Legislative Assembly of Alberta

The 28th Legislature
First Session

Standing Committee
on
Resource Stewardship

Hydroelectric Energy Production
in Northern Alberta
Stakeholder Presentation

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Standing Committee on Resource Stewardship

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Standing Committee on Resource Stewardship

Participants

6:19 p.m. Monday, October 29, 2012

[Mr. Rowe in the chair]

The Deputy Chair: Ladies and gentlemen, we'll call the meeting to order now. We're over time a little bit already. My mistake. My bad, as we say.

We'll start with introductions first. We'll go around the room starting with Mr. Hehr.

Mr. Hehr: Kent Hehr, MLA, Calgary-Buffalo.

Mr. Rogers: George Rogers, Leduc-Beaumont.

Ms DeLong: Alana DeLong, Calgary-Bow.

Ms Calahasen: Pearl Calahasen, Lesser Slave Lake.

Mr. Casey: Ron Casey, Banff-Cochrane.

Mr. Stier: Pat Stier, Livingstone-Macleod.

Mr. Webber: Len Webber, Calgary-Foothills.

Ms Kubinec: Maureen Kubinec, Barrhead-Morinville-Westlock.

Ms Fenske: Jacquie Fenske, Fort Saskatchewan-Vegreville.

Ms Blakeman: Laurie Blakeman, and I'd like to welcome each and every one of you to my fabulous constituency of Edmonton-Centre.

Mr. Bendiak: Lance Bendiak from Hatch.

Mr. Irving: Jacob Irving, president of the Canadian Hydropower Association

Mr. Cao: Wayne Cao, Calgary-Fort.

Mr. Hale: Jason Hale, Strathmore-Brooks.

Mr. Barnes: Drew Barnes, Cypress-Medicine Hat.

Dr. Massolin: Good evening. Philip Massolin, manager of research services.

Dr. Brown: Neil Brown, from the scenic riding of Calgary-Mackay-Nose Hill.

Mr. Sandhu: Good evening. Peter Sandhu, Edmonton-Manning.

Mr. Anglin: Joe Anglin, Rimbey-Rocky Mountain House-Sundre.

Mr. Xiao: David Xiao, Edmonton-McClung.

Mrs. Sawchuk: Karen Sawchuk, committee clerk.

The Deputy Chair: Thank you, everyone.

Does everyone have a copy of the agenda?

Oh, sorry. We do have one member online.

Ms L. Johnson: Linda Johnson from the gorgeous constituency of Calgary-Glenmore.

The Deputy Chair: Thank you.

Deron, did you want to introduce yourself?

Mr. Bilous: Sure. My name is Deron Bilous. I'm the MLA for Edmonton-Beverly-Clareview.

The Deputy Chair: All right. Thank you.

Does everyone have a copy of the agenda? Okay. Could we get a motion to approve the agenda, please? Mr. Sandhu. All right. There are no seconders required for motions in this committee. Are there any additions or deletions to the agenda? Hearing none, all in favour? Carried.

First, I'd just like to advise that the Canadian Dam Association was unable to join our committee meeting this evening. A short written submission was received from them and has been posted under recent documents on our internal committee website. Time permitting, at the end of our presentation this evening members can read any questions they may have had for the Dam Association into the record, and the committee offices will endeavour to obtain responses from that association for distribution to the whole committee.

On behalf of the committee and the chair, who, unfortunately, was unable to join us today, thank you to the Hydropower Association for accepting our invitation to appear and provide us with an overview of the hydroelectric energy industry.

We're on a tight schedule, so I'll remind everyone of the process. Our presenters will have 10 minutes to provide their overview, and then I'll open the floor to questions from the committee. As the chair referenced at our meeting last Wednesday, the schedule for questions and answers will start with the Wildrose caucus for five minutes, followed by the PC caucus for five minutes, the Liberal caucus for five minutes, the ND caucus for five minutes, and so on. We will be using a timer to keep everyone on track. When the buzzer goes, you're done. We'll leave five minutes or so at the end for any outstanding questions to be read into the record, with a request that they be responded to in writing.

With that, I will turn it over to our presenters. Go ahead, please, gentlemen, whoever is speaking first.

Canadian Hydropower Association

Mr. Irving: Thank you very much. Again, my name is Jacob Irving. I'm the president of the Canadian Hydropower Association. I'll walk us through the slides in 10 minutes. Lance Bendiak is here with me from Hatch. Hatch is an energy consulting firm that is a member of the Canadian Hydropower Association that also commissioned a very detailed study on hydro power potential in Alberta a few years ago. He'll be here to answer questions as we get into the question-and-answer period.

Without further ado I will endeavour to live up to the invitation and essentially try to explain hydro power across Canada and also delve into hydro power in Alberta as much as I can. Again, I have a very general perspective of hydro from my position as the federal hydro power association, but I think we can talk some specifics about Alberta, too. I think it will be a very interesting discussion that way.

Just some quick overview, introductory information. Hydro power is 130 years old in Canada. It has a long history from coast to coast to coast. In fact, in Alberta there are dams that are 100 years plus. Horseshoe dam, for example, on the Bow River comes to mind. So Canada is a pioneer and an innovator in hydro and continues to be. When you look at the overall electricity generation in Canada, it's 60 per cent of our total installed capacity. What does that mean? It means that we have 74,000 megawatts of installed capacity. On a global scale that makes us the fourth largest.

6:25

Now, an interesting piece is when you then move to: how much

electricity do we actually generate with this hydro? We have 74,000 megawatts. Then when we actually make power with it, how much power do we generate? We generate 360 terawatt hours a year. That actually puts us in third place. We're the world's third-largest generator. Just to break that down a little bit, in terms of installed capacity the world's largest is China, and then number two is Brazil, number three is the United States, and number four is Canada. But it's interesting. Even though the United States has more installed hydro power capacity than Canada does, we produce more electricity from our hydro than they do. We actually use our hydro generation capacity far more than the United States does. So just a bit of an interesting perspective.

Of course, many of the benefits of hydro are well known, but they bear repeating, especially given a lot of the challenges you hear today in terms of energy development. There is zero air pollution associated with hydro power, and we have ultra-low GHG emissions. On a full life cycle basis for hydro power, if you look at GHG per unit of energy, we have some of the lowest. In fact, we are as low as wind, and in many cases we are lower than wind power in terms of GHG generation. Just to substantiate that a little bit, each terawatt hour of hydro can displace between half a million and a million tons of CO_2, depending if it's displacing natural gas or coal, to give you an idea.

Then just, again, a bit more of a breakdown. I think that probably the best pie chart to look at here first is the world. I'll draw your attention to that. That is a breakdown of how the world makes its electricity. You can see that 60 per cent of the world's electricity generation comes from combustible fuels – that would be a mixture of coal, natural gas, biofuels, others – and that 16 per cent comes from hydro power, 14 per cent from nuclear, and then that smaller 3 per cent wedge is wind, solar, others.

Now, look over at Canada, and you can see that we are pretty much the mirror, opposite, image of the world's generation profile. Sixty per cent of our electricity comes from hydro. Then you can see that combustible fuel adds up to about 25 per cent. We're able to break it down here, showing you that coal is a little more than half of that, 13 per cent; and then nuclear, 14 per cent; and wind, solar about 1 per cent.

Then we decided, of course, that we should put up the Alberta generation profile. You can see – and many of you, of course, already know this better than myself – that the majority of electricity from Alberta comes from combustible fuels and that 63 per cent of that is from coal-fired generation. So that's, again, just to give a bit of perspective.

What's interesting when you talk about Canada and its 60 per cent hydro and that it's the fourth-largest installed capacity, the third-largest generator – we can substantiate that a little bit more. Seventy-four thousand megawatts: that's our current installed capacity that I mentioned earlier. This is what puts us in fourth place in the world. If you look at the green bar above, this represents the undeveloped potential across Canada, 163,000 megawatts undeveloped, more than double our current installed capacity. You can see that it's also very much a national resource. It exists at some level in every region of the country.

Now, if you look at this light green sliver, the light green sliver here is part of the 163,000 megawatt total. It's not separate; it's part of it. But what it represents are publicly announced projects. It's an aggregation of the projects that are being pursued across Canada right now. We have about 25,000 megawatts of projects from coast to coast to coast that are currently being developed. So you can see that it's a story of undeveloped potential, that as big as we are and as large as we are, we have a long way still to grow in hydro power development.

I'll flip back to Alberta quickly because this is also a very interesting story, that sometimes gets lost. The installed capacity of Alberta currently is about 900 megawatts. You can see that there is about 1,600 megawatts of projects that are proposed, the majority of that being made up of the Slave River project in the northeast of the province and then another 100-megawatt project, the Dunvegan project. But then above that you can see that the undeveloped potential for hydro in Alberta is about 10 times the current installed capacity. So there is hydro power potential to be pursued in this province. When you take a step back and you think about it, it stands to reason. For hydro power what you need is a change in elevation and water, and this province has both of those things.

To zoom into it a little bit and dig into that 11,775 megawatts of undeveloped potential, this is a bit of a provincial breakdown by river system. At the top here we have the Slave River mentioned because, again, that's a project that's currently being studied by ATCO and TransCanada. Underneath you can see that the Peace River has a large amount of undeveloped potential. Athabasca. We grouped it this way because it shows that the northern rivers tend to have some of the greatest undeveloped potential. Then you can see that the North Saskatchewan has a fair amount as well and the South Saskatchewan not as much. We've got an idea of the small hydro sites that could be developed on smaller rivers, tributaries sort of across the province. That adds up to 185 megawatts.

Again, it's a national resource. We can more than double our current capacity. There are 25,000 megawatts in various planning stages currently being pursued. Our association actually did a jobs and economic impact study last year. It was released in November 2011. We actually put some dollars and cents in employment of all of this. Our study found that over the next 20 years the projects that we're looking at would bring about $125 billion in investment across the country. That would equal over a million potential new jobs over the next 20 years.

Another way that I sometimes put it to try and characterize it for people in Canada is that if you were to imagine for a second, let's say, that Canada did not have an oil and gas industry – I know it's hard to imagine. It's not a great thing to bring up in Alberta, but imagine that it didn't for a second. Many countries around the world don't have an oil and gas industry whatsoever. We're very fortunate in this province and in this country to have that. Well, if that didn't exist in Canada, the number one energy resource development in the country would be hydro power. That's just to get some context.

To dig deeper into the Alberta example and numbers, it's interesting in terms of how it ranks within Canada. It's ranked seventh in installed capacity and eighth in production in terms of generation – that's out of the 13 jurisdictions – but Alberta ranks fourth in undeveloped technical potential. Again, you can see that there's a lot of hydro power that can be looked at and that could be pursued in this province.

Some of the recent developments in energy policy that I've been able to perceive from Ottawa: 60 per cent of Alberta electricity is used in the industrial sector, and by all accounts that is anticipated to grow. The Alberta Electric System Operator indicates a growth in generation, led, I think, by a lot of large industrial activity in the province. Currently the installed capacity for the province is 14,000 megawatts. That's, again, about 97 per cent coal and natural gas, combustible fuels, so it's largely made up of that. The increase is projected to be about 19,000 megawatts by 2022 and then up to 24,000 by 2032. So you can see that there is growth.

Also, you can see that through a combination of provincial and federal policy older coal-fired generation is going to be retired

over time and that that will need to be replaced. So not only do you have growth, but you'll also need to replace existing generation. Essentially, as you saw with the undeveloped potential, hydro power could help meet Alberta's demand for electricity and, of course, help reduce emissions while you're at it.

The Deputy Chair: We do have a little latitude here today because we only have the one presenter, but your 10 minutes is up. We'll give you another five, and then we have to get to the questions.

Mr. Irving: Thank you. I have a couple more slides. I almost made it.

The greenhouse gas emissions profile I think is fairly well established and well known. One of the things that I often say – it's interesting – is that I feel that sometimes people feel that the greenhouse gas issue is a new issue, or at least they've only caught on to it recently whereas most people know that it's a fairly old issue. It's been a compounding issue since the Industrial Revolution. What's funny is that often people think that because they think GHG is a new issue that it, therefore, must also be and can only be addressed by new technology. While there is truth to that, that new technology can help in GHG abatement, what I like to remind people of is that, actually, it's an old problem that can be addressed with an old, established technology in the form of hydro power. It's something that Canadians happen to be pioneers at and we happen to be quite good at as well.

6:35

Of course, in the new world when you bring on new renewables such as solar and wind, hydro is helpful there as well. One of the advantages of hydro power is our operational flexibility. With storage we are able to help shape load, and that means that we're able to help bring solar and wind onto the grid and help them with their variable, or intermittent, delivery to the grid. We can get into that later if you like.

Some of the advantages. We've seen advances in aboriginal relations across Canada in some of the newer projects that have come about. We've seen job-sharing programs that did not exist before. We've seen equity stakes in hydro power projects. There is an example here of a 25 per cent equity stake in an ATCO project with the Peigan. In Manitoba you see a 30 per cent equity partnership with the Wuskwatim project. So there have been advances in that area that are worth noting. Again, hydro power is the only renewable energy source with storage capacity, which is important for grid stability. We can get into that later.

We offer competitive, stable electricity prices. Hydro power is something that you are able to – you don't have volatile fuel import issues. You have a river system, and you're generally able to gauge that fairly closely. You're able to then offer stable prices as a result of that. It shows itself to be the best long-term investment for electricity generation. It's helped build Canada's strong industrial base from east to west. It's reliable and efficient, and of course it can be multipurpose, as you know, in this province. It offers flood control, irrigation potential, and water supply.

The price argument is a pretty compelling one when you look at it on a comparative basis in Canada. You can see on this chart, in fact, that what's highlighted are regions that are served predominantly by hydro power. In Quebec the electricity system is over 90 per cent hydro. It's the same thing in Manitoba. You can see that they have the lowest electricity prices in North America, and it's based on their multigenerational investment in hydro over time. You can see it bears out in the United States as well. Tennessee and Oregon are both hydro-producing regions of that country, and they have comparatively lower prices in the United States as well.

Quickly about our association. We deal with regulation at the federal level. One of the issues with hydro has always been the length of time it takes to build a project. It takes eight to 14 years to build a hydro project in Canada. It takes three to five to build a thermal project, to build a natural gas or coal project, for example. A lot of that has to do with regulatory overlap, and one of the things that we've worked at at the federal level is to try to bring some order to that. We've actually seen advances in that department from the federal government through Bill C-38 this spring. That's a positive development, I think, for hydro development across the country.

In conclusion, we are one of the most affordable and reliable ultra-low GHG-emitting electricity sources. We're a world leader in Canada. We can more than double our current capacity. Alberta's undeveloped technical potential is 10 times its current installed capacity. Effective policy both at the provincial and federal level could help unlock Albertan and Canadian hydro power potential and help us deliver, again, more clean, renewable electricity to meet all needs.

Thank you for the extra five minutes. I needed it.

The Deputy Chair: All right. Thank you.

We'll move right to the questions. I would remind everyone that we have five minutes per question and answer combined, so keep your questions short and to the point if you could. We'll start with the Wildrose. I believe Mr. Anglin is going to speak for the Wildrose to start.

Mr. Anglin: Thank you, Mr. Chairman. With regard to the estimates of the potential for Alberta's hydro, I was a little bit surprised to see it limited to about 11,700 megawatts. In the overview that was provided to us, it says: in a range of 11,775 to 35,000 megawatts. Now, when I was talking with industry members, they were up in that 30,000 megawatt range. Could you comment on the advances in technology? How do we get to that 30,000 megawatt number?

Mr. Irving: Yes. One of the studies that was submitted was the technical potential. It's a zoom in on it. The difference has to do with the capacity factor of the hydro power installations. What we've assumed as a conservative case is a 60 per cent capacity factor. That's the general factor across Canada, and that's what was applied to the resource. When you do that, it discounts it down. The idea is that a hydro power facility will not run at a hundred per cent capacity all the time because of the fluctuations of flow, seasonality of flow. You know, in spring runoff you're operating near a hundred per cent, but then in the height of summer maybe you're down to quite a low capacity factor. So the 60 per cent range was chosen as a conservative estimate, but if you have more water running through, it can be higher.

The Deputy Chair: Thank you, Joe.

The PCs' question. Go ahead.

Ms Calahasen: Thank you very much for coming in. I know that was really quick speaking in order for you to be able to get through the information. My first question is: when assessing hydroelectric generation potential, how does one come to an estimation of potential generation? How does capacity factor into that equation?

Mr. Irving: The study that was shared before tonight's

presentation is a study that was conducted in 2006. The methodology that was followed there largely was trying to get some existing numbers but then also reaching out to hydro power generators, and we asked them about projects that are possible but that are not under active consideration. You're basically asking members about projects that they've considered and that they've looked at, that they've put some time and money and resources into examining but that aren't publicly announced or that aren't part of the public record yet. We were able to get a little bit of a deeper look through that lens. That was one of the ways that we were able to figure it out was by going to the developers and asking them: what projects are you looking at other than the ones that you've announced? So that's one of the inputs that was really important in gathering that.

Then the capacity factor is one where you look at it and say, "Well, if these projects were running at a hundred per cent water flow, maximum capacity, they would produce this much installed capacity," but then you want to start discounting that because you know that they will not run at a hundred per cent capacity all throughout the year.

I don't know. Lance, is there a . . .

Mr. Bendiak: I guess on overall river potential you have, obviously, the flow of the river, but what also matters is: can you develop the head at a particular site? Say, for example, the Bow River. You can't necessarily have high enough banks all the way along to contain the flow, so you have to be able to stage it in proper stages. Studies have been done in the past. It was looked at doing it in steps to capture the available head.

Ms Calahasen: Thank you.

As you may know, Alberta's high-demand electricity days are in the middle of winter and to a lesser extent at the height of summer. In your mind, how flexible are storage dam projects versus run-of-river projects in producing electricity in response to demand both over the course of a day and over the course of the seasons?

Mr. Irving: That's a good question, actually, to touch on when we talk about storage hydro versus run of river. Essentially, run-of-river hydro usually means very little storage, that the water runs through the facility, and there's no reservoir created. It's just water running through the river. You put a facility across the river, and it produces.

When you create a reservoir and you flood in doing so, what you create is storage capacity. You create backup. Canada has a large amount of storage hydro compared to other countries around the world, and it offers a great amount of flexibility. Actually, for all the different types of electricity generation that have occurred over the past hundred or so many years, no form of electricity has been able to be as flexible as storage hydro power. What it means is that you can turn on storage hydro power and turn it off quicker than any other form of generation. When you store water behind the dam, you've got a reservoir of water that you can draw upon when you need it, and then you're not subject to the variability of flow from season to season. You could capture the spring runoff, keep it behind the dam, and then use it later in the summer when the water isn't flowing as strongly. It's very attractive in terms of optionality and stability to the grid.

6:45

The Deputy Chair: That ends that one. If we could go to a Liberal question now.

Mr. Hehr: Sure. I have three questions, but if we don't get to them all, that's fair enough. You didn't go into detail. You brought up some of the regulatory burden, but if you could help me sort of track the environmental concerns and how they're mitigated in a good hydro dam project, any long-term effects that people are worried about and how they're mitigated.

Two, what's a typical project? I know that's a catchphrase that runs the gamut. But in your typical project what's the capital involved in putting these up? Are these private entities, public entities? What's the rate of return on them? If you could comment on whether you see a different structure in various jurisdictions as to how these are put together and which system of investment and/or of running it you would recommend. Does your group have a particular bias or a particular value set in that regard?

Mr. Irving: The first question about environmental regulation. Yes, with all forms of energy development, of course, there are environmental impacts. The ones associated with hydro power I sometimes characterize as being mostly at the microecological level. What that means is your footprint and fish and aquatic species associated. When you change the nature of the flow of a river, you do change its composition; you change its biology. What you have to make sure of is that you have a good understanding of how you will be changing it and how you can avoid impacts in the first place and then, in the second place, mitigate any of them. So if you are adversely affecting a species, can you develop a plan to help protect it or rehabilitate its numbers? Those are a lot of the prime considerations in hydro. They're really on that local ecological basis.

Interestingly enough, I usually then zoom out to the environmental concerns. I call those the macro issues. We know that greenhouse gases, air pollution are large-scale environmental issues that need to be addressed. Hydro power actually tends to be quite beneficial in that regard. Where hydro has to balance its issues is really at that local ecological level, as I think you alluded to.

Across Canada hydro has developed in all kinds of ways. We have large Crown corporations; publicly owned developers: Hydro-Québec in Quebec, Manitoba Hydro in Manitoba, B.C. Hydro in B.C., where the provinces own the developing company, and it's developed in that way. There are also private developers across Canada. Brookfield power is a member of our association. Fortis is another. Actually, ATCO and TransCanada here in Alberta are private developers as well. We see all different types of models being pursued. Unfortunately, I don't have the general breakdown for you. The reason why is because hydro, in particular, is so site specific. You're really building a generation source to suit a local topography.

Mr. Hehr: Just a follow-up question: are the B.C., Ontario, and Manitoba governments making any money at this business? Are they profitable?

Mr. Irving: They tend to be profitable. Mostly, hydro tends to be very profitable over a longer course, over a longer time frame, and that can sometimes be a challenge for private development. When you see that it takes eight to 14 years to build a hydro project, you need patient capital for that kind of return, but when you consider that hydro power projects have lives of 50 to 100 years, it becomes quite attractive. It's heavy upfront capital expenditure and then long-term return over time. In fact, in Ottawa on the Ottawa River – you can see it from the Parliament Buildings – there's actually the oldest hydro power facility in Canada. It's located right there in the middle of the capital. There's a water wheel from 1891 in that facility that's still making power today. It's very interesting technology from that perspective.

Mr. Hehr: Thank you.

The Deputy Chair: Thank you.
Now we'll go to Mr. Bilous.

Mr. Bilous: Sure. A couple of the questions I wanted to ask, actually, Mr. Hehr asked, so thanks for pulling in the environment.
Alberta does currently have some hydro power dams in the south end of our province. Without ballparking too much, if Alberta were to take more of an aggressive approach toward developing hydro power in the north, what kind of, if you can, price tags come with that?

Mr. Irving: Yeah, the price tag is probably a little too specific for me to get into, unfortunately, but I do believe that you'll probably hear from some individual developers later at this committee, and I think they'll probably be able to share some more detailed information on that, which will be helpful.
Generally, I think I can probably say from my perspective that anything that can be done to reasonably shorten that development time is very helpful, and a lot of that does have to do with regulatory efficiency. At the federal level with Bill C-38, that passed this past spring, there is the opportunity for the Canadian environmental assessment process to be delegated to the provinces, and that's new. I think it offers the opportunity for some real streamlining in terms of the time it takes to assess the projects. I think that that's a potential benefit to all provinces in Canada but Alberta in particular. I think the Alberta government being ready to be able to take on that regulatory process and demonstrate to the federal that it has it well in hand would probably help speed the development, and that would help very much in bringing on new hydro.

Mr. Bendiak: I could just maybe add to that.

The Deputy Chair: You still have time for one more question.

Mr. Bilous: Okay. Sure. I do have a follow-up, but if you want to finish . . .

Mr. Bendiak: I just need to add that hydro is very site specific from a cost point of view. It's kind of different than, say, wind power, for example, where there's little interaction with the environment around it other than making sure you have a source of wind. Hydro is very dependent on the actual site foundation conditions and the hydrology of the river. Does it come out as an even flow, or is it a very varied flow? That will make a difference to how economic a hydro site would be.

Mr. Bilous: Then a follow-up question, and this may vary. Is the hydro industry across Canada primarily regulated by industry, or is it often a public body that oversees it? Or is that province to province, outside of, let's say, Environment Canada?

Mr. Irving: It's regulated both at the provincial and federal levels, and oftentimes that's one of the differences between hydro power and, say, thermal generation. Natural gas and coal oftentimes will be regulated only at the provincial level; they will not trigger a federal environmental assessment. With hydro power you're dealing with water, so you almost invariably trigger both provincial and federal. The new changes at the federal level will offer the opportunity for the previous federal regulation to be looked after by the province now, untangling some of that mixture, some of that duplication that occurred between the two levels of government that slowed a lot of hydro production in the past. Yes, it's a very regulated industry both at the provincial and federal levels.

Mr. Bilous: Just a tiny follow-up. Are the regulations – have you noticed? – quite different from province to province? I mean, from Manitoba to Quebec to, say, Saskatchewan. Saskatchewan is a bad example.

Mr. Irving: They can be fairly different, but I think all the regulations are based on many of the same principles, which are the protection of the environment and ensuring that energy is produced responsibly, and our members adhere to those principles and are believers in those principles as well. What we advocate at the federal level is just to try and make sure that it's efficient and that duplication is reduced to help try and speed and bring on hydro development, compared to where we've been in the past, where, whether by accident or by design, we've been slowed down somewhat.

Mr. Bilous: Thank you.

6:55

The Deputy Chair: Thank you.
Okay. We're back to Wildrose questions. Mr. Anderson, you had one?

Mr. Anderson: My question is quick. You've touched on it already. First off, great slide presentation. Do we get these slides? Are these produced? Okay. I didn't seem to get a copy of them. Anyway, the slides were fantastic.
If you could go back to that subsidization, are you basically saying that because capital would have to be so patient for some of these hydro projects, it is unlikely that we would get much investment in Alberta unless we were open to government subsidization of these things? Or is it something that has been done in other provinces on a larger scale, to have private capital invested in this way?

Mr. Irving: When you look at Alberta, the Slave River project is a good example of two private entities, ATCO and TransCanada, pursuing a project despite those longer lead times. Brookfield is a private developer that's active in provinces across Canada. It is possible to attract private investment under the current framework, but I think that with regulatory streamlining and with that time frame being appropriately curtailed or shortened, you would probably have more success in raising private capital and also probably the public. It would help the financing for those entities as well.

Mr. Anderson: Thank you.

The Deputy Chair: We've got another five minutes left because we added two minutes to Mr. Anglin's time because I cut him off at the knees before we had the process down. Anyway, Rob, do you have anything else to add?
Okay. Mr. Anglin, did you want to . . .

Mr. Anglin: Yes, I did. Yes, I did. I'm learning from my more experienced counterparts across the room. I'm going to ask you two questions real fast. I'll slip two questions in here. One thing I would like you to comment on is some of the advances in turbine technology, specifically with regard to the river-run hydro. The second thing, that you haven't touched upon, is the economic analysis with its relationship to stable lower prices in the growth of GDP. I know that that case was made back with Hydro-Québec,

and I think Manitoba has made that case. I was wondering if you could comment on both of those.

Mr. Irving: Actually, what's interesting on the technology front is that hydro power is an incredibly efficient source of generation, one of the most efficient, and has been for a good, long time. We convert water energy to electricity at over 90 per cent. By comparison, with natural gas or coal fired you're converting that at 40 to 60 per cent.

In terms of turbine design there are very incremental achievements in terms of getting more energy out of the water flow, but where a lot of the advances have actually happened in terms of turbine design have not necessarily been about greater efficiency but have actually been about environmental protection. There are developments in what are called fish-friendly turbines. The design of any hydro facility, first and foremost, is to make sure that species do not go through the turbines, so there are gates and racks that protect from bringing them in, but when they do enter, there are designs that you can put into the turbine to make them more survivable by species. There's a lot of innovation that's happened in that area over the last few generations.

Then in terms of your question about GDP I don't have a specific analysis on GDP that I could speak to at the moment, but I think one of the major arguments that we do put forward as an association, as an industry is that stable, reliable electricity prices are something attractive to be able to help develop jobs in industry based on it. If you can supply a customer with a predictable long-term price for electricity that doesn't fluctuate with fuel prices, then it makes it easier for them to plan their business. That's an undeniable strength of hydro that's continued since the beginning.

The Deputy Chair: You've got two minutes.

Mr. Anglin: Good. I've got two minutes. Last question. I want to have you comment on the transmission design of the Slave River project in particular. Would it be more advantageous to use HVDC technology to bring that all the way down to the Edmonton area, and can you explain why?

Mr. Irving: That might be getting a little too specific for me, unfortunately. But just as a clarification, high-voltage direct current lines, HVDC lines, are a technology that Canada is a pioneer in and actually really was a game changer somewhere around the '70s. It's what allowed the James Bay project in Hydro-Québec to be economic and to build out and has some real attractive benefits in terms of reducing line losses.

If you're producing electricity at a 90-plus per cent efficiency rate through your hydro facility, now you put it on the power lines. You want to minimize the amount of loss of electricity you get on the lines, and that can be up to 10 per cent in a worst-case scenario. With HVDC lines I believe it's down to somewhere around 3 per cent, even lower. So HVDC can be a very attractive technology, but it has to be fit for purpose. It's sort of like a highway going down as opposed to an arterial road. For HVDC to work, you can't branch off it very easily and serve loads along the way to its ultimate destination. It's sort of a straight highway to its ultimate destination.

That would have to be for more strategic Albertan minds to figure out, I think probably, than what I could offer.

Mr. Anglin: If you could mention something about the distance on the economics of it.

Mr. Irving: Distance and economics. HVDC is more attractive usually the longer your distance is. It usually makes more sense because you're delivering a bulk amount of electricity over a long distance to . . .

Mr. Anglin: I'm just setting them up for tonight. That's okay.

The Deputy Chair: Thank you very much.

Just before we go to Mr. Xiao, the whole PowerPoint presentation I think is going on our site now, so you can find it there.

PC question, Mr. Xiao. Five minutes.

Mr. Xiao: Thank you, Mr. Chair. I just have a very quick question. When you're talking about, you know, that hydro can provide low-cost electricity, to my study I think this is not true. All the hydros in Canada are deeply in debt: Hydro-Québec, Ontario Hydro, Manitoba, and B.C. So my first question to you is: how can you guarantee that Alberta hydro will not get into debt, will not be subsidized by the government?

Mr. Irving: I, unfortunately, don't have a great deal of information on the debt of the different members. But I do know that many are in the process of building large new generation at the moment, 25,000 megawatts across the country, and some of that is debt financed. The new generation is required to keep up with new demand. It's a good question in the sense that I try to be careful when I talk about the price feature of hydro and saying that it offers stable, reliable pricing over time. Usually any new generation costs more, and oftentimes to build it, debt is required. But in the long term you're usually able to forecast your amount of production, and you're able to price it in a stable fashion toward your customers.

Mr. Xiao: I guess my last question would be a comment, and I also want to hear your comments on this. Every time we present hydro, people say that this is a pollution-free project. Actually, it is not. Having been to the largest hydros in the world, Itaipu in Brazil and the Three Gorges dam in China, I can tell you that there is a lot of pollution before you complete the dam because you consume a lot of steel and cement. These two products take a lot of energy to produce, so you actually already produce all the pollution before you complete the dam. To now say it's zero pollution: yes, after completion of the dam the electricity can probably be produced with minimal pollution. I think that's a more accurate statement.

7:05

Mr. Irving: In terms of a pollution profile it's zero air pollution from the generation of it. Now, if you do a full life cycle assessment of the facilities, the greenhouse gas information – there's a chart in the appendix here that talks about it as well – is done on a full life cycle assessment. It's done in terms of energy required for the steel and concrete and the like, and it also factors in any reservoir emissions that could occur or anything of the like. On that full life cycle basis, especially on the greenhouse gas front, hydro power is as clean and in many cases cleaner than wind as a renewable source of energy, especially in the Canadian context and some of the very particular nature of Canadian hydro power. It offers a very clean renewable source of energy.

Mr. Xiao: Thank you.

The Deputy Chair: Okay. Thank you, folks.

There's one minute left. Mr. Cao, could you read your question into the record?

Mr. Cao: All right. I'll quickly do it. We're talking about hydro power and building dams and so on and getting the electricity out

of that, but there's another side of it, which is agriculture. I think that is a thing that I hope there's some input into: agricultural development after you've got the water and all of that.

Mr. Irving: What's interesting in terms of dams – the Canadian Dam Association isn't here, unfortunately. They might be able to answer it. In many jurisdictions around the world the hydro power dams are the smallest percentage of facilities. In the United States I know, for example, that 97 per cent of dams are not for hydro. Only 3 per cent are for hydro power. In Ontario it's similar.

The Deputy Chair: I'm sorry. I'm going to have to interject. We've got to get this done so that people can get back to the Assembly. When we're reading in the questions, I would ask that we make note of them, and you can respond in writing to the read-in questions. We'll just go quickly around the room. Make them very short and quick.

Mr. Casey: Very quickly, I would just like to understand from a recommendation point of view whether we're looking at run-of-river projects or storage facilities here. I'm still unclear as to which one would be recommended for our situation.

The Deputy Chair: Okay. Carry on.

Ms Calahasen: A question I have is that when we're talking about the rivers, some of the rivers are losing flow, so I'm wondering whether or not that would impact anything to do with any of the dam development.

The Deputy Chair: Thank you. That's the question, Pearl?

Ms Calahasen: Yeah, and I have an aboriginal one. On the aboriginal side you said that there were advances in aboriginal relations across Canada, and you identified some areas where there was some relationship building. Can you identify any other ways for people to be able to look at how they are dealing with the aboriginal people across Canada to deal with this whole issue on the environmental side and their way of life?

The Deputy Chair: Okay. Thank you, Pearl.

Ms Calahasen: Thank you.

The Deputy Chair: Anything? Further questions? We're good. All right.

Gentlemen, thank you very much for making the trip here, for your presentation this evening, and for responding to questions from the committee. Any written responses can be submitted to the committee clerk for distribution to the committee. Thank you again very much.

The next meeting is Monday, November 5, the same time and place. We hope to have our next presenters confirmed within the next couple of days.

Now you may move adjournment.

Mr. Rogers: With that, I move that we adjourn.

[The committee adjourned at 7:09 p.m.]

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