On a volume-of-energy basis, the backup heater would provide approximately 10 per cent of the annual needs.

Senator Peterson: That would always be required in any project anywhere; they would have to have the backup? You could not rely totally on solar?

Mr. Bateman: It depends on the ratio of the solar collector area to the energy demand. If the collector area were oversized, then they would be able to achieve 100 per cent of heating demand. By aiming slightly below 100 per cent, they would manage not to reach a situation where there is oversupply and where the prices would naturally therefore be higher than would be necessary due to inefficiency or waste.

Senator Peterson: Those costs would have to be factored in to your numbers, which you can deliver as well?

Mr. Bateman: That is correct.

Senator Neufeld: I do not have a number on the slide but it is making solar mainstream, where you show your generation costs on the low scenario at \$300 a megawatt to the high scenario of just over \$400. I would say that is probably \$440.

Are those costs that you have extracted there representative of Ontario; are they representative with rebates and programs all included in that, or is that your raw costs where?

Mr. Young: That would be the capital cost, including the cost of money going to a project. That is what it would cost to say that if you were to install it that would be your production cost.

Senator Neufeld: That is your production cost. Is that not tied into a grid or distribution or any of that?

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Mr. Young: No. It could be tied into a grid but it could be a stand-alone basis.

Senator Neufeld: Could be. Which is it?

Mr. Young: Either or.

Senator Neufeld: So the low is what?

Mr. Young: The low is predicated on your cost of installation and money. In the large-scale projects I would like to add that cost of money is the second most important input. We do not get interest rate guarantees from any government body. We have to go to the commercial market and raise capital to install these utility scale projects. That cost of capital may be 8 per cent or 9 per cent in some cases, whereas a nuclear facility has a government backing at 2 per cent cost of money, so it is a trade-off.

If I am competing with someone who essentially gets free money from a government-backed guarantee, it is hard for me to be on an even playing field.

Senator Neufeld: Yes; I appreciate that. I am familiar with it in British Columbia. However, with wind power, those folks are out borrowing on the market – run-of-river – all of those new private electricity purchases that are done by BC Hydro and have been done over the last number of years, they are all out there on the commercial market exactly the same as you are but are bringing in electricity at much less than even \$300.

That is part of the difficulty. That does not mean I do not think solar is good. It is straight economics.

Mr. Young: Great.

Senator Neufeld: When you are the minister and responsible for the cost of electricity, and you are out there taking a few good shots because you are going to buy electricity at \$400 when you could go out and buy it at maybe \$125, what does the public tell you? The public say they want their electricity delivered to their homes as cheaply as possible. That is part of the problem, right?

I appreciate all of the things that you are doing and I guess wind was at the same position at one time and will come down. When you compare us to Germany, Germany generates a huge part of their electricity with coal. There is a significant reason why they are actually attracting maybe some higher costs of electricity; it is the same with Saskatchewan and Alberta. In Ontario it has been a mishmash of a whole bunch of things over time.

I would like to go on to some other things. When you talk about competing with remote power I think that is where solar comes in relatively well. We have lots of remote communities in the province that I live in where solar could provide part of the electricity maybe as reasonably as diesel generation. However, that depends where it is at. On the West Coast, around Prince Rupert, where you have rain all but about 25 days of the year, and cloud, you will not get much sun, or if you are in the High Arctic, in Rankin Inlet. Can you generate lots of electricity in Rankin Inlet year round? Is that a possibility?

When you compare those costs to remote power, you are actually including those costs of moving diesel fuel to those really remote communities, which is really high. I appreciate that, but I do not think that solar can actually generate electricity in some of those far northern communities because there is very little sun; even where I live there is little sun in the winter.

Mr. Young: Senator, you hit on something. The cost of diesel generators is about \$1 a kilowatt hour, with maintenance costs maybe even \$1.20 in some occasions.

I would like to dispel a myth. You do not have to have direct sunlight to generate electricity with solar. It is not as efficient if it is cloudy. I will provide a website to you where you can see the generation in Germany on a real-time basis. Some days it is high, some says it is low, but it still generates electricity. On a cloudy day, out of the 18 gigawatts installed, they may get 4 gigawatts of electricity provided; on a sunny day across the country, in the summer they put out 13 gigawatts.

It is a case of how much force do you put behind it? If you have enough capacity installed, you can reach the demands.

Senator Neufeld: It is great to compare Germany. I would like you to compare the real North in Canada. Pick a community; Rankin Inlet or any one of those that might have two hours of sunlight and complete darkness, or maybe three hours of sunlight, or where I come from where in the dead of winter we do have

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sunshine but about eight hours of sunlight and the rest is dark. Then you have to bring in something extra, which are batteries and backup; is that correct? That would add to the cost.

Mr. Young: Indeed, and I will have my engineers run a model for you just so you can see what happens at various latitudes. The government has done a project in the Northwest Territories on a building that was very innovative. They covered the outside glass wall with photovoltaic material. It was presented at a conference in Italy and no one could believe that you could generate electricity that far north.

Senator Neufeld: That would be great. If in fact that proves out to be cheaper than what is happening now, there is a great place to talk to the government because all of that is actually federal government, regardless of how you want to look at it. The federal government pays all those bills. If, in fact, you can do that, it would be a great place to start, I would think.

In relation to the Arnprior solar project, at 23 megawatts, how big is that area covered with solar panels?

Mr. Young: That is not my project so I cannot comment specifically on it.

Mr. Bateman: It is a 200-acre field.

Senator Neufeld: It is 200 acres to produce 23 megawatts?

Mr. Bateman: Yes.

Senator Neufeld: You cannot use that land for anything else. Is it strictly for generation of electricity?

Mr. Young: There are a few opportunities to put small livestock on solar farms like that. It is not entirely accepted right now. We have a 250-acre project in Hawkesbury that is 30 megawatts in size. It is a different technology, uses fewer panels and generates more electricity. One of the problems we had with that was that the community did not feel that putting sheep on the land was a good idea; they were afraid of wolves. It is just something where NIMBYs creep up everywhere. If you can gain public support and community interest, then there are opportunities to have multi-purpose sites.

Senator Neufeld: I think actually rooftops and those kinds of things; people use it for augmenting heating their water and all those kinds of things. I think those are great processes to move forward with.

I clearly remember in British Columbia a company came there – I will not mention any names – but wanted a 20- or 25-year guarantee on industrial power at 3.5 cents so that they could build panels in British Columbia to provide a solar market in British Columbia and you would not be able to buy any technology from anywhere else. You are hooked right there.

Those kinds of things are impossible for governments to even do when you look at government operated, at least from the perspective of a free enterpriser. That is a comment to you. I think you are probably aware of which company it is. Thank you very much for being here.

The Chair: We will have two more questioners and then we will terminate this section.

Senator Kenny: Thank you for including me, chair, and welcome.

What do you think of the work that governments are doing with their own facilities and their own fleet of vehicles in terms of promoting electricity? Have you been keeping track of the alternative fuels bill, which this committee was instrumental in addressing about 15 years ago? It was sponsored by me and it required 75 per cent of the federal fleet to be on ethanol, methanol, natural gas, propane or electricity. This is the law of the land and there is a report on it every year. In terms of federal vehicles, how are we doing with electricity right now?

The Chair: This seems far removed from the solar mandate but if you gentlemen want to address it, that is fine.

Senator Kenny: The solar mandate would perhaps not apply to the legislation that I am talking about. It would certainly apply to buildings and how our government is doing generally?

The Chair: As I say, if these witnesses have something to add, they can.

Mr. Bateman: It is not something that I have in-depth knowledge of but I am aware of a number of different Government of Canada sponsored programs that are improving the sustainability of the building stock. The green municipalities fund, which is administered by the Federation of Canadian Municipalities, which has led to a significant number of solar installations on government buildings.

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Secondly, for the Government of Canada's sustainable procurement policies, there are a number of provisions that require a certain performance under the Leadership in Energy and Environmental Design program (LEED). Though that program there are opportunities for building designers and operators to incorporate solar within those buildings to achieve environmental energy performance. This makes it suitable for government procurement.

Senator Kenny: We seem to be acquiring buildings in the Ottawa area fairly regularly. Can you give us examples in the National Capital Region of buildings that are principally taking advantage of solar?

Mr. Young: We have a pending project with the Canadian Aviation Museum. We have just received approval to build. Essentially this is a commercial arrangement between Enfinity Canada Ltd. and the museum corporation. Enfinity Canada invests in the technology and the host facility receives rent for the rooftop space.

Our company does not typically sell systems. We invest in the capital. We take the risk away from the building owner. That is something that Public Works and Government Services has a hard time manoeuvring through. Some of the other agencies have a little more latitude to pursue. I think it is something worth exploring in the future.

Senator Wallace: Thank you for your presentation, gentlemen.

Mr. Bateman, you made a comment at the outset of your presentation that the pace of growth of solar energy in global terms is slower than you would hope. There certainly are impediments. Many of those have been discussed around the table today.

I listened to your comments and I read your material. It seems your members are approaching that growth by looking at a number of potential market customers. To me there are at least three categories of market customer. At the consumer level there is the individual industrial commercial customer, the residential customer and the on-grid, large industrial energy producer.

All marketing requires a targeted approach, and I realize that each of our markets may have a particular interest. When you look at those three markets in the Canadian context, in which would you see the greatest opportunity in the short term for an increase of market share of solar energy? I realize that changes are needed to make inroads in any one of those areas. With the way the playing field is today, is there any one of those market groups you see in the short term as having the greatest chance for immediate growth?

Mr. Bateman: When proceeding with the status quo?

Senator Wallace: Yes, as it is today.

Mr. Young: In an ideal world, we would have access to electricity grids across the province or the country.

One of the problems that we have in this country is a fractured electricity market. There is no uniform vision that goes coast to coast. That is where we look to leadership in the federal government. That can at least give the global vision where people can say, "We have the right to connect power to the grid."

In Ontario, the Feed-in Tariff program is from the grassroots up. Individuals make the investment with access to the grid. I think we can achieve that, with the cooperation of the federal government, to introduce it as a viable policy.

We speak about costs and I think the success of the German program is because it is tied to cost price digression. There is a clear path to get to grid parity. To do that, they have the scale. On a nationwide basis, I would hope that we would have a similar sort of scale to drive our costs down. It is very inefficient to go across each province, trying to figure out the legislative framework. A uniform approach to this across the land is something that I think CanSIA and the Government of Canada could work toward.

Mr. Bateman: I agree with what was said.

Senator Wallace: I am from the province of New Brunswick. Is there any comment you can make about the state of the development of solar energy in New Brunswick?

Mr. Bateman: CanSIA recently participated in the New Brunswick Energy Commission. We are hoping to continue a dialogue and be involved. At present, there is a slow rate of development of solar within the province. For the foreseeable future unless the dialogue becomes more directed, that may be the case for the near term.

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Senator Wallace: Thank you.

The Chair: Senator Brown, did I see you had your hand up?

Senator Brown: Yes. I want to make a comment. In Arizona, there is a company that produces a solar blanket for the army. It is ingenious as it allows troops to keep themselves warm when they are out in certain climates. It also provides signal power for their communications.

I think solar has a wonderful future. What worries me is that I read something on all kinds of different power in European countries. In spite of solar and wind, the report said that they had to build four more coal-fired and gas fired standard plants, because a backup must be there. When you get into really big surges of motors and electrical plants, it comes on and needs a backup. The warning I would give is to not go too far too fast because that backup problem must be covered as well.

The Chair: Thank you very much, Senator Brown, for that observation. I will ask Senator Mitchell to conclude.

Senator Mitchell: I cannot resist but to say we certainly have gone quite far with fossil fuels and have not worried about all the backup issues there. We are starting to worry about them now.

It is interesting and timely that I just received on my tablet – on which I have all your documentation for this meeting as well so it is very environmentally efficient – a report just released by the national round table on the environment that indicates there will be huge costs related to climate change impacted on Canada's economy and then they say their estimates are probably low.

I guess this is a leading question, but it is unfortunate that when you assess the costs of producing your energy versus other forms of energy, fossil fuel, in particular, there is no way really of adding per kilowatt hour the cost of climate change into coal fired or other emitting kinds of electrical energy generation, is there?

Mr. Young: That is a delicate situation. Carbon capture and storage is one approach and it comes with costs. People try to trade carbon credits and that is an incentive. We see mechanisms in the U.S. where solar credits are generated but because more people flock to it the price goes down, so it creates instability in the pricing mechanism. Much thought has to be given in terms of flat fees and adjusting it to the price of production as opposed to credits traded on an open market.

The Chair: With that, gentlemen, we will wind up this session. I would like to thank you both, Mr. Bateman and Mr. Young, for coming here. I know you have had some issues that made it a bit complicated but here you are. I think we have had a good session and I trust we can come back to you if you have further questions and if you have issues that you would like to supplement from today's discussion you can deal with the clerk, Ms. Gordon, in the usual fashion.

(The committee continued in camera.)