STANDING COMMITTEE ON CROWN AND CENTRAL AGENCIES

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STANDING COMMITTEE ON CROWN AND CENTRAL AGENCIES

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Regina Rosemont

Published under the authority of The Honourable Don Toth, Speaker

Inquiry into the Province's Energy Needs

[The committee met at 10:00.]

The Chair: — Good morning. I'd like to welcome everyone to the meeting of the Standing Committee on Crown and Central Agencies. Today is the sixth day of the committee's inquiry into Saskatchewan's energy needs. I am Tim McMillan, Chair of the committee.

I would like to introduce the other members of the committee: Mr. Weekes, Mr. D'Autremont, Mr. Allchurch, Mr. Bradshaw. We have Mr. Wotherspoon and Mr. Taylor is substituting in for Mr. Belanger. I would like to note that Mr. Belanger is a witness for the Crown today in a court case and that is why he was unable to attend.

All of the committee's public documents and other information pertaining to the inquiry are posted daily to the committee's website. The committee's website can be accessed by going to the Legislative Assembly of Saskatchewan website at legassembly.sk.ca under What's New and clicking on the link to the Standing Committee on Crown and Central Agencies. The hearing will be televised across the province on the legislative television network, with audio streaming available for the meetings outside of Regina. Check the website for information regarding locations, cable companies, and channels. The meetings will be available online on the website with past proceedings archived on the website as well.

Before we hear from our first witness this morning, I would like to advise witnesses of the process of presentation. I will be asking all witnesses to introduce themselves and to please state their name and if applicable their position with the organization they represent. If you have any written submissions, please advise that you would like to table your submission. Once this occurs, your submission will be available to the public. Electronic copies of tabled submissions will be available on the committee's website.

The committee has asked all presenters to present an answer to the following question: how should the government best meet the growing energy needs of the province in a manner that is safe, reliable, and environmentally sustainable while meeting any current and expected federal environmental standards and regulations and maintaining a focus on affordability for Saskatchewan residents today and into the future?

Each presentation should be limited to 15 minutes with time set aside following for question-and-answer. Once your presentation is completed, the committee members may have questions for you. I will direct the questions and recognize each member that is to speak. Members are not permitted to engage witnesses in any debate, and witnesses are not permitted to ask questions of committee members. I would also like to remind witnesses that any written submissions presented to the committee will become a public document and will be posted to the committee's website for public viewing.

I would also like to add today our timeline is following our session today, we will be packing up and heading up to tomorrow's event in La Ronge. Therefore I'm going to be a little more on the clock today. We have a presenter, I believe, every hour. If members could keep their question portions to five minutes, that will allow everybody to get their questions in, and we will take it from there.

So with that I would ask our presenter to please take it away. Thank you.

Presenter: Atomic Energy of Canada Ltd.

Mr. Oberth: — Thank you, Tim. My name is Ron Oberth. I'm the director of marketing and business development with Atomic Energy of Canada Ltd., a Crown corporation with head offices in Mississauga, Ontario. I'm proud to say that I'm a Western boy. I grew up in Winnipeg. I hope that is still considered the West. So it's always nice to come back to this part of the world and to feel the brisk air that you have offered me today. So thanks for giving us a short period of time. I'll be succinct as I can and then be ready for questions.

What I want to do today is just give you a couple minutes on who AECL [Atomic Energy of Canada Ltd.] is and something about our business, and then to tell you just where nuclear power stands in the world today and then to talk about the economic impacts. Used-fuel management is an issue that people always discuss around nuclear. And then I've got some thoughts in the end about why our company believes that Saskatchewan should have a serious consideration of nuclear to meet your future supply requirements.

First of all, AECL is a global nuclear technology company. We were established in 1952 by the Government of Canada and are a Crown corporation. We have more than 5,000 employees, mainly in Ontario — Chalk River and Mississauga. And as you may know, at one time we had up 150 employees here in Saskatoon. And our business is basically to design and market the CANDU reactor both in Canada and worldwide. We undertake research and development in support of that technology at our Chalk River facilities. We are responsible for managing the nuclear waste that we produce at our research reactor at Chalk River and also to providing nuclear waste management solutions for our customers. And as you surely know, we have been in the medical isotope production business for many years.

I'll start off with CANDU is a proud Canadian invention. On that slide, you'll see some of the other Canadian inventions over which we are very proud. The one on the left is the CANDU nuclear fuel bundle which is kind of the, sort of the symbol of what CANDU is all about.

Brief history of nuclear. Canada was the first country outside of the USA [United States of America] to achieve a nuclear chain reaction. This occurred in 1945 at Chalk River. Cancer therapy using gamma radiation from cobalt was invented in Canada — in fact, it was pioneered right here in Saskatchewan by Dr. Johns in 1951 — a history of which Saskatchewan should be very proud.

Ontario was the first province to turn to nuclear energy to achieve self-sufficiency. Our large hydroelectric plants were fully developed at Niagara. And rather than be dependent upon

coal imports from Pennsylvania, we turned to nuclear energy. We had nuclear uranium resources near the Elliot Lake area. So our first commercial power plant in Ontario was built and commissioned in 1971. Ultimately we constructed 20 nuclear power plants in Ontario, and it currently provides 50 per cent of the province's electricity. So nuclear is a well-established form of generation in the province of Ontario.

In addition, New Brunswick gets 30 per cent of its electricity from its single power plant at Point Lepreau.

Our industry is a $5 billion a year industry: 30,000 workers mainly in Ontario; 150 manufacturing companies and service companies that support both the domestic power plants operating in Ontario, Quebec, and New Brunswick, as well as those that we have exported.

You know that Saskatchewan is currently the world's largest exporter of uranium, although I understand that position may be challenged by Kazakhstan.

We have built 22 CANDU reactors in Canada and have exported 11 reactors around the world. This shows you where they are. I won't go into details, but you see plants are in Romania, South Korea, China. India and Pakistan also received early versions of the CANDU but subsequently developed their own technology. So we've been a successful international nuclear vendor.

What I want to show in this slide is to recognize just how important nuclear electricity generation is in various regions of the world. For example on the far left you'll see that France, because it does not have large hydroelectric resources or coal resources, generates 70 per cent of its electricity from nuclear energy. And it's a very successful program. Other notable countries: Ukraine, a country that I visited just last week, derives 48 per cent of its energy from nuclear. You'll see Germany at 27 per cent, and even the United States at 19 per cent. Canada is about 17 per cent. So the point is that nuclear is a proven, well-established technology that's basically an important part of the fabric of many countries.

But what does the future hold? You might have heard the term, the nuclear renaissance is happening. At the moment there are 440 nuclear plants operating worldwide. Another 30 are currently under construction, and around 200 plants are in various stages of planning — in particular China and India, who will rely heavily on nuclear power to support their rural electrification plus their modernization and industrialization programs. And that's a point that we should be very thankful of because if those two countries used coal to support their large population, that would have a serious impact on the carbon dioxide in the ozone. So those are two countries that thankfully are having a very aggressive nuclear program.

So I think I've just tipped the next slide. What is the driver for the renaissance? Well the number one driver for the renaissance is the recognition that man-made carbon dioxide emissions are a key driver towards climate change. Nuclear is one of the only large baseload forms of generation that does not produce greenhouse gases. For example the CANDU units in Canada annually save 90 million tonnes of greenhouse gas emissions. Now what does that really mean? That equates to about 18 million cars and trucks. So if we did not use the CANDU plants in Canada, you'd be adding the emissions of an additional 18 million cars and trucks, or 12 per cent of Canada's total. So that's having a big impact in Canada and other countries.

Here you see a comparison of the life cycle emissions of various types of generations. You see on the right-hand side, wind, hydro, and nuclear are very low. And by the full life cycle, I'm talking about the emissions that are created during the construction of the plant as well as its operation. Coal is among the highest, oil and natural gas somewhat lower. So this is a key impact of why people are looking seriously about nuclear around the world.

Another consideration is nuclear safety. We're all aware of what happened in Chernobyl in 1986. That had a serious impact, but that was partly due to some bad design at the time under the Soviet Union regime and some bad operator practices.

We're proud to say that nuclear is a very highly regulated industry. It's regulated in Canada by the Canadian Nuclear Safety Commission. Nuclear power plant design, equipment construction, and operator training must meet very, very stringent quality standards, and it's continually being reviewed in order for plants to maintain their operating licences. So I think generally the public now accepts that nuclear can operate safely in many jurisdictions with good regulation and good utility practices. In fact no member of the public in Canada has ever been harmed by radiation from a nuclear power plant or a waste storage facility. So I think we've won the public confidence on safety.

Basically I just wanted to say nuclear is just another way to boil water. What you see in this slide, the parts in blue is conventional turbine generators, a steam turbine driving a turbine generator that spins and produces electricity. The only difference between a coal plant and a nuclear plant is how you boil the water. In the coal plant in the bottom, you boil the water in a coal boiler, and in the nuclear plant you boil the water by creating a chain reaction which gives up its heat to a heavy water coolant and then it produces steam in a steam generator. So the mechanics of nuclear are fairly straightforward.

The key to nuclear, however, is the fact that the energy in uranium is extremely concentrated. For example one CANDU fuel bundle — and one bundle would stay in the reactor for a period of about 18 month — during its 18 months in the reactor, it produces as much energy or as much electricity as 400 tonnes of coal, 60,000 gallons of oil. So that gives you a perspective of nuclear as a concentrated form of energy, and therefore also is the only form of electricity generation that contains all of its waste. All of the waste products of the nuclear power plant are contained in that metal bundle.

So what do we do with it after it's been in the reactor for 18 months? Of course it's radioactive after its period in the reactor, and initially it's stored in a water-filled pool with water providing both cooling and shielding. So it's quite safe for that operator to stand above the pool. There's about 12 feet of water between him and the fuel bundles. So it'll stay in that pool at the reactor site for about 6 to 10 years. During that period of time, the heat generation and the radioactivity in that bundle

decreases significantly — for example it's 30 000 watts per bundle when it initially comes out of the reactor; and at 10 years, it's down to 5 watts.

[10:15]

Now to give you a perspective how much nuclear fuel waste there is in Canada, all of the waste from all of the plants in Ontario, New Brunswick, and Quebec could be stored in an area the size of a football field to a height of one player. So that gives you a feeling for, you're really talking about relatively small amounts of nuclear waste must be managed with high care, as opposed to the extremely large amounts that you would get from a coal plant.

And this sort of, I think, really drives that home. The radioactive decay of nuclear fuel can be shown graphically, as I've depicted. At the discharge, the analogy would be if it were a 50-storey building. By the time, let's say 10 years go by, the relative intensity of radiation and heat is down to about the thickness of a book. And in 1,000 years, it's down to the thickness of a credit card. So nuclear fuel does decay in terms of its energy level and its radioactivity, and that's what allows us to manage it safely in the long term because over time it does decrease quite significantly.

After the 6 to 10 years in the pools, the fuel can be transferred to a dry storage container where air and concrete provides the shielding. And those are the types of facilities that are used at our Whiteshell facility in Manitoba. The one in the upper right are the concrete bunkers that contain the used fuel at the Gentilly site in Quebec. Thus far all the nuclear fuel produced in Canadian reactors is contained at the reactor site.

In the longer term, the Canadian government created a law called the *Nuclear Waste Management Act*, and an organization was formed called the Nuclear Waste Management Organization to come up with a long-term plan. They released their plan in 2005. It was accepted by the federal government in July 2007. It calls for continued storage of all used nuclear fuel at the reactor sites in Canada for 30 years. Then it would be moved to a central storage facility where it would be maintained for another 30 years, during which time demonstration of geologic disposal would begin. And in the longer term, 60 years and beyond, the fuel would be emplaced in a geologic repository.

The rock formation chosen to host the nuclear waste facility in Canada is granite rock. This rock has proven to be very dry and stable, free of any earthquake activity for millions of years. That's the key to the siting decision. You'll see the Shield extends through a large part of Canada, and then mines would be excavated and the fuel would be placed in underground caverns. And that just shows you what it looks like. A site has yet to be selected, in fact the site selection process is just beginning now which would involve of course geologic investigations and public consultation. Ontario, as you can see, has a large Canadian Shield. Since that's where most of the radioactive waste is produced, it's probably a likely area for its ultimate management.

So just to give you an update on where nuclear stands in the rest of Canada — three minutes — Alberta as you may know, they appointed a three-person panel to prepare an expert report, and they've conducted public input to that decision through a web-based means.

Nuclear power. Bruce Power may well be looking at a site near Peace River to apply for a license to build a nuclear power plant, but it would wait for a government direction. Ontario recently suspended its procurement program for about 18 months. They have the luxury of doing so. Ontario has lost some demand through loss of some jobs and manufacturing jobs in the province of Ontario, so that is on hold, although I'm proud to say that AECL was the only vendor that submitted a compliant bid. And we do hope that we might be able to resume negotiations with the province in the future.

You're going to hear from SaskPower who'll tell you about their program. There's a requirement for them to replace about 2800 megawatts of fossil-fired generation. The province has aggressive greenhouse gas reduction programs. And we do believe . . . And we have spent some time providing information to SaskPower so that they hopefully will consider nuclear as one of the viable supply options to replace that aging generation.

The issues of course, safety and environment are top of mind. I think public understanding is key, and the only way you can achieve that is through a lot of communication; factual communication. I would encourage some community leaders to visit communities in Ontario and New Brunswick where they can appreciate what it's like having a nuclear power plant as a neighbour. You'll find extremely high support at the nuclear sites in Ontario.

The cost of power and its financing is going be key to the decision. More importantly, I think there's an industrial strategy for Saskatchewan to consider job creation and the creation of a CANDU industry in the province which could support not only its own nuclear power plants but participate in the exports of CANDU worldwide.

There's also an opportunity for a nuclear centre of excellence, likely right here in Saskatoon around the University of Saskatchewan that could support both a nuclear power plant and an isotope reactor and enable Saskatchewan to really move into the forefront of nuclear technology development.

You probably read this in the Bruce Power report: the economic impacts in the province of building say a two unit of 1000 megawatts each is quite significant in terms of direct employment and impact on GDP [gross domestic product]. There are spinoff benefits that were identified by the uranium development panel. One that AECL looks seriously at is the opportunity to produce hydrogen from electricity using what is called steam electrolysis.

We did submit a proposal to the Saskatchewan Research Council as well as the University of Saskatchewan and the Canadian Light Source to collaborate on a method of producing hydrogen from electricity. The hydrogen could then be used to upgrade bitumen from the oil sands resources in northwestern Saskatchewan. So we see this as a nice synergy between your uranium resource, which is abundant of course, and your newly developing oil sands industry. We're meeting with the

University of Saskatchewan people this afternoon to further discuss that collaboration.

AECL would like to partner with Saskatchewan nuclear industry to identify R & D [research and development] work that could be done here at Saskatchewan universities and would be pleased to co-operate on setting up a nuclear centre of excellence.

So this is my last slide, Tim. I think it is important that nuclear is well understood in the province. It's not an easy technology to understand. You can't get it in five-minute sound bites. People have to invest a little bit of energy in terms of understanding the technology — where it stands worldwide, the safety barriers it has implemented.

We hope that the decision in Saskatchewan is based upon sound analysis of options and their long-term impacts on the environment and the economy and should not be driven by some of the non-factual discussions that perhaps have taken place during some of the public hearings. The nuclear industry is about to embark on a major growth around the world. Saskatchewan is at a crossroads with an opportunity to play a much larger role in that expansion beyond the role that it currently plays.

AECL is Canada's nuclear company. We'd like to work with Saskatchewan and its creative leaders to help the province achieve its full potential in the nuclear field.

The Chair: — Well thank you very much for the presentation. I'm certain that there'll be many follow-up questions, so I think we'll get right to it. Mr. Weekes.

Mr. Weekes: — Thank you, Mr. Chair. Thank you very much for your presentation. Very interesting. Your wrap-up comments really speak to what I want to bring up about having the industry well understood, and I feel that for various reasons — Chernobyl and all the other reasons.

In North America at least, the nuclear industry hasn't done a great job of promoting itself over the last 30 years. And you know, we note that the public opinion polls show that the degree of comfort with the people of Saskatchewan and Canada — North America, quite frankly — is certainly increasing. But that's just my opening comment about promoting the industry and just the level of understanding that people need to have to be comfortable with nuclear.

I guess I want to go to the safety factor. I mean, some people will never accept anything that's said by experts or by you or your industry, but I just want to touch on kind of worst-case scenarios. We've heard, I believe in Japan, the nuclear reactor in an earthquake zone being damaged slightly. I don't think there was any radioactivity material released or anyone injured. But could you just comment on the worst-case scenario — a plane crashing into a nuclear reactor. What are the safety . . . What kind of assurances can you give about safety in these worst-case scenarios?

Mr. Oberth: — Well all nuclear plants, not only ours, are all designed to high earthquake levels. So in other words, depending on where you're going to site the nuclear plant, the design has to accommodate the worst-case . . . I think it's 1 in 1,000 year earthquake is the design level.

In terms of external impacts, 9/11 changed the world and it changed the nuclear world. So the new plants will all be designed with a containment structure, which is that concrete dome that surrounds the reactor, that can withstand a direct impact from an aircraft. So our industry, you know, as the threats change, our industry has evolved.

One of the reasons nuclear power is not an inexpensive option, from a capital cost point of view, is the multiple safety barriers that we build into our plants, the high quality that has to be put into all components to ensure their reliability. So I think the worst-case scenario is that a plant would shut down safely.

Three Mile Island is a good example where things went wrong. The operators made some errors, but all the safety systems worked perfectly and no member of the public at Three Mile Island was harmed. Some people look upon Three Mile Island as one of the finest hours for our industry because we showed that nuclear plants are designed with systems in place to accommodate malfunctions. Our safety record is second to none. I mean the only nuclear accident from a power plant that's harmed members of the public was the one in Chernobyl in 1986.

Mr. Weekes: — I may have a follow-up. Again, from presenters that we've heard in the last couple of weeks, we have presenters that just point-blank say that there's going to be contamination. You know, if the power plant's in my backyard it's going to affect peoples' children and grandchildren and just point-blank given as a fact that there is going to be reactivity given off from these plants. And storage is obviously the other big part of that. I guess you spoke to that, but it's a really grave concern to people that believe that there's going to be a reactor built in their backyard about the long-term safety. And I guess that's a hurdle that needs to be overcome. I guess if you could comment on that.

Mr. Oberth: — I wish we could take some buses and drive everybody to Kincardine. Kincardine-Port Elgin is a community around the eight nuclear power plants that Bruce Power operates in the province of Ontario. Both of those communities were disappointed when Ontario made a decision that the next nuclear plant would be at Darlington. They want to host the next nuclear plant. And it's not just because it brings wealth to the community, it's because those people in those communities live next to nuclear power plant workers. They probably at a barbecue ask questions about nuclear power plants, so those communities have learned to understand how nuclear plants operate, the multiple safety barriers, the professionalism of the people who run those power plants, the defence and depth in the design.

So, you know, we don't have the luxury of that much time unfortunately, but if we could take some people from local communities in Saskatchewan and have them visit Kincardine or Darlington or Point Lepreau and talk to people who have grown up next to nuclear power plants and are proud to have their children go to university, get educations in nuclear engineering and then come back and work at those power plants.

Mr. Weekes: — I would agree. That was my opening comments that your industry, you know I've said hasn't done a good job in the past going back a number of decades. And I believe that your industry needs to do that to educate and really improve the comfort level of people. Because it's obviously a concern when you think about nuclear weapons and Chernobyl, these things just keep rolling out the worst-case scenarios, and we all need to have a good understanding of the potential problems if a reactor is ever built. Thank you.

[10:30]

The Chair: — Mr. Taylor.

Mr. Taylor: — Thank you very much, and welcome to you, Ron. I appreciate your presentation today. A number of questions. I don't know if I'll get them all in in my five minutes, but maybe if there's a second round of questions, I'll get to all of them. Try to be as relevant as possible here, but I am a little bit concerned, coming back to Randy's questions here.

Your comments in your slide referred to irrational fear of people, and you talked about those who appeared during our Uranium Development Partnership. I've attended a lot of the Uranium Development Partnership meetings. I've sat through almost all of this committee's hearing. We've heard from very highly educated, well-respected people within the community of Saskatchewan who have come to express desire for Saskatchewan not to ignore a wide mix of energy options and to review the entire need for the province of Saskatchewan's future energy needs. And some of those highly educated, well-respected individuals have said Saskatchewan's need for the immediate future does not include nuclear and should not include nuclear. Do you believe that those individuals are irrational?

Mr. Oberth: — No, not at all.

Mr. Taylor: — All right. I wanted to clarify that. Thank you. Secondly, you indicated in your remarks that AECL have supplied SaskPower with information to help. Was this information solicited by SaskPower, or was it provided in an unsolicited manner?

Mr. Oberth: — Solicited.

Mr. Taylor: — SaskPower came to AECL . . .

Mr. Oberth: — Yes.

Mr. Taylor: — To ask for this information.

Mr. Oberth: — To improve their knowledge of nuclear so they could improve their planning.

Mr. Taylor: — Okay. Thank you very much. AECL was quite active in research work at Whiteshell, Manitoba.

Mr. Oberth: — Yes.

Mr. Taylor: — Is that correct?

Mr. Oberth: — That's right.

Mr. Taylor: — Can you tell us quickly what has happened with the expenditure of funds and what the future of Whiteshell is, please.

Mr. Oberth: — Well Whiteshell has largely stopped its major role, which was to be the home of the underground research laboratory. So that has been closed and has now been decommissioned. It was researching, completed its mission to test the underground disposal of nuclear fuel in granite rock. The site has been largely decommissioned. But there will always be people at Whiteshell conducting some experiments to support the nuclear power plants, and also to continue to oversee some of the nuclear waste that's stored at Whiteshell.

Mr. Taylor: — Just to follow that up though, but for all intents and purposes, the original purpose of Whiteshell, to become a repository — as you say, decommissioned — the people at Whiteshell can no longer expect any long-term activity there.

Mr. Oberth: — If I may respectfully make a correction, there was never an intent that Whiteshell would be the site for a long-term waste disposal facility. It was designed to test the concept, although waste was never inserted in the underground laboratory. We used simulated waste forms in terms of heat generation to determine how it would behave underground. Whiteshell was never a destination for long-term waste. It was a research to test the concept.

The original mission of Whiteshell was to develop an organic-cooled CANDU reactor, and that mission was cancelled, I believe, sometime in the '60s when we decided to go with the current design.

Mr. Taylor: — Okay. And then one last question in what I hope is just my first round. You said you've been in the medical isotope business for years. We all know through the media the story of Chalk River. Can you tell us what the problem at Chalk River is as quickly as you can, how we got there and how we're going to get out of this?

Mr. Oberth: — Well NRU [national research universal] reactor is 55 years old, and it's done excellent service through its lifetime. And recently we detected some corrosion in the bottom of the reactor which caused, you know, a minor leak that had to be corrected. We are working now around the clock to fix that problem, and the latest information I have is that we should have that reactor back up and running in the first quarter of 2010. But in the long term it will have to be decommissioned and replaced with another isotope production reactor, perhaps here in the province of Saskatchewan, because I know you have submitted a proposal to do such.

The Chair: — Mr. D'Autremont.

Mr. D'Autremont: — Thank you. I was very interested in Mr. Taylor's question about SaskPower. When did AECL first have talks with SaskPower? Because I know as a new government we came in, we found that SaskPower already had studies and plans for nuclear power on the books. So when did AECL first talk with SaskPower?

Mr. Oberth: — We've had discussions with SaskPower; some of the earlier ones were as far back as 2005. We provided more information to them in 2007 and 2008. The intent was never because they had made any decisions to go forward. They simply wanted to understand the options. So before they could make rational decisions or recommend to the government which way to go, I think they needed to increase their understanding of the nuclear option, and our discussions with them were simply to help them understand the nuclear option.

Mr. D'Autremont: — Okay, thank you. So those discussions took place both then under the former NDP [New Democratic Party] government and under the current government.

Yesterday one of the presenters suggested to us that there was no longer a need for baseload, and you mention in your presentation that nuclear power is a baseload. Would you agree that there is no longer a need for baseload?

Mr. Oberth: — In Saskatchewan?

Mr. D'Autremont: — Well in Saskatchewan, but I'm assuming from his discussion that it would be anyplace.

Mr. Oberth: — Well I would disagree with that. Countries like India and China have huge demand for baseload generation. You know, there are 50,000 villages in India that have no electricity. I think those people aspire to the kind of lifestyle that we have in North America. In order to achieve that, they're going to require electricity around the clock, so you know, depending on the regime the amount of baseload generation you need will vary, but yes, there certainly is demand for baseload generation.

Mr. D'Autremont: — Okay, thank you. One of the other issues that is continually raised, particularly concerning nuclear power plants, is cost overruns. When I first went into government, on the government side of the House, I asked my officials about cost overruns and they said they had never had any cost overruns. When the budgets, the cost of building a project looked like it was going to exceed the budget, they simply expanded the budget, so it never exceeded the budget. Do you have any knowledge of any energy projects that exceeded the original budget estimates?

Mr. Oberth: — Well I can't cite the names but I think there've been a good number of major developments in the oil sands industry where budgets have been exceeded.

In your written presentation is a list of five CANDU projects in China, in Korea, that were managed by AECL, which all came in on budget and on schedule, but there are examples of many large industrial projects that have gone over. And this can happen if project management systems are not applied effectively, and it can also happen in a time when there's escalating labour prices.

As you may know, the economy in northern Alberta heated up such that you can make $25 an hour at a fast food restaurant. So you know, when those projects were originally planned and estimated, it was probably using a labour rate that was closer to traditional rates. Then suddenly those labour rates go up, and contractors have to pay more for labour. So there are factors that can make a project go over. And it's not unique to nuclear.

Mr. D'Autremont: — Thank you. You mention that the possibility for a nuclear plant in Saskatchewan or even here in Saskatoon. I think it came as a surprise to a lot of people that there has been a nuclear plant here in Saskatoon since the 1970s at the university.

You mention India and China and the growth there. I believe China's bringing a new coal-fired plant online approximately every week. CO_2 is obviously a large issue. What kind of cost factors is carbon going to have on energy production? And/or what kind of a cost to the world if nothing is done about it?

Mr. Oberth: — Well I've heard a number of experts talk about the real cost of carbon. I've heard numbers ranging from $25 a tonne to a recent European study — I think 2008 — talked about $100 a tonne. How you measure the long-term impact on the planet of continued carbon production, I mean, I can't put a dollar value on that. But there are various agencies that are attempting to put a price tag on carbon. And that has to be factored into your power planning decision. So whatever is decided will be based upon, hopefully, some rational judgment. Like I can't comment on what the right number should be.

The Chair: — Mr. Taylor, did you want to get in for a second round?

Mr. Taylor: — Oh sure. I'm ready for some more questions. Thank you very much.

I do want to just ask some more questions about cost. Quickly back to your slides. Early in the presentation when you were just providing us with a review of the nuclear renaissance, you indicated 30 power plants under construction, 200 plants planned or proposed. I'm assuming one of the 30 nuclear plants is the one in Finland that everybody talks about cost overruns, significant problems. One of the arguments of course is new technology. You don't know really what it's going to cost until you start working. But that means there's 29 other nuclear power plants under construction that we don't hear about every day. Can you give us some idea of how those plants are proceeding from a financial perspective? Are they coming in based on their original budget calculations?

Mr. Oberth: — I think your remark, Mr. Taylor, is accurate. You only hear about things when they go badly. The reason the Finland project is getting so much publicity, both in the nuclear trade publications and beyond that, is because it has been a less than successful project which hurts the entire industry. And I think a number of factors there is that it's a first-of-a-kind technology. Some of the companies that were asked to pour concrete and provide materials, you know, hadn't been in the nuclear business before and therefore stumbled in terms of their initial supply of concrete to meet high requirements.

Typically you don't hear about projects that are well managed. I don't have the facts to say the other plants are going well. All I know is that Finland is going badly and we hear about it because it is going badly, but some of the projects in China and Korea, as far as I know, are going according to plan. But I can't provide you with any more detail.

Mr. Taylor: — That having been said, Korea, China, are not well known either for their disclosures. You know, for what it matters, in China will we ever know what it costs to build a plant?

Mr. Oberth: — Well in the presentation, the written presentation, is we provide information on the cost of the two power plants that we built in China. And we're the cheapest of all the power plants that were constructed in China. I believe it was about $1,738 per kilowatt installed. So that information was disclosed and it's in your written material.

So we're very proud of that project. It was well managed. We had a very good local labour force who were committed to making that project a success.

Mr. Taylor: — One of the ongoing challenges that Saskatchewan has in taking a look at our future energy needs is to get a good handle on cost comparisons to ensure that if we are saying to the Saskatchewan people, what you get for your dollar invested is X, Y, and Z. To date, we don't have a clear understanding of what 10 years from now or 15 years from now, the actual costs of putting a nuclear power plant in the ground are going to be to the Saskatchewan people. And even the feasibility study from Bruce Power to the Saskatchewan people did not indicate at all what the potential costs to the Saskatchewan people are of the power that will be produced. In other words, we don't have any idea, if SaskPower is going to distribute this power, at what costs do we have to purchase it first and foremost.

[10:45]

So we don't know what the costs of putting it in the ground are going to be and we don't know what the costs of producing that power are going to be. How can, with those two major uncertainties, how can we make a recommendation to proceed when a lot of the costs around many of the alternatives are more certain?

Mr. Oberth: — Those are the first questions that need to be answered. In our discussions with SaskPower they obviously wanted to understand the capital costs of nuclear power plants, the operating costs, and so they could run some of their long-term calculations. It depends on the cost of capital because nuclear plants are very intensive. It also depends upon, I guess, the rates of salary that you'd be paying your plant operators. But those numbers can be made available. They're a forecast, of course, but I think we can make some fairly reliable forecasts.

The Ontario government, in their procurement process, requested that information and before any nuclear power plants are built, a vendor is asked to submit a commercial proposal. We're not at that commercial proposal stage. All we can do is provide some estimates and I suspect SaskPower, when they appear before you, will give you their estimates based upon information that they have acquired from various sources as to what the cost of power from a nuclear plant might be compared to other sources.

And I think I should also add that when we calculate the long-term costs of nuclear power, we include in that cost the cost of managing the waste in the long term as well as the cost of ultimately decommissioning the plant. We're one of the few industries that actually factors into the price of its product the cost of its long-term disposal and management of any waste products.

Mr. Taylor: — If I could ask one more question along that line. That was where I was going next actually, was what is that sort of percentage, in a percentage term, of the price of sale that comes back for decommissioning? And what do you mean specifically by decommissioning for the dollar that's brought forward? In other words, we all know the plant at some point in the future must be decommissioned.

Mr. Oberth: — Yes.

Mr. Taylor: — The public has little knowledge about the dollar value of what that will be. We're talking 40 years down the road?

Mr. Oberth: — At least.

Mr. Taylor: — So what dollars are being put away currently in Ontario, for example? And what can we in Saskatchewan expect that would have to be put away, from each dollar of kilowatt hour produced, goes to decommissioning? And I guess the final thing is, is the dollar value that's destined to be put away going to be enough to cover the costs of decommissioning?

Mr. Oberth: — Well there is a law that requires . . .

A Member: — Somebody's BlackBerry is going off.

Mr. Oberth: — That requires Ontario Power Generation — I hope it's not mine — that requires Ontario Power Generation set aside funds. And the way it's done is that AECL has made an estimate of what a cost of a long-term fuel repository would be, what the cost to transport fuel to that facility would be. And then you bring it forward because that facility would be starting up 30 years, 60 years from now. So what works in the favour is the value of money. So you have to put aside every year a certain amount of money and it's in a segregated fund, such that when it comes time to decommission the power plant and move the fuel to a repository, the funds are available.

I do know that it's a relatively small percentage of the electricity that I pay in Ontario goes to that fund. The actual amount, I don't have that figure now, but I can guess it's less than about 1 per cent of the total cost of electricity. It's a relatively small number. But I can get that number for the committee.

Mr. Taylor: — I would like that information, if you can provide it to the committee. But more importantly, your opinion or your knowledge as to whether the funds that are being collected will in fact cover the costs of decommissioning or will the provincial government, on behalf of the taxpayers of the province, have to subsidize that or top that up when the day comes to pour the cement over the plant?

Mr. Oberth: — Well the calculations and the estimates suggest that the amount that's being collected will be adequate. That's how the rate was set. And I can't say more than the financial

experts do the calculations, run models, and they set the rate. And that rate's reviewed by a committee in Ontario to make sure it's adequate. So there is oversight. It's not just simply some experts in a room making those calculations. There's oversight.

The Chair: — Mr. Bradshaw.

Mr. Bradshaw: — Yes. Thank you for your presentation, Ron. I've just got a couple of questions here. One, we keep on talking on large-scale reactors. You know it's always 1000 megawatt, be whatever. What are the logistics of several smaller reactors or is that not feasible when you're putting up a nuclear reactor? Is it too costly to do it that way or what would be, you know, something like say a . . .

Mr. Oberth: — In the early '90s, the AECL team here in Saskatoon was designing a 450-megawatt CANDU plant that would have been ideal for the grid at the time. When the decision was made to stop that project, we stopped working on that smaller plant. So we have two plants that are . . . And that's described in your handout. The CANDU 6 produces about 700 megawatts of electricity and the newer, larger ACR-1000 [advanced CANDU reactor] is around 1100.

Technically there's no reason why you couldn't design a power plant that's in the 300- or 200-megawatt range, but you're harmed by the economies of scale that once you put up the infrastructure and you go through the site licensing process and train operators, it doesn't take many more operators to operate a 1000-megawatt reactor as it does to operate a 500-megawatt reactor. So the economies of scale and the costs of infrastructure and the costs of licensing and setting up the organization make it more practical and more economic to go somewhat larger.

But there is a lot of recent interest, especially in the US [United States], in smaller reactors, and a couple of vendors are now looking at designing plants that could be in the 200- and 300-megawatt range and could be modular, and may be shipped to a site with more fabrication done at the factory and less done in the field.

Mr. Bradshaw: — Okay. Well thank you. I have another question here and it goes back to your slides and when you were showing your carbon footprint, and you had nuclear less than wind. Why would it be that way?

Mr. Oberth: — According to that study — it was an IEA [International Energy Agency] study — wind, as you may know, operates at about 30 per cent efficiency so when you factor in the cost of manufacturing the wind turbines and calculate the footprint of all the materials that need to go into a wind plant, and compare that with the full footprint of all the materials and the construction that goes into a nuclear plant and balance that against the output, the calculations seem to show that nuclear is around the same or a little less than wind.

Now I'm not arguing that the wind is a bad thing and that nuclear is better than wind in terms of carbon footprint. I'm just showing that nuclear is one of those forms of generation, along with wind and solar and hydro, that has a relatively low carbon footprint. That was the point of that slide, that they're all in that same low-impact category.

Mr. Bradshaw: — Okay. Also in that slide though, did that include the mining of the uranium also?

Mr. Oberth: — Yes.

Mr. Bradshaw: — It did.

Mr. Oberth: — It's a full life cycle.

Mr. Bradshaw: — It's a full life cycle.

Mr. Oberth: — Yes.

Mr. Bradshaw: — Okay. Thank you. That was all the questions I had.

The Chair: — We're within one minute of our time so I'm going to give Mr. Wotherspoon a quick question.

Mr. Wotherspoon: — So we've heard about the issues around smaller nuclear reactors, economies of scale. We've heard concerns with regard to our grid with, I guess, proposals that relate to 1000-megawatt plants and really how that fits in and in fact concerns that it might fit in very poorly to serving Saskatchewan's power needs. So I guess, without presupposing power need growth beyond what SaskPower has already, could you speak to how two reactors, as Bruce Power has put forward, is apparently the right fit for Saskatchewan's grid?

Mr. Oberth: — Well I can't comment on as it's the right fit, but as I understand it, some grid upgrades would be required and that those upgrades would have to be costed and added to the full cost of the option.

You can take an example in New Brunswick. It's a very, very small grid, but it was able to support a 700-megawatt power plant because it has very good interconnections with neighbouring jurisdictions.

The issue is that if your largest plant is, say, 1000 megawatts and it trips off the grid, then you've got to suddenly replace that power and you've got to have spinning reserve or strong interconnections. And I understand the Saskatchewan grid isn't as well interconnected as some other grids and that in order to sustain, in order to have the 1000-megawatt plant on the grid, some stronger interconnection would be required with neighbouring jurisdictions.

The Chair: — Well I think that takes us to our time. I would like to thank the presenter for the presentation and questions. I would also like to say we have run over our time and in courtesy to our next presenter, I know that many of the members like to talk to our presenters afterwards. If we could do that off to the side so our next presenter could set up, that would be terrific. So thank you again for your presentations.

Mr. Oberth: — I have undertaken to provide numbers to the committee on what percentage of the total nuclear cost relates to the provision for long-term spent fuel management and decommissioning.

The Chair: — Thank you again. The committee will now recess momentarily while the next presenter gets prepared.

[The committee recessed for a period of time.]

[11:00]

The Chair: — Before we hear from our next witness, I would like to advise the witnesses of the process for presentations. I'll be asking all witnesses to introduce themselves. Please state your name and, if applicable, your position with the organization you represent. If you have a written submission, please advise that you would like to table your submission. Once this occurs, your submission will be available to the public. Electronic copies of tabled submissions will be available on the committee's website.

The committee is asking all submissions to be in answer to the following question. This question is: how should the government best meet the growing energy needs of the province in a manner that is safe, reliable, and environmentally sustainable while meeting all current and expected federal environmental standards and regulations, and maintaining a focus on affordability for Saskatchewan residents today and into the future?

Each presentation should be limited to 15 minutes, with questions to follow. Once your presentation is complete, the committee members may have questions for you. I will direct the questions and recognize each member that is to speak. Members are not permitted to engage witnesses in any debate, and witnesses are not permitted to ask questions of committee members.

I would also like to remind witnesses that any written submissions pertaining to the committee will become a public document and will be posted to the committee's website for public viewing.

And with that, I would ask our presenter to take the floor. Thank you very much.

Presenter: Cathy Holtslander

Ms. Holtslander: — Thank you very much. My name is Cathy Holtslander. I'm here speaking as a private citizen. I'm not representing any organization, but I'm somebody who has taken a strong interest in Saskatchewan all my life — it's where I grew up — and I'm very dedicated to this province and our future. And I really thank you all for participating in this committee and being willing to listen to people talk about what our vision is for the future of Saskatchewan's energy.

So I have a PowerPoint presentation here. This first slide is basically what I'm going to be talking about. I will be addressing the question, and these are just the areas I'll be covering as we go forward.

So speaking of the energy context that we're in, right now we're aware of peak oil, which is that the amount of oil that is available and easy to get at, is either at its highest point right now or is already diminishing. And so we have to realize that that's part of our picture. So we have to reduce our reliance on oil, and we can expect the price of oil and fossil fuels to rise.

We're also in the context of climate change. And these are just some figures from the Intergovernmental Panel on Climate Change report from 2007 which is very authoritative. And it shows rising temperatures, rising sea levels, and reduced snow cover — just a few indicators that we are in a climate change situation, and also that Saskatchewan is not immune to climate change. Some people like to say, well if we've got climate change, why was the winter so cold and how come we didn't have summer? And I don't like that. But it's the instability and the unpredictability, and that's something that Saskatchewan is particularly vulnerable to, partly because of the importance of agriculture in our economy. So it is definitely a serious problem that is something that Saskatchewan needs to deal with and face.

And this slide is just talking about how big a deal climate change is. There's so many different things it affects. It really affects everything: biological systems, culture, society, economy. It's all interconnected. And the climate is an important part of how things work in our world, and when it's unstable it creates uncertainty in many ways.

Another context specifically to Saskatchewan is the uranium development report that came out in April and was discussed at the Perrins consultations on the report. The UDP recommended nuclear development, but when the public consultations on this report happened, it was clear there was strong public opposition to nuclear development, and that is something that was included in Perrins report. And another aspect of the UDP report is that it did not disclose the full cost of nuclear power such as grid changes, decommissioning, and waste management.

So I'm going to focus on renewable energy. And one of the things that's really exciting about renewable energy is how it is becoming a priority in other jurisdictions. This is from the Government of Ontario's program. Ontario has a green energy law, and one of the features of that is the feed-in tariff, which means that people and companies can set up renewable energy projects and they get a guaranteed price. They can sell it to the grid. Here in Saskatchewan we have a pilot project on net metering, which means that people can produce their own power, but feed-in is actually one where people can provide power to the grid. So that's a feature of the Ontario program.

Nova Scotia is embarking on a renewable energy strategy and they are looking to have 20 per cent of their electricity from renewable by 2013. And they're focusing a lot on wind energy.

Germany I'm sure you've heard lots about. Germany is a real leader in Europe on renewable energy. One of the things that they're doing is trying to shift people to using renewable heat. We're mostly dealing with electricity in this set of hearings, but some electricity is being used for heat. If we're using renewables for heat, then we're saving that electricity for other purposes. So this is just a little bit about what Germany is doing to shift that energy to renewables.

Sweden is doing a lot with renewables too. And I thought this was interesting because Uppsala is a city about the size of Saskatoon and it's farther north than Saskatoon, and it is 100 per cent renewable. So if Uppsala can do it in the cold and dark

of northern Sweden, probably Saskatoon can do it too. And it's a good model for us to look at.

Spain is another country in Europe that maybe we haven't heard so much about. But Spain is really big on renewables and is the second biggest solar producer in the world, I think. And in the course of just one year, they installed 2600 megawatts of solar using a subsidy and a feed-in tariff model. So this is really quite a remarkable increase in renewable energy capacity and actually is more than what Saskatchewan needs for their whole grid.

Scotland has a renewable energy policy and goal. And this page is talking about their goal is to have 50 per cent renewable by 2020 and 31 per cent by 2011. And they actually believe they can be 100 per cent renewable, I think it's by 2050. So Scotland is another country that's, you know, farther north and, you know, colder and cloudier than Saskatchewan, but they're really proceeding with a renewable energy program.

And the United States, our closest neighbour and biggest trading partner, is very much into renewable energy. And I'll just read you this quote from President Obama that was just a few months ago, March 19, 2009. He said:

> So we have a choice to make. We can remain one of the world's leading importers of foreign oil, or we can make the investments that would allow us to become the world's leading exporter of renewable energy. We can let climate change continue to go unchecked, or we can help stop it. We can let the jobs of tomorrow be created abroad, or we can create those jobs right here in America and lay the foundation for lasting prosperity.

Well if the United States can do it, maybe we can do it too.

So now I'd like to turn to the concept of demand. One of the aspects of the question that you're looking at is, how does Saskatchewan meet its growing demand for energy? Now I think we can break this down in a couple of ways. One is, are we using electricity for things that could be better met by other forms of energy? And I think there's a lot more potential for cogeneration than is currently being used, and there's ways to encourage that and use some of the heat that is being produced in industrial processes and also use that to make electricity.

And then the other side of it is electricity being used for something like space heating just doesn't make sense because electricity is something that's a very fine form of energy; it's a very special form of energy. When you think you can run computers with electricity, it can do such amazing, detailed work. Just heating up space is something that a very less sophisticated form of energy can do, such as passive solar or, you know, burning wood in wood stoves and so on.

And so we should focus the use of electricity on the things that electricity does best and look for other types of energy for things like space heating. And there is some interesting things that can be done, like district heating for housing, heating using industrial waste heat, and things like that. So I think some of the demand for electricity may be because we're using electricity for things it shouldn't be used for.

One thing that just . . . I used to live in the North, in northern Saskatchewan, and I was surprised to see that some of the social housing units that were built in the northern communities were using electric baseboard heating in communities that are surrounded by wood. And this was generated by diesel generators — very expensive and very inefficient form of heating, and very hard on people that were low-income and had to pay those heating bills.

And then I'd like to go to how demand is predicted. And I think there's some issues. I read SaskPower's presentation and, if we're going with their figures, I think we have to investigate them a little bit, about how SaskPower collected the data, who they asked, what assumptions they made, and that SaskPower is a company that wants to sell electricity. The way they become important and powerful, feel good about themselves is by, you know, selling a lot of electricity. So it's kind of their deal to say that they need more energy or that they need to provide more energy. So we need to kind of investigate that and be critical of the demand projection that they've provided.

[11:15]

They did say that they asked, when they tried to figure out how much demand was going to be needed, they asked their biggest customers. And one of the things I found quite interesting was that 35 customers account for 45 per cent of the energy used in the province. Now that is pretty incredible. I mean I can do all of the energy conservation possible; I can turn my lights off and use a little flashlight for lighting and, you know, that kind of thing. I'm not going to make much of a dent in the electricity demand, but these 35 big customers, I think we really need to focus on them.

And then when you look at SaskPower asking their customers to predict their own growth, generally a company is not going to say well, you know, we're kind of thinking it's going to be flat or, you know, we're not going to grow that much. Companies will say hey, we're great, we're doing really well, all our projections are for growth and expansion. And that can get us into trouble and unfortunately that's what happened with the potash industry. Projections that they had were overly optimistic. So I think we need to be careful about how we interpret the numbers that SaskPower was given by their big customers.

And there's all sorts of things that can affect the amount of growth and the amount of energy needed. You can have growth in the economy without actually increasing energy requirements, and this can be achieved through policy and technology. And that's what we've seen in a lot of countries in Europe.

And then another thing that SaskPower said in their presentation was that they expect a yearly increase of 110 megawatts. Well they also said that demand fluctuates from 500 megawatts to 1000 megawatts a day, and so when you look at 110 megawatts is 10 to 20 per cent of current demand. Now to add 10 to 20 per cent of current demand every year — and they said that's equivalent to 110,000 households — we're not having that kind of population growth in Saskatchewan. You know, we're having population growth but it's not at 100,000 households a year, and each household will be, you know, two to three people. So I think that's a rather large . . . I think that

estimate is too high. So I think in terms of meeting our demand we have to look at what is a realistic demand, and also how do we shape demand so that we're not building excess capacity which would be an expensive overbuild.

So moving right into conservation as a form of investment, you've probably heard the term negawatts. Negawatts are conservation. If you can save energy by conservation, that means you don't have to build. So the benefit of conservation should be considered as an investment, and that should be counted. And demand management can shift peaks so that you can use capacity more effectively by using more electricity in the downtimes and less electricity in the peak times. And there are lots of interesting techniques for doing that through technology and through education and policy.

And I think another really big one is the rate structure. SaskPower says the more you use, the cheaper it costs. Well that's not really helping with conservation. If the more you use, the more it costs, then these big customers — these 35 big customers — it'll be worth their while to invest in the kind of innovation and technology that will allow them to conserve energy. And that will probably save them money and probably make them into a more competitive company, as well as helping our whole province reduce the need for added capacity.

Okay. So I guess I'd better hurry up. Nuclear power has been offered as a possibility for a generation. There's a lot of issues with that. I'm not really going to go into them. I'm sure you've heard this from other people. But one of the things that concerns me most about nuclear power is the high cost. The cost is going to require debt. It's going to require interest payments, and it's not going to be paid off by this generation. So we're talking about an intergenerational debt that we may be leaving something to pay for, including the cost of waste and so on to future generations that won't have a chance to use the electricity itself. So to me that's a big issue of justice, is creating an intergenerational debt.

With renewable energy, there's a lot of positives to it, and I guess you've heard a lot about this from other presenters as well. I've read about that in the media.

The things that I'd like to focus on are that renewable energy is a really good way to have rural economic development and create jobs across the whole province. I think it's an issue in Saskatchewan that we've got a lot of economic activity concentrated in the cities. And the rural areas, you know, sometimes they suffer quite a bit because there's not as much opportunity there, or it's changing because of changes in things like the way agriculture is done. So I think renewable energy can be a real positive solution for economy.

This is a quotation from Scotland talking about the advantages of, or defining distributed energy, which is energy that is produced in many different places rather than in one centralized place. And this is a key part of the Scottish plan and it has benefits by allowing . . . One of the really neat things, I think, is it allows people to become producers and make an active contribution to energy and climate goals. So it's not just people can contribute by conserving, but they can actually contribute by producing. And I think that's a really neat thing for Saskatchewan people.

And I was thinking, solar panels — you could think of it as a new kind of combine. Crops turn solar energy into food and fibre, but risks from the weather and input costs and market fluctuations affect a farmer's income. And sometimes the combine's sitting in the yard because there's snow on the ground and the crop's in the field, and that's a pretty stressful situation. Solar panels, they harvest sunlight all year long and they turn it into energy that can be used for lots of interesting purposes. And so with the help of the government and SaskPower, solar panels can be used in rural areas to generate wealth and build communities.

And then I think we can think of www, like weave a web of wind. So that wind, if we spread it all around the province, it will be a more reliable resource for energy. And redundancy and diversity mean that you're going to have more resilience and flexibility and stability. So those are some of the advantages of wind.

And then green jobs is really, really a key thing too because when you invest in renewable energy, it's highly labour-intensive. There's lots of work to be done. And so we can create lots of jobs. And this picture there is from a study done in Alberta that said the potential for creating green jobs is huge. And that's a really important aspect of renewable energy.

So here's what I think are some of the roles that government can take: setting targets and timelines for implementation; set minimum standards for conservation; establish principles to guide renewable energy development; eliminate perverse incentives; support research and development in conservation and renewable technology; enable community-based energy co-operatives; and really, I think, really important is reward SaskPower for selling less electricity.

And then SaskPower's role: invest in megawatts first; design a rate structure to promote conservation; become an energy consultant; implement a smart grid mechanism; and I'd say graduate from net metering to feed-in tariff. You know, we've got grade 8; let's go for grade 12. Invest profits in renewable energy implementation; and learn from others' successes and build on Saskatchewan's strength.

And at the university I think we can create a centre of excellence for renewable energy; the UDP . . . Yes, I've just got two more slides. I'll wind it up real quick. UDP said that there's a shortage of people interested in nuclear careers, but there is a lot of young people that are interested in environmentally friendly energy careers. So I think we would be able to attract lots of students and lots of researchers to a renewable energy centre of excellence.

And so I'd say the next steps are that we need a fully funded, independent study to guide renewable energy for Saskatchewan. We need SaskPower to focus on conservation and demand management, pending the results of this study. And I'd really like to see tours by key personnel from the government and SaskPower and the university to go to the places where they're really implementing renewable energy policy and strategy, and learn from these other jurisdictions. So thanks very much.

The Chair: — Well thank you for your presentation. I apologize for speeding you through it but I know that many of

my colleagues will have questions for it.

Ms. Holtslander: — It's good to have discussion too.

The Chair: — But you'd said off the top you weren't representing any group in particular yourself, but I appreciate it and I think that's very valuable. As politicians we are always asking, are people in the public, you know, what do you think on this issue? So to have you who have an interest in this to come and bring it forward, I just wanted to thank you personally for that.

I'm going to just lead off with a couple questions. We had a presenter yesterday and someone last week that made a couple comments about . . . And I think everybody shares your point of view that any electricity we don't have to produce is by far the cheapest electricity we can bring on to our system by not having to bring it on. SaskPower has recently asked Manitoba Hydro to come in and look at what they can do to mitigate some of their increases. There's been debate on if it's enough or not.

But I guess going back to what we heard yesterday from a presenter and someone last week, was if we do everything right and if carbon is a major issue and we start moving to kind of out-of-the-box technologies, you know, electric trains, electric public transit, the electric car ultimately, and maybe the electric car feeds into the storage system, but if we make that next step — and there's those that say we will — we could be looking at replacing gasoline with electricity. Our capacity needs, even if we do mitigate as much as possible, could be 30, 40, 50 per cent higher than they currently are and that might be the most environmentally sustainable way to move forward. Do you see a future that could be utilizing electric public transit and some of those technologies?

Ms. Holtslander: — That's a possibility definitely, and I think they can be integrated into a renewable system as well. One of the interesting things about the electric cars is that people have proposed that the batteries in electric cars be used for a mobile storage like a distributed storage system and I think that's a pretty neat possibility. I don't know if electric trains could do that as well, but the potential for renewable energy is huge. It's a matter of installing the equipment to do it. The fuel costs are free and, you know, they're predictable. So I think it would be feasible to do more development using electrical stuff and use renewable energy. I think they could go hand in hand.

The Chair: — Yes. I think that looking at these technologies like using the mobile storage and batteries in cars, you start looking outside the box, there's some pretty neat stuff that have that kind of common sense element to it as well. I'm sure there's a lot of things that need to come into play before that.

Ms. Holtslander: — Another aspect of like in terms of using electric cars, it's also maybe we can combine that sort of thing with urban planning that makes our cities more walkable, more cyclable, and so that we're actually using more active transportation which improves health and social, you know, the social quality of life. So there's kind of a conservation element in terms of the electric car thing as well.

[11:30]

The Chair: — My last question here is, you commented about feed-in tariffs. And I have a sheet of what Ontario has done and some fairly aggressive things to encourage renewables. And I'm going to take the biggest example is solar PV [photovoltaic]. They have one category where people can get up to 80 cents per kilowatt for a feed-in tariff. In Saskatchewan my bill is about 10 cents now. You know, there's everything from 19 to 44 in there.

But, you know, as we bring more of this type of renewable on, the people of Saskatchewan I'm sure are expecting that costs of electricity will go up. You — who's a citizen here in Saskatchewan and I think has interest and concern — do you have a ballpark? Where do you think that balance is met? Where, as a consumer and a person who's concerned about our environment, what do you think is a reasonable position? How much will the people of Saskatchewan be willing to pay for the electricity knowing that we're making . . .

Ms. Holtslander: — I think there's an interesting balance of benefit. If we have good income levels and full employment — especially in First Nations and rural areas where we've seen more, you know, economic hardship — if a new sunrise industry like renewable energy can involve people in these parts of the province and these communities, you're going to have a better income structure in Saskatchewan. People will have more money to pay for things. And so if there's a rise in the cost of electricity, it's not going to be an undue hardship or an unfair burden on any group.

And also the costs of not investing in renewable energy where you have the climate uncertainty and the kinds of things that we've got with wild temperature swings — potential for crop failures and that sort of thing — that there's so many outcomes of climate change that need to be dealt with, and those costs are usually borne by the weakest people.

So I think it's a good thing to move to a more renewable type of energy and higher employment, more dispersed economic activity. And that makes the cost distributed more fairly and also adds to the economy in a good way.

The Chair: — Mr. Taylor.

Mr. Taylor: — Thank you very much. And thank you very much, Cathy, for your presentation today. It's obvious from your presentation that this is very important to you and the future of Saskatchewan is very important to you. And I think you do represent the feelings of a lot of people out there in our province.

That having been said, I just want to test your opinion on a couple of things. Because one of the arguments you make is an argument that's been presented to us in other ways before, and sort of the idea of the district and creating heating capacity and generation in smaller units. Your history in the North is probably useful to this question. But do you think Saskatchewan people have enough confidence in themselves and their community to move to a more district approach? Or are we a more centralized province and expect that power and heat and all of that will come from a more centralized source and less local?

Ms. Holtslander: — Well I get the sense that people do like

being involved in and looking after themselves. I think that it gives people a sense of pride and a sense of commitment and involvement in their own community and control over their own lives when they're part of something like that, rather than just looking at themselves as a customer or a consumer. I think people in Saskatchewan embrace working together on something like a community-based central heating project.

I have visited a community in Denmark where they used central heating and it wasn't an onerous system. It did not . . . There was a few people in the community that were responsible for looking after it and making sure it worked. And it was another job and people did it. And people were happy with it and it was reliable. So I don't think there would be a big barrier to Saskatchewan people taking on that kind of approach.

Mr. Taylor: — I'm glad to hear you say that. I can see the people in Pinehouse for example embracing a biomass facility. I can also see the people in Kindersley embracing a wind, municipal or community wind farm.

Ms. Holtslander: — Yes.

Mr. Taylor: — And I think that your comments are well taken in that regard. Also your use of the term negawatts is not something we in the committee have heard yet . . .

Ms. Holtslander: — Oh really.

Mr. Taylor: — . . . or at least while I've been sitting in this chair, which is most of the time. But I do like that phrase, negawatt. You had indicated that this helps to shift the peaks, reducing demand and creating more efficiency in the system. Earlier in your comments, you repeated something that SaskPower had said to us, that 35 customers use 45 per cent of the energy created in the province. Do you think that, given that dynamic, that negawatt is possible? That those major users — potash, steel, essentially the resource base of our province — can actually be convinced to use less power?

Ms. Holtslander: — Well I guess I'd like to clarify that negawatts and peak shifting are not the same thing. Negawatts is overall reducing the . . . Well they're related, but negawatts is more conservation, and peak shifting is you may use the same amount of energy but you use it at different times. So negawatts would be overall reduction in amount.

Well, you know, I'm not a technical expert, but when I look at European countries that have healthy, growing economies that are reducing their energy needs by 11 per cent, 20 per cent, they're figuring out how to do it. And so I think money is a good way to focus the mind too — if the rate structure for these large users was set up so that if they used beyond a certain threshold their price would go up, and if they used even more than that their price would go up higher.

And then that could also be done in terms of a timing thing. If they came on stream at suppertime when all of the residential people are going home and cooking supper on their electric stoves, then they would have to pay a high premium for the use of that electricity. If they're willing to, you know, do their energy-intensive stuff in the middle of the night or at times when it's not as in demand by other users, then they would have to pay less.

So those kinds of structuring the rates to spread the use and encouraging them if they cost more to use more energy then they have to pay for it, they may find it would pay off in terms of research and investment to find less energy-intensive ways of doing their things or more efficient equipment. Or maybe they could get into cogeneration, you know, maybe where their process where they're using a lot of electricity also creates a lot of heat, well let's reuse that heat in some way so it's not just going out a smokestack or out into the river or wherever the heat goes.

Mr. Taylor: — Okay. And I have a number of other questions. I don't know if the Chair will allow them, but one more question for now until we see how much time we have. I believe you were here during the presentation from AECL earlier today, and therefore I'm hoping that I can ask for your opinion on something.

The fellow from AECL indicated that nuclear generation is just another way of boiling water. Would you agree with him in that statement?

Ms. Holtslander: — Well it boils water and it does a lot of other things, like it creates high-level nuclear waste and gives off emissions of things like radioactive water which is called tritium and so on. So it does boil water, but I think there's easier and cheaper and more environmentally friendly ways to boil water.

Mr. Taylor: — You don't feel that you're creating irrational fears when you say that?

Ms. Holtslander: — I don't think so. I've studied biology and if you're putting radioactive water into the ecosystem, and that's going into all sorts of life forms and so on, and it's damaging to DNA [deoxyribonucleic acid], I think that's something that it's worthwhile paying attention to. And if we don't have to do it, why do it? Why create a danger and a hazard when you can get the same job done in a much safer way and that it won't affect . . .

Like I guess one of the things that bothers me about taking on sort of a nuclear approach to things is that we could make decisions now that people in two or three or four generations have no say in, and they will be subject to the risks that we are creating, that they didn't have a part in making that decision. And I don't think we would have liked it if people did that to us, you know, that if we had to deal with some dangerous hazardous things . . . And we do have some things that were done, people didn't understand or realize what the implications were. We have to deal with that.

Things like using PCBs [polychlorinated biphenyl], you know, we thought that was great, but now we're finding that it's really toxic and it's really persistent. So children that are born today are dealing with that in their bloodstream, but they didn't have a choice. So I think it's not right to create a situation for future generations when they can't have the benefit and they don't have a say.

Mr. Taylor: — Thank you very much. Appreciate that.

The Chair: — Mr. D'Autremont.

Mr. D'Autremont: — Thank you. That was a very interesting presentation. You started off your presentation talking about climate change and about the problems associated with the production of CO_2. And then you talked about cogeneration, which in Saskatchewan up until now I think we've got four or five projects. But generally it's natural gas, which is an emitter of CO_2.

Biomass was one of the issues that was raised yesterday. And again that's combustion, so it's an emitter of CO_2. What forms of energy would work so as to not affect climate change, taking into consideration that by between the years 2020, 2030 we basically need to replace or renew all of our fossil plants — mainly coal plants — here in Saskatchewan. So what kind of an energy source could we count on for all of our needs that would not be emitting CO_2?

Ms. Holtslander: — Well I think what one of the things I would suggest is a diversity of sources. That has a lot of benefits. And you know, it's like don't put all your eggs in one basket. And some types of energy are more appropriate for certain processes and certain uses than other types, and when you combine them, you get the ability to use what's available most easily. And if you have a mix of sources, then you have more opportunity to take advantage of the current conditions. So I wouldn't say there's one thing that you would choose. So we have a combination.

Saskatchewan has wind and we have sun, so wind and solar are really a positive that we can develop. We have some hydro; we could develop more hydro and micro hydro in an environmentally friendly type technology rather than the big, big dams. Manitoba currently exports a lot of hydroelectricity to the United States. That could be, you know, we could probably import some from there if we needed it.

Biomass like wood combustion, you're right, it is burning something. But it's current carbon, it's not fossil carbon. So we're recycling the carbon that's already in the atmosphere when we're burning wood and crop residues, we're not burning new carbon or old carbon that we're pulling out of the ground that's adding to the atmosphere. So even the biomass is not adding new carbon. So that's a possibility that wouldn't be increasing our greenhouse gas emissions. So I think the key is to put many things together in combination.

[11:45]

Mr. D'Autremont: — I've been reading some articles on the CO_2 emissions and some agree with you that burning wood today is simply, if you allowed it to decompose, you would get the carbon back into the atmosphere again anyways; so it's a neutral. And others argue that it's still putting it out into the atmosphere, if you allowed it to decompose — which is what oil and coal is, it's decomposed organic matter, trees, woods, dinosaurs — that it's simply a matter of the time frame that it was stored for, rather than whether it's current or how it impacts the Earth.

One of the things you did talk about as well is transmission, that you would need to change the transmission system for wind or for solar. Many of the presenters have commented on the same thing, that our transmission system is in disrepair, needs to be renewed.

And I asked this question yesterday as well to one of the presenters. Should the cost of the renewal of the transmission system be borne in general across the entire user base? Or should it be borne specifically by new generation that comes online because of the need for — in the case of wind — the smart grid, the technology to control where it comes in and how it comes in, the need to have backup for it so that you have the gas plants available to come online if there is no wind? So should that transmission cost be spread across the entire system, or should the cost be dedicated to the new generation?

Ms. Holtslander: — Well, I don't know. That's kind of a strange question because I don't know how it's currently charged . . .

Mr. D'Autremont: — Well now it's spread across the entire system.

Ms. Holtslander: — Well I would say, you know, I like to think holistically. So I think it sounds like electricity isn't going to do much good if it's just sitting there in one spot. It needs to be transmitted to be useful and valuable, and the benefit goes to everybody who used the electricity system. The benefit doesn't just go to the people that are within 10 miles of a generating plant. It goes to the whole system. So it seems to me that the cost should be spread out over the whole system, and the savings should be spread out over the whole system too.

Mr. D'Autremont: — Okay. Thank you. I was interested in your comments about cost and debt, that we should proceed in a manner to minimize that. The numbers that we have received, particularly from SaskPower, that any new generation ranges from roughly 8 to 13 cents a kilowatt no matter what kind of generation it is — so should we only proceed with the ability to pay today? Whatever we can pay for today we build, no matter what our need is? Or should we incur debt and build the plants that we believe we need if we believe we need any?

You commented on buying from Manitoba. Well obviously Manitoba overbuilt so that they had the capacity to sell to somebody else. So should we only build what we can afford to pay for immediately, or should we build for the future?

Ms. Holtslander: — Well I guess when I'm looking at debt, another aspect of debt is how long does that . . . What is the size of the debt and what is the period that it would be paid off in and how predictable are the interest rates. So that, you know, if you go into debt to — a simple example — to buy a house, and you choose to buy one that is more affordable and you can get a 10-year mortgage for it versus one that is more expensive and maybe you're going to need a 35-year mortgage, with the same payment, you're going to be paying a lot more for the expensive house because it's going to take longer to pay it off. You're going to be paying interest for many more years. And then over 10 years with the cheaper house you'll pay it off quicker, pay less overall interest, and you're more likely to be able to predict what the interest rates are going to do over those next 10 years. You could plan a little bit better.

But say you bought a house today. The interest rate is low. Maybe you're paying four and a half per cent, and in five years the interest rate goes up to 10 per cent. All of a sudden your financing costs have gone up a lot, and you didn't maybe really expect that.

So I think when you're looking at putting in something like wind energy and solar that can be built faster and each individual unit is less expensive than say a nuclear plant, you have a lot more predictability in financing and paying for it. And that you're not going to be spending quite as much money on interest payments and financing as you would for a very, very large capital project that is not only unpredictable in how long it's going to take to build, but also how much it's going to cost. So I think the financial risk of the larger capital projects is greater. And I think that is something that makes, you know, it makes you think a little bit more seriously about the renewable projects.

Mr. D'Autremont: — Well the costs are significant for any kind of energy. I believe when the former administration put in the wind generation down at the Swift Current area, it was $250 million for 150 megawatts of capacity. But it's 38 per cent efficient, so it generates about 50 megawatts.

As your own numbers suggested that SaskPower was indicating, we need 100 megawatts-plus per year for growth, and we'll actually use 3000 megawatts a day — not 1000.

Ms. Holtslander: — Well I was taking a number from the figure . . .

Mr. D'Autremont: — The variance is, the variance is 500 to 1000 in any one day within nighttime, daytime, etc.

Ms. Holtslander: — Okay. Maybe I misread that slide. It looked like it was saying they were as low as 500 and as high as 1000.

Mr. D'Autremont: — Yes. So there's significant costs. If we need 50 megawatts or 100 megawatts a day for growth at the cost of wind at 250, we would need to spend 500 million. But it's still intermittent; it's not constant.

Ms. Holtslander: — Well 500 million is a lot less than 13 billion.

Mr. D'Autremont: — Yes.

The Chair: — Mr. Wotherspoon.

Mr. Wotherspoon: — Thank you, Cathy. I guess first I'll make a comment and ask a question. My question being, I hope you can table your presentation here today back to this committee.

Ms. Holtslander: — Yes. I will. Yes.

Mr. Wotherspoon: — Okay. And then as comment, I think that you've made fair comment with question around assumed power growth in this province. And I think you targeted specifically that you think there should be oversight on SaskPower on these questions of assumed power growth.

But my questions to SaskPower, just a week ago, in asking them to share their assumptions as it related to GDP or population or industrial demands, and where they got these numbers and how they go about that process, what they shared with us at this committee was they get those from the provincial government of the time.

And not to take a partisan position here, but certainly as a statement, what we've realized in short order is that many of the numbers that are put forward by the current government as it relates to the economy or as it relates to GDP or to many factors within that have been wildly incorrect. And I think it's important that, when we're looking at how those are a major factor back into power needs and potential growth, that we should certainly be looking at those numbers and continuing to question those.

Furthermore I think that SaskPower has a very unique opportunity, or Saskatchewan as a whole through SaskPower and through the people of this province, to work with many of the pieces you've talked about here from more of a demand-side management piece — the negawatt perspective, power shifting or cogeneration as it relates to industry. So I continue to urge you to work on that front.

I think we've heard through these presentations that I believe $1 invested in one jurisdiction into efficiency offered a savings of $1.70 back to ratepayers or taxpayers, whatever the mix might be. So I urge you on your work and I please request the tabling of your report. And I do think that we should continue to look at the forecasts of power needs, specifically when they're prefaced upon provincial data around the economy at this point in time.

Ms. Holtslander: — Yes, just a comment. One of my next steps in my presentation was to have an independent, fully funded study on potential renewable energy strategy. And I think that would, you know, I guess the mandate of that study should include a fairly critical look into the kind of assumptions that you would be using.

The Chair: — Great. Well thank you very much for your presentation and taking the questions that you did today. We sure appreciate your time here today. With that, the committee will recess for about five minutes while our next presenter gets prepared. Thank you.

[The committee recessed for a period of time.]

The Chair: — If I could welcome everyone back. Before we hear from our next witness, I would like to advise witnesses of the process of presentations. I will be asking each witness to introduce themselves. Please state your name and, if applicable, your position with the organization you represent.

If you have a written submission, please advise that you would like it to be tabled. Once this occurs, your submission is available to the public. Electronic copies of tabled submissions will be available on the committee's website.

The committee is asking each presenter to present in answer to the following question: how should the government best meet the growing energy needs of the province in a manner that is safe, reliable, and environmentally sustainable, while meeting

any current and expected federal environmental standards and regulations and maintaining a focus on affordability for Saskatchewan residents today and into the future?

Each presentation should be limited to 15 minutes. Once the presentation is complete, the committee members may have questions for you. I will direct the questions and recognize each member that is to speak. Members are not permitted to engage witnesses in debate and witnesses are not permitted to ask questions of committee members.

I would also like to remind witnesses that any written submissions presented to the committee will become a public document and will be posted to the committee's website for public viewing. And with that, our presenter could introduce himself and lead off with his presentation. Thank you.

Presenter: Coalition for a Clean Green Saskatchewan

Mr. Geary: — Hi. I'm glad to be here. I welcome this opportunity to address you all. My name is David Geary. I'm from Saskatoon. Actually this is my hometown, actually. I've lived here a lot of my life. You all have my hard copy there of my presentation, so I'll just kind of zip through it and you can follow it.

So I'm representing the Coalition for a Clean Green Saskatchewan. Who we are is we're a network of organizations and individuals throughout the province which support this province quickly moving towards a sustainable society that uses modern, renewable energy and conservation technologies and strategies.

To this end, we question a push toward an unsustainable nuclear energy future because that is not clean, green, affordable, sustainable, nor a good investment in comparison to the alternatives, which I'll try to demonstrate in my presentation here. Anyway, so we are an organization. And by the way, you asked, you would like to know our position in this organization. Actually our organization does not have positions. We're sort of a loosely structured organization. I guess I could call myself a researcher or something.

Anyway we propose that the best way to build a prosperous and healthy Saskatchewan is to encourage creative energy efficiency, conservation, and green architecture and to develop wind, solar, biomass, natural gas, cogeneration, and small-scale hydroelectrical sources. A shift toward renewable distributed electrical generation could greatly benefit many communities throughout the province, north to south, by providing high-quality, long-term jobs. Small energy producers — of course in partnership with SaskPower — should include First Nations and Métis communities, farmers, ranchers, regional businesses, and rural and urban municipalities.

So I would like to address this nuclear issue because it has been on the table all year here and it's part of the agenda, and especially since the first presenter here was presenting his point of view about this subject. The first thing I would address here — you'll see my first chart — is addressing this issue of the so-called nuclear renaissance which he referred to. Well the following graph on page 2, there at the bottom, with numbers from the *IAEA Bulletin* and the *Bulletin of the Atomic Scientists* — these are kind of industry journals — it shows a trend. And that trend is that the nuclear industry worldwide has plateaued some years ago and is now beginning a decline. I mean there are great hopes and optimism within the industry that they can revive themselves, but it doesn't seem to be happening.

As this chart shows here — well you can see the chart, and my explanation's on the following page — nuclear power as of this year accounts for less than 14 per cent of total electrical generation in the world. That's down from 16 per cent three years ago and down from an all-time high of 17 per cent in 1989. As of March this year, there were 436 reactors operating worldwide — that's down eight from 444 in 2002.

Over the past several years, 117 reactors have been shut down worldwide, their average lifespan being only 23 years on average — half of the promised lifetime. According to a recent bulletin article, at least 93 reactors will close between 2008 and 2015, another 192 will close between 2016 and '25, and the remaining 154 will close after 2025. Closings will exceed openings because, you know, those numbers will show that.

The 40 or 50 reactors that have now been under construction for maybe up to 20 years, some of them, plus some tentatively new planned ones — and there's always plans for hundreds more; it's always been that way since the beginning of the nuclear age — they may or may not materialize. They usually do not materialize. Anyhow if they do, they cannot reverse that trend of a net loss of units worldwide.

Now why is this kind of renaissance kind of stalled or not happening? Well several articles in the literature, nuclear kind of industry literature, over the past year or several years actually, have examined why this much-hyped and -hoped-for nuclear renaissance will probably not happen. And the reasons they say are, there's a lack of skilled workers, a critical shortage of nuclear engineers and technicians currently — all over the world by the way. This is a very serious problem, especially in eastern Europe and Russia. There's a wave of retirements and a dearth of qualified entrants into the nuclear workforce because many graduating engineers and designers and people like that are drawn now to the new renewable energy technologies and strategies. There are supply bottlenecks for heavy components.

I'll just zip through this. You can read it later. I might want to skip over so I can make my time here.

Nuclear power plants, number 3, require substantial government policy support and financial handouts since the private will not invest without government guarantees and subsidies. Historically, significant cost overruns have led to a massive loss of confidence in the nuclear option by financial institutions.

Number 5, strong competitors and highly dynamic natural gas and renewable energy sectors continue to slow down the nuclear industry's growth.

Number 6, nuclear proliferation worries regarding weapons, of course, security issues, polarized public opinion, and the global recession all negatively affect the nuclear sales and growth.

Number 7, with this new generation of nuclear plants and all these big companies like Westinghouse, AREVA, AECL,

Hitachi, they're all kind of redesigning nuclear plants for some reason. That's kind of an admission, I guess, that the older ones weren't all that efficient. Anyways, with this new generation each project is essentially a demonstration project. No one has any real experience with them so utility ratepayers and shareholders have to fund a big, large experiment basically and it's very risky.

An example of these points I've just mentioned here. The new AREVA reactor model, EPR [European pressurized reactor] it's called, currently being built in Finland, reflects the above problems. It was to be the poster child of the new generation of reactors to jump-start the so-called nuclear renaissance. However it has been plagued with problems over the last few years since it started construction. It's at least 50 per cent over budget and will now cost $6.7 billion.

The president of AREVA in France has admitted to 1,500 mistakes in construction, admitting that they had to relearn how to build nuclear reactors after a long period of no new orders. Plus it's kind of a new design so they had problems there too — a variation on their old design basically. There are safety and quality assurance problems with the piping, containment liner, and concrete base slab.

The Finnish government is suing AREVA, which is a French Crown corporation by the way, for almost $3 billion as a result. A similar AREVA reactor construction site in France in Flamanville was shut down last year for similar reasons. The AREVA EPR is being touted by Bruce Power as one of the reactor options for Saskatchewan, by the way.

Contrary to what these proponents say — nuclear industry proponents — nuclear power is not clean or green, is not competitive in price, and is not really reliable as a baseload. Regarding the fiction of nuclear power being clean power, first of all, nuclear power has emissions and lots of emissions. CO_2 is not one of those emissions really. But several radioisotopes are routinely emitted. These are invisible, of course, but harmful gaseous and liquid effluents that are known to adversely affect human health and in fact all health of all life forms, really — plant and animal life forms.

[12:15]

It would be foolish to trade a carbon footprint for a radioactive footprint. The following illustration shows routine emissions throughout the nuclear fuel chain, including those released during power generation. The fission products — which are actinides, by the way — and activation products and some of the chemicals shown are proven carcinogenic, mutagenic, and teratogenic agents. So on the next page is an illustration of some of these emissions and how they work themselves into the food chain.

Page 7, the CNSC, the Canadian Nuclear Safety Commission, which is supposed to oversee these kinds of safety concerns, allows a certain amount of emissions as being within so-called permissible limits. But that is a concession to the industry. It has no real meaning for the safety of the public. Permissible limits do not mean safe limits. The CNSC's standards are scandalously far behind those of European countries and even those of the United States. Europe's standards are 70 times more stringent and the USA's are six times more stringent than Canada's when it comes to exposure of radioactivity to the public.

And by the way, I'll just insert something here. That's why AECL could not sell CANDU reactors in most European countries and in the United States, because they just emit too much tritium. And their standards in those countries won't allow that. So those countries have their own designs which don't allow that much release of tritium and other radioisotopes.

Secondly, and more importantly perhaps, the US National Academy of Sciences BEIR report, that's the biological effects of ionizing radiation report of 2005, states that any extra amount of radiation the body is exposed to is potentially harmful. In other words, there is no safe threshold. This is quite contrary to the controversial theory known as hormesis, promoted by Bruce Power personnel, which states that a little extra radiation is good for you.

And there's an illustration of how ionizing radiation affects human organs. Childhood leukemias and cancers and Down's syndrome clusters have been identified near nuclear power facilities in Europe, America, and in Canada — including near Pickering and Bruce Power stations in Ontario, by the way, although they're inconclusive studies. Precise causes of these health effects are inconclusive either way, but the precautionary principle should prevail for a technology that is unnecessary and only one option of many. The whole nuclear fuel chain, from mining, milling, tailing, storage, refining, conversion, and power generation is indeed polluting — not big black puffy clouds of smoke come out, but invisible, harmful carcinogens do come out along the way as this other picture illustrates below.

According to Greenpeace Canada, supplying a typical household with nuclear-generated electricity results in the production of 14 kilograms of toxic and radioactive mine tailings and up to 440 kilograms of waste rock every year. This material — including the waste rock, by the way — has carcinogenic emissions like polonium and thorium and radium and so on, and uranium itself. That is a large radioactive footprint for one household to bear.

I'll get into the costs a little bit in the nuclear field, sphere. The estimated capital costs of building new nuclear plants are astronomical and soaring, especially in the last two or three years. Capital costs could exceed $10,000 per kilowatt by the end of this year. Plans for two new reactors at Darlingon nuclear station were put on hold this past summer after the lowest bid came in at $26 billion — more than Ontario's entire power expansion budget for the next 20 years. And that was from Atomic Energy of Canada, AECL, by the way. That was the lowest bid.

The chart just below that shows a comparison with certain nuclear projects. These are all estimates because none of these things have been built yet. These are new generation, by the way. So it compares those prices, the capital costs of those certain reactor types, with conventional hydro, coal-fired plant — not a carbon capture coal-fired plant, by the way — wind power, and conventional open cycle gas turbine. And you can see by that chart, nuclear power is 10 or more times expensive

than many of those options. That's just the capital costs, upfront costs. So the bar graph illustrates how uncompetitive it is with other electrical power options.

And aside from these capital costs there are other costs that are unique to nuclear power. Nuclear power is a unique power generating option. It has unique problems which would drive up the price even more. These include spent fuel management, security issues about, you know, terrorism and things, refurbishment after half of their estimated lifespan, and decommissioning. Historically, Canadian reactors have had to be retubed and refurbished after only 20 years. Usually they promise they'll be good for 40 years or more, and now they're saying 60 years even, but historically that has never, ever happened in Canada or anywhere in the world, I don't think.

And costs for refurbishment are very huge. For example, at Bruce Power right now they're refurbishing four reactors at the Bruce A station at an estimated cost now at $5.2 billion. That's just fixing a reactor that shouldn't have been broken in a sense, you know — four reactors. These reactors are out of service for lengthy periods during refurbishment, like a year or two years or even more sometimes, like the Point LePreau one's out for two years already. In fact eight CANDU plants in Ontario were out of service from 1998 to 2004, so backup coal-fired generation was required to, you know, back up that.

When it comes to the liability, by the way — and a lot of people don't know this — accidents at nuclear power plants are not covered by insurance companies. If you look in your own SGI [Saskatchewan Government Insurance] house insurance policy booklet you'll see on page 17, line m), property and causes of loss are not covered by your SGI insurance policy:

> loss or damage caused by a nuclear . . . [accident] as defined in the *Nuclear Liability Act*. Nor do we cover nuclear explosion or contamination by radioactive material.

So that's really all I want to say about the nuclear option. But I'd like to really focus on the positive aspects of the renewable energy kind of revolution. Like there is a renewable energy renaissance going on, not a nuclear renaissance. So I'll just briefly go through that. Are we okay? Okay.

Some policy- makers, including members of American President Obama's inner circle, are calling this new kind of renewable energy explosion the new industrial revolution — the basis for a new green economy in America and Europe and elsewhere in the world. Canada is unfortunately very far behind. I think we need some federal political direction in this area — and provincial of course, but federal would be really important.

Investing in the expensive nuclear option here in Saskatchewan would suck up all the capital that could be spent much more cost-effectively on renewable energy and efficiency and conservation. And negawatts, as a previous presenter explained negawatts, negative watts. The Saskatchewan government should be and could be positioning itself now in the renewable energy revolution. Decentralized distributed renewables and cogeneration facilities are growing at a rate 20 to 40 times faster than nuclear power. According to a recent *TIME* magazine article, in 2007, worldwide, these renewables attracted $71 billion in private capital while nuclear got zero in private capital.

Nuclear's growth rate is lower currently than any other energy source — and there's a graph that shows this later on here — growth that was just half a per cent in 2007 compared to 27 per cent for wind energy, for example. In 2007 the USA, China, and Spain each added more new wind capacity than the whole world added nuclear capacity because it's at least two to three or more times cheaper than nuclear power. That's just wind.

And the next chart here shows how renewable energy cost trends are declining. Just in the last 20 years, they're declining rapidly and markedly. Whereas you saw one of my previous charts showed nuclear power rates escalating dramatically, these rates are declining rapidly. So it's a real contrast there.

The solar economy has grown over 600 per cent since 2000. It's the fastest growing source of energy in the world percentage-wise by the way, not in mass in total. It was a $38 billion industry three years ago, and it's now worth much more now with the invention of nanosolar materials and new technologies like that. And run-of-the-river hydro projects, biogas, biomass, and geothermal installations are growing rapidly as these costs decrease.

This chart on the next page, on page 12, shows these growth rates in comparison. Now these are just percentages. You know it says there PV. That's photovoltaic. It's really high, 40 per cent, and nuclear's point eight per cent on this graph. You know, there aren't as many photovoltaic panels as nuclear plants, obviously. It's just a growth rate, percentage rate, but it shows a trend.

The potentials and opportunities here in Saskatchewan are enormous for producing power with renewable technologies. It's the sunniest place in Canada — I think Estevan is the sunniest city in Canada — and along with Alberta, the windiest inland location in the country. These and other renewables here can create more than enough electricity, including a baseload with new strategies and peaking power for our needs, while creating good jobs in every part of the province. Renewable energy, efficiency, conservation are huge growth industries worldwide attracting capital and young talent everywhere.

According to several recent polls, the Saskatchewan and Canadian public very strongly support renewable energy and conservation more than traditional energy sources. And if you've seen Bruce Power's — the nuclear company — Bruce Power's own polls when they presented these last spring, the support for nuclear power might have been 50 per cent. The support for wind power — in Bruce Power's own polls — was 96 per cent.

Anyway so I'll finish now. For prosperous and sustainable future, we encourage our political leaders to embrace this renewable energy and conservation path. And I'll quote Wayne Gretzky, when he was asked the secret of his success said, you ". . . skate to where the puck is going, not to where it has been." Thank you for your time.

The Chair: — I think you can never go wrong by quoting Wayne Gretzky. So thank you very much for your presentation.

Mr. Weekes.

Mr. Weekes: — Thank you, Mr. Chair. Thank you very much for your presentation. Just a bit of a background on your association. How many members do you have in your coalition?

Mr. Geary: — You know it's impossible to say. We're spread out all over the province. Like there's a group in Paradise Hill, North Battleford, P.A. [Prince Albert] Those kind of renewable energy groups, there's several groups here — several hundred to 3 or 4,000. It's impossible to say.

Mr. Weekes: — Thank you.

Mr. Geary: — We are such a kind of loose knit kind of organization.

Mr. Weekes: — It's interesting to go through the experience of this committee. We've learned quite a bit, especially about the history of nuclear in the province. Just as one of our former presenters pointed out, that cobalt cancer therapy treatment was pioneered by Dr. Johns in Saskatchewan as early as 1951, and of course Sylvia Fedoruk, her career was around that type of research and medicine. And you know, we're a leading producer of uranium. And it's real interesting to hear and be reminded that we've had a nuclear reactor at the University of Saskatchewan for the past 30 years.

You know, we're going through this process and, you know, the Government of Saskatchewan hasn't made a decision on the future of building a nuclear power reactor in the province. But the problem that we as a province have is future electrical generation, obviously. And the previous government, in their 16 years, never really had improved the infrastructure, electrical generation to any major degree, and never held any public hearings around the future of electrical generation.

I guess always the concern, the question that comes to my mind where we're still a coal-based electrical generation system, some natural gas, some of everything, some wind and some hydro: how do we get from where we are today to a future with renewables?

[12:30]

And I guess my question to you is, what do you foresee as the proper mix? We talked about demand load and all those others. If you leave out any potential nuclear development — let's just say it's not going to happen — what do you see as a potential mix of renewables versus coal, clean coal hopefully coming on, and solar and other types of energy production? So could you just comment on the proper mix and the breakdown that you see the province needing.

Mr. Geary: — Sure. Well it's hard for me to say but there definitely should be a mix of options. Don't put, like our previous presenter said, you shouldn't put all your eggs in one or two baskets, like nuclear or coal especially, but have a wide distribution of energy sources around the province in partnership with SaskPower, in conjunction with SaskPower somehow.

A lot of states in the USA and Ontario now, and a lot of European countries, are doing this. They have a wide mix of electrical production — small, medium, large. It's more secure that way. If you have a breakdown of a big, massive, centralized thermal power plant, you have blackouts like in Ontario and so on, you know. Anyhow, I'd have a mix. I'm not an expert; I'm not an engineer; I don't work for SaskPower. They'd know. They'd have more expertise on that.

But by the way, regarding our nuclear history in Saskatchewan, you brought it up. The first cobalt radiotherapy device . . . There were two simultaneously. One was in London, Ontario and one was here. They were both kind of doing it at the same time. And the little reactor at the university — the Slowpoke reactor, research reactor — it's just a number of kilowatts. It's not megawatts. It's not like a power reactor by any means. And it uses highly enriched uranium that they get from the United States. It's refuelled every 20 years. It was put up in 1980 or '81. So it's kind of quite a different kind of animal than these power reactors they're talking about now.

And in 1990 they tried to get a larger Slowpoke district heating reactor on campus, which I think was 20 megawatts or something. That was really problematic because that was too large for a populated area, and it was kind of . . . That initiative was defeated for various reasons but partly because of that. It was going to be right in the middle of a populated area, right in the middle of university campus. I could see it out my office window in the hospital there. I could see that site, and it was right beside the campus daycare and right beside the hospital. It was kind of a kooky kind of scheme. Anyway that's just by the way.

And by the way, there were hearings on energy options in Saskatchewan — I know it for a fact — in 1990. I think just around between governments there. Romanow might have initiated these hearings. And I know some people who were on the panel there, and they had a really exhaustive study on all kinds of energy options. That's the one I know of. I don't know if it's been done before or since then. Anyway, I just thought I'd add that too.

But as for energy mix, I wish I was more of an energy expert, I could tell you. Because it's very complex, as you gentlemen know. You know, the demand, the supply — I mean, is this demand real? SaskPower's demand has increased by 800 megawatts from June of this year till September of this year, so I don't know what happened in between there — demand for the future, or their predictions for the future.

Anyway I hope I answered your question. I don't know if I did.

The Chair: — Mr. Wotherspoon?

Mr. Wotherspoon: — Thank you, David. You made a comment specifically as it relates to the economics or the financial unsustainability of nuclear power, and you talked about that private sector requires government to make commitments, guarantees, and subsidies. Could you provide an example of some of these subsidies and commitments?

Mr. Geary: — Well loan guarantees is one thing, and of course the governments would have to supply all the infrastructure. And when it comes to the nuclear option, well maybe

everybody doesn't know this, but Bruce Power is only a management company. They don't own their reactor. The Canadian people through AECL pay for that reactor and they're responsible for it, not Bruce Power.

So I mean there's a multi-zillion-dollar — sorry, I'm being facetious — there's a multi-billion-dollar price tag right there that the taxpayer is stuck with, just designing the new generation of AECL-CANDU's reactor. That's an expense. Transmission lines, like I said, new infrastructure. Plus Bruce Power I think finally admitted when they came here that they'd have to partner with the government because it's just so expensive. The government would have to really throw a lot of money at this, you know.

Mr. Wotherspoon: — Thank you, David. Your chart on page 9 of your presentation, specifically the information that you have cited here from the US Energy Information Administration with respect to the cost of various power generation costs, these vary significantly from what SaskPower's put forward per kilowatt cost for capital costs of various sources. The only one that it's similar for is nuclear power. It seems to be a similar number. I believe SaskPower puts forward a number between 5,000 and $7,200 cost per kilowatt. And certainly I see the range that you've cited here, range from 5,000 to $12,000, which is the experience in Ontario.

But as I look at the other pieces, such as hydro, coal-fired, wind, and gas, the numbers that are on this sheet here that you've provided are significantly lower than those provided by SaskPower.

I guess more of a rambling question here, and maybe a question back for SaskPower, but have you reconciled this information with other data or other industry information? How confident are you in the numbers that you've put forward here?

Mr. Geary: — Fairly confident. I found these on the Internet, and there's some other sites I've seen that kind of correspond roughly to those numbers. This is an American, by the way. I haven't seen SaskPower's numbers, by the way. Who knows how different agencies kind of compile these numbers.

Mr. Wotherspoon: — Just as an example — and I think this is maybe work that we can undertake as a committee between now and then, and certainly questions we can have for SaskPower, and certainly look to many sources as to the cost per kilowatt of capital cost — but the discrepancy is noticeable if you're looking at hydro. The number cited here by the EIA [environmental impact assessment] in your information is 1,500 per kilowatt, and within SaskPower's analysis right now, it's 3,000 to $6,000 per kilowatt. Coal — yours is at 1,290 and for SaskPower it's 4,300 to 5,700. And if we look to something like wind, you have it cited here at 1,200 and SaskPower has it ranging between 2,000 and 10,000.

So there's a significant discrepancy. And I think certainly, just as members of the committee, we'll want to undertake further questioning and analysis of information to see how those numbers have been substantiated.

Mr. Geary: — Yes. That's interesting. I mentioned in my presentation here . . . That coal, by the way, that coal-fired plant with scrubber number I have there, that is not clean coal. Maybe the SaskPower's number is regarding clean coal.

Mr. Wotherspoon: — Clean coal's significantly higher.

Mr. Geary: — It is pretty high, yes.

Mr. Wotherspoon: — . . . with the basic traditional, just I guess prescribed to regulations.

Mr. Geary: — Yes. Well I don't know. Maybe our situation is here different. With hydro for example, it's increasingly, a lot of our hydro resources are exploited to the max already. I don't know.

Mr. Wotherspoon: — Yes, I don't make any judgement other than . . .

Mr. Geary: — But I think this is a reputable source. You people can look it up, look up that site.

Mr. Wotherspoon: — We'll follow up. Yes. I don't make judgement with your presentation nor with SaskPower's. But it certainly, when you have discrepancy like that, and for us to be able to look at actual costs in some sort of a comparative analysis, we're going to need to come to some stronger understanding of the economics of each, the cost of each.

One last question for you. And I appreciate your presentation as it relates to baseload. You talked about new strategies to I guess support baseload with renewable, I assume. I'm just looking for some more information, some of your thoughts on that front.

Mr. Geary: — From what I hear, you can link up certain — let's say it's all renewable energy; let's say you've got some hydro, wind, solar power, some biomass stuff — you just link those up as a so-called kind of creative kind of computerized grid system. That's kind of a smart grid, but it's kind of more than that. Anyhow it just coordinates everything — when one thing's down, the other one jumps in immediately.

I mean I saw a great thing in Germany, they're working on this. In the USA everywhere, they're kind of developing this now. It's kind of a new paradigm. And a new technology is involved obviously, computerized technology. But you just link all those things up, so when one thing's not working, well the other one jumps in. And then you've got a bit of, you know . . . if you're desperate. And then if there's nothing's working, then you get some gas-fired generation or something.

But it's just a new kind of highly computerized way of doing things — just a new thing, you know. I don't know too much about that. Again, I'm not an engineer.

The Chair: — Mr. D'Autremont.

Mr. D'Autremont: — Thank you very much. On your last comments on the smart grid, the need for improvements to our transmission system, most of the presenters coming forward have commented that our transmission system needs to be upgraded, and so there will be a significant cost there. If we go to a smart grid type of system, how would you share that cost? And I asked the young lady that was here as well the same

question. How would you share that cost for those necessary upgrades? Would that cost be associated with the new generation that would come online, or would it be spread throughout the whole system?

Mr. Geary: — Spread throughout I guess. First of all, that's what I would guess, what I would think.

How much new transmission do we need really and all that? I mean I haven't really examined this, but there's certain predictions and assumptions that SaskPower makes and has always made. And like some presenters have said, of course that's their business to kind of forge ahead and keep on keeping on and doing what they do and what they feel comfortable with — it's just selling a lot of electricity and transmitting a lot of electricity.

But I think, you know, a lot of utilities in America and everywhere around, they have this thing called the primacy of prudence when it comes to fiscal matters, you know. Utilities can thrive and make a lot of money without huge, enormous capital commitments or even huge in transmission or power generation. There's ways, really creative ways, to kind of keep on going, you know, with fiscal prudence.

Mr. D'Autremont: — You mentioned the brownouts that were in Ontario and eastern seaboard of US, and in large part that was because of the failure of the transmission system.

Mr. Geary: — Was it?

Mr. D'Autremont: — Not the generation system, but the transmission system, that the switches weren't able to handle the sudden loads as things dropped off the line.

Mr. Geary: — It was switching between Canada and the USA or something, wasn't it? Was that the problem? Something like that.

Mr. D'Autremont: — Well including Saskatchewan, we are part of the Midwest and eastern grid system. So it didn't get this far because somebody — SaskPower gave us this information — that I believe it was somebody in Ontario pulled the switch, even though he didn't have permission to block the system so the rest of us didn't get affected by it.

And otherwise we would have been affected because you have to have a load balancing, according to SaskPower. I'm not an engineer either. But your generation and your use have to be relatively balanced together. And when the switches failed, that went out of balance and there's four seconds to deal with it. So the part of the system that we need to upgrade is those kind of switches. So that's why I'm wondering about who has to pay for this. Obviously the customer's going to pay for it at the end, but do you allocate it just to a new generation source, or do you allocate it to the whole entire system?

Mr. Geary: — To the whole, I guess. To the whole entire system. Yes.

Mr. D'Autremont: — Okay. Thank you. I note in your paper here on page 3, you say "Nuclear power plants require substantial government policy support and financial handouts since the private sector will not invest without government guarantees and subsidies." Your opposition to government policy supports, financial handouts, and government guarantees and subsidies, are those just for the nuclear industry or do they apply to all energy sources?

Mr. Geary: — No. I think that there should be some subsidies, obviously for example to kick-start the renewable energy program. But what I would oppose is these enormously, enormously huge subsidies that have been given to the nuclear industry historically.

Ontario in Canada is a good example. In France, France has a relatively successful nuclear program because it's all paid for by the government. Areva is a Crown corporation. Everything's kind of paid for by the government. And even so Areva is asking for $6 billion bailout money right now, more, from the government.

[12:45]

So I object to that because the taxpayer gets stung with that. And those enormous costs — those are enormous — and they can put this province in debt for hundreds of years, you know. We need more prudence in investment. Investment prudence, put it that way, like where do you get the most bang for the buck and stuff. Sure some subsidies are good to kind of spark new industries and so on. I mean that's a good role for government. Yes.

Mr. D'Autremont: — The young lady that was here before, one of her slides had a subsidy of $442 a megawatt for solar. Would you limit . . . If that's a good number — and I have no reason not to believe it — would that be acceptable as a subsidy then for energy sources such as solar, such as wind? And if it is, why wouldn't it be available for clean coal and other types of energy?

Mr. Geary: — Yes. Good question. I don't know, I'd have to check those numbers and all the options. I mean, yes if it's too expensive, if the public feels that's too large of a subsidy, yes don't go that way. Go another way. There's lots of more efficient, financially efficient and financially sound ways to do things.

Negawatts is really, really the first place to start. It's lucrative. A lot of people can make a lot of money doing energy efficiency and conservation, you know.

Anyway yes, I guess in answer to your question, I'd say, yes. Judge each subsidy, each option's subsidy that they want and kind of just go the fiscally prudent, frugal way. I don't know, that's just me. I'm kind of frugal.

Mr. D'Autremont: — Thank you. Final question. BC election, one of the issues that came forward in that election was run-of-the-river generation. While the government got re-elected there, there seemed to be a considerable opposition to run-of-the-river. Do you think the public is prepared to accept run-of-the-river as a type of electrical generation?

Mr. Geary: — Yes. I do. In Saskatchewan our best potential for that is in northern Saskatchewan rapid rivers. Yes. And in

BC, the experience there was, it's very complicated, I hear. They invited a lot of companies to come in and kind of gave them carte blanche almost, disrupted a lot of the landscape, and a lot of local people are not getting cut in on the action and stuff. So that was part of the problem. There's a lot of projects, 3 or 400. There's a lot.

And I like that idea, run-of-the-river hydro. It's relatively not disruptive. Don't have to make massive dams. They kind of pipe the water, you know, around the edge or something. Sorry, what was the question? Yes. I would agree with run-of-the-river, done prudently of course. Yes. With a lot of, you know, guidelines and so on.

Mr. D'Autremont: — Okay. Thank you.

Mr. Geary: — I think SaskPower would have to kind of . . . I really believe that SaskPower should be the umbrella, the kind of group that would kind of manage . . . well obviously SaskPower would manage the electrical output, even if they're not generating everything. But I think there should be special partnerships with SaskPower to make sure everything's kind of good for the people of Saskatchewan, and we don't give away too much stuff like they've done in BC.

The Chair: — Mr. Taylor.

Mr. Taylor: — Thank you very much. Welcome, Dave. Thanks very much for your presentation. I want to go a little bit beyond your presentation here and ask a question or two about your observations and further opinions from that observation.

The previous presenter talked about young people finding interest in renewables increasing. Your presentation, page 12, you talk about renewable energy efficiency and conservation will attract capital and young talent worthwhile . You've been around the University of Saskatchewan for quite a while — in fact I think you and I were students together 30 years ago. And you have your M.A. [Masters of Arts] I'm assuming from the University of Saskatchewan. You're currently employed at the University of Saskatchewan.

Most of us in the province believe that a big part of Saskatchewan's future is the knowledge economy, and universities will play a significant role in regards to the knowledge economy. And the University of Saskatchewan is well positioned to do that here. From your perspective of being around the university over — give or take — the last 30 years, is it your opinion that young people are indeed more and more attracted to the idea of a knowledge-based economy that extends into the fields of energy and renewable energy and would embrace the concept of moving things forward in this regard?

Mr. Geary: — Yes indeed. Yes. Just one small example, in the engineering college now there's a group of students called Footprint Design — a really, really creative bunch of young guys and girls — and they're real interested in renewable energies. And it's kind of like Engineers Without Borders. They do that kind of work too. But some very interesting kind of ideas they're coming up with — renewable energies and alternative energies and so on — it's just one example, but I know all over Canada it's the same way. Young engineers, they're just going into these new things. They're not interested so much in the traditional things, you know. It's only natural, I guess.

Mr. Taylor: — Well that's to a certain extent my experience. But as I say, I wanted to take advantage of your position, being close to the university over the last number of years, and so that I could further understand your comments about a renewable energy renaissance and the ability of the university to play a role in that.

We've heard a number of presenters talk about centre of excellence in a number of areas. Do you believe the University of Saskatchewan could indeed be a centre of excellence along the lines that you are arguing through the Coalition for a Clean, Green Saskatchewan?

Mr. Geary: — Yes. And again indeed I do think so. Of course, I mean it really should happen. It should have happened 10 or 20 years ago. It's happening in a lot of places, you know.

There's this for example. I just read about there's a contest that's in Washington, DC [District of Columbia] in October at the mall in Washington, a solar house contest. A bunch of universities across Canada and the USA and some from the rest of the world, they get their students — engineering students, architecture students — to build these new modular, solar houses with newest, cutting-edge stuff. And then the deal is they have to be modular, so they take them apart, put them on three flatbed trucks, truck them to Washington, DC and put them back up. I think they're up there right now as we speak. Look on the Internet. You'll see it's amazing.

I wish our university was involved in that. You know, I wish our university was involved in that solar-powered automobile thing they do from all universities. You know, I mean there's so much we can do. And I know a lot of students are interested in that, and maybe they're trying to get that kind of stuff going.

Mr. Taylor: — In that regard, how much direction should the university be given from the province or from SaskPower, or how much financial incentives should the university be given from the province or SaskPower in order to make that a reality? Or is this something that the university through its board of directors or through its — I call them board of directors but that's . . .

Mr. Geary: — Board of governors.

Mr. Taylor: — Board of governors or other administrative units could make this happen.

Mr. Geary: — Yes. Well there should be encouragement. And our government pays for the university, for heaven's sake, of course they should give them some different kinds of directions. Of course that always happens, of course. But yes, this would be good for them to give them that direction.

And another thing is wind turbines. Apparently they're not as efficient in cold weather like minus 30, minus 40 I've heard. Well that can be an area of expertise. It's just an engineering challenge. It's not impossible to get those things because there are wind turbines in Antarctica and in our far North. They're

working. Maybe they could be more efficient. There could be a next area of expertise: how to get those turbines really efficient for super cold, windy climates.

And I've heard that solar PV, photovoltaic panels, actually work better in colder climates than in hot climates because the intense heat in Arizona and California and stuff kind of wears them down faster. So there could be another area of expertise: how to really capitalize on or develop PV-type solar panels in a colder climate like this. If we develop this expertise, we could export it around the world, to our latitude around the world, you know. And there's lots of areas like that, that yes indeed we could be and should be a centre of renewable energy excellence. I sure hope that happens sometime.

You know, young people want this, I'll tell you. They want it, and they're ready. And they just want some more encouragement.

Mr. Taylor: — Thank you very much, Dave.

The Chair: — Thank you very much for your presentation. You talked of the solar house, the modular solar house. I watched with keen interest last week, I think it was CNN [Cable News Network] was talking about it.

Mr. Geary: — Was it? Oh really.

The Chair: — And yes, some fantastic technologies. You know, integrating technologies of today into houses of today. And I'm trying to think, I thought that there was a University of Saskatchewan that was a partner with another university that . . .

Mr. Geary: — The University of Alberta is in this year, Edmonton. And I think somewhere in Ontario too. No, that would be very cool. I taught a pre-architecture class. I'm very interested in architecture and green building strategies and stuff. Oh, that would be so, so neat, you know, to get . . .

The Chair: — I really felt like there was a Saskatchewan connection, but you've taken me back a week, and I don't remember if it was U of R [University of Regina] or U of S [University of Saskatchewan].

Mr. Geary: — It might be. I hope there is. I didn't know but it would be nice if there is.

The Chair: — But I just wanted to thank you for your presentation today. It was very good of you to take the time to come out and answer questions and present to us. So thank you very much.

Mr. Geary: — Thank you.

The Chair: — The committee will now recess momentarily for our next presenter. We will reconvene here near the top of the hour.

[The committee recessed for a period of time.]

The Chair: — Before we hear from our next witness, I would like to advise witnesses of the process of presentations. I'll be asking all witnesses to introduce themselves and, where applicable, please state your position within the organization you represent. If you have any written submissions, please be advised that would you like to table your submissions. Once this occurs, your submission is available to the public. Electronic copies of tabled submissions will be available on the committee's website.

The committee has asked all submissions to be in response to the following question: how should the government best meet the growing energy needs of the province in a manner that is safe, reliable, and environmentally sustainable, while meeting any current and expected federal environmental standards and regulations and maintaining a focus on affordability for Saskatchewan residents today and into the future?

Each presentation should be limited to 15 minutes. Once your presentation is complete, committee members may have questions for you. I will direct questioning and recognize each member that is to speak. Members are not permitted to engage witnesses in any debate and witnesses are not permitted to ask questions of committee members.

I would also like to remind witnesses that any written submissions presented to the committee will become public documents and will be posted to the committee's website for public viewing.

With that I'd like to welcome our next presenter. And please go ahead.

Presenter: Solar Outpost

Mr. Anderson: — Thank you. I think that was maybe my written submission there that just went around. Okay. I had a copy here in case people didn't have it as well.

My name's David Anderson. I'm with Solar Outpost. We're a company here in Saskatoon. We've been around in some form or another since 2001. We were a company called Solar West. We did a lot of water pumping with cattle. We now are into the residential and commercial sector of renewable energy. Grid-tied power and geothermal are our main businesses. I'm the design engineer, alternative energy engineer for the company. We're just on the north end of Saskatoon, right up by Costco.

So the focus of my work today is what we do for power generation. And that's small-scale renewable energy, wind and solar energy, and specifically grid-tied systems.

So I think a lot of you probably know that the national commitment to reduction of greenhouse gases is 20 per cent below 2006 levels by 2020. And there's also a commitment to have 90 per cent of electricity provided by non-emitting sources.

Provincial targets are similar. There's not a really clearly laid out plan how to get there and that's part of the reason why we're here today. Renewable energy has to be a part of that mix. Regardless if there's agreement when or how, non-renewable sources are going to run out. They are starting to be depleted and they will run out eventually.

Clean energy is a necessity, not only because of the high public demand but also because it is cost-effective. And it's going to be increasingly cost-effective as we get into a carbon market and in that type of world.

We really have a great opportunity here in Saskatchewan to be a leader and an innovator in a green economy, and there's some sectors that are already flourishing. Renewable energy in Saskatchewan in particular, we have one of the best wind resources in southern Saskatchewan that occurs anywhere inland in North America. Southern Saskatchewan in particular, we're seeing great results from some of our small units. Some of the larger units I think are showing fairly good results as well.

As far as the solar goes, we have more bright sunshine here than anywhere else in Canada. If we're looking for a place to start the renewable energy market with the solar end of it, this is the place to do it. We have more sun than anywhere else and we'll see better produced energy than anywhere else in Canada.

We also have fairly high emissions intensity of greenhouse gases, and that's based on our existing infrastructure. So again this is a great spot to look at reducing greenhouse gas emissions with clean energy and renewable energy.

Distributed generation and the net metering program here in Saskatchewan are ones that are working fairly well. Good policy in place to get some of these renewable industries going. One of the key things that distributed generation does, it really acts as the same effect as a reduction in load. They both reduce the need for power at a certain node in the grid. Power is provided where it's needed. The transmission and distribution system, the load on that system is greatly reduced.

The picture there on the right is a picture from a city in Japan. They have policies and incentives in place in that city — it's one of their sunniest cities — that's allowed them to put on solar panels on about 90 per cent of all the residential buildings and they provide a large amount of power from solar energy in that city. The residential portion of it is close to 90 per cent of all the power for residential use.

Some of the other effects — a lot lower grid costs and losses if you have produced the power right at the site that you need it. Lower risks with smaller project size, and we can scale them up in a very short amount of time.

In terms of some of the wind projects we've done, in the last year we have installed nearly half a megawatt of installed capacity for small wind energy and solar energy. The shorter lead times are a great way to delay the need for a large-scale centralized power plant. You can delay that so you don't need it right away if there's a growing need like there is here in Saskatchewan.

Low or no fuel price volatility. Once you have the wind and solar systems in place, there's no cost other than some maintenance for the wind. The solar systems, no moving parts, there's really no maintenance involved.

Better grid reliability and cleaner air in the environment. We produce all the power right in the city from clean, renewable energy. There's no dirty pollutants and greenhouse gas emissions. It's pretty hard to put a cost on the pollution that comes from a coal-fired power plant, but certainly there is a health cost to our society, some societal costs that are pretty hard to put a number on.

The small wind industry many of you probably know, but the net metering program was introduced in October 2007. The policy, the incentive, and the education were all introduced at the same time, and it was a very effective way to quickly grow the industry. There's a 25 per cent grant that was used to stimulate the economy. The policy in the net metering allowed you to feed power back in the grid and get credit if you couldn't use it at that point. And the education with SaskPower, the Saskatchewan Research Council, and all the private companies is ongoing. We talk to people at trade shows. People come to our offices every day and that education is ongoing.

The growth in the small wind industry has taken time and a lot of commitment, but over the last couple of years we've got to the point where it's a fairly streamlined process to get a new order, get everything in place — the permits, the regulations through SaskPower — and have all the inspectors and engineers out to do the commissioning. We can have a system up and running fairly quickly. It certainly took a long time to get there. There was little intricacies that needed to be taken care of, and it needed a continued commitment to get it to the point where it is.

This industry's created new jobs across the province, and it's a multi-million dollar sector of the green economy. There's many success cases like our own in the small wind industry, and growing all the time.

The first time we had a grid-tied system at a trade show was at Agribition in October '07. There was no net metering policy at that point. We were the only ones there with that system. Created tremendous attention; lots of people stopped and asked. The last time we were at Farm Progress Show, this year, there was eight different systems that were competitors and eight different people in that market. So it's certainly a growing industry, lots of high-value jobs that are being created there.

One suggestion for policy improvement, we have a lot of people that . . . A farmer would like a system. We'd go to the site and they have more than one meter. Right now if you have more than one meter, you need more than one system. You can't feed power to another meter and get credit for both, even if the bill is coming out of the same person's pocket. You have to put up two separate systems and that's just a policy that's in place currently because they don't give access to the retail market. You can't sell it for retail and credit other people's meters. They want to stop that. If that's something we improved, I think it would improve the small wind market as well.

[13:15]

Photovoltaics industry. That picture there is just south of our facility in Saskatoon. It's McDiarmid Homes. They do RTM [ready-to-move] homes. We put solar systems, grid-tied ready, right on the roof of their homes in some cases, and they put them in place and connect to the grid.

We have the model that works from the wind industry. We've created a multi-million dollar industry here with a lot of high-value jobs. And that model really works. The policy's in place. All the workings from SaskPower are in place. The education is ongoing and the incentives are there in some cases.

One of the things in the small wind industry that really helps is a lot of people are using these for business. There's a business capital cost allowance on the federal level and a lot of the people can take advantage of that capital cost allowance. It really makes the product a lot more attractive.

One idea for the solar industry, because it's going to be used in a residential capacity more so than in business, is a personal tax credit could go into place. And if that was the case, they would have the similar type of tax benefit that the businesses see, and it would really stimulate it. You could start growing the economy.

The costs have come down — as you can see there on the bottom there's a chart — roughly 15 per cent per year. This year there was a drop of roughly 30 per cent in price. We're now at the price where solar is fairly competitive with wind in terms of installed cost per kilowatt hour on a small scale.

The tax credit's the one thing that's driving the wind industry more — and the education. People know it. There's a tradition of small wind energy in Saskatchewan. Farmers all had small wind energy before the grid was very reliable and now that the grid is reliable, going back that way again. The net metering policy really helps that.

That personal tax credit would really stimulate the economy and I think we would grow another multi-million dollar industry fairly quickly if we had that. The policy's in place and the education is coming. This is a study that was recently done by Natural Resources Canada. It shows the effect of building-integrated photovoltaics in the various provinces. Saskatchewan is one of the top places in the entire country to use building-integrated photovoltaics. They show that our electricity production could be 88 per cent of all power used in residential-type systems.

We have the highest mean daily insulation or the most bright hours of sunshine than anywhere else in Canada. And Saskatoon is actually a little higher than the Saskatchewan average, and there's places in Saskatchewan that are even better. Coupled with the high greenhouse gas emission intensities, this can be a very good thing for cleaning up our power grid, and we can provide almost 90 per cent of all residential power, which is a significant portion of our power use in Saskatchewan.

The last thing I want to talk about is the economy. Everywhere we go, we kind of spread evenly the work around the province. We have installations from the Southeast, in the Yorkton area, up to Candle Lake and Anglin Lake, and down in the Swift Current area — all across the province. Everywhere we go, tradespeople are needed — electricians, plumbers, local contractors for foundation work, concrete. They're needed everywhere we go. We're stimulating all those little economies everywhere as well on the local level.

We retain highly educated people in Saskatchewan. My personal experience, I focused some of my study on renewable energy in my schooling at the University of Regina and wanted to stay in Saskatchewan and pursue that. It was difficult to find anybody where I could get work in that kind of economy. I was going to go to work for one of the biggest companies in the world doing pipeline design for inspection, pipeline inspection. A couple of entrepreneurs from Saskatoon got in contact with me and wanted me to stay in the province. It was an easy choice for me. I wanted to be in this industry and I'm here now.

The same thing goes for a lot of engineering students that I talk to at the U of S. We hired a student and we did interviews. There was probably 50 applications, and all of them really were interested in being in the green economy and wanting to work in wind, solar, and geothermal energy. The renewable industry has tremendous interest, and the public appetite for these products is huge as well.

When people ask me where to look and where to go for a job, I mean my type of job that I got into is pretty rare at this point. But I think we have a real good opportunity to grow a very green, strong economy here and have some of these multi-million dollar industries like we see with the wind. And solar is the next one that's coming. With the right stimulation, it's going to grow quickly.

The solar industry does need a little bit of time like the wind industry did, a couple of years to scale up and get ready so it's a real streamlined process. All the products are in place and easy to use. The inspectors and the people in SaskPower are starting to know the small wind industry real well. Solar, it's not as big yet and there's some little intricacies there that need to be dealt with. But with continuous support for these industries, they can contribute to a large part of our economy and our energy future.

That picture there is in Bankend, Saskatchewan. There's four 10-kilowatt wind turbines we recently installed there. That's a large seed plant that is powered — and the whole farm is powered — by wind energy now, these four 10-kilowatt systems up on a high hill, real windy spot. He's going to have great production of power there. And that kind of concludes what I have for now.

The Chair: — Excellent. Well thank you very much for your presentation. I have a couple questions for you. Something like this, what is the payback time that that individual currently . . . He's made the investment. How long until he gets his investment paid back to himself?

Mr. Anderson: — Yes. A simple payback on a system like that, you're looking at five to ten years. This particular one, I think it came out at about seven years when we ran the numbers on it. That includes a 5 per cent inflation rate for electricity over the next number of years — which may be low from what I hear lately — as well as the grants and incentives that are currently in place that he has access to.

The Chair: — Okay. I think that's my questions for now. Mr. Taylor.

Mr. Taylor: — Thank you very much. And indeed, David, thank you very much for your presentation today. I want to just

take off from what Tim was questioning and the last slide that's up there and this farm, just to get an idea of a very specific project. Essentially a seed farm. They get all of their electricity needs I think you said, or energy needs, from this wind resource?

Mr. Anderson: — Yes.

Mr. Taylor: — Is there any challenge for that operation as you've installed these units? Is there any challenge to the intermittent nature of the wind, and does this source of energy need to be balanced with electricity from the grid? So I'm assuming it's tied into the grid; sometimes it's drawing, sometimes it's putting back. And so I'd just like you to describe that process of how this system works. Obviously there's something to be learned, I think, from how a specific example can give us a better understanding of the general, in a larger context.

Mr. Anderson: — Yes, absolutely. This particular project, no problem with the intermittency of the wind. It is grid-tied so if he's using power, he'll use all the power that's generated from the wind first. Any excess that he needs if the winds aren't real strong, he'll pull from the power grid just the same as he always would. All of our systems are already set up, just the way they're inherently designed, to accept power flowing in either direction. You can increase the power available on the grid if you have excess, or you can take power from the grid very easily. It's something that happens automatically once you do the correct connections.

And there's no real concern with . . . I think the second part of your question was if there's any concern with connection to the grid at all. All of the inverters and systems that are grid-tied are CSA [Canadian Standards Association] and UL [Underwriters Laboratories] approved. So there's fairly stringent regulations on voltage, frequency levels, those type of things. And there's no concern with any type of power going backwards on to the grid either.

Mr. Taylor: — Can you give us some idea of what the percentages might be? The percentage of time that the farm is drawing from the wind source compared to the percentage of time that he might be drawing from the grid.

Mr. Anderson: — In a real good small wind application, a good capacity factor is 20 per cent. So what that means is 20 per cent of the full . . . for instance, a 10-kilowatt unit will be produced for a year. So a 10-kilowatt generator, for instance, would put out 86 000 kilowatt hours roughly per year; 20 per cent of that is a pretty good capacity factor. So it's right around 20 000 kilowatt hours for a 10-kilowatt system in a good area, it's going to be putting out.

In terms of how often it blows, there's a probability distribution called the Weibull curve for the wind energy industry that we use. And it can tell you the percentage of time the wind will blow at a certain speed, based on the average wind speed. In a good wind site, there's not many times where there's no wind at all at the heights that we have our system set at.

Mr. Taylor: — You talked quite a bit about sort of local benefits — or in this case, farm or individual benefit to this — but for every individual benefit there is an accumulated net benefit. When we take a look at Saskatchewan's future energy need and just looking at that number that you suggested — you might use 20 per cent from wind, 80 per cent from the grid — in fact what you're telling us if this is on average, that for all intents and purposes the net generation of power going into the grid from other sources could be reduced by 20 per cent if there is a greater number of individual units through the system. Am I correct by that analysis?

In other words what I'd like you to do is tell us if the overall system as managed by, directed by, built by SaskPower — what is essentially now powering the grid — if the amount of generation that's required elsewhere can be reduced by 20 per cent if we have a greater number of individual small wind systems on the system and maybe expand that a little bit to include future solar installations, or what some are arguing, now district-built systems whereby you might use biomass or something else to create some energy.

In other words I'm asking you, can you help to define the amount of power that SaskPower might need to reduce its generation by? Should we be more supportive of individual systems?

[13:30]

Mr. Anderson: — Yes, certainly you can reduce it. That 20 per cent number, it's not quite using 80 per cent in use and feeding back in 20 per cent. I guess I didn't explain that quite correctly, but for a system that we have at 20 per cent capacity factor on, we'll design the system for a farm that would require roughly 20 000 kilowatt hours. And we'll put a 10-kilowatt system in there, so it'll provide all the power throughout the year for that farm and power the grid in a distributed way at other times of the year.

So it's essentially kind of oversized. If they had a 10-kilowatt generator on the farm, they needed 20 000 kilowatt hours going, they'd have a lot more capacity than they need. But because of the wind, he's never going to produce 10 kilowatts all the time every day, 24 hours a day. That's why we use that capacity factor in sizing that way.

In terms of the reduced load, certainly I think, with the slides that I talked about with solar, we can provide almost 90 per cent if we had it on almost all available roof space. It can play a significant role if we start doing it in building-integrated photovoltaics.

With the wind energy, the same thing. Almost all the systems that we're putting in right now are net metered systems, so we'll go and provide . . . We'll try to aim for all of the power for that given farm or acreage to be produced by wind energy, or solar energy if it's installed on a rooftop. So the distributed effect certainly has the same effect as load reduction. For producing the power right there on site, it's the exact same effect as no load on the site at all.

Mr. Taylor: — And one last question, because SaskPower has indicated that when they are buying power they need to know when that power is coming into the system because that means that they — depending on what the demand is elsewhere in the

province — they might have to shut down something else in order to take what's generated through the system. Has SaskPower discussed with you or any other provider of equipment that would feed power back into the system, have they talked to you at all about gathering that information about when power is coming into the grid so that they can make their balancing decisions?

Mr. Anderson: — I think what you're talking about is kind of like a smart grid application. Most of our solar and some of the wind systems are already set up for a smart grid type of information flow, were it needed from SaskPower. With all the net metered systems that are out there right now, they come and they take a new meter and they put it on. I don't know if that's set up for smart grid, but it's set up for net metering, which flows both ways.

So they have two key data that they want. They want to see how much was fed back into the grid, and they want to see how much was pulled out of the grid for billing purposes so they can bill out the difference. If these systems were smart meters that were put on, they could get access to that information any time they needed. A lot of the solar systems and wind systems are already set up for it but aren't being used by the utilities. But they certainly could be.

Mr. Taylor: — All right. That's all my questions for now. Thank you very much, David.

The Chair: — Mr. Allchurch.

Mr. Allchurch: — Thank you, Mr. Chair. David, thank you for your presentation. One quick question regarding the picture showing the solar panels on the houses of Japan. That picture showed that there was some 90 per cent of the houses there had those solar panels on. Where do they store the excess power? Because it produces power during the daylight, and then when nighttime comes it shuts down. So where do they store that?

Mr. Anderson: — Typically the loads that any society uses, most of the energy is used during the daytime. When it's a system that's set up to provide 90 per cent of the energy. I think that they would have to have some kind of smart grid system in place that they would know when the loads are, and they would be able to ramp down other forms of energy as that solar was creating lots of energy.

It's set up in a way that most societies use all the power during the day for the business and industry and those type of things. Residential sector's really the only one that uses a lot of power at night compared to how much it uses at day. People come home at the end of the day and use power. But really during the day, all that power would be being used somewhere else. It's not going to be used for those individual houses. They'll feed in and then they'll just use power from the grid at night.

Mr. Allchurch: — And the second questioning is regarding the windmills. And you mentioned that you've sold a number of units, most of them in the southern part of Saskatchewan because that's where the wind is predominant. But you also said that you sold some of these windmill systems up in the Candle Lake area. I'm wondering where they're situated at Candle Lake because Candle Lake is situated in an area where there's a lot of trees. So where do they get their wind from in that area to supply the wind power for these windmills?

Mr. Anderson: — Yes. In that particular case, he's at the end of the lake where it does see a little bit more wind, and it is above the tree level. So it's on a 130-foot tower. Most of the trees in the area are, I believe, about 80 to 90 feet. In that particular case, he certainly still won't see the same type of production that you would in the southern area of the province.

One of the other things that went into the evaluation for him is he needed some equipment to supply Internet to other customers around in the area through a satellite type of thing. I don't know all the details. But that was part of his plan too. He needed to put up a tower already for that type of thing, so it made sense to use the tower for a wind generator as well.

Mr. Allchurch: — Because we don't experience a lot of wind in the, I'll say, the central and northern area, what can you prescribe for that area that would be good for the initial power that we need?

Mr. Anderson: — Yes. Good to add solar. We have a lot of sun. And when you get past a certain point where the wind stops, certainly once you get into the forested areas, grid-tied solar makes a lot more sense. And the economics of a system like that are better. It's easy to show that. Sometimes, being right in the forest, you've got to take account of a few other things, you know, like the shading and things like that. But if it's done right, grid-tied solar is very beneficial.

Mr. Allchurch: — Well thank you very much.

The Chair: — Mr. Wotherspoon.

Mr. Wotherspoon: — I'm sorry, I missed pieces of the presentation, David, but I appreciate you coming here, and I'll certainly go through in detail what you've put forward. Can you share with this committee what the average cost per kilowatt is for both wind and both solar out of your systems?

Mr. Anderson: — Yes. Per kilowatt hour or per kilowatt installed?

Mr. Wotherspoon: — Maybe both and then we'll . . .

Mr. Anderson: — Okay. So now the installed cost for a grid-tied solar system per kilowatt installed would be roughly $7 per kilowatt of installed capacity. And depending on where that system is installed, it'll produce different amounts of power. So sunny places in the province, we're going to see — oh, per kilowatt hour, let me think; I don't know that number off the top of my head — it's probably in the range of 10 to 20 cents per kilowatt hour once we take into account incentives and that type of thing. I don't know the number off the top of my head without any incentive.

Mr. Wotherspoon: — And your cost is very similar for wind and for solar?

Mr. Anderson: — It's cheaper for wind than it is for solar right now for the most part. If you're in a good area that has good sun and good wind, wind is certainly cheaper.

Mr. Wotherspoon: — Then you've said you've installed point five megawatts of wind within this province. How many windmills would that be?

Mr. Anderson: — Yes. We have 3 of the 40 kilowatt size installed and 35 roughly of the 10 kilowatt size, as well as roughly 10 kilowatts of installed capacity for solar.

Mr. Wotherspoon: — Do you see a bit better efficiency out of the 40 kilowatt windmills than the 10 as far as certain economies?

Mr. Anderson: — Yes, in certain terms, we're actually seeing better in terms of the 10 kilowatts. Ten kilowatts is a great product, and it's producing really good energy.

Mr. Wotherspoon: — It's more efficient than the 40?

Mr. Anderson: — It has been, yes. And that's been a bit of a surprise to us. And that's some of the growing pains we've been going through, through the industry, finding the right products that are going to make the best energy for our customers.

Mr. Wotherspoon: — Thank you very much.

The Chair: — Mr. Bradshaw.

Mr. Bradshaw: — Just a couple of questions, David. And thank you for coming today. You were talking about the metering and you kind of lost me on that when you were . . . Could you explain that one again? On the metering you were talking about, it would be a policy for SaskPower to change their metering around. Just could you explain that through again?

Mr. Anderson: — Sure, absolutely. Right now the way the policy's set up, it's not designed for customers that install a system to have access to the retail market. So they're not designed so they can sell to, say, their neighbour if they're producing more power than they need over the entire year. So in the extreme case of when there's two meters in the same yard, they're not allowed to credit one meter from the other.

So the net metering policy, we always try to design our systems so they'll just produce slightly less than their entire usage. Because if you design it for more power production than you're going to use, they're going to cancel that credit at the end of the year. There's a reconciliation date and it's reset to zero. So essentially what it does is it just prevents you from access to a retail market and crediting any other meter or any other person with the power you produce with your system. Is that what you were looking for?

Mr. Bradshaw: — Yes. That's what I was looking for. I didn't quite understand it when you were explaining it there before and, you know, so I certainly appreciate that. Just one other thing. This actually works on the solar end, and you see those, like I mean we saw the houses there in Japan and whatnot. Are they at a steep enough angle that the snow comes off them in the wintertime? And I didn't know, does the snow just come off automatically, or do you have to go up there and clean them off, etc.?

Mr. Anderson: — Yes. Typically the way they're installed, as long as it's not a really wet, sticky type of snow, it's not going to stick to it. It just kind of slides off. It's mounted a little bit off the roof so it's not right on the rooftop level. And if there's a little bit of sun on a corner of that panel and there's a little bit of snow on it, it'll quickly melt off, even at low temperatures.

So yes, sometimes you do need to sweep it off a little bit if it's a real wet, sticky or freezing rain type of thing that comes. The freezing rain will melt off more because it's still transparent to the dark surface behind. But the snow, if it's a real wet, sticky snow, sometimes you do have to wipe it off.

Mr. Bradshaw: — Those were my questions. Thanks.

The Chair: — Mr. D'Autremont.

Mr. D'Autremont: — Thank you very much. Interesting presentation. When you made your presentation talking about your towers — and I have seen them on the highway heading home, on 33 — you talked about the subsidy that was involved in it as well. My concern is, though, that you say you design your system to almost match the need of that particular location.

Mr. Anderson: — Yes.

Mr. D'Autremont: — Yet you still have that connection. You still have the use of the generation system and the transmission system. Do you consider that access as part of the subsidy? Because somebody else is paying for that transmission system coming into that location. Somebody else is paying for that generation system, wherever it's sitting. If your system is supplying that location with all the power need that they have so somebody else has to pay for that other system that's coming in to back theirs up, so would that be considered part of their subsidy or should they be paying for that service?

Mr. Anderson: — Actually the service charges for net metering are still paid. There's a basic monthly cost that is paid, and I believe part of that is for transmission distribution. But I think the benefits of a distributed generation system spread out throughout the province far outweigh the costs of the grid that other people may pay for. There's many benefits to it. I've listed just a few of them here. I've got a lot more literature on it if anybody would like further literature on distributed generation. But all the grid losses that are saved, system reliability, a lot of the other distributed generation benefits I think outweigh the possible costs.

Mr. D'Autremont: — Thank you. I asked Mr. Prebble when he was here, and one of the other presenters as well, about the distributed system. And Mr. Prebble just presented myself today and he gave the full report to the committee with a study on that. And I'll read one sentence from it, from the abstract, "[It was] found that an average of 33 per cent and a maximum of 47 per cent of yearly-averaged wind power from interconnected farms can used as reliable, baseload electric power."

So while it's certainly a benefit, I think in Saskatchewan our generation from SaskPower's wind towers is 38 per cent. There still is obviously a need for backup to the system.

Mr. Anderson: — Yes. I think renewables should play a role, certainly. And as we progress in this type of industry we can find ways to improve those numbers. Absolutely. But yes, currently it's just going to play a role in the energy mix. It's not going to be able to provide all of the power for the entire system with our current type of technologies. As we progress and we innovate new designs, I think there'll be a chance to really increase that number from the 38 per cent that you stated there.

Mr. D'Autremont: — One of the questions I've been asking a number of the presenters deals with the transmission system. We're informed by SaskPower that we need to upgrade our transmission system. As we go to new generation such as wind or solar that will connect into the grid across the province, there will be an increased cost to the transmission system because of that smart grid, etc. Who should pay for that? Should that be paid for by the new generation system, or should that be paid for by the system as a whole?

[13:45]

Mr. Anderson: — Again I think the distributed generation, the benefits that are going to come for it are going to offset a lot of those costs that you're talking about for the upgrades to the transmission distribution. There's a lot of evidence that suggests that a grid connected distributed wind or solar system, often the value of it will be increased tenfold when looking at distributed generation type of system.

So there's a lot of value and a lot of savings that will offset some of those costs that do need to be upgraded with the grid. And maybe we can avoid some of the upgrades. I know some of them have to be made. They're getting old, but there's certainly a lot of ways that distributed generation can save a lot of money for the transmission and distribution.

Mr. D'Autremont: — We're obviously going to need, though, an upgrade to the baseload system as well as the backup. And there will be need for new transmission for those locations as well. So you would include that as part of the entire system as well.

Mr. Anderson: — So you're saying if there was a new centralized power station built?

Mr. D'Autremont: — Yes. Or if there was cogen plants or biomass generators that maybe, you know, fairly large units . . .

Mr. Anderson: — Okay.

Mr. D'Autremont: — Should that transmission for those locations be considered to be paid for by the entire system as well?

Mr. Anderson: — You know, I'm not an expert on those type of systems and what's required for transmission distribution. But what I'm focused on in the distributed generation, and what I know, I know that's going to save money. So I can't comment in an expert way on that.

Mr. D'Autremont: — Okay. Thank you.

The Chair: — Just a couple questions I have to finish off. You know, we've heard from different people about wind generation and temperature. And SaskPower said that 30 degrees was kind of their rough baseline. Yesterday we heard there's a few other factors. With your off-the-shelf models, do you have a shutdown temperature?

Mr. Anderson: — We don't. We don't have a lot of our technical electronics up in the air. This particular 10-kilowatt system, all that's up in the air is basically a big alternator, permanent magnets spinning around a coil, and that has no low temperature issues at all.

The Chair: — So at 50 below you're producing electricity and putting it on the grid?

Mr. Anderson: — With these systems, absolutely.

The Chair: — Excellent.

Mr. Anderson: — And I noticed a comment by the last presenter, he was talking about less efficiency. Maybe he was talking about that shutdown temperature. But there's actually more energy available in the wind at low temperatures due to the density of the air. So we tend to see more power produced at cold temperatures, which seems to fit fairly well with what's required from the grid.

The Chair: — I asked you about payback on one of these wind systems on that house that was behind the truck going past, what would be the payback on that tie-in?

Mr. Anderson: — It's slightly longer than wind, certainly. That particular system is only going to provide, I think it was roughly 50 per cent of his needs. But that particular system, the payback period would be probably 15 to 20 years currently. And that is largely due to the tax credit that's not available for personal use if he's not running a business, like he would be just on his home there.

The Chair: — Okay. My last question is, before politics I was a rancher. I have a solar water pump, and I think it actually came from your company, so for full disclosure I should state it publicly. So I've got an electric fencers with electric panels. I've got a bunch of electric panels just laying around that I use a few months of the year. What would it cost individuals like myself to put in the appropriate box, plug these in, and be producing power when we're not using them on the farm?

Mr. Anderson: — Yes. It all depends on how much you have, but a cost-per-kilowatt-installed roughly, you'd be looking at about $1 per watt or about $1,000 per kilowatt of installed solar capacity. So I'm not sure how many panels you have or how many you'd want to connect, but that's a pretty good estimate just for the grid-tied inverter.

The Chair: — Just for the grid-tied converter?

Mr. Anderson: — Yes.

The Chair: — Okay. You're going over my head a little bit. Let's say I have approximately five two-foot by three-foot panels.

Mr. Anderson: — Okay. So what the grid-tied inverter does is it interacts with the grid. It's got all the safety connections, so if the power goes down, the power drops off right away. The way you're using it right now, all the panels produce DC [direct current] power. And you're doing a lot of battery applications there and off-grid applications. To tie it to the grid, you need to have the really well-conditioned AC [alternating current] power come out of the inverter.

So that's what it's doing. You could just have it sitting on the wall, mounted, tied to the grid somewhere in a shop or wherever and connect the panels to that system if you were only using them at certain times a year. Certainly that is a possibility. You said roughly two-foot by three-foot panels?

The Chair: — Yes. About five of them.

Mr. Anderson: — Yes. If they were, they're probably the 120 watt panels if they are panels that came from Solar West. So you'd have 600 watts of installed capacity there, and you could produce probably 1 to $200 or more in power, depending on at what time of year you're using it and how often you're using it.

The Chair: — Okay. And how much was that for the box?

Mr. Anderson: — For a system that size, we usually do the 2 kilowatt grid-tied installs as our bottom kind of smallest system. So for you I guess it would be a little bit more; you'd probably be looking at roughly 2,500 for the equipment. If you had the 2 to 3 kilowatts to install, that would be roughly a dollar per watt or $1,000 per kilowatt. But for you, because you don't have as much capacity, it's a little bit more.

The Chair: — Okay, great. Because I'm thinking, you know, every rancher I know has solar panels around that aren't putting anything into the grid right now.

Mr. Anderson: — You know, that's interesting because a big part of our business was water pumping with solar. And that's nothing we've really looked at before; certainly it is a possibility. We should revisit that. We know all those customers real well.

The Chair: — We had a couple of ranchers here last week and they made a comment — and I found it funny because I am a rancher — that ranchers or farmers were cheap and they're going to find the best way to do stuff. And I had to chuckle because I'm a rancher and I am cheap, so they may be on to something.

Thank you very much for your presentation today. I think you answered a lot of the technical questions and kind of on-the-ground information we want to know. So thank you very much.

Mr. Anderson: — Sure thing. And if there's anything else I can provide further to my presentation that anybody had any interest in, as far as distributed generation or the wind and solar industry, I'd be more than happy to help.

The Chair: — Thank you. The committee will now adjourn. And actually I will have to entertain an adjournment motion. Mr. Bradshaw so moves. All in favour?

Some Hon. Members: — Agreed.

The Chair: — Carried. This committee now stands adjourned until 9 a.m. tomorrow morning in La Ronge.

[The committee adjourned at 13:53.]