

IN THE MATTER OF THE JOINT REVIEW PANEL ("JOINT PANEL")
ESTABLISHED TO REVIEW THE SITE C CLEAN ENERGY PROJECT
("PROJECT") PROPOSED BY BRITISH COLUMBIA HYDRO
AND POWER AUTHORITY ("BC HYDRO")

CANADA ENVIRONMENTAL ASSESSMENT AGENCY

AND

BRITISH COLUMBIA ENVIRONMENTAL ASSESSMENT OFFICE

PROCEEDINGS AT HEARING

Questions focused on the need for, purpose of,
and assumptions about the alternatives

Responses to Undertakings

January 23, 2014

Volume 28

Pages 1 to 211

C o p y

Held at:

Pomeroy Hotel - Scott Pomeroy Ballroom
11308 Alaska Road
Fort St. John, British Columbia

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Thursday, January 23rd, 2014
Fort St. John, British Columbia.
(Proceedings commenced at 9:00 a.m.)

Introductory Remarks by the Chair:

THE CHAIRMAN: Good morning, everybody. We are returning to where we started in December with questions focused mostly on the need for and the purpose of and the assumptions about the alternatives to and so on, for this project.

And at last, it's the panel's day. We have half a dozen questions that we've asked BC Hydro to answer, and we invited interested parties to let us know what questions they would like us to ask.

Here's how we're going to proceed today.

First, BC Hydro will answer the six questions we gave them at Halfway River on January 7th. If we need clarification of the answers, we'll ask.

Following our invitation to participants, we have prepared 19 additional questions. We have not simply parroted the questions posed by interested parties, but we have read and considered every one of them to help us determine what additional information might be material to our mandate to assess and make recommendations on the

1 environmental, economic, social, health, and
2 heritage effects of the Site C project.

3 All of these 25 questions have been posted on
4 our website; although, the final 19 went up only
5 this morning. Some problems with connectivity at
6 Blueberry River. All 25 will be on the screen as
7 we go through this.

8 After we have finished the discussion of
9 those 25 questions, Hydro will then have the
10 opportunity to answer any questions it believes to
11 remain outstanding that have arisen during the
12 public hearing.

13 If, during the course of the day, you think
14 there is a question for BC Hydro, the answer to
15 which would materially assist the panel in its
16 conclusions or recommendations, please, give it to
17 Mr. Wallace, the gentleman who looks like
18 Le Corbusier over there with those glasses, please
19 give it to him in writing or speak to him at a
20 break.

21 Ms. Yurkovich.

22

23 **BC HYDRO PANEL:**

24 **Susan Yurkovich.**

25 **David Ince.**

1 **Randy Reimann.**

2 **Chris O'Riley.**

3 **Mike Savidant.**

4

5 **Opening remarks by BC Hydro:**

6 MS. SUSAN YURKOVICH: Thank you, Mr. Chairman.

7 Good morning, panel members. Good morning to those
8 who have joined us here today.

9 I am joined today by our needs, purpose, and
10 alternatives panel that appeared before you in
11 December, including Mr. David Ince, our manager of
12 market forecasting, and Mr. Randy Reimann, who is
13 our director of resource planning, and
14 Mr. Savidant, our commercial manager who is
15 familiar to you at this stage of the process.

16 I am also joined by my colleague, Chris
17 O'Riley. And Chris is the executive vice-president
18 at BC Hydro who is responsible for our generation
19 assets and operations, as well as energy planning.
20 And because some of the questions that the panel
21 has posed overlap with how we reliably operate the
22 system. I have asked him to be here today to speak
23 to a number of the questions.

24 At the session at Halfway River on January 7,
25 you provided us with six questions where you asked

1 for additional information. You were very clear to
2 us that you did not want to add to the already very
3 large volume of materials. And we took that to
4 heart, and, as such, we have prepared a PowerPoint
5 presentation that you have today, and that will
6 help us to respond to your request.

7 If I could ask for the first slide to go up.
8 Mr. Chair, we have noted them.

9 Sorry, can you go to the next slide,
10 Danielle.

11 We have noted them in order. In fact, as you
12 read the transcript number 2, actually, has three
13 parts to it, and, with your permission, we would
14 like to go through them largely in order, but
15 leaving question 3 to the end, if possible.

16 THE CHAIRMAN: That's fine.

17 MS. SUSAN YURKOVICH: Thank you.

18 I'd note that this panel will also be
19 available to answer other questions, and we've also
20 made arrangements to have many of our other subject
21 matter experts available should they need to
22 respond to something the panel has as an
23 outstanding question. And for those who were not
24 able to travel here today, we can have them
25 available on teleconference.

1 Just before we begin our presentation, I want
2 to quickly provide this response to the question we
3 had at Blueberry River First Nation yesterday with
4 respect to taxation.

5 There was a question about respect to PST
6 being applied to a Blueberry River First Nation's
7 hydro bill, and we have checked with our colleagues
8 in our customer care group and understand the
9 following:

10 That generally residential customers should
11 be PST exempt should Indian Bands on reserve land
12 or unincorporated business owned by a Status Indian
13 provide that the documentation has been provided.

14 Having said that, we understand that under
15 the **Provincial Sales Tax Act**, there are some
16 circumstances where PST will be charged.

17 So for the person that asked the question, we
18 would need to look at the specific account details.
19 We absolutely will undertake to do that following
20 our day today, we'll follow-up directly to make
21 sure that that matter is cleared up.

22 THE CHAIRMAN: Thank you.

23 I'm surprised that the Province thinks that
24 it can tax on reserves.

25 MS. SUSAN YURKOVICH: Well, we'll get to the bottom

1 of it, sir.

2 THE CHAIRMAN: Good.

3 MS. SUSAN YURKOVICH: Thank you.

4 So I would now like to turn the presentation
5 over to Mr. Reimann and Mr. O'Riley, who will
6 provide our responses to the panel.

7 Thank you.

8

9 **Presentation by Mr. Randy Reimann, BC Hydro:**

10 MR. RANDY REIMANN: Thank you, Susan. Good
11 morning.

12 The first two slides go to the questions
13 about the relationship between population growth
14 and the load forecast growth. And I kind of want
15 to just walk through some of the key relationships,
16 and then look a bit historically how things have
17 evolved. And I think that's quite informative of
18 what we see going on in the Province.

19 In this first slide, what we're showing is
20 that -- next to historical load, so the billing
21 data, there -- here are shown for the three load
22 forecast segments the key drivers.

23 And starting with the residential side, the
24 key drivers, pretty much of equal importance, are
25 housing starts, personal income, and end use

1 information and saturation rates.

2 And certainly housing starts are related to
3 population, and we do see a general relationship to
4 population.

5 But in the industrial and commercial, the
6 next most important factor that drives the growth
7 is gross domestic product.

8 And so -- and, particularly, I guess with the
9 large industrial, we wanted to point out that we do
10 go through an account-by-account forecast. We've
11 got key account managers that have good
12 relationships with the customers and they go
13 through and try to understand business plans. We
14 have sector forecasts that are done for us. And we
15 take all of this detailed information to go through
16 really a customer-by-customer estimation for those
17 large accounts. And I think those large accounts
18 account for about 40 percent of our energy.

19 Next slide.

20 So on this graph, we tried to explore, then,
21 what those relationships are between both growth
22 GDP population and the load forecast, so it's
23 showing 40 years of history and then the 20-year
24 forecast.

25 The red line shows the gross domestic

1 product. The green line -- and the colours maybe
2 -- could be more differentiated, but it starts on
3 the top left, and then it goes off towards the
4 bottom right, is population growth.

5 And then the blue line shows the load growth;
6 historically, you can see the 2008/'09 recession.

7 And then in the current 20-year view, the
8 dotted blue line shows load growth before DSM. And
9 the solid blue line shows expected load growth
10 after DSM.

11 So what this shows us, and I guess what we've
12 experienced in the past is there are times when the
13 growth in the Province moves quicker than
14 population, and I think you see that for a lot of
15 the previous 40 years up until the recession.
16 These are times, I guess, when the Province is
17 becoming more prosperous and the industrial load is
18 growing.

19 So there are times, then, you can see in the
20 early 40 years where that load growth is outpacing
21 the population growth. And these are really times
22 when the Province is becoming wealthier and more
23 prosperous as the industrial sector grows.

24 And so we do see periods of fast growth. And
25 then particularly with the 2008/'09 recession,

1 there are periods where it slows down.

2 Looking out over the next 20 years, and, in
3 particular, the next 10, again, we see that load
4 growth, this is before DSM, is pretty much matching
5 or getting close to matching what the GDP forecasts
6 are. And we're seeing the large industrial load
7 growth attributable mainly to the mining
8 development in the Province and the oil and gas,
9 and, particularly, the gas development. And those
10 are probably the two key factors that are moving us
11 somewhat faster than on average.

12 And so once we do the demand-side management,
13 that does pull the forecast down to track more with
14 population. And I guess we see that there's a bit
15 of an inflection point, if there is one, when we
16 start committing to the large DSM target, and we're
17 trying to pull down the load growth and that
18 shifted it a bit away from tracking GDP. Our sense
19 in the longer term, GDP is the key driver.

20 I also wanted to mention that the GDP and
21 population forecasts that we get in the shorter
22 term is the Ministry of Finance. And in the longer
23 term, we use Stokes and Stats Can to forecast those
24 out.

25 So we would be happy if there's any -- to

1 take any questions, if anything in detail, David
2 would be happy to answer them. But if not, we
3 could keep rolling.

4 Okay.

5 Next slide. You're already there. Thank
6 you.

7 This slide is trying to get to the questions
8 about the elasticity and some of the
9 back-of-the-envelope calculations and how those
10 might have been different than what -- or to
11 understand how they relate to the elasticity that
12 we calculated.

13 And so I just wanted to point out that the --
14 we covered some of this material in the JRP IR26S
15 and the further information, request one, and in
16 undertaking 1. And what we'd pointed out is that
17 our method of elasticity calculation and the way we
18 determine the imputed elasticity was based on a log
19 map that -- and using a logarithm method is
20 something that is an industry standard, and, in
21 particular, when you're doing time series analysis
22 and looking for correlations to do future forecast
23 estimation. And it's our understanding and belief
24 that when you see a lot of the work out in the
25 industry that is trying to determine elasticity

1 relationships, that they follow a similar sort of
2 logarithm formula calculation.

3 And so to get at some of the differences that
4 you might see, depending on how you apply these, so
5 what we did in the table was looked at how you
6 would go about calculating the elasticity with a
7 logarithm based on a percentage based.

8 And so we looked at the load forecast in
9 three steps: 2012, 2022, and 2033. And so the
10 logarithm-based calculation of elasticity, that was
11 the imputed elasticity after DSM effects. And what
12 it was intended to do was to say -- the DSM
13 programs are really taking us from the 72,000 down
14 to a sixty-one six.

15 And to get from a -- in the second column
16 from the 50,000 starting point to a 61, given the
17 price increases and original load forecast, what
18 was that imputed elasticity? If you calculate that
19 with the logarithm-based method, you get the -.57.

20 What we find is that you get different
21 results if you use the percentage-based type
22 calculation, and so we've done the same thing in
23 the right column.

24 THE CHAIRMAN: Excuse me. Are you applying
25 elasticity only to the incremental load?

1 MR. RANDY REIMANN: No, it was to the total load.

2 It was just how to apply that elasticity to get
3 down to that total load point.

4 And so if you do the percentage-based
5 calculation, you end up with a different
6 elasticity.

7 And, again, it's our experience and belief
8 that the logarithm-based is the -- is sort of the
9 industry standard and the proper way to do it.

10 And so what ends up happening, if you take
11 the logarithm-based imputed elasticity, and you
12 then try to go out ten years and you see what the
13 numbers are, you do come up with a number in the
14 order of 55,000. You could do the same thing with
15 the percentage-based one if you used that imputed
16 elasticity and do a calculation out ten years,
17 you'd get to a similar number.

18 I think where we need to be careful is if you
19 do the logarithm-based imputed elasticity and then
20 try to replicate the ten-year results using the
21 simplified formula, you do then end up with about a
22 2,000 gigawatt hour difference.

23 THE CHAIRMAN: Hydro is going by the classic
24 economics textbook definition of elasticity, and
25 economists can't handle logarithms, as you know.

1 MR. RANDY REIMANN: Okay. Next slide.

2 This slide was to address the question about
3 where the capacity requirements that we see earlier
4 in the 2020s are showing up relative to the energy.
5 And, really, the short answer is is that it's due
6 to the smaller capacity contribution that we get
7 from intermittent IPPs.

8 And so when we do our load resource balances
9 over the 20-, 30-year period, what's included in
10 that? So we've got the load forecast, we've got
11 our existing and committed supply, we have a DSM
12 target and IPP renewals. And then from there, we
13 started looking at adding additional resources. So
14 this was the basis of determining the gap.

15 And so what we did, just to demonstrate where
16 the capacity requirements are coming from is
17 looking at the energy and capacity, and then we did
18 a simple capacity-to-energy ratio of megawatts to
19 gigawatt hours just to show the relative
20 contribution.

21 And so what you see for the load forecast is
22 a ratio of .18. And we see that as being pretty
23 constant over the full period of the load forecast,
24 so there's nothing really changing there.

25 On the existing and committed supply, not

1 surprisingly, we target that to meet the load
2 requirement, so we need the right ratio of energy
3 to capacity. It has the same number.

4 The DSM target, given that our DSM programs
5 are broad in trying to hit all areas, we find that
6 the capacity contribution from it that we're
7 hoping; albeit, it's large, is a -- is very close
8 to what a normal load ratio would be at the .17.

9 But when you look at the IPP renewals -- and
10 this is that relative to the energy contribution --
11 the dependable capacity or the contribution that
12 these make to the system from a capacity
13 perspective is quite a bit less.

14 And so when you add that into our load
15 resource balance with a ratio of .10, that's where
16 you now start seeing that there's a need for
17 capacity sooner than there's a need for energy.

18 THE CHAIRMAN: I'm sorry, Ms. Yurkovich, you
19 were suggesting that we go through all of the
20 questions before we --

21 MS. SUSAN YURKOVICH: No, Mr. Chair. I'm just
22 trying to make sure that we've addressed your
23 question before we move along, so whatever you
24 would like.

25 THE CHAIRMAN: No. I was -- I'm perfectly

1 willing to accommodate you, but if we want to do
2 this question-by-question, I want to go back a
3 step, then.

4 MS. SUSAN YURKOVICH: Okay.

5 THE CHAIRMAN: To your slide -- whatever it
6 was. The one before that.

7 On the industrial side, the information -- an
8 important source of information is what you get
9 from your account managers. Historically, how good
10 has that been as a predictor?

11

12 **Presentation by Mr. David Ince, BC Hydro:**

13 MR. DAVID INCE: Good morning, Chair. David
14 Ince, on the load forecast.

15 They are dealing with the customers, our key
16 account managers are dealing with the larger
17 industrial customers on a regular basis.

18 THE CHAIRMAN: Yes.

19 MR. DAVID INCE: And so they'll be talking
20 about the production outlook.

21 Our industrial forecast is done looking at
22 the production forecast, multiplied by an
23 intensity. So how much energy is used to produce,
24 let's say, a certain amount of tonnes of ore or
25 amount of pulp.

1 And so it -- they are looking at a production
2 outlook, but also tempering that with our
3 information with respect to the industry, commodity
4 prices. We try and be very -- I guess a sober
5 analysis in terms of -- particularly, some
6 customers, like the mining customers and their
7 expansion plans, we have to make sure that we
8 temper optimistic expectations with some sense of
9 reality.

10 THE CHAIRMAN: Yes. And you have the
11 problem of, you know, they are on or they are off,
12 it tends to be big lumps and so on.

13 MR. DAVID INCE: Indeed.

14 THE CHAIRMAN: But when you say you temper
15 this stuff with intensity with sectorial forecasts
16 from third party sources and so on. I'm still
17 curious, the account managers in many businesses
18 are often the people who have really a pretty good
19 sense of what's going on. And considering them
20 alone as a source of information, how good are
21 they?

22 MR. DAVID INCE: A lot of our account managers
23 have expertise in the specific industry, so we have
24 people on the oil and gas side who have experience
25 in the actual industry itself, or people in the

1 pulp and paper side who have been with the
2 facilities. And they are a very good source of
3 information.

4 But, again, we have consultants on each of
5 the sectors. So, for example, we have pulp and
6 paper consultants, forestry consultants, mining
7 consultants, and we assemble all this information
8 together with the economic indicators to combine
9 that, to come up with, I think an informed forecast
10 on 220 individual customers.

11 MR. RANDY REIMANN: Yeah. I think the --
12 probably the short answer is is that -- and the
13 exact percentage, I'm not sure we could quote, but
14 we've tracked pretty well the relationships that
15 the key account managers have, what the accounts
16 often allows us to have some inside information of
17 what's likely to come down the road, things that we
18 can't actually put out into the public because it's
19 privileged, and it might really impact financial
20 health.

21 THE CHAIRMAN: Okay. Now, particularly, the
22 field reports will tend to get a little vague when
23 you get off there 10 or 20 years into the future.
24 Your industrial forecasting must produce a kind of
25 an array of forecasts for 2032 or something; right?

1 MR. DAVID INCE: If you mean an array in terms
2 of -- there's different sectors.

3 When you look at the GDP forecast, for
4 example, we just can't apply that on every sector.
5 Every sector has a characteristic in terms of their
6 health such as gold prices, wood prices and so on.

7 THE CHAIRMAN: Yes, but those -- when they
8 are on a sub-sectorial basis or an aggregate basis,
9 you're going to have a cloud of uncertainty that
10 grows as you get farther forward into the future.
11 It's only natural.

12 MR. DAVID INCE: Absolutely. The industrial
13 forecast is more uncertain, yes.

14 THE CHAIRMAN: So what number do you choose
15 for your forecast? Is it the middle of the cloud?
16 Is it the 90th decile? What is it?

17 MR. DAVID INCE: One of the key principles of
18 the forecast is we try not to bias it. So it's P50
19 forecast. That's what we endeavour for. So,
20 hopefully, my legacy will be that 20 years for
21 now --

22 THE CHAIRMAN: Closer to your mic.

23 MR. DAVID INCE: Hopefully, my legacy will be
24 that 50 percent of the time, my forecasts would
25 have been too high and 50 percent too low, so with

1 no intention of bias.

2 THE CHAIRMAN: That's perfection. Okay.

3 I'm not sure quite where --

4 MR. RANDY REIMANN: If I could add to what David
5 was saying, is we do do a P10 and a P90 calculation
6 of our loads and of the expected DSM delivery, and
7 that is when you see the portfolio analysis of our
8 low growth or a high growth scenario, or a low or
9 high gap, that is based on taking these forecast
10 segments and doing a P10, P90 assessment.

11 MR. MATTISON: Just a question.

12 I know, for instance, in the residential, we
13 know there's a day and a nighttime load that's
14 quite different, and there's also seasonal loads
15 that change. How does industry change seasonally
16 and even daily or weekly? Are there swings in the
17 load -- I'm not thinking now of long-term
18 forecasts, I'm looking in year.

19 MR. DAVID INCE: The load across the year for
20 the industrial customers is relatively flat. We
21 see that with all the sectors that I can think of;
22 they are trying to run flat out basically --

23 MR. RANDY REIMANN: And if there is a bit of
24 seasonal in there, it's just that in the
25 wintertime, in colder temperatures, some of the

1 processes take more energy to operate and that
2 would be the biggest difference.

3 THE CHAIRMAN: Okay. On that, I'm now on to
4 your page 7. Over to you.

5 MS. YURKOVICH: Go ahead.

6

7 **Presentation by Mr. Chris O'Riley, BC Hydro:**

8 MR. CHRIS O'RILEY: Thank you, Mr. Chair.

9 So the panel requested information on the
10 revenue requirements of the project, including key
11 inputs to that, the amortization and such. And
12 what that would mean in terms of a rate increase
13 when the project comes into service. And that's an
14 important consideration for capital projects
15 because they do have a significant rate impact.

16 I should qualify this: the BCUC will
17 ultimately determine how the costs are recovered
18 from ratepayers in the future, and that would occur
19 in a revenue-requirement process covering the
20 period when the asset comes into service, but there
21 are some general approaches which we've reflected
22 in these calculations and some principles.

23 So we have undertaken a project-specific
24 revenue requirement and rate analysis, and it's
25 included in the table on the chart. And you can

1 see the asset coming into service in fiscal 2024.
2 And you can see the various categories of
3 amortization, finance, operating costs, which
4 include water rentals.

5 And then there's a netting off of sales of
6 surplus energy. So that's energy that's being sold
7 into the external market, and that leaves a total.
8 And that total line would go in our revenue
9 requirements, in our budget, and it would be used
10 to calculate the rates.

11 And I'll start and talk a bit about the
12 amortization because you asked a specific question
13 about that.

14 The amortization is really -- comes from the
15 accounting. And the principle is we amortize the
16 component over its expected life. And when you
17 hear the 70-year weighted average, what that is,
18 it's a dollar-weighted average of the various
19 components of the asset.

20 So we've done an analysis in our estimating
21 group where we looked at the different components,
22 and we compared that to our experience. And, for
23 example, the dam is in the calculation at 80 years,
24 so with the civil assets and such. 80.

25 And then other assets like the other

1 components, like the turbines and generator are in
2 it at 45 years. And that roof of the powerhouse,
3 for example, is in at 25 years.

4 So when you weigh those all together, it
5 comes out -- it actually comes out to 71.2 years.
6 And so we've approximated the 70 years.

7 And I would say that's consistent. You know,
8 if we look up the river to Bennett dam and the
9 powerhouse, those kind of expected lives are
10 consistent with what we're experiencing with our
11 existing assets.

12 So if we turn -- yeah, I should say one more
13 point. If you go beyond the four-year period we've
14 shown in this chart, what happens is the surplus
15 sales tend to go down as the load grows, and these
16 costs end up being spread over a larger base in the
17 system.

18 THE CHAIRMAN: Your assumption on finance
19 charges, these are all real dollars, of course,
20 2013?

21 MR. CHRIS O'RILEY: These calculations are done
22 in nominal dollars, and I'll stand to be
23 corrected --

24 THE CHAIRMAN: Oh, nominal?

25 MR. CHRIS O'RILEY: -- on that.

1 But that's what -- when you do rate -- when
2 you're doing a rate impact calculation, like in
3 this case, we need to do that in nominal dollars.
4 And Mr. Savidant may correct me here.

5 THE CHAIRMAN: So, if nominal, what's the
6 forecast? What rates are you using?

7 MR. MIKE SAVIDANT: Sorry, what financing rates?
8 Our long-term costs of debt is expected to be just
9 under 5 percent. I think it's something like 4.82.
10 That's recently decreased from 4.95 when I believe
11 we did the analysis for this, this was
12 4.95 percent.

13 THE CHAIRMAN: How long can you lock in a
14 rate like that?

15 MR. MIKE SAVIDANT: Yeah. We manage it not on a
16 project basis, but on an overall portfolio of debt.
17 So when our treasurer goes out and finds
18 debt, he creates what he thinks is the best balance
19 between short-term and long-term debt of varying
20 tenors.

21 Generally, you see the longest term debt that
22 I believe we have in our portfolio right now, and
23 subject to check, is, roughly, 30 to -- 30 to
24 40 years. I believe 30 years is my recollection,
25 but I believe we were looking at potentially

1 getting some longer term.

2 THE CHAIRMAN: I'm sorry, I can't hear you.

3 30 and 40 years and what.

4 MR. MIKE SAVIDANT: Sorry.

5 THE CHAIRMAN: Between 30 and 40 years, and
6 what --

7 MR. MIKE SAVIDANT: 30 to 40-year debt is the
8 longest term debt we have in our portfolio.

9 I know we have a 30-year debt in our
10 portfolio, and I believe we've been looking at some
11 longer term stuff as well.

12 THE CHAIRMAN: What are you paying for
13 30-year debt?

14 MS. SUSAN YURKOVICH: We will check with some
15 friends at the back of the room and get that to
16 you.

17 THE CHAIRMAN: Okay.

18 Kind of an interesting question because if
19 you're running a 70- to 80-year amortization on
20 chunks of this stuff, the assumptions that you make
21 about future inflation when you're dealing with
22 nominal debt are hugely important. So what are you
23 assuming?

24 MR. CHRIS O'RILEY: Well, I would say, generally,
25 when we're doing -- looking at portfolios like

1 this, we're talking about real dollars. And you'll
2 see a chart in the handout that shows the revenue
3 requirement over time, and that is done in real
4 dollars.

5 You asked -- the panel asked the question
6 about the rate impact when it comes into service.
7 That has to be done in nominal dollars.

8 THE CHAIRMAN: Yes, I understand.

9 MR. CHRIS O'RILEY: This is an unusual
10 calculation.

11 THE CHAIRMAN: I mean, one can do rate
12 calculations in real dollars, but the custom is not
13 to do that, so I was interested that you said that
14 these are nominal dollars in this chart.

15 MR. MIKE SAVIDANT: Sorry, Mr. Chair, I've been
16 handed a document.

17 So on what our -- we've recently completed a
18 triple-A price debt issue at 3.25 percent for a
19 30-year debt.

20 THE CHAIRMAN: That's an attractive number;
21 isn't it?

22 Now, what are you going to do about the next
23 half century after that?

24 MR. MIKE SAVIDANT: This is why we finance on a
25 portfolio basis across.

1 THE CHAIRMAN: Yes, I know you finance on a
2 portfolio basis, all corporations do.

3 MR. MIKE SAVIDANT: Yeah.

4 THE CHAIRMAN: But you have an asset here,
5 which you are depreciating over a very long period
6 of time, which you are financing over a very long
7 period of time. And so the assumptions for the
8 out years become interesting in terms of inflation.

9 Is historical experience useful here? Could
10 we have another 1980?

11 I guess the real question is how do you
12 conceive of the risk of interest rate excursions in
13 the period beyond current finance ability?

14 MR. CHRIS O'RILEY: That's a great question.

15 I think what we do in the -- first of all, in
16 the comparisons, the portfolio comparisons, is we
17 look at present value, which kind of drops off the
18 back end of the value and the costs.

19 You can certainly have interest rate
20 excursions, and we've seen them, you know,
21 throughout history. If you take a long view of
22 history, hundreds of years, and decades, even, we
23 have interest rate excursions.

24 I think the two points to consider here, when
25 you get beyond the 30-year window, which is what we

1 can lock in, and we have been locking in through
2 the government, 30-year money, the benefit here is
3 half the -- by 30-year point, half of the costs of
4 the plant have been amortized down, and you're
5 looking at a much smaller base.

6 THE CHAIRMAN: Right. I mean, half of 8
7 billion is chicken feed, I agree.

8 MR. CHRIS O'RILEY: Yeah.

9 THE CHAIRMAN: That's a bit of a cheap shot.

10 MR. CHRIS O'RILEY: Yeah.

11 THE CHAIRMAN: But it is an interesting
12 point.

13 MR. CHRIS O'RILEY: Yeah. I mean, we do have
14 this problem generally because half of 8 billion is
15 4 billion --

16 THE CHAIRMAN: Yeah.

17 MR. CHRIS O'RILEY: -- which is two years of our
18 general capital plan. So we have a financing
19 challenge in general, and so we have to be very
20 careful with interest rates.

21 THE CHAIRMAN: Well, I have to say that the
22 panel has refrained from asking questions about
23 what bankers would classically call the financial
24 condition of BC Hydro because it's not directly
25 relevant. And also because it's an artifact of

1 provincial policy more than good accounting
2 practice, I think.

3 The real question, though, is the
4 entanglement of Hydro with the Province. And
5 Mr. Savidant just said that -- did a 3.25 over 30
6 with a triple-A rating. Unless the Province is
7 pretty sharp at managing its increasing debt load,
8 there is a danger that triple-A could become
9 double-A and so on.

10 The cost implication of one notch might be 20
11 basic points, something like that.

12 In your calculations, thinking now as -- of
13 yourself as a corporation rather than as an arm of
14 the BC government, have you examined the
15 consequences for corporate finance of -- and for
16 rate requirements and so on -- of a loss of a notch
17 or two in the BC credit rating?

18 MR. CHRIS O'RILEY: So we have looked at
19 different scenarios for financing cost. We've not
20 explicitly speculated, I don't think, or considered
21 the changes in the government's credit rating, but
22 we've looked at changes in the interest rates,
23 which you could attribute to a change in the
24 government --

25 THE CHAIRMAN: To anything you wanted

1 without being charged with lèse-majesté.

2 MR. CHRIS O'RILEY: Pardon?

3 THE CHAIRMAN: Would you contribute to
4 anything you wanted without being charged with
5 lèse-majesté.

6 MR. CHRIS O'RILEY: Exactly. Exactly.

7 THE CHAIRMAN: Yeah.

8 Now, there's a number here for surplus sales,
9 again, nominal, but -- and I notice we have a
10 diagram coming later of prices that are -- as it
11 were, market prices, but those do seem, to me, to
12 be pretty large numbers that you can -- you know,
13 that you can -- in the early years that you can
14 flog a substantial part of the output of Site C for
15 an amount of money, which is a very appreciable
16 part of your total costs.

17 Now, what are the assumptions about power
18 prices in years 24, five, six, and so on.

19 MR. CHRIS O'RILEY: We were -- we have an
20 intention to come on to that on slide 11. Would
21 you like to go there now, or would you prefer to --

22 THE CHAIRMAN: Yes, while we're on the
23 topic, let's have a look at that.

24 MR. CHRIS O'RILEY: Okay. Sure.

25 So the portfolio modelling in the EIS and in

1 our IRP takes into account the surplus that's
2 expected, and the range of surplus given different
3 scenarios for load. And it effectively balances
4 the surplus by selling it in the market. And so we
5 use different price scenarios, and these are the
6 three scenarios and the weightings that we use in
7 the portfolios.

8 So, for example, the base case here really is
9 a 35-dollar per megawatt hour --

10 THE CHAIRMAN: Okay, these are real or
11 nominal? Real, I suppose.

12 MR. CHRIS O'RILEY: These are real. So you can
13 see they are in 2013 dollars.

14 MR. DAVID INCE: And I should add that those
15 are yearly average values, so that -- these are
16 year average values, so there will certainly be
17 seasonality. Freshet prices will be quite a bit
18 lower.

19 THE CHAIRMAN: Okay. All right. Let's
20 carry on.

21 MR. CHRIS O'RILEY: So perhaps we'll go back to
22 slide 8, and here we talk about the rate impact as
23 it -- as the asset comes into service.

24 And I want to say, first, there's been a
25 number of -- well, a couple changes that have

1 occurred relating to the government November 26th
2 announcement. So the government changed how return
3 on equity was calculated, and they had this concept
4 of deemed equity and a percentage return on deemed
5 equity, so it wasn't real equity. And it was a bit
6 of a cash machine --

7 THE CHAIRMAN: Yes, the question of your
8 real equity is one of the great mysteries of --

9 MR. CHRIS O'RILEY: Yes. It's a whole other
10 question, which I'm happy to get into, but ...

11 The other thing they did is they eliminated
12 the third tier of water rentals, and that was a
13 particular water rental that was paid only by
14 BC Hydro.

15 THE CHAIRMAN: I'm aware of that, and that
16 accounts for one of the further questions, but I
17 didn't pick up the November 26th announcement.
18 Thank you.

19 MR. CHRIS O'RILEY: Yeah. Yeah.

20 So this transition I think in about 2018.
21 And after 2018, what they are going to do is have
22 the income, the return to the Province go up at
23 about -- at inflation.

24 So they've actually reduced the amount of
25 money they are taking out of BC Hydro, and,

1 consequently, from the ratepayers. And that was
2 just a recognition that it was too much. There was
3 just too much going across the -- across the water.

4 MR. MATTISON: Mr. O'Riley, when you say
5 "reduce the amount of money," reducing both the
6 dividend and the water rentals? Or it's a mix of
7 both of those payments? Is that correct?

8 MR. CHRIS O'RILEY: Yeah. Well, it's -- they did
9 both. And I would distinguish. They actually --
10 there's the calculation of that income, which goes
11 into our revenue requirement, and then there's a
12 portion of that which is the dividend. They also
13 reduced the dividend, which has a debt reduction
14 benefit for us, so -- I didn't mention that, but
15 that's really a third change.

16 And there's two implications of that: one is
17 it's reduced our forecast load rate increases in
18 general, takes a significant weight off the
19 company.

20 And in the 2012 load forecasts, we had a
21 33 percent increase in rates over a 20-year window.
22 And based on the announcement in November 26th,
23 that figure is now 21. And, again, these are real.
24 So that's great.

25 And it also has a very beneficial impact for

1 Site C's revenue requirement because of the way
2 that the deemed equity would have been counted and
3 we would have paid the third-tier water rentals on
4 Site C.

5 And there is a handout in the set of slides
6 that you were given that shows the revenue
7 requirement over time. And it's broken down by the
8 different components. And you can see that the
9 dashed line is what the revenue requirement would
10 have been before these changes were made.

11 MR. MIKE SAVIDANT: That -- that's handout 4.

12 MR. CHRIS O'RILEY: Yes, Danielle, thank you.

13 So it takes more than \$100 million out of the
14 revenue requirement for the first year as the asset
15 goes into service, so a significant reduction.
16 And, again, these are real dollars, so we go back
17 and forth.

18 THE CHAIRMAN: So it's not -- you'll have
19 some real equity by 2024 in a responsible
20 calculation?

21 MR. CHRIS O'RILEY: Yes. The target in the
22 company is some -- you know, through the reduction
23 of dividends is to maintain that reduction until
24 the equity -- debt equity reaches a 60/40 ratio,
25 which we think is appropriate for the company. I

1 think, in general, the feeling has been it's been
2 light, particularly given the capital plan.

3 THE CHAIRMAN: But one way to put this is
4 that a change in policy by the government of BC has
5 reduced the annual cost of service by, I don't
6 know, 15 or 20 percent, it looks like?

7 MR. CHRIS O'RILEY: Yes. And that -- those
8 changes also flow on to our existing asset. So
9 it's a very --

10 MR. CHAIRMAN: Yeah.

11 MR. CHRIS O'RILEY: -- very important change.
12 And we were very, very happy that they agreed to
13 this.

14 Those recommendations --

15 THE CHAIRMAN: So the interesting question
16 is does that cascade through all of the
17 calculations of UECs and so on for the project and
18 for its alternatives?

19 MR. CHRIS O'RILEY: It actually does not
20 affect -- well, the water rental change affects the
21 UEC because that's a variable cost.

22 THE CHAIRMAN: Yeah.

23 MR. CHRIS O'RILEY: The return on equity does not
24 affect the UEC because it's -- the UECs are
25 calculated based on a -- the capital cost divided

1 by the energy. So it -- it has about a dollar, I
2 understand. The water rental change has about a
3 dollar impact on the UEC.

4 It doesn't affect the alternate portfolios
5 because they -- you know, the run-of-river, the
6 IPP, hydro plants never paid the water rental; they
7 always had the benefit of a lower water rental.

8 THE CHAIRMAN: Yeah. Yeah. Okay.

9 MR. CHRIS O'RILEY: So if we could go back to
10 slide 8. And this -- so we have actions that have
11 been taken, and then potential actions that could
12 be taken. And this concept of rate-smoothing to
13 really clip the peak of the initial revenue
14 requirement as an asset comes into service, and we
15 do that through a rate-smoothing regulatory
16 account. So you would effectively under-recover
17 for, say, the first five years of the asset;
18 over-recover later.

19 And we did this in 2010 when we bought
20 one-third of Waneta dam from Teck, and Fortis have
21 used this technique when they brought assets into
22 service recently. So it's a common utility
23 technique to kind of smooth the blow, if you will,
24 of large capital.

25 THE CHAIRMAN: It's a legitimate use of

1 deferral accounts.

2 MR. CHRIS O'RILEY: Yeah, absolutely.

3 So if we go to slide 9, and you can see the
4 effect of this. And what we're showing here,
5 again, is a project-specific rate impact in nominal
6 dollars with and without the smoothing.

7 So if you look at the blue line, that's
8 without smoothing. And you can see the initial
9 rate impact -- cumulative rate impact peaks between
10 5 and 6 percent in fiscal 25.

11 And with smoothing, you can see the rate
12 impact peaks at about 3 percent. And carries on at
13 a constant rate through 2023. And you can see the
14 over and the under, 33. Fiscal 2033.

15 And you can see the over and the under, which
16 is the difference between the blue and the green
17 lines.

18 The other point is that in both cases, the
19 cumulative rate increase is below what it would
20 otherwise be. It's actually negative when you get
21 to 2034. And you've paid down that initial amount.
22 And that's indicated by the fact that we're -- the
23 cumulative rate increase is below the line.

24 And I just say two things. Again, the
25 smoothing is very much subject to the commission

1 review and approval.

2 And I would also just say, as by comparison,
3 we normally do these calculations on a comparative
4 basis between portfolios because our job is to
5 choose one portfolio over the other. So it's not
6 one portfolio or nothing, it's one or the other.
7 And we've shown, in the handout, the comparative
8 rate impact calculation between the portfolio with
9 Site C in it and the clean generation portfolio, if
10 you have any questions about that.

11 And to interpret these, these charts, when
12 you're above the line, that means that the clean
13 generation portfolio has a higher rate impact.
14 When you're below the line, it means the portfolio
15 with Site C in it has a higher rate impact.

16 So the cumulative rate impact of the clean
17 generation portfolio without Site C is much
18 greater. And that's indicated by the high red or
19 orange line there.

20 We've shown the effect of smoothing with or
21 without. And that effect goes away after the
22 10 years because that's the term we've assumed for
23 the smoothing.

24 THE CHAIRMAN: If you go back one to the
25 blue and green --

1 MR. CHRIS O'RILEY: Slide 8, 9.

2 THE CHAIRMAN: Slide 9. The bottom line: a
3 comparative rate analysis is provided in the CPCN
4 filings. Are they going to do a CPCN judgment?

5 MR. CHRIS O'RILEY: Well, no --

6 THE CHAIRMAN: It's a rate hearing; is it
7 not?

8 MR. CHRIS O'RILEY: No. What we're trying to
9 make the point here is -- we're really just
10 providing this information on slide 9 for your
11 benefit.

12 THE CHAIRMAN: Yes, okay.

13 MR. CHRIS O'RILEY: Normally, in -- the CPCN
14 guidelines ask us to do comparative rate impacts,
15 which is what we would do in a CPCN if there were a
16 CPCN.

17 So let's go, Ms. Melchoir, to slide 10.

18 So the panel asked the question about changes
19 in the power markets since the 1980s, which was
20 when our previous large -- our last large hydro
21 plant came into service and generated a surplus.
22 And the panel, I understand, wanted to talk about
23 the financial risk implications associated with
24 those differences in the market.

25 So I worked at Powerex for seven years. I

1 wasn't there in the '80s because I was in high
2 school. But I was there from 1997 through 2004, so
3 a period of a fair amount of development of the
4 industry and we went through the California power
5 crisis and all that.

6 But I have spoken to folks who were involved
7 in trading electricity in the 1980s, so I have a
8 sense -- we have a good sense of how that worked.

9 And what I would summarize, that the key
10 differences between the '80s and today is all
11 around the access that we have to markets and to
12 customers because the transmission is now open, and
13 utilities are required to make that available to
14 third parties.

15 So in the '80s, we had to negotiate with
16 bondable power as -- you know, to get to
17 California. And it was very difficult to get to
18 California. And expensive. And you had to kind of
19 pay the toll on the way. And there were no --
20 there was not a regular --

21 THE CHAIRMAN: And the rewards turned out to
22 be less than wonderful. Gosh, your timing was
23 good, sir.

24 MR. CHRIS O'RILEY: Yeah.

25 So the other difference between the '80s and

1 today is there are a lot more products. We mostly
2 sold these big block contracts, perhaps shaped
3 seasonally, to utilities in California for
4 multiple years. We have a lot more different
5 markets, power pools, capacity markets, different
6 products, peaking products, ramping products,
7 regulation products, there's a lot more tools in
8 our kit to market the power. And that doesn't
9 really come through in the portfolio analysis.
10 We're just looking at bulk energy prices as a
11 proxy. So it is quite different today.

12 You asked, in particular, about, well, let's
13 compare the prices. And we did have a go at that.
14 We, unfortunately, don't have a lot of price
15 history from the '80s because they were a different
16 kind of product.

17 We have included in the handout -- and if
18 Ms. Melchoir could go to that -- and it's a chart,
19 a very busy chart -- right there -- that shows the
20 spot prices in the pacific northwest, the daily
21 prices for peak and off peak, going back to 1996,
22 and that's when those -- that price visibility came
23 to exist.

24 What I would say is the other big difference
25 we have today relative to the '80s is -- comes

1 through in this chart, and it's the volatility.

2 And what we've learned is Powerex, our
3 trading arm, actually make their money more off the
4 volatility and the variability of the prices than
5 the absolute value of the prices.

6 So Powerex has done well in the last decade
7 or so in periods where prices were high and prices
8 were low because they've become very adept at
9 taking advantage of the variability and the ability
10 to move price power around.

11 THE CHAIRMAN: Good.

12 Tell me what HLH and LLH mean.

13 MR. CHRIS O'RILEY: Yeah. HLH is a -- it's heavy
14 load hours. It's a -- it's one of the many
15 acronyms. And light load hours is LLH. So it's
16 peak and off peak. And it's -- the HLH is
17 two-thirds of the day, and the LLH is one-third of
18 the day, overnight.

19 THE CHAIRMAN: Thank you.

20 Just from nowhere, what do you think is going
21 to happen this summer with the loss of the 2,000
22 megawatts of nuclear in California? What's going
23 to happen to prices?

24 MR. CHRIS O'RILEY: Yeah. So I'm a little ways a
25 way from that, I probably shouldn't be speculating

1 on short-term markets. That was a -- that was a --
2 I think a Rube's game when I was at Powerex, let
3 alone now that I'm so far away, but -- I mean, I
4 think it's an issue of concern when you take that
5 much capacity out of a market.

6 And, in general, the prices in the summer,
7 you know, depend a lot on the weather and outages.
8 And, I mean, it could -- it could be fine; it could
9 be a challenge for the --

10 THE CHAIRMAN: Okay.

11 MR. CHRIS O'RILEY: -- and I -- what I -- I guess
12 our traders kind of stand at the ready to help if
13 there's a need for power. And ...

14 THE CHAIRMAN: Make sure they get paid in
15 advance?

16 MR. CHRIS O'RILEY: Yes.

17 THE CHAIRMAN: Dealing with California.

18 Back to your slide 10, a regional shortage of
19 dynamic capacity. Do you want to expand on that a
20 bit?

21 MR. CHRIS O'RILEY: Yeah. Sure.

22 So what's happened in the market is there is
23 more renewable capacity; there's more wind. And
24 there's actually an increasing amount of solar in
25 California. And the solar is interesting.

1 In many ways, it matches the load because the
2 sun is out in the day. It is a real problem over
3 the morning and the evening peak. And when you get
4 people -- the sun goes down and you get people
5 cooking and plugging in their electric cars and
6 doing all the things they do when they get home,
7 and I know in California they are very concerned
8 about their ability to deal with the solar ramp.
9 And so our folks -- our trading folks are working
10 very hard to try and find a way for us to help.

11 And our capacity, our hydro capacity,
12 including the existing capacity we have, and
13 Site C, is perfectly suited to helping California
14 deal with their ramping problem. And so we see
15 that as a big opportunity.

16 There's also a challenge in the market. The
17 wind in the northwest is clustered in the Columbia
18 Gorge, and it tends to be either on or off, there's
19 not a lot of diversity in the resource.

20 And Bonneville provide the short-term back-up
21 for that wind through some tariffs that they have.
22 And it's a very big challenge for them.

23 And their administrator, their effective CEO
24 shared with us an internet chart, showing the
25 output of the wind. And it turned off for weeks in

1 the -- in the summer, and also in the winter, you
2 know, due to high-pressure zones. And people
3 actually called in and said this internet site
4 down, but, no, the wind was down.

5 So he is responding -- - Bonneville is
6 responding to try and manage the regulation, and
7 they have a limit on their capacity. So there have
8 been opportunities for Powerex and BC Hydro through
9 Powerex to take advantage of the opportunities that
10 creates.

11 So we are finding that short-term ability to
12 ramp up and ramp down is just becoming more and
13 more value -- valuable.

14 And, again, the subtleties like that aren't
15 reflected in our portfolio analysis, which, again,
16 is just what you could get for the energy.

17 THE CHAIRMAN: So your non-firm hydro
18 production from the heritage resources is
19 increasingly valuable in export markets?

20 MR. CHRIS O'RILEY: No. I would say our firm
21 exports and our ability to match load and
22 generation is increasingly valuable. I would say
23 our non-firm hydro is the opposite. And we'll come
24 to that. We do intend to address that particular
25 question later in the presentation.

1 THE CHAIRMAN: Just to register one other
2 point, it seems to me that this fascinating
3 discussion raises again the question of what on
4 earth the government meant by self-sufficiency?

5 MR. CHRIS O'RILEY: Well, we'll come to that.

6 THE CHAIRMAN: Yes.

7 MR. CHRIS O'RILEY: So I think we're on slide 12.
8 Thank you, Danielle.

9 So we turn now to the -- I missed that. We
10 turn now to the question of self-sufficiency. And
11 I -- the panel was asking for ways we could
12 interpret that policy in ways that could give us
13 more flexibility to time new resources.

14 And I should say, by way of background, we've
15 had the self-sufficiency policy requirement for
16 awhile. And it goes back to the 2007 energy plan.

17 And the origin of that policy was that the
18 government's concern that our planning criteria,
19 prior to 2007, resulted in a systemic reliance on
20 imports.

21 And we had an explicit reliance of 2,500
22 gigawatt hours in our planning criteria, so for
23 market imports. So we wouldn't acquire that
24 generation in BC, we would just rely on the market
25 for that.

1 We also had 6,000 gigawatt hours of reliance
2 on Burrard for firm energy, which, for many years,
3 has tended not to run, and we would end up just
4 importing.

5 So the sum of that 8,500 gigawatt hours
6 resulted in a systemic imports -- systemic reliance
7 on imports into the system, even in a normal water
8 year, and a much larger imports in a -- in a really
9 low water year. And we had a number of those in
10 the last decade.

11 So the self-sufficiency -- well -- and the
12 government didn't like that. They didn't think
13 that was a good foundation for running a system, an
14 appropriate way to plan for a system.

15 So that the self-sufficiency at its kind of
16 basic element is about having enough power in the
17 system to meet the load. And that's not just
18 capacity, but also energy. Because in a hydro
19 system, you have to think about energy.

20 And that self-sufficiency is about having
21 that capacity and energy in amounts and in products
22 that you can rely upon.

23 And while it is a policy for us, it goes to
24 the basic, our basic responsibility as a utility,
25 which is meeting -- meeting the load.

1 And I should say -- and I note -- and I say
2 this with the greatest of respect to my colleagues
3 in transmission and distribution, within limits, an
4 outage caused by transmission or a distribution
5 problem is expected. And it's -- and really
6 acceptable. And I understand that you had one of
7 those not too long ago.

8 An outage or a curtailment due to a lack of
9 generation is a different story. And it's
10 generally considered to be a crisis and a really
11 big problem. And we saw kind of an example of this
12 very recently in Newfoundland where they didn't
13 have enough generation because of a combination of
14 one of their plants being down, and load growth.
15 And they ended up with rolling blackouts. And the
16 language around that was quite elevated, and the
17 term "crisis" was used. And that falls back,
18 ultimately, on governments. It hits the utility
19 along the way, but it ultimately lands in
20 governments. So that is why --

21 THE CHAIRMAN: And I know -- -- I notice we
22 have a new Premier there, too.

23 MR. CHRIS O'RILEY: I did note that, as well.
24 And there was a little bit of a connection, I
25 understand.

1 So -- I mean, that is why utilities and
2 regulators and governments spend so much time on
3 planning criteria. It's very important. And
4 there's a lot of thought that has gone into this.

5 So if we look at the -- the slide lists the
6 key components of self-sufficiency. And the most
7 important determination is the degree to which we
8 can rely on the heritage hydro system for energy.
9 It's probably the most important planning input
10 that we have.

11 And the regulation says, as you know, the
12 resource capability can be no more than what we can
13 produce under average water.

14 And if you turn that around another way, it
15 says what we do is we plan to rely on up to 4,100
16 gigawatt hours a year of imports above and beyond
17 our critical -- critical water.

18 So the 4,100 compares to the 8,500 I talked
19 about, historically, so it's a reduction in that.

20 THE CHAIRMAN: But, you know, one thing that
21 troubles me a little bit about -- I think the --
22 that going to average water and relying on external
23 markets, when you need to, is a sensible
24 conclusion. But I'm thinking that it's demand more
25 than energy that's driving the need for additions

1 to the system at the moment, at least in time.

2 And when you think about the demand curve,
3 sort of the -- you know, that cumulative annual
4 demand curve, you get -- I don't know. At the
5 left-hand edge of the curve, you have hundreds of
6 megawatts that you need for only 1 percent of the
7 time.

8 And so the question of how you define
9 self-sufficiency way off on the left-hand side of
10 the curve is interesting. I mean, you would,
11 presumably, be willing to pay quite a lot for
12 demand that would be called on a few dozen hours a
13 year.

14 MR. CHRIS O'RILEY: Yeah. Well, we'll come
15 back because you asked specifically about that. So
16 if you'll allow me to -- we'll come to that very
17 point.

18 And I just -- I just want to say we need --
19 in the -- Site C is a long-term resource, and we
20 need both energy and capacity. And you've --
21 you've seen the charts, and we've got them in here
22 about the details around the timing, but I want to
23 say we need -- we need both. And it's being driven
24 by both. And we can talk about that some more in
25 terms of the tactics.

1 Just to say one more thing, or a couple more
2 things about the self-sufficiency based on average
3 water. You're aware they came to this after the
4 government review we had in 2011. It was actually
5 a recommendation of BC Hydro. We thought it was an
6 effective way to plan and operate the system.

7 And, for me, personally, it's the right -- I
8 think we got to the right place on this
9 calculation. It's a -- it's a good foundation for
10 both planning the system and operating the system
11 with an appropriate reliance is I think was your
12 term, on external -- on external markets, so ...

13 And I think it was all -- it's in -- in this
14 Province, it does get hotly debated, and there are
15 a lot of perspectives back and forth. And I know
16 the government, they hear from us, they also hear
17 from stakeholders and experts, and there's a lot of
18 people that have expressed opinions on this. And I
19 would say the effect of that, it was an informed
20 debate and a well-considered debate.

21 The next slide turns to the question of how
22 we deal with this IPP non-firm. And this is really
23 a hydro issue because of the -- well, we'll
24 explain -- explain that.

25 And I think the suggestion I heard from your

1 questions was could we somehow firm this non-firm
2 energy up and get some more credit for it in our,
3 in our stack, in our load resource balance, and be
4 able to defer new acquisitions? And --

5 THE CHAIRMAN: Well, specifically, to use
6 your gas allowance for firming?

7 MR. CHRIS O'RILEY: Yes. And we'll specifically
8 deal with that.

9 And what I want to say at the outset is we've
10 actually, in our planning process, we've done what
11 you're suggesting. And I'll explain -- explain
12 that.

13 So when we -- we acquire these contracts
14 through calls, and there's a firm amount bid in and
15 a non-firm amount, and you can add up the amount of
16 contracted firm that you have from all those
17 individual contracts, and you can add up all the
18 amount of non-firm that you can get. That is not
19 how we make the determination of our reliance on
20 firm.

21 We do that calculation on a portfolio basis,
22 on an aggregation basis, taking into account the
23 diversity among those contracts, and our ability to
24 store and re-shape it with the system.

25 So we did that calculation in our IRP. And

1 the result is that 85 percent of the average
2 run-of-river hydro IPP power is considered firm.

3 And that is more than what you would get --
4 significantly more than what you'd get by looking
5 at the contracts on an individual basis.

6 And for comparison, our clean power call,
7 which was our -- you know, had a lot of
8 run-of-river hydro in it, 72 percent of the average
9 generation in that call was -- was firm on a
10 contracted basis.

11 So we're giving the benefit of the
12 aggregation, the diversity in our system to this
13 very important resource for us.

14 The other thing I would say is in the -- in
15 this IRP process, we sharpened our pencil and were
16 able to increase that determination, the firm
17 amount, by 500 gigawatt hours per year, which is a
18 couple percent on that 85 percent calculation. So
19 I think we have pushed that.

20 If you look in the handout -- and I'll defer
21 to Mr. Savidant on the number.

22 MR. MIKE SAVIDANT: Handout 8.

23 MR. CHRIS O'RILEY: This shows the profile of the
24 run-of-river hydro over the year. And you can see
25 that bulge in the middle, which is the freshet or

1 the spring energy, call it by various names. This
2 data comes from the resource options report. So
3 it's potential projects not actual projects. But
4 the actual projects would be very similar to this.

5 And a lot of this non-firm hydro that we're
6 talking about, the 15 percent that's kind of the
7 balance that's left -- left over here occurs in the
8 freshet. And it's very difficult for us to turn
9 that into firm, to make better use of it.

10 And we're finding we're very close to the
11 point where we can't absorb any more spring freshet
12 energy into the system and use it and move it
13 around from -- from year to year -- or from season
14 to season.

15 And there are times when we're -- we end up
16 spilling it or we end up selling it for very low
17 prices. So it's a very tough resource for us to
18 put more reliance on it, and -- and, really, that
19 particular part of the supply is not that useful
20 for running a utility. It's kind of a necessary
21 by-product of the firm run-of-river, but it's more
22 problem than a -- than a -- something of value.

23 So from a very practical operations view,
24 that -- we're back to -- yes, so back to slide 13.

25 That's fine.

1 The very practical operations view, we don't
2 have the ability to increase our reliance on this
3 kind of seasonal non-firm hydro. And we'll get to
4 it a little later, but a thermal plan, a
5 single-cycle gas turbine doesn't help you move that
6 energy from the spring to, say, the winter. It
7 doesn't shape --

8 THE CHAIRMAN: No, but it can help with
9 other sporadic resources?

10 MR. CHRIS O'RILEY: Yes. It provides its own
11 benefits, but those benefits are completely
12 independent of that energy we just talked about.
13 So we'll -- and we'll talk about those benefits
14 later on.

15 So that is the practical and operating view.

16 I would also say that if you go back to the
17 self-sufficiency definition, we think relying on
18 this non-firm and putting in our stack would be
19 outside the policy. And it would effectively be
20 increasing that 4,100 gigawatt hours and -- well,
21 increasing that number because you're effectively
22 going to be importing and replacing that energy
23 because they can't use it for our system.

24 And, again, that was a subject of much
25 consideration and debate and -- and in the IRP, in

1 the drafts we sent to the government, and the
2 consultation and in the final decision.

3 So the next slide gets at the question of
4 gas. And I think what you're saying is could we
5 use the head room that we have in the 93 percent
6 clean, could we be more aggressive in interpreting
7 the self-sufficiency to defer investments, to defer
8 commitments.

9 And I want to say, as a general comment, when
10 we implement government policy, we do consider both
11 the letter and the spirit of the policy. And there
12 are times when the policy might not be as clear as
13 we would like.

14 And what we do in those occasions is we have
15 a lot of dialogue back and forth with the Province.
16 And we confirm that we're aligned on where we want
17 to land.

18 And this has been the approach we took on
19 this issue of gas and self-sufficiency in the IRP.

20 THE CHAIRMAN: When those discussions take
21 place, are they concluded with a letter or a minute
22 or something --

23 MR. CHRIS O'RILEY: Yeah, sometimes --

24 THE CHAIRMAN: I'd like to know what it's
25 about.

1 MR. CHRIS O'RILEY: Yeah, sometimes.

2 In this particular instance, they were
3 formalized through the IRP, so we put a draft to
4 the government in May 2012, we put -- and we got
5 feedback. And they heard from folks. And we put
6 another draft to them in August. And -- of 2013.
7 And we did some more consultation. There was a lot
8 of debate in the Province, and we got lots of
9 feedback. And I'll talk about the specific
10 feedback we did get. And then we put a final
11 document forward.

12 So -- so these policy interpretations are
13 made in the -- in this IRP. Like, they are
14 confirmed. That's our view.

15 So we think the role of gas and
16 self-sufficiency has been thoroughly explored.
17 It's been documented in the 2013 IRP.

18 We also went through the experience of the
19 2008 process -- planning process at the BCUC, and
20 I'm going to talk about that and how that unfolded.
21 And we -- we got clarity by the government on the
22 legislation after that. So I will come back to
23 that.

24 So we --

25 THE CHAIRMAN: Just before you leave that.

1 The approval of the IRP in 2013 was when?
2 November?

3 MR. CHRIS O'RILEY: It was -- it actually was
4 announced November 26th, the same day as the rates.
5 Yeah, it was approved by -- officially approved on
6 November 25th through the order in council.

7 THE CHAIRMAN: Thank you.

8 MR. CHRIS O'RILEY: So in the IRP, we set out
9 three ways to meet the 93 percent objective. And
10 the first was the interpretation based on the
11 critical water from the heritage hydro system.
12 That was the way we did it under the old definition
13 of self-sufficiency, and that was more strict, so
14 we -- we didn't recommend that.

15 The second was aligned with planning based on
16 average water is, and that was what was obviously
17 recommended, it says there, and was approved.

18 And the third was to meet this 93 percent
19 based on not counting the -- or discounting the
20 amount of generation we're going to get from
21 thermal plants, and relying on imports from the
22 market to help us out in the 93 percent
23 calculation. So that's what number 3 is.

24 So -- so putting in gas plants that rarely
25 run and then having those displaced by market

1 imports and then showing that rate in the -- in the
2 93 percent calculation.

3 So, option 3, the challenge with that is it
4 resulted in a systemic reliance on -- on
5 self-sufficiency -- on imports, and undermined the
6 concept of self-sufficiency. So you could meet the
7 93 percent, but you're failing over here on
8 self-sufficiency.

9 And we are also concerned that -- I mean,
10 there's a lot of fossil-based fuel in the
11 generation in the U.S. Sure, there's some
12 renewables. But we would be getting fossil-based
13 imports. And, again, that would undermine the
14 clean energy intent and spirit of the regulation.

15 So I would note that -- so we put all that in
16 the IRP. We had lots of back-and-forth
17 discussions.

18 What is interesting is the only feedback we
19 got to change the IRP between August and
20 November was to add in a section on clean energy,
21 to develop a strategy that would support the clean
22 energy sector. So there was no feedback to, well,
23 let's do more thermal. There wasn't any feedback
24 to, say, do more DSM. They were happy where we
25 landed there, that the policy emphasis was on clean

1 energy, here in BC.

2 THE CHAIRMAN: And that's because the panel
3 was otherwise occupied.

4 MR. CHRIS O'RILEY: Yeah.

5 So if we go --

6 MR. MATTISON: Mr. O' Riley --

7 MR. CHRIS O'RILEY: Sorry.

8 MR. MATTISON: -- I just want to back up to
9 the statement you said about the reliance on the
10 thermal energy imports. And, I mean, I just want
11 to make sure I understood what you said about not
12 burning natural gas but importing coal-fired
13 electricity.

14 How did you move from that? Where did you go
15 from that?

16 I mean, I understand they said more reliance
17 on clean energy, but is that not still -- most of
18 the market purchased energy is thermal purchased
19 when it's cheap, if I understand the way Powerex
20 trades thermal power from Alberta or somewhere
21 where it's less costly --

22 MR. CHRIS O'RILEY: Yeah.

23 MR. MATTISON: -- it contributes to the
24 bottom line, BC Hydro and the government, I
25 suppose, but it contributes to greenhouse gas

1 emissions in a greater way than it would if
2 generation was done from burning natural gas.

3 And I just want your comments on that, and
4 how that -- I can't follow that into what you're
5 just telling us.

6 MR. CHRIS O'RILEY: The change, yeah.

7 Well, the primary -- the primary
8 consideration was that what they didn't want us to
9 do was to put in single-cycle gas turbines that
10 would tend not to run because of prices and carbon
11 tax and the like, and then lead to imports because
12 it goes against the spirit of -- of
13 self-sufficiency.

14 I think they also recognized that if we did
15 that, they've got these other objectives around
16 climate change and reducing emissions, there would
17 be emissions associated with those imports. We
18 don't do a great job of tracking them or
19 calculating them. It's hard. But there would be
20 emissions associated with those imports.

21 And they weren't looking at the calculation
22 between -- well, coal in Alberta versus gas here in
23 BC; they were looking at coal and gas in the U.S.,
24 which is increasingly playing a role given prices,
25 and renewables here in BC, so that, I think, was

1 the calculation.

2 And I just reiterate, the primary thing was
3 the self-sufficiency policy, but I think the nature
4 of the imports was also a factor.

5 And I do acknowledge the imports are a mix
6 of -- I mean, there's lots of wind in there,
7 there's freshet hydro, there's all kinds of things
8 in the mix, but we think the GHG content of those
9 emissions is much greater than the intensity here
10 in BC. I think that's factual.

11 THE CHAIRMAN: Before we leave this I'm
12 still confused about the rejection of single-cycle
13 gas turbines. And I'm thinking of that load
14 duration curve with its very narrow peak on the
15 left-hand side of the diagram, and how that relates
16 to the definition of self-sufficiency. In a -- in
17 a strictly purist world, you would say that we
18 would have -- we would have to have enough capacity
19 on average to meet the -- you know, the last hour
20 of high demand on a winter breakfast morning or
21 whatever it is. And that's nonsense. That would
22 be a very, very expensive way of doing it.

23 So to rely, if one can, on market imports for
24 the very tippy peak of the thing would be fine.

25 If you're not allowed to do that for the

1 self-sufficiency criterion, then gas turbines that
2 run a few dozen hours a year would seem to be
3 attractive; particularly, if the alternative is
4 bearing very large environmental costs.

5 MR. CHRIS O'RILEY: Yeah. And we are kind of
6 going back and forth here between capacity and
7 energy and firm energy. And --

8 THE CHAIRMAN: I'm thinking -- I'm thinking
9 of your own tables, which show that we run out of
10 capacity six, seven years before we reach the
11 energy threshold.

12 MR. CHRIS O'RILEY: Yeah.

13 THE CHAIRMAN: And so, in my mind, that
14 means that capacity is the most urgent thing that's
15 facing you at the moment.

16 MR. CHRIS O'RILEY: Well, again, we think we need
17 both. And we'll come -- come to that.

18 THE CHAIRMAN: But you need capacity first.

19 MR. CHRIS O'RILEY: Yes. And that's because
20 we're renewing some IPP contracts, as Mr. Reimann
21 said, that have lots of energy, but don't bring
22 capacity in the --

23 THE CHAIRMAN: Well, we're going to come
24 back to this business, but, so far, you haven't
25 convinced me on the peaking power problem.

1 MR. CHRIS O'RILEY: Okay. Well, we -- I think
2 the peaking -- well, we'll come back to the peaking
3 power, because there's also the -- we have other
4 hydro resources for capacity that, in our stack,
5 come out first right ahead of the single cycle. So
6 we'll come back -- we'll come back to that before
7 we close.

8 I just want to -- if we go to slide 15, and I
9 think it's important to just go through this
10 experience we had with Burrard because I think it
11 illuminates the -- the -- how we're thinking about
12 this.

13 And this option 3, this reliance on -- kind
14 of notional reliance on gas for energy -- and I'll
15 put your question for capacity aside for the
16 moment -- for firm energy here, was played out and
17 tested in this 2008 planning process called the
18 LTAP, long-term acquisition planning, process;
19 equivalent of the IRP that we went through at the
20 commission.

21 And the -- I think the story kind of
22 illustrates how we've got -- where we've got to.
23 And the government policy at the time was to phase
24 our reliance on Burrard out, and that was in their
25 2007 Energy Plan.

1 It was not as definitive as what you see in
2 the 2010 **Clean Energy Act**. It was more ambiguous.

3 And given that, we proposed -- BC Hydro
4 proposed what we thought was a middle-ground
5 approach where we would go from 6,000 to 3,000
6 gigawatt hours of firm energy reliance.

7 And we spent a fair amount of time, probably
8 a year, on that proposal with engineering and
9 environmental experts and -- and regulatory
10 analysis.

11 And we had a fair amount of support. We had
12 some support from our customers. We had one
13 intervener, in particular, that took a contrary
14 view, and did a pure cost analysis and said, well,
15 if you put in 6,000, it's cheaper. And did that
16 with really discounting the government policy,
17 openly discounting it, saying we don't need to
18 consider that.

19 And it was acknowledged that that reliance,
20 Burrard would rarely run in that circumstance, and
21 that we would end up meeting the load over time
22 with imports.

23 THE CHAIRMAN: So we've heard from
24 interveners up here that the action of the
25 provincial government in taking Burrard off the

1 table was what required Site C to be built. We are
2 trading air pollution in the Lower Mainland for a
3 set of environmental consequences up here, plus \$8
4 billion. Would that be an accurate --

5 MR. CHRIS O'RILEY: I disagree with that
6 characterization. I'll show you how it played out
7 here.

8 THE CHAIRMAN: Yeah.

9 MR. CHRIS O'RILEY: So I don't think that's true.

10 So the BCUC accepted the pure costs view,
11 they didn't factor in what the government said in
12 their energy policy. And they came back with 6,000
13 gigawatt hours of reliance on Burrard.

14 And the Province, I think, publicly weren't
15 very happy with that. And they -- they were, I
16 think, offended that their policy had been
17 discounted. And they came back and legislated the
18 reliance on Burrard at zero. And that was zero
19 gigawatt hours, so, here, the firm energy.

20 And that was initially in a direction and to
21 the commission in 2009. And it was later embedded
22 in the 2010 **Clean Energy Act**.

23 The **Clean Energy Act** also laid out a path to
24 replace Burrard, and that included replacing the
25 energy with renewable power from the Clean Power

1 Call, and other calls. It -- where we replaced the
2 capacity with Mica 5 and 6, which is under
3 construction. And it required the Interior to
4 Lower Mainland transmission line, which is under
5 construction.

6 And our reliance on Burrard for capacity was
7 contingent on -- well, it was only allowed until we
8 got those replacement products done.

9 So Burrard has been replaced in the system.
10 And was left with a very limited kind of technical
11 role, an emergency back-up role that, in our view,
12 didn't -- didn't justify its ongoing operating
13 cost.

14 And it also needed -- it's coming up on
15 50 years old; right? So it needs -- it needs
16 significant reinvestment. So we would be facing a
17 big decision.

18 So -- so Burrard, in our view, is done. And
19 that was reflected in the decision -- the
20 November 26th decision. And it's been replaced
21 already in the system.

22 THE CHAIRMAN: I understand the argument.
23 But I would imagine that, just hypothetically
24 speaking, the cost of refurbishing that 50-year-old
25 plant would have been less than building Site C.

1 And that had Burrard been available for --
2 pick a number -- 1,000 hours a year, that it would
3 have put off the requirement for Site C for some
4 time. I'm assuming, of course, that the
5 alternative -- the alternatives that have been
6 installed in order to take care of that 6,000
7 gigawatt hours a year would have been attractive
8 anyway, and would have been part of the stack.

9 MR. CHRIS O'RILEY: Well, I mean, there's some --
10 some fairly expensive clean power in that, so ...

11 And we're dealing with the rate impact of
12 that, so ... I mean, we have it, so it's done.
13 Those contracts are signed.

14 THE CHAIRMAN: Do you have a round number
15 for what the refurbishment cost of Burrard would
16 have been?

17 MR. CHRIS O'RILEY: Well, we -- yeah. We did
18 a -- we did a detailed study in 2008. And, you
19 know, years have gone by now, and there's been lots
20 of change in the market. We -- we -- we did not --
21 and we did not update the study for the purpose of
22 the decision on terminating it.

23 The -- you know, it's in the -- it's probably
24 in the 4 to \$500 million range to kind of make it
25 useful.

1 The challenge with that -- the challenge with
2 that is whatever energy we put in, firm energy we
3 put in in -- in place of Burrard today, and the
4 stack would -- I mean, the thing isn't going to
5 run. We put all that money into it with the gas
6 and electricity prices and the carbon tax, which
7 significantly changes the effect of the economics
8 of it, it's just going to sit there. And we're
9 going to end up importing. And that was outside
10 the policy.

11 So the lesson of the experience I went
12 through around the 2008 LTAP, and the back and
13 forth that resulted, is that that policy decision
14 was clearly considered by the government, and they
15 weighed in on it.

16 You know -- and what I would say, from our
17 perspective, is pouring, you know, money into a
18 plant that -- that isn't going to run. And was
19 also -- you know, the federal is -- is drafting
20 their -- their climate change regulations as they
21 apply to gas-fired plants. So they have previously
22 targeted coal plants. They have not finalized
23 those regulations, but they did signal in the
24 drafting of that that they are particularly
25 targeting plants over 50 years old because they are

1 less efficient, and -- and, you know, that's not
2 a -- that wasn't determinative of the decision, but
3 it's indicative that -- that Burrard's time has
4 passed.

5 So we don't see -- I don't see Site C as a
6 replacement for Burrard. I think we've already
7 replaced Burrard.

8 So let's -- Ms. Melchoir, let's go --

9 THE CHAIRMAN: I'm just thinking, it's
10 probably time to stop for a bit of a coffee break
11 here.

12 MR. CHRIS O'RILEY: That's be great.

13 THE CHAIRMAN: The questions keep occurring.
14 So we'll come back in -- at 10 to the hour.
15 Thanks.

16

17 (Brief break)

18

19 THE CHAIRMAN: Ladies and gentlemen, can we
20 reconvene, please.

21 We are on slide 16 now, I think, which makes
22 the interesting point that an order in council has
23 passed to allow the LNG industry to do its squeeze
24 and freeze with its own fuel rather than using
25 electricity.

1 I must say, when I saw that, an order in
2 council, which purported to change a statute, I was
3 surprised, but, apparently, there is a clause
4 buried deep within the statute that allows that to
5 happen subject only to the GHT criterion, Section
6 2(m) of the **Clean Energy Act**.

7 Now, if the LNG industry is allowed to
8 massively ramp up its use of natural gas for
9 transportation and compression, transportation and
10 liquefaction, what effect does that have on the
11 availability of CH₄ for you guys?

12 MR. CHRIS O'RILEY: So if -- I think there's an
13 assumption there that may -- that may not be
14 correct, or we might not agree with. And I think
15 the key assumption is that -- well, in our kind of
16 interpretation, there was never a constraint or a
17 requirement on the LNG producers around how they
18 chose their fuel for compression, for the freeze
19 and squeeze.

20 THE CHAIRMAN: No, I agree. There were some
21 early and area assumptions that they would --

22 MR. CHRIS O'RILEY: Yeah.

23 THE CHAIRMAN: -- use electricity for that.

24 And we all knew that that was crazy from --

25 MR. CHRIS O'RILEY: Yeah.

1 THE CHAIRMAN: -- the start because they
2 never do and never would and so on and so forth.
3 So, in that sense, the order in council
4 merely recognized reality.

5 MR. CHRIS O'RILEY: Yes.

6 THE CHAIRMAN: But the order in council
7 still interacts with Section 2(m) of the **Clean**
8 **Energy Act**, and I thought might have an effect on
9 the availability of -- C -- methane --

10 MR. CHRIS O'RILEY: Emissions.

11 THE CHAIRMAN: -- of natural gas for Hydro's
12 purposes. Is there such an effect?

13 MR. CHRIS O'RILEY: Yeah. And I don't think so.

14 So -- so, yes -- so we all agree that the LNG
15 proponents could decide to use direct-drive gas.

16 Their -- what we saw the regulation as doing
17 was making BC Hydro competitive so that we could
18 provide them a gas-based solution to running their
19 compression process and perhaps mix in with that
20 some renewable energy, some IPPs, and result in a
21 lower emission scenario than what you might see if
22 they were using gas within their fence to do their
23 compression.

24 And the only way we could be competitive in
25 that is if you pulled that generation outside this

1 93 percent.

2 So I think the government was trying to
3 reconcile the freedom that -- that they'd given,
4 that the LNG producers had around choosing their
5 fuel with, with the constraints that had been
6 placed on BC Hydro around 93 percent.

7 THE CHAIRMAN: So the intent of the order in
8 council was to violate the inviolable Section 2(m)
9 of the ***Clean Energy Act***.

10 MR. CHRIS O'RILEY: Well, I think the effect of
11 not making the change would have said, well,
12 they're -- the LNG companies are all going to go in
13 the fence, and there would be no opportunity to mix
14 renewable generation into that -- into electricity
15 supply. So, practically, I think what it did is it
16 opened the door for a lower emissions scenario
17 from -- from the LNG sector.

18 THE CHAIRMAN: Yeah. I'm still confused
19 about that.

20 MR. CRAIG GODSOE: Mr. Chairman, if I might. It
21 sounds like a statutory interpretation question.

22 THE CHAIRMAN: Sorry. Who's --

23 MR. CRAIG GODSOE: It's Craig Godsoe speaking.
24 BC Hydro's in-house counsel.

25 It sounds to me like you had asked a legal

1 question about Section 2.

2 So Section 2(g) is the greenhouse gas
3 reduction section. I think that's what you were
4 asking about. That isn't sector-specific; in other
5 words, there's no electricity sector-specific
6 allocation from the 33 percent reduction. But I
7 can certainly address this in legal submissions if
8 that's what you'd like.

9 THE CHAIRMAN: Mr. Wallace.

10 MR. BRIAN WALLACE: I think it would be useful to
11 hear BC Hydro's position on that in law.

12 THE CHAIRMAN: Thank you. We'll accept that
13 as an undertaking. Thank you.

14

15 **UNDERTAKING 92: BC Hydro to provide its position in law**
16 **with respect to Section 2(g), the greenhouse gas**
17 **reduction section, with respect to the electricity**
18 **sector-specific allocation from the 33 percent**
19 **reduction**

20

21 MR. CHRIS O'RILEY: Chair, if I could just go
22 back to something I said earlier, and I just want
23 to reiterate. We talked about this estimate for
24 reinvesting in Burrard, and the -- I just want to
25 caution that that's really a kind of a fixer-upper

1 estimate. It still would be substantially a
2 50-year-old plant.

3 And when we've looked in the past at
4 comparable projects for a long-term resource at
5 that site, we've looked at re-powering, and --
6 which is putting in a new equipment for, you know,
7 different configurations, but that's much, much
8 more expensive. And I'm not going to offer a
9 figure for that.

10 I think, more importantly, that would trigger
11 a whole raft of environmental approvals, including
12 a federal and provincial process. And, our view,
13 when we looked at this in 2008, is we would not
14 secure -- we would not be successful in citing
15 that, and that was based on in experience for a
16 much smaller plant at Sumas 2 in the Fraser Valley
17 on the U.S. side of the border. And our own
18 experience with the Duke Point project in Nanaimo,
19 which I was quite involved with, that was
20 ultimately not successful.

21 THE CHAIRMAN: Yes, I take your point on
22 that. But I reiterate the point that many
23 interveners here in the north see that there was a
24 trade-off here, and that they are being traded off.
25 That's enough.

1 MR. CHRIS O'RILEY: Yes. Okay.

2 The other point I -- and we're going to come
3 to this, but I fear that it's a bit scattered in
4 the presentation, and so it's this concept of a
5 needle-peak capacity requirement that you're --
6 you've referred to on a number of occasions. And
7 you've looked at the load duration curve, and
8 you've seen that -- that there is a sharp drop-off
9 in the requirements from the -- the few hours of
10 the year to the -- kind of the bulk, what we
11 call -- there's a shoulder period there, and then
12 there's kind of a flatter period, and then it drops
13 off at the rest.

14 And I want to make the point that -- we've
15 already got a system to deal with the needle peak.
16 We've got hydro assets that are sized and have --
17 have generation -- have the right configuration of
18 water and storage and capacity to meet that needle
19 peak. And an example of that would be our Jordon
20 River plant on Vancouver Island, near Victoria. So
21 it's a 170-megawatt plant, that's very little
22 water. And, really, just -- it mostly sits in
23 standby and occasionally runs for two or three
24 hours over the peak.

25 And so what I'm saying -- and we'll get to it

1 a little more in this discussion of load
2 curtailment, is -- is we're good on the needle
3 peak. And more resources on the needle peak don't
4 really help. What we need in the long-term is we
5 need more shoulder, and we need more base-load
6 capacity to -- to fill in the bulk. Like, we've
7 got to keep the balance between the needle peak and
8 the shoulders and the -- and the flatter part of
9 the curve in line.

10 And when you see the chart that was put up
11 earlier around the DSM capacity, we're assuming it
12 shows up in proportion to the existing load, so it
13 comes through at the ideal shape almost by
14 definition. And there's, obviously, some risk
15 around that if what shows up doesn't match the
16 shape, we're going to have a hole.

17 But I -- I want to reiterate, when you see a
18 need for capacity in a certain year in the, you
19 know, 19 or 20 or 25, whatever that year, it's not
20 a needle peak requirement, it's more for the
21 shoulder. And that's because we've got the needle
22 peak covered with the -- the many hydro assets that
23 are in place in the system.

24 THE CHAIRMAN: So if you did acquire a gas
25 turbine, you would like to run it 15 or 20 percent

1 of the time?

2 MR. CHRIS O'RILEY: Well, you'd tend to run it
3 more often. Yeah. And I think that was why we
4 came up with that figure, I think is 18 percent, in
5 the calculation.

6 THE CHAIRMAN: Thank you.

7 MR. CHRIS O'RILEY: So I'm not -- so we're on 17,
8 I think.

9 So this was our attempt to summarize how the
10 various generating projects come into play here,
11 and the various products.

12 The generation types and the products that
13 they -- that they contribute to the system, and how
14 they work together with other resources to -- to
15 ultimately allow us to serve the load.

16 And you asked us, in your questions, the
17 panel asked us a series of -- questions about a
18 series of resources that could be used to firm up
19 additional non-firm hydro to make it -- make it
20 firm to provide capacity. What -- what were the
21 options really to push out the need for -- for new
22 resources? And so we've attempted to summarize
23 that in this table.

24 And I think the panel offered up -- or asked
25 about the first three resources: the gas resource,

1 the time-of-use, and the wind. And we've added in
2 the storage hydro, really, for completeness and
3 comparison.

4 And you can see there's kind of three
5 products or attributes that are associated with
6 different generation types. And it's the question
7 of do they provide dependable capacity? Do they
8 provide firm energy in their own right? And do
9 they interact with other resources, particularly,
10 the non-firm hydro to make that product useable and
11 useful for our system.

12 And I think we've -- we mainly -- we've
13 talked about that product, the non-firm product;
14 mainly, being our run-of-river IPP hydro because
15 that's kind of -- we've kind of got everything else
16 covered in the -- in the calculations.

17 So in terms of the table, a combined cycle --
18 single-cycle gas turbine, an SCGT, would, of
19 course, provide dependable capacity. It would
20 provide its own firm energy, subject to the
21 93 percent, and the assumptions around how much it
22 ran. And we've said, I think, already, that it
23 would not make non-firm energy useable, like,
24 because it's not able to shift energy.

25 Time-of-use rates. And, here, we're looking

1 broadly at residential, commercial, industrial.
2 We've -- we'll come back to the policy restrictions
3 on residential and commercial.

4 What we're saying here, in terms of
5 dependable capacity, we think that's an uncertain
6 and an unproven resource. And we will talk about
7 that in more detail.

8 Those time-of-use rates do not provide firm
9 energy. Typically, it's a shift in the -- in the
10 load, not a reduction in the load.

11 And, of course, they don't help us convert
12 the non-firm energy from the freshet into something
13 that's useful.

14 Similarly, the wind, it doesn't provide
15 dependable capacity. It does, of course, provide
16 energy. And we calculate that based on its average
17 annual production. And it does not, again, help
18 with making the non-firm useable.

19 And, finally, the storage that hydro provides
20 dependable capacity. It generally provides firm
21 energy. And it is the one thing that will help us
22 shift some of this freshet non-firm energy and make
23 it more valuable for the system.

24 MR. MATTISON: Mr. O'Riley, you lost me.

25 And you lost me on the gas. And so you need to do

1 it again for me. And I apologize if I'm stupid.

2 MR. CHRIS O'RILEY: Okay.

3 MR. MATTISON: But if the answer in the
4 first two columns is, yes, I can't see how the
5 answer in the third column or the fourth column, I
6 guess it is, is a no.

7 MR. CHRIS O'RILEY: Yeah. And, really, that goes
8 back to the hand-out, and I -- I don't know. It's
9 this handout, Ms. Melchoir, the ...

10 And that -- the -- so this is the profile of
11 generally run-of-river energy, and the non-firm
12 portion, the 15 percent of that energy we would
13 consider as non-firm, it's typically in that big
14 bump in the spring.

15 And our challenge with making that energy
16 useful is we have to find a way to move it to other
17 parts of the year, whether it's the -- typically,
18 the winter where we have higher loads. So that
19 it's a -- that non-firm energy is a poor match for
20 our load.

21 And -- and a single-cycle gas plant will help
22 you meet your load in the winter, and you can turn
23 it on, but it's completely independent of that
24 freshet energy in the spring.

25 MR. MATTISON: I agree.

1 MR. CHRIS O'RILEY: You can't -- you can't store
2 -- you can't use it to store that energy and move
3 it.

4 So what you end up doing is you end up
5 selling it and spilling it sometimes, and then --
6 and then running your gas plant. So that's the ...

7 MR. MATTISON: Well, I guess -- I mean, if
8 you have the capacity and the energy sitting there,
9 not operating, and when you need it, you fire it
10 up. Then with this -- I mean, it sits there, it's
11 firm and it's available. And it's just not used
12 when you have this, so this isn't wasted. Are we
13 -- is it just semantics?

14 I mean, okay, it's -- this is never going to
15 be firm. I get that. But you're using this energy
16 with the gas to have a firm resource waiting for
17 you.

18 MR. CHRIS O'RILEY: Well, the effect is you end
19 up with a firm resource. And what I'm saying --
20 what I'm saying is that the firm resource is coming
21 from the gas plant itself, whether you have this
22 firm -- non-firm energy or not is kind of -- is
23 really immaterial in it; you end up with a firm
24 resource from the gas plant.

25 And another way of saying it is there's not a

1 synergy between this freshet non-firm energy and a
2 single-cycle gas plant.

3 MR. MATTISON: No, I understand that. Okay.
4 That's fine.

5 THE CHAIRMAN: I would be more comforted if
6 that diagram were not run-of-river stuff, but was
7 wind where, particularly, if you have an ever
8 larger fleet of windmills out there in different
9 parts of the province some of the unpredictability
10 begins to disappear, and you guys have a wonderful
11 capacity to calculate that. You may still be able,
12 in dips in wind availability, use gas turbines to
13 fill in the blanks. So I fully understand the
14 argument about storage and the freshet, but I don't
15 think that diagram tells the whole story.

16 MR. RANDY REIMANN: So I think, yes, certainly
17 wind integrates well with the system. And it does
18 use up flexibility of the system as it goes up and
19 down. And wind tends to have an attractive profile
20 where it's a little lower in the spring/summer, and
21 higher in the winter.

22 So from that perspective, wind is quite a
23 nice resource, but we don't actually have a
24 non-firm energy component from wind. We don't see
25 the same amount of inter-year variability on wind,

1 so, in fact, we count on wind for its expected
2 output; we don't de-rate it.

3 So when we talk about the non-firm energy,
4 it's really specific to the run-of-river plants,
5 and the -- most of that energy comes in the
6 freshet, and that's when it's very difficult to
7 use.

8 MR. CHRIS O'RILEY: Just in terms of some -- I
9 gave you before the statistic for run-of-river
10 hydro, so the contract firm amount was 72 percent
11 of the average. And through our system
12 integration, we got that up to 85 percent.

13 For wind, the contract firm amount is 94.
14 And we count on it in the system at 100 percent, so
15 we give the full credit of the diversity of the
16 wind resource; we count that in the -- in the -- in
17 the load resource balance.

18 THE CHAIRMAN: Okay. Back to the slide a
19 bit.

20 Time-of-use rates for industrial uses, I'd be
21 surprised if you couldn't get a little energy
22 consumption reduction out of time-of-use pricing.

23 MR. CHRIS O'RILEY: Yeah. Well, we're going to
24 talk about that in more particular --

25 THE CHAIRMAN: All right.

1 MR. CHRIS O'RILEY: I think -- to answer your
2 question, I think it would be almost immaterial
3 because the feedback we've had from them, through
4 these activities in the past, is they want to make
5 the production of.

6 THE CHAIRMAN: So this is strictly
7 peak-shaving stuff?

8 MR. CHRIS O'RILEY: It's -- yeah.

9 THE CHAIRMAN: Okay.

10 MR. CHRIS O'RILEY: And we're going to talk about
11 that.

12 THE CHAIRMAN: Yes.

13 MR. CHRIS O'RILEY: Okay. So let's go.

14 Okay. So we're on to question 3, which is --
15 considering, really, capacity-focused products in
16 the load resource balance. And right now I think
17 we're going to start with on the load-side or
18 demand-side products, and what -- what that does.
19 And what are the opportunities to defer resources.

20 So when we look at these types of resources,
21 the first thing we do is try and figure out the
22 degree to which we can rely on them. And, again,
23 talked a lot about our obligation to serve and our
24 legal obligation to serve, and that really drives
25 the need to be prudent around this.

1 And we look at that on a case-by-case basis,
2 looking at the individual resource. And then we
3 look at it in context of our larger reliance on
4 these types of programs. And we've got a heavy
5 reliance, as we'll see, on demand-side management
6 for capacity.

7 We've also got a heavy reliance on capacity
8 from intermittent resources that both of which, I
9 would say, are non-traditional resources for a
10 utility, and we are making a very big reliance on
11 them.

12 So if we go to the next slide, we are -- we
13 are heavily reliant on load-side resources for
14 capacity, and -- and for intermittent. And the
15 1,400 megawatts is -- it's a big number for us. I
16 mean, it's -- it's three units at Mica. And when
17 we get Mica finished with -- it will be 2,800
18 megawatts, it will be half of Mica. So that's a
19 very significant reliance in our -- our base, in
20 our plan, going -- going out. And it represents
21 85 percent of the incremental capacity needs in
22 the -- in the system over this period.

23 And if there were a number in our IRP, our
24 long-term plan that we're most concerned about,
25 it's that number.

1 And I think we've been appropriately
2 aggressive in coming up with it. But what I would
3 highlight is we've got -- we've got our contingency
4 plans in place, we're working today on the early
5 stage work for Revelstoke 6, to keep that project
6 as an option because of -- if this doesn't show
7 up -- or it's not showing up in the profile that
8 we're assuming, which is a very generous profile,
9 perfectly matching our load, we're going to need to
10 move on Revelstoke 6. So I think that just
11 highlights our concern.

12 And I -- and, again, just reiterate that
13 capacity is kind of the most critical thing when it
14 comes to running a utility, and especially a
15 winter-peaking utility.

16 And when we get into scrapes here, often, you
17 know, we'll have problems on our generation system.
18 We'll have a high load. The inter-time might be
19 de-rated and bondable is experiencing the same type
20 of situation with a -- you know, an arctic express,
21 as they call it. Right? You -- we get -- we get
22 cold; they get cold, then -- and the loads are
23 really high.

24 So we are concerned about an undue reliance
25 on capacity, and that is why we're concerned about

1 these two resources, both of them, again. As I
2 call them, they are non-traditional for -- for
3 capacity.

4 THE CHAIRMAN: I understand how that would
5 be the biggest worry that you've got because
6 BC Hydro is relatively inexperienced with this, you
7 know, compared to, for example, some of the U.S.
8 utilities that have been ploughing this furrow for
9 a long time. And have more empirical experience on
10 ordinary price elasticity never mind demand
11 management tactics that require expenditures or
12 foregone revenues by the utility.

13 It's an area where I would expect that your
14 experience will get a lot better in the next few
15 year as the effects of current price increases --

16 MR. CHRIS O'RILEY: Yeah.

17 THE CHAIRMAN: -- and foreseen price
18 increases begin to feed in.

19 MR. CHRIS O'RILEY: Yeah. And I'll ask the panel
20 if anybody wants to jump in on that.

21 I -- you know, I think when you look around
22 at the winter-peaking utilities, this is a -- I
23 think a lot of the examples in the U.S. where
24 they've done -- had more reliance on these type of
25 resources have been more summer-peaking utilities.

1 And where they have the air-conditioning load. And
2 that's just a little different than -- than what we
3 see in the north. You know, and you can turn your
4 water heater off in the summer peak and probably
5 better off to do that. Right? And there's been a
6 lot of experience on those type of things.

7 So this is new ground for us, and we -- and I
8 guess what I'm trying to say is we are making a big
9 commitment to capacity -- load-side capacity in our
10 plan already. And I think -- it's the 85 percent
11 is -- is a -- is an example --

12 THE CHAIRMAN: Well, we'll come back to the
13 DSM business, I'm sure, later in this suite of
14 questions --

15 MR. CHRIS O'RILEY: Yeah.

16 THE CHAIRMAN: -- but there are elements of
17 option 3, or even option 4, that, I think, would
18 bear thinking about against the environmental
19 consequences of Site C, for example.

20 MR. CHRIS O'RILEY: So let's shift -- yeah, let's
21 shift to slide 20.

22 So -- and this is getting at one of these
23 products, which is the time-of-use. And I've heard
24 it said in the - or seen it in the transcripts for
25 the proceeding that there's some ambiguity about

1 whether there's a policy constraint on time-of-use
2 for residential and commercial customers. And I
3 just want to say that the Province has been crystal
4 clear with us on that, so there's no ambiguity at
5 BC Hydro about whether this is allowed. And our
6 view is it's not. And we're not working on it.
7 Like, there's no --

8 THE CHAIRMAN: We understand that.

9 MR. CHRIS O'RILEY: Okay.

10 THE CHAIRMAN: I also understand that you've
11 had industrial time-of-use protocol for a long
12 time. And that the Minister's announcement that it
13 was allowed was possibly a little after the fact.

14 MR. CHRIS O'RILEY: Yeah. Yeah. So I -- we --
15 we've had it in place for 2006. And they are
16 looking at it again through this --

17 THE CHAIRMAN: But just to sort of
18 short-circuit this, I read your report to the BC
19 Utilities Commission on why there's been no take-up
20 in RS 1825. And I think your report goes a long
21 way to answering the question.

22 Now, it's pretty darn complicated, and the
23 advantages to an industrial user are not
24 immediately apparent, even for a treasurer with a
25 sharp pencil. And that possibly some

1 simplification of that offered contract might be
2 useful.

3 MR. CHRIS O'RILEY: Well, I think we would agree
4 with that, so ...

5 The -- so I think if we turn to the load
6 curtailment. And maybe just a point here is for
7 industrial customers, the concepts --

8 You want to go to the next slide. Sorry.
9 Yeah. Slide 21. Yes. So we're on 21.

10 We see the load curtailment and the
11 industrial time-of-use as two ways of getting at
12 the same process flexibility among our industrial
13 customers. So I just want to make the starting
14 point that these are not additive. And there are
15 two different ways of getting at the same thing.

16 And we have highlighted these in our IRP,
17 recommended actions, that we want to pursue these
18 programs in the long-term. And it's important to
19 do that because we have a long-term need for
20 capacity.

21 You know, we have -- we have one large hydro
22 site to develop at Site C. We've got a few
23 opportunities in our system for expansions. The
24 load will continue to grow, and we're going to need
25 capacity resources. So we think this is a

1 long-term need, and that we have to do that.

2 THE CHAIRMAN: All that's true, but you've
3 been in this time-of-use pricing business since
4 2006, and I'm surprised that you haven't gone
5 beyond a desktop study.

6 MR. CHRIS O'RILEY: Well, to some degree, we --
7 we have. And we'll -- we'll talk about that.

8 But -- well, I guess I would say we're not on
9 the capacity side; we're not sitting idle again,
10 going back to the 1,400 megawatts. Like, I -- we
11 feel we've been -- we've been busy on the demand
12 side. And -- and running full out since 2006. So
13 -- I won't repeat myself, though.

14 The -- I'll just -- I'll just give a little
15 bit of my personal experience on this. When I
16 worked at Powerex, I was part of a team that put in
17 place a -- we -- we called it a pilot. It was a
18 price-dispatchable curtailment program in the late
19 '90s, and it gave customers the -- the opportunity
20 to curtail in -- in response to high market prices,
21 and we shared the savings. And we got -- I think
22 in the end, we got about ten customers signed up,
23 and we had a few curtailments, and were able to
24 share some benefits with customers.

25 Later on, in 2007 and 2008, we introduced a

1 more formal load curtailment program in the company
2 that required customers to sign up for two or
3 three years and commit. It wouldn't be voluntary,
4 it would be commit, that when we called, they would
5 curtail. And we gave them a reservation charge for
6 that.

7 And so a few learnings of that -- that I took
8 away -- I mean, there -- it's -- it's a relatively
9 limited subset of our customers that have this
10 process flexibility to respond. And -- and you --
11 you need -- you need the ability to turn down parts
12 of your process. You need storage to -- to -- you
13 know, inventory materials so that you can keep
14 other parts of your process working. You need a --
15 you know, the controls in place, and the -- the
16 infrastructure for that.

17 And that translates into a limited number.
18 And, predominantly, it was the thermal mechanical
19 pulp customers, and the pulp chlorate companies
20 that were most keen on it.

21 There also were a fairly limited number of
22 megawatts and a limited number of hours that they
23 were willing to curtail before it started to
24 seriously affect their business.

25 The other conclusion I took away from it --

1 and it ties to the hours -- is it's very much a
2 needle peak product. So back to my earlier
3 discussion about what we need, we only need so much
4 needle peak, and we've got it in our system. So it
5 didn't help with the broader -- the broader need
6 for capacity in the shoulders and -- and the
7 flatter part of the curve.

8 So -- and I would also note that our best
9 customer for this, the customer that was most keen
10 and contributed the most megawatts, was the
11 catalyst mill at Campbell River. And,
12 unfortunately, they are no longer with us, so -- so
13 that -- that takes away of -- I mean, they were
14 perfectly set up, you know, given the
15 characteristics to respond.

16 So we've had some experience with the
17 short-term programs, like I said. And I -- I think
18 that experience has given us some kind of -- kind
19 of given us some concern about the long-term
20 viability.

21 We absolutely will work to try and prove out
22 the long-term viability of this, but we need to do
23 that in a measured and a prudent way.

24 And I think, again, given the context of our
25 reliance on capacity in this current time period,

1 this is not the time to double-down on capacity
2 DSM.

3 The other program, capacity focused DSM, this
4 would be more broadly focused on residential and
5 commercial customers. So this would be our first
6 attempt to identify, demand, and load control. So
7 this is the -- kind of the -- this would be the
8 Canadian equivalent or the cold climate equivalent
9 of turning down the water heaters over the -- over
10 the peak.

11 And -- and this work is -- is very much at
12 the early stages. And the extent to which our
13 customers are going to be willing to accept and --
14 and implement the behaviour is -- is really
15 unproven at this point.

16 So we're not in a position to -- to increase
17 that amount, you know, until we get some -- until
18 we make that more solid. But, again, it's
19 something we need to do; it's something we've
20 committed to do in the -- in the IRP.

21 The next slide.

22 So having said all that -- I mean, you asked
23 us to prepare a portfolio that shows the effects in
24 delaying our peak capacity requirements by putting
25 these resources in. So we've put in an amount for

1 industrial load curtailment and capacity-focused
2 DSM. And we've shown some scenarios of -- of --
3 without LNG and different scenarios with LNG and
4 we've shown where the energy comes in and the
5 capacity requirements.

6 The first point I -- I want to make is this
7 is a relatively crude calculation. And it's really
8 crediting the needle peak capacity that we think we
9 can get from the industrial load curtailment kind
10 of -- we're just assuming that meets our needs
11 here.

12 And -- and I think, as I've said, it's a much
13 more complicated calculation. So I think a
14 one-for-one deferral from -- of -- you know, our
15 capacity need from -- from 1919 -- 2019 to 2025 is
16 -- is aggressive, but that's the way the
17 calculations were done.

18 You know, again, back to the -- the context
19 for this being the amount of DSM that's already in
20 the stack, and you're asking the person who is
21 responsible for -- for keeping the lights on in the
22 Province; I'm not recommending that we do this.

23 And -- and, in fact, what -- we would come at
24 this with supply-side resources, which is kind of
25 addressed on the next slide.

1 Ms. Melchoir, yes.

2 So you asked us about supply-side resources,
3 and these are more viable resources.

4 And Revelstoke 6, we -- we know exactly
5 what -- how that would perform, and how we would --
6 would implement that.

7 GMS, 1 to 5, capacity upgrades, we've done a
8 similar project on units 6 to 8 at -- at GMS
9 already.

10 The 1 to 5 project is -- is cheaper than --
11 than Revelstoke 6. It does come with a lot of hair
12 on it. It's quite disruptive for the plant. And
13 you end up -- in order to do the upgrades, you end
14 up taking units out for the winter. So you get a
15 short-term hit for a long-term gain. So the very
16 time we would be needing the capacity, we're
17 actually ending up with less.

18 So it's -- I think that just goes to
19 illustrate the complexity of this, and how the
20 various components interact.

21 It does show, when you put those resources
22 in, that you shift out the need for capacity. And
23 that's certainly a viable portfolio.

24 It's -- it's -- you know, as the person
25 running the system, I'm much more comfortable with

1 supply-side resources than the ones we talked about
2 on the -- on the previous slide.

3 The challenge for this, with this portfolio,
4 is we do have an energy need. And depending on the
5 assumptions for LNG, you end up -- you know, that's
6 -- that's uncertain. And our concern with this
7 portfolio is it's a backdoor way into the more
8 expensive clean generation portfolio because the --
9 you end up -- you end up with this capacity, you
10 end up doing a call, and you've -- you've -- we're
11 backing our way into a -- what is a higher cost
12 portfolio.

13 THE CHAIRMAN: Just to -- sorry, you're
14 going to go on to the next slide: characteristics
15 of ...

16 MR. CHRIS O'RILEY: Well, do -- yeah. And
17 what -- what -- what I'm trying to say here is
18 there's a number of constraints imposed on the
19 company. And we've talked about the policy
20 constraints.

21 What I would say is those are -- well, we've
22 talked about that they clearly are articulated, and
23 I think have been -- have been -- become more clear
24 over time.

25 What I would also say is they are very much

1 aligned to what a prudent utility would do in terms
2 of making sure you have enough supply to meet
3 demand. And -- and they are particularly
4 well-aligned to a utility that's in a part of the
5 world where we are concerned about climate change
6 and -- and greenhouse gas.

7 So what -- what we're -- what I want to say
8 about this is it is -- whenever we've faced a large
9 investment decision, there is always the temptation
10 and -- and probably a responsibility to push on the
11 planning criteria, and see if there's ways to avoid
12 or defer the investment. And -- and -- we -- we
13 think that is an appropriate thing to do when
14 you're considering a short-term problem. Or you've
15 got a bridging situation for a number of years, and
16 we've done that in the -- in the past.

17 But I want to reiterate here, we're not
18 dealing with a short-term bridging need. We're
19 dealing with a long-term need for energy and
20 capacity.

21 And we don't believe --

22 THE CHAIRMAN: Just to refresh us, that
23 Rev 6, Shrum, and clean intermittent IPPs for
24 energy, what was that in terms of either UECs or
25 present value? And how did that compare with

1 Site C?

2 MR. MIKE SAVIDANT: My recollection is 154,
3 subject to check, on UEC. One, five, four.

4 THE CHAIRMAN: One, five, four?

5 MR. MIKE SAVIDANT: Yeah, the portfolio and PV,
6 which is generally our measure of
7 cost-effectiveness with --

8 Sorry, Nancy.

9 Our portfolio and PV differentials, which is
10 our measure of cost-effectiveness that considers
11 timing and everything like that, I believe the PV
12 differential, at our 5 percent discount rate, was,
13 roughly, \$630 million.

14 THE CHAIRMAN: Okay. That's for the --
15 that's for a Site C sized portfolio, these --

16 MR. MIKE SAVIDANT: The UEC is when we do the
17 matching block-to-block. That's mostly used -- the
18 block analysis is mostly used for an environmental
19 attribute analysis, but we do provide UECs to kind
20 of look at the long-term cost.

21 THE CHAIRMAN: Yeah.

22 MR. MIKE SAVIDANT: The portfolio PV
23 differentials are not perfect matching --

24 THE CHAIRMAN: No.

25 MR. MIKE SAVIDANT: -- they say what is the

1 load --

2 THE CHAIRMAN: Yeah.

3 MR. MIKE SAVIDANT: -- how is it growing? How
4 are you going to bring on resources.

5 THE CHAIRMAN: Yes. And we're going to come
6 back to the timing issue.

7 Okay. Thank you.

8 MR. CHRIS O'RILEY: And so -- and just to -- so
9 reiterate, the problem with relaxing the planning
10 criteria is you put yourself -- you can put
11 yourself in a situation where you don't have
12 enough.

13 So that goes back to the -- our fundamental
14 responsibility as utility operators, my
15 responsibility. And we don't think that's a
16 prudent thing to do.

17 So what -- what that -- that -- the
18 implication of that is when we're considering
19 alternatives, we should consider alternatives that
20 meet the planning criteria.

21 And, as Mr. Savidant just highlighted, that
22 is the clean generation portfolio that -- that --
23 and the clean generation portfolio with the
24 thermal, and those are the -- the most likely paths
25 we would take in the event this project wasn't

1 proceeding.

2 THE CHAIRMAN: Okay. So --

3 MR. CHRIS O'RILEY: And both of them are -- are
4 higher -- higher costs.

5 THE CHAIRMAN: Yeah. But just to summarize
6 that a little bit there.

7 If you fed that Rev 6 portfolio in, as
8 required, over time, you'd wind up with adding,
9 give or take, 10 percent to the energy capacity of
10 the utility at 154 over an existing -- what's your
11 average of EC now?

12 MR. CHRIS O'RILEY: Oh, our average is -- it's,
13 like, 40.

14 THE CHAIRMAN: 40?

15 MR. CHRIS O'RILEY: Yeah.

16 THE CHAIRMAN: Okay. So you get 90 percent
17 of 40 and 10 percent of the 150, and you would wind
18 up with a price increase that would be felt by all
19 British Columbians, or all ratepayers.

20 Another way of looking at it is that you
21 would be charging those folks \$630 million to avoid
22 the environmental consequences of Site C. Is that
23 another way of putting it? For awhile anyway.

24 MR. MIKE SAVIDANT: So the \$630 is -- is an NPV
25 analysis. That's the average price of that.

1 THE CHAIRMAN: Yeah.

2 MR. MIKE SAVIDANT: What we would be looking at

3 is higher rates for the duration of the project.

4 You know, the NPV is a short-term analysis.

5 It's conducted over -- in the portfolio, this is

6 conducted over, approximately, 20 years of the

7 project's operating life.

8 THE CHAIRMAN: Yeah. I understand that.

9 But what I'm getting at is that there's a

10 quantifiable trade-off here.

11 MR. MIKE SAVIDANT: Yeah. When we looked at

12 this, we looked at -- I mean, we've talked about

13 the portfolio analysis before, there's a financial

14 benefit of proceeding with this project; I believe

15 -- we believe that.

16 When we look at the environmental impacts,

17 and all projects have impacts, and so what you're

18 looking at -- and we did -- to -- to address this,

19 we used the environmental attributes that -- that I

20 know you've -- we've talked about previously.

21 So what you're looking at with this project

22 is you're looking at the impacts that we've

23 described in the Environmental Impact Statement --

24 and I'm not going to revisit it again -- versus

25 Revelstoke 6 and GMS, plus IPPs for energy in the

1 long-term. And so you're looking at this impact
2 versus not -- no impact, but a spider web of
3 impacts at various sites across the Province.

4 We believe we've quantified the difference in
5 footprint in terms of what those would be. But
6 when we look at footprint, this project would have
7 a larger terrestrial print, and we believe that is
8 likely.

9 We believe the project would result in
10 however lower GHGs, not -- not a large difference
11 compared to the clean generation portfolio, but
12 when we're looking at municipal solid waste, that's
13 a component. And local air emissions and things
14 like that.

15 We're also required to look at the impact on
16 economic attributes outside of just the ratepayers,
17 but in terms of jobs and GDP.

18 We also believe this project has a higher
19 impact on jobs and GDP. So when we looked at this
20 project, we know, no matter what we do, there's an
21 impact to it.

22 But we believe on balance that when you look
23 at the financial benefits, the economic benefits,
24 and a little bit of a mix on the environmental
25 attributes, we believe this is the preferred

1 project.

2 THE CHAIRMAN: I understand there's no free
3 lunch, but the numbers, even as a crude indication,
4 are interesting.

5 On the environmental side-effects of that
6 portfolio, for example, we don't know what, at
7 least in detail, the other clean intermittent IPPs
8 might be. I would expect that Rev 6 and the Shrum
9 improvements would have close to zero in an
10 environmental effect, as you could imagine.

11 I think you undersell your contribution to
12 greenhouse gas emission, at least in the EIS. You
13 may recall, I had to ask a question to get that 43
14 to 76 million tonnes avoided and so on and so
15 forth.

16 So I think -- I think the environmental
17 argument may not be particularly strong in favour
18 of Site C against that. But, nonetheless, we have
19 a -- we have a thumbnail way of comparing these
20 portfolios.

21 If you did that, would you argue that you
22 would simply be putting off Site C for a decade?

23 MS. SUSAN YURKOVICH: Mr. Chair, if you did this,
24 it does not change overall the trajectory of the
25 increase in need for electricity.

1 And we recognize that this is a big, lumpy
2 project, and it comes in at one time resulting in a
3 short-term surplus. But over the life of this
4 project, 70 to 100 years plus and beyond, if
5 well-maintained, we believe that this is the right
6 thing to do.

7 And we recognize that these are big
8 decisions. And they have impacts and they take
9 courage and they invite very significant
10 conversations. They have in the past when we
11 brought them in, and they have today. And I
12 mentioned that in my opening.

13 I just would reflect that over the long term,
14 these assets have been a benefit to the Province by
15 way of clean, reliable electricity. And those
16 jurisdictions who do have the ability, the
17 geography to undertake projects of this kind are
18 doing so across the Country.

19 THE CHAIRMAN: Yes, I understand that. And
20 we are -- we will come back to some of the details
21 of this in the next 19 questions, I think.

22 I would even argue that from a financial
23 point of view, Site C undersells itself against
24 IPPs because, after all, after every 20 or
25 30 years, you get to buy them again. It depends a

1 bit on what your social discount rate is. But if
2 it's low, as most of the literature would guide you
3 to, there is an unquantified advantage to
4 publicly-owned, long-term electric resources.

5 Okay.

6 MR. CHRIS O'RILEY: Yes. So we're concluding
7 here, and it's really on that point, and -- you
8 know, I've -- I've had the fortune of spending my
9 career around -- career so far around hydro plants,
10 so coming up on 25 years. And there's really kind
11 of three things that are unusual about large hydro
12 plants. And one is the fact that you do incur all
13 the costs up front, so you -- you -- in some ways,
14 you pay this financial penalty. And it's always --
15 there's always sticker-shock with them. And there
16 has -- there's -- that goes back to the -- through
17 the history of the company.

18 The second thing that's unusual is they do
19 produce a steady stream of output that doesn't
20 decline, and it lasts for generations. There's --
21 there's nothing in our society that lasts like
22 hydro plants.

23 And I'm currently replacing the 85-year-old
24 -- or rebuilding the 85-year-old Ruskin plant, and
25 it was built in 1929. And there's nothing. We

1 look out there and -- and say -- well, we're still
2 relying on it. The bearings in it were made of
3 wood, you know, to ...

4 And the third thing is that the feasibility
5 of hydro plants, especially large hydro is very
6 much site-dependent, so there are only a -- there
7 are only a select few, relatively few,
8 opportunities to do this.

9 And, really, in our -- in our economy and our
10 society, there's very few comparisons to this kind
11 of investment. And you might say, well, maybe a
12 major highway like the Coquihalla, which has all
13 these spin-off economic benefits in turn for an
14 upfront investment, as an analogy, to it. I think
15 the point is that it's very unusual and rare to
16 find that type of asset.

17 And I -- I think the point, Mr. Chairman,
18 that you touched on is the financial analysis is
19 quite conservative when you look at this type of
20 asset. And it's really the present value, you
21 know, which we've come to settle on in these
22 proceedings as the way to do it. And the key part
23 of that is you discount away so much of the value.

24 In other portfolios, the clean generation and
25 the thermal portfolios, the costs continue to rise

1 over time. And in this portfolio, with this
2 project, the costs decline over time.

3 And when you look at this portfolio 25 years
4 out, the benefits are discounted to about 10 cents
5 on the dollar.

6 And what we know, from experience, when you
7 get there is those benefits will be 100 cents on
8 the dollar. And that's the magic of a large hydro
9 plant. And it's a way that we can pay for the
10 benefits to a future generation.

11 THE CHAIRMAN: No, there's no question that
12 the view one takes of these things is highly
13 time-dependent. 50 years ago the top of the pops
14 for hydro was the Moran Dam on the Fraser, plus Hat
15 Creek coal.

16 MR. CHRIS O'RILEY: Yeah. Yeah.

17 THE CHAIRMAN: That's unthinkable these
18 days. Anyway ...

19 MR. CHRIS O'RILEY: Yeah. Well -- and, really,
20 the alternative to the Peace projects was, in fact,
21 Hat Creek coal. And BC electric were advocating
22 for a -- and it was cheaper. So imagine, you know,
23 if we had done that.

24 So I just want to just remind ourselves I'm
25 not saying we should ignore the present value

1 analysis, you know, I'm not sure what I would
2 replace it with, but we -- we have to recognize
3 that there's a -- a tremendous societal value
4 that's -- that's very broadly felt in -- in our
5 Province that -- that we want to consider. And
6 it's the back-end, really, three-quarters of the
7 value of the project that disappears when you do
8 the --

9 THE CHAIRMAN: Wonderful article by Kenneth
10 Arrow *et al* in science on social discount rates,
11 which is, I commend to you. Anyway ...
12 Madam Beaudet.

13 MS. BEAUDET: Thank you, Mr. Chair.
14 I would like to know what is the history of
15 outages in British Columbia. How frequent? How
16 long they last? Do they happen in winter more than
17 summer? Et cetera. And the reason why is I know,
18 for instance, in Quebec when we had the ice storm,
19 we didn't know outages, and the policy of the
20 government was that, you know, it was a crisis.
21 Like you mentioned earlier, for BC Hydro, there was
22 a crisis. And that it should never happen again.
23 And I think very often you look at investing
24 in something that you can totally rely on like
25 Site C because the IPPs would be an added value,

1 but there isn't as much control as something you
2 own. And -- or satisfaction. I mean, the IPPs,
3 you don't have the control on the quality of
4 service all the time.

5 So I would like to see to what extent the --
6 the public is creating something like that in the
7 sense that your first requirement by law, I think,
8 is to make sure that everybody has electricity all
9 the time.

10 And I live in a province now that most people
11 have a power -- a source of power independent from
12 the main service because we are having outages all
13 the time.

14 So maybe we have to frame our minds, you
15 know, in -- with the restriction that we impose on
16 ourselves in terms of environmental impacts.

17 I mean, if -- we are very demanding on -- on
18 the top-notch quality of service. It has also --
19 we have to look at the environmental impact that
20 this brings.

21 And I would like to have a picture of what
22 happens here in BC -- I mean, how often do you get
23 outages and how long are they and what season they
24 happen?

25 MS. SUSAN YURKOVICH: Thanks, Madam Beaudet.

1 I'll address just a couple of your first
2 points, and then ask Mr. O'Riley to address the
3 outages.

4 I think your question referenced is it more
5 important that we control the generation. I think
6 we have about 20 moving up to about 25 percent that
7 is delivered in contracts through the independent
8 power sector, and we are comfortable in that. It's
9 not a question of ownership for us as BC Hydro.

10 Your question, though, about I guess the
11 public's desire to have power in the hands of the
12 public, I think is an interesting one.

13 We have that, as I mentioned, in legislation.
14 Yes, the heritage assets are held by the public in
15 perpetuity. And I would say that in previous
16 times, this has been tested maybe through trial
17 balloons of public policy.

18 I think -- while I don't have statistical
19 information to verify that -- I think there was a
20 strong sense from the public that it was desirable
21 to hold these strategic assets in public hands.

22 With respect to our outages, we live in a
23 province that has some spectacular terrain, as
24 Ms. Davis, in our tourism -- the folks from Tourism
25 BC were noting. We have some very challenging

1 landscapes, and we do experience outages. And I
2 would ask Mr. O'Riley just to speak a few minutes
3 to that.

4 MR. CHRIS O'RILEY: Sure. And, I mean, I
5 distinguished Madam Beaudet earlier between outages
6 on the distribution system and, really, the -- the
7 transmission system. And we do have our share of
8 those. And we have a lot of trees in the Province.
9 And there's a direct connection between our
10 willingness and ability to cut trees down or cut
11 back trees and our outages on the distribution
12 system.

13 And, you know, we're probably a little bit
14 behind where we should be on that, but I think
15 we're kind of in the zone of acceptability on that
16 calculation, and we look at it every year.

17 I think the kind of outage that you were
18 talking about, the -- the major disaster in Quebec
19 and eastern Ontario, we've not experienced that.
20 And I -- and I think to some degree, that's
21 fortune. And to some degree, it's how we've --
22 we've set up our -- our system.

23 And the mix of generation and regional
24 diversity and access that we have to the U.S. and
25 such. And -- and -- but we've not experienced it.

1 And we -- we do take that experience as a --
2 as a bit of a cautionary tale, and it's something
3 -- you know, there have been big system outages in
4 the western North America in the last 20 years. In
5 1996, and in the 2000s. And every time they
6 happen, there's a, you know, a big investigation
7 and -- and calls for -- for let's do better. We
8 must do better. And, you know, it can't happen
9 again.

10 And so I -- I think we've -- we -- we have --
11 if not here directly, we've -- we've tested
12 society's openness to taking more risk on the -- on
13 the electric system. And I would say that that
14 openness or willingness is declining.

15 What we are seeing I think with the
16 transition and work and increasing reliance on --
17 on technology for work, that the cost of outages,
18 even -- even a, you know, distribution outage is --
19 is going up. And we had a -- we had an architect
20 on our board a number of years ago, and he had a --
21 his office downtown was impacted by a major
22 distribution outage we had in Vancouver a few years
23 ago, but -- due to a fire. And he was very
24 articulate in describing the cost to his business
25 and the disruption of taking all those knowledge

1 workers out of the -- of the economy for three
2 days. It was very, very -- very, very troubling
3 for him. And he was, in fact, considering, what
4 you suggested, which is putting in their own
5 back-up diesel generation as -- as some of our
6 customers have done. And we've -- we have
7 anecdotal views on that.

8 But, again, I think it goes back to the
9 planning criteria, and I think it's back to having
10 enough. I think if we're having outages in this
11 Province because we don't have enough generation,
12 that -- that is a crisis and it's a -- it's a --

13 THE CHAIRMAN: That's a different sort of
14 crisis?

15 MR. CHRIS O'RILEY: Yeah, it's a different sort
16 of crisis. And -- and it -- and I believe it's at
17 the root of the -- the planning criteria that we
18 have in place today.

19 And, again, I would say, as the person who
20 is, you know, implementing that, I think it's -- I
21 think we're in the right spot.

22 THE CHAIRMAN: Okay.

23 MS. BEAUDET: There is an environmental
24 cost to that, and a financial cost as well?

25 MR. CHRIS O'RILEY: Yes.

1 MS. BEAUDET: Thank you.

2 THE CHAIRMAN: I think we have come to the
3 end of the initial 6 questions and have only 19
4 left to go. One little piece I would like you to
5 give us, given the 93 percent threshold, the famous
6 93 percent threshold, how many gigawatt hours does
7 that allow you year-by-year off in the forecast
8 period? Do you know offhand? Or I would be glad
9 to have a brief table at your convenience.

10 MR. RANDY REIMANN: I think we could probably
11 locate it in the filing.

12 THE CHAIRMAN: It's probably already there.

13 MR. RANDY REIMANN: Yeah, it's in chapter 5. It
14 works out to about 700 megawatts of SCGT capacity,
15 but I don't recall the gigawatt number, but we
16 could probably -- oh, hang on. We could get --

17 THE CHAIRMAN: Chapter 5 of the EIS has it?

18 MR. MIKE SAVIDANT: I've got it right here.
19 Table 5.33 of Section 5 of the EIS, page 5-54. We
20 looked at it a few ways. We looked at it --
21 there's a space available for natural-gas fired
22 generation in fiscal 2022 --

23 Sorry, Nancy.

24 We looked at the space available for natural
25 gas-fired generation in fiscal 2022. That's,

1 approximately, 4,356 gigawatt hours.

2 When we looked at that in terms of how many
3 megawatts of simple cycle gas turbines we could
4 bring on, it's, roughly, 530 megawatts in fiscal
5 2022 that we have room for.

6 THE CHAIRMAN: Yeah, that's great. I just
7 forgot that.

8 MR. MIKE SAVIDANT: It's a big document.

9 THE CHAIRMAN: You know, I had it memorized
10 last fall.

11 Let's see if we can get in at least
12 Question 1 of the 19 before we break for lunch.

13

14 **Questions 1 through 19 addressed:**

15 MR. MIKE SAVIDANT: Water rentals, I can answer.

16 So water rentals are calculated based on a
17 schedule that we received from the -- I believe
18 it's the water stewardship division of the Ministry
19 of Environment. There's different rates for
20 different sectors.

21 For hydro power, there's really three
22 categories of rates. There's one rate for
23 capacity, one rate for -- so the installed
24 capacity. One rate for the generated energy, and
25 there's a very minor rate for the amount of

1 storage.

2 Of those three, the biggest cost in terms of
3 water rentals, is the energy one, the one per
4 gigawatt hour of energy we produce.

5 So the way those work for hydro power,
6 especially for the energy specifically is they are
7 tiered-water rental rates. We talked a bit about
8 that before.

9 So for the first 160 gigawatt hours of
10 generation for a company, you pay a lower rate.
11 It's a dollar and change -- I can't remember the
12 exact rate -- this year.

13 For the second tier of water rental rates,
14 it's, roughly, \$6 and change, and that goes from
15 160 gigawatt hours to 3,000 gigawatt hours.

16 And then above that, 3,000 gigawatt hours and
17 above, up until the change in 2018, we pay
18 \$7.20-something cents. That's evaluated by
19 company.

20 So, effectively, with BC Hydro -- this is why
21 we say Tier 3 only applies to BC Hydro. BC Hydro,
22 an IPP, if they generated 5,000 gigawatt hours,
23 would have Tier 3 up until -- up until 2018, none
24 of them do, it's really a hydro rate with Tier 3.

25 THE CHAIRMAN: Does anybody else pay that

1 much? Does Fortis pay that much? Do they get into
2 Tier 3?

3 MR. MIKE SAVIDANT: No. For the fiscal --

4 SPEAKER: No.

5 THE CHAIRMAN: No? So this is what you call
6 categorilla, huh?

7 MR. MIKE SAVIDANT: It's just for us.

8 So what the change in 2018 will do is it will
9 eliminate the third tier. So for every gigawatt
10 hour above 160 gigawatt hours for the company,
11 we're well above that, of course, you pay the
12 lower-tiered water rental rates, it's about 1.25
13 less. If you look at this project, it lowers our
14 UEC by about 1.25.

15 If you were to align our rates with IPPs,
16 either just flatten it out at Tier 2 or flatten it
17 out at Tier 1, you're looking at about \$5
18 differential in -- in dollars per megawatt hour.

19 THE CHAIRMAN: \$5, if you levelled it out at
20 a level 2, say?

21 MR. MIKE SAVIDANT: Yes.

22 I'm not sure how we would compare to
23 consumptive use. This project isn't a consumptive
24 use, it passes water through the turbines. So I
25 don't really have a good metric for comparing to

1 gas fracking or pulp and paper.

2 THE CHAIRMAN: Well, I'm -- my observation
3 is that ratepayers are getting hosed on water
4 rentals when consumptive uses of water, not, you
5 know, through the turbines, that pay very little.

6 And I'm just curious if you have any
7 statistics on fracking or pulp and paper? Or what
8 people pay for irrigation?

9 MR. CHRIS O'RILEY: Well, we actually weren't
10 able to get that, Mr. Chair. I agree with you. I
11 think it's a fraction of what we pay for water
12 rentals.

13 THE CHAIRMAN: Okay.

14 MR. CHRIS O'RILEY: There's certainly a --
15 been -- they are discussing changes to the **Water**
16 **Act**, and -- and I think that question of what
17 should consumptive users pay is a -- kind of a very
18 live issue in the -- in the Province right now, but
19 -- but I would go out on a limb and say it's a
20 fraction of what we pay for the -- the water.

21 THE CHAIRMAN: Okay. But the -- this is
22 a --

23 MR. CHRIS O'RILEY: I might defer to the panel --

24 THE CHAIRMAN: -- bit of a set-up of a
25 question because, as you may know, the panel has

1 some internal expertise on the questions, but I did
2 want to get this on the public record.

3 The key is that last sentence:

4
5 "If Hydro were charged the same as
6 the IPP, what would be the
7 difference?"

8
9 And you're saying that it's on the order of
10 \$5 a megawatt hour, and that is material.

11 MR. MIKE SAVIDANT: Yes. The -- I've pulled it
12 together when I saw this this morning, the rental
13 rates in 2013 for Tier 2 are \$6.01.

14 The Tier 1, so that's for everything under
15 160 gigawatt hours per year, is, roughly, a buck
16 thirty. \$1.30.

17 THE CHAIRMAN: Okay. Let me suggest that we
18 break for lunch, but that we not wait until 1:30 to
19 come back; we'll come back at 1 o'clock. All
20 right? Thanks very much.

21
22 (Proceedings adjourned at 12:00 p.m.)

23 (Luncheon adjournment)

24 (Proceedings reconvened at 1:00 p.m.)

25

1 THE CHAIRMAN: Good afternoon, and welcome
2 back.

3 Could we have Question 2 up on the slide,
4 please.

5 Question 2:

6
7 "The historical accuracy of
8 EIA forecasts? A trend of rising
9 inaccuracy from 1985 to 2008."

10

11 I just asked Mr. Ince when he took over, and
12 he said 2007, so this will be interesting.

13 Could you put that graph up.

14 That's the famous graph.

15 Over to you.

16 MR. DAVID INCE: Thank you, Mr. Chair.

17 And I should add, I came into the
18 load-forecasting function midway through 2007. So,
19 as I said, I was right at the edge of the cliff,
20 and I was widely criticized for reducing the 2008
21 forecast as being overly conservative, and by the
22 end of 2008, I was being criticized for forecasting
23 too high, so ...

24 THE CHAIRMAN: Like Mr. O'Riley, your timing
25 is pretty good, huh?

1 MR. DAVID INCE: It was right at the cusp.

2 But this is an interesting chart in that it's
3 from the energy information administration, so
4 they're from the -- they're from the U.S.
5 Department of Energy. They'd be doing long-term
6 forecast and comparing their accuracy versus the
7 actual outcomes. So what happened this the
8 forecast versus the actuals.

9 We have -- so the history I'm familiar with
10 is in the mid-2000s, our forecast was being
11 criticized overly conservative.

12 So during the boom of, let's say, 2003 to
13 2007, we were underforecasting. And then
14 subsequent to the great recession, which I've
15 talked about in December, we were criticized for
16 overforecasting.

17 The 2007 forecast I know was widely
18 criticized because, again, it was right at the edge
19 of the cliff. And that was a profound disruption.

20 So we are still recovering from that event.
21 And I would suggest that economic growth rates that
22 we're assuming right now are a lot less than they
23 were pre-recession, as -- as are the load forecast.

24 So pre-recession, our load forecast, would be
25 growing at around 3 percent per year, and now --

1 now, in the current forecast, we're looking at
2 about 1 percent after DSM and 1.9 percent before
3 DSM.

4 So to recap, I think -- we don't try and
5 forecast economic cycles, so major booms, busts, we
6 try and forecast right down the middle.

7 So as I mentioned earlier, we try and do a
8 P50, which is averaging these long-term economic
9 events.

10 But I must add, the recession of '08/'09 was
11 a very special event. And if you look at the
12 history of BC Hydro load going back, and its
13 predecessors going back to the 1930s, there's
14 nothing like that in the historical record.

15 So we've never seen a case, where, for
16 example, residential load it has flattened out.
17 And we haven't seen a case where we've had such
18 significant attrition, as happened with the pulp
19 mills in 2008 to 2010.

20 So it -- it's made forecasting a challenge,
21 but I think we've considered this in the forecasts
22 going forward.

23 THE CHAIRMAN: You're going too fast, I
24 think here.

25 COURT REPORTER: No, the Realtime stopped.

1 THE CHAIRMAN: The what stopped?

2 COURT REPORTER: The technology.

3 SPEAKER: Technology problems.

4 THE CHAIRMAN: Oh.

5 COURT REPORTER: A technology problem.

6 THE CHAIRMAN: Oh.

7 COURT REPORTER: Do you mind if you give us a
8 minute?

9 THE CHAIRMAN: Yes.

10 It isn't you, it's the machinery. Hang on.

11 Maybe while we're waiting, I could just
12 assure everybody that Madame lives in Nova Scotia
13 and not Quebec. And it is Nova Scotia Power whose
14 delivery was impugned before lunch.

15

16 (Stenography team rectifying technical issue)

17

18 THE CHAIRMAN: We're working there?

19 Say something, Mr. Ince.

20 MR. DAVID INCE: Testing.

21 THE CHAIRMAN: Okay. We're back online.

22 And you were saying (Reading from Realtime draft
23 transcript):

24

25 "So what happened with the forecast

1 versus the actuals, we have -- so
2 the history I'm familiar with --"

3

4 Blank.

5 MR. DAVID INCE: Yes.

6 So the history with, let's say, going back to
7 the mid-2000s, we were criticized for
8 underforecasting, that the good economic times --
9 actually, the forecast was excessively low compared
10 to the actuals that occurred, and that abruptly
11 changed in 2008 with the great recession.

12 And after that, for a period of two to
13 three years, we were underforecasting -- or, sorry,
14 overforecasting. And I think that's one of the
15 hazards of forecasting, is that this was a profound
16 economic event.

17 And the other agency, such as the banks and,
18 in fact, the other governments did -- were subject
19 to the same effects with respect to forecasts of
20 GDP, and -- so it wasn't just BC Hydro in terms of
21 its forecasts; it -- it was a profound event, that,
22 you know, really changed the forecasting horizon.

23 So our current forecasts, we're looking at
24 .9 percent annual compounded growth. And that's
25 compared to -- before the recession, 3 to 2 percent

1 range. That's the combination of the aggressive
2 DSM targets, but also a recognition that -- in the
3 forecasting community, there's the terminology of
4 the new normal. And it's a recognition that
5 economic growth is probably going to be lower than
6 it was pre-recession.

7 And also aging demographics. So we're
8 expecting a lower participation of the workforce,
9 lower GDP as a result of aging demographics, the
10 baby boomers; less people working.

11 So we would like to consider all those
12 factors in the forecast, not just population. But
13 there's a number of -- a number of issues that
14 impact the forecast.

15 With respect to the forecast accuracy to
16 date, this was a forecast that was prepared in
17 2012, that's underpinning the Site C, and we're
18 tracking well within 1 percent accuracy in our
19 fiscal 14 to date.

20 And I'm pleased to say the industrial
21 forecast is -- is tracking quite closely, that's
22 always an area of uncertainty in the forecast
23 because the vagaries of commodity prices and
24 foreign markets. So, to a large extent, our
25 forecast is dependent on foreign markets that are

1 really out of control of the pulp and paper sector
2 or from the forestry sector.

3 And so we're pleased to see that our
4 industrial forecast, in particular, is tracking
5 well because that's always the subject of
6 considerable variability.

7 THE CHAIRMAN: Yes, this diagram is an
8 amalgam of a large number of U.S. utilities; is it?
9 And reported by the EIA.

10 MR. DAVID INCE: It's my understanding that
11 this is just the energy information administration.
12 Their staff forecast of the whole United States.
13 So utility.

14 THE CHAIRMAN: It's the staff forecast of
15 the EIA. Okay. I'm glad you're better than that,
16 being within 1 percent. That -- you say you've
17 been within 1 percent of the actuals now for
18 several years since recovery --

19 MR. DAVID INCE: To -- to be correct, that
20 this forecast that underpins the Site C
21 application, the 2012 forecast is tracking within 1
22 percent of actual loads in this fiscal year to
23 date.

24 THE CHAIRMAN: Okay, that's good. Thank
25 you.

1 Let's go on to Question 3.

2 Who wants to answer that one?

3 For those who are on the phones and can't see
4 the question, it is:

5

6 "Whether or not Hydro and the
7 IPPs should use the same cost of
8 capital?"

9

10 And noting that there had been a change in
11 BCUC policy, or at least Hydro policy agreed to by
12 BCUC?

13 MR. RANDY REIMANN: Sorry. Just trying to catch
14 up to what exactly the question was here.

15 And so the basis for the change -- and I
16 think this was originally referring to about an IR
17 that had talked about what we had done in 2006:
18 integrated electricity plan and the long-term
19 acquisition plan. I think that's the change it's
20 talking about.

21 And so in the application that we made to the
22 BC Utilities Commission, in that 2006 application,
23 we had done some project evaluation evidence. And
24 an initial position that we put in there was to
25 suggest that maybe all resources should be

1 considered on a level playing field.

2 And in the decision and after the discussion
3 and the information requests at that process, the
4 Commission's direction to us was that it wasn't
5 Hydro's job to level the playing field. But if
6 there was an advantage for our ratepayers, by
7 having utility financing, that that should be
8 recognized and taken advantage of.

9 And so since 2006, we have been then trying
10 to be more accurate to both what Hydro's financing
11 costs are, and what the IPPs are.

12 The way we've dealt with the risk, I guess,
13 is to look at the different discount -- or cost of
14 capital. We did that sensitivity test where the
15 differential to us was 5 percent for Hydro.

16 There's a real WACC in 7 percent for the IPPs.

17 THE CHAIRMAN: Yes, but -- I mean, that's
18 old territory. And, as you know, there is an
19 argument that says that Hydro's cost of borrowing
20 does not account for the risk to the taxpayer, that
21 you accept on behalf of all of us when you're the
22 entrepreneur and so on.

23 And that the other items that the BCUC cite,
24 that their decision was the same discount rate that
25 should be applied to all resource options

1 regardless of who develops them.

2 MR. RANDY REIMANN: Right. And so the
3 distinction, I think, is between the cost of
4 capital that you would use to determine what the
5 cash flows are that you put into your analysis
6 versus the discounting of those cash flows then to
7 determine a PV value.

8 THE CHAIRMAN: Yeah.

9 MR. RANDY REIMANN: So we have one discount rate.

10 THE CHAIRMAN: If we think of the discount
11 rate and a WACC as being separate concepts.

12 MR. RANDY REIMANN: Right. So we do use one
13 discount rate for all the cash flows.

14 THE CHAIRMAN: Okay.

15 Okay. I found that point confusing in my
16 reading, I must say. You use a single discount
17 rate for comparison of all alternatives?

18 MR. RANDY REIMANN: That's correct --

19 THE CHAIRMAN: You're not using a
20 differential WACC.

21 MR. RANDY REIMANN: Right.

22 So we -- we break the analysis down into two
23 stages: the first part being, so what is the
24 entity's cost of capital that they would seek to
25 recover on a particular resource.

1 THE CHAIRMAN: No, that's a -- that's a --
2 that's what you would use for calculating rates and
3 making a rate application and so on.

4 For the economics of alternatives, as near as
5 never, you should be using the same discount rate
6 regardless of who the proponent is.

7 MR. RANDY REIMANN: Yes. The difference between
8 the discount rate and the cost of capital to
9 determine what the cash flow is.

10 So when we're creating these portfolios, we
11 time the resources. And when a resource comes in,
12 this is the cost of buying or building that
13 resource.

14 THE CHAIRMAN: Yes. Yeah, my point is that
15 I think that you're confounding financial and
16 economic considerations.

17 MR. RANDY REIMANN: Well -- yeah. I mean, I -- I
18 think this gets back a little bit to where we were
19 in December about the idea of using different --
20 like, I -- I've seen different things where people
21 suggest that you should be using market rates of
22 equity and market risk assessments for projects all
23 the way up to social discount rates, and we've kind
24 of landed somewhat in between.

25 THE CHAIRMAN: That may be the problem. I

1 mean, classically, what you would do would be to
2 select the attractive alternatives on an economic
3 basis, and that is without accounting for the
4 nature of the proponent and so on and so forth, but
5 you would account for risks inherent to the
6 project, not inherent the proponent.

7 And that would give you a ranking. And then
8 you choose the most attractive ones or so, and then
9 do a financial analysis.

10 But I think you're right. I think that you
11 kind of run them together.

12 MR. RANDY REIMANN: Well -- and -- and that was
13 the discussion that we had with the BC Utilities
14 Commission. And what they suggested was if there
15 was an advantage in financing a project, that was
16 to the benefit of ratepayers, that we should
17 recognize that. So that's where we've landed.

18 THE CHAIRMAN: Well, if that's what they
19 wound up saying, then I think they are ignoring the
20 assignment of project risk. And I think that
21 that's an improper decision.

22 If -- if an IPP outfit, for example, is
23 undertaking a project and they overrun; presumably,
24 they eat the cost or the project never occurs.

25 In the case of Hydro, if you were undertaking

1 the same project, and you overran, the ratepayers
2 would pay the cost.

3 So there is a risk there which is not the
4 same necessarily, but it would take an awful lot of
5 analysis to tease out just what that ought to be.

6 MR. RANDY REIMANN: Yeah. And, again, I guess --
7 so we -- we did -- we were -- we did discuss and we
8 were told that difference in WACCs for the cash
9 flows was appropriate. And that if you were then
10 wanting to look at uncertainty or risks, that you
11 could do those by doing sensitivity analyses.

12 And think that's what we started to do is we
13 were then looking at the costs of the project
14 versus the costs of the IPPs and the change in the
15 discount rates -- or the change in the WACC.

16 Sorry.

17 THE CHAIRMAN: I may be a bit sensitive to
18 the point because I've worked both as an economist
19 and as a banker. But I think we may have pushed
20 that one as far as we can. Let's go on.

21 Question 4.

22 MR. CHRIS O'RILEY: Mr. Chair, I'll take that.

23 So as context in my role as being in charge
24 of generation, I'm also responsible for our
25 generation capital program. So excluding the

1 Site C project.

2 And we've got right now about 100 projects
3 that we're doing, which total about \$4 billion in
4 -- in budget that's been allocated to me.

5 And those range from projects in the million
6 dollars or so up -- to the largest one is the John
7 Hart's development project, which is about a
8 billion dollars.

9 And there are three projects in the range of
10 between 500 and 1 billion, and those are John Hart,
11 Mica 5 and 6 capacity, and Ruskin re-development.

12 And most of our work is refurbishment work of
13 existing equipment, and, what we call, Brownfield.
14 So kind of messy.

15 We have done and finished, on my watch, about
16 200 projects over the last seven years. And -- and
17 I'm quite involved in those projects and report
18 every quarter to the board on our progress.

19 Our estimating philosophy for the bulk of our
20 portfolio -- and Mr. Savidant can talk about how
21 it's applied to Site C, but our estimating
22 philosophy is to use this 50 percentile concept.

23 So we estimate projects at a level such that
24 50 percent of them should come in under and
25 50 percent should come in over.

1 And the reason that -- that was a deliberate
2 decision that was taken by our board a number of
3 years ago to avoid the inclusion of -- of
4 additional contingency in projects, and to -- to
5 just to make sure we're being as sharp as possible.

6 And we benchmark our performance against the
7 first implementation estimate for the project, so
8 that's the estimate we take at the go/no-go point
9 for the project. And we report on that annually on
10 a portfolio basis to the board, and we do this for
11 generation projects and transmission projects.

12 And I would say we have had good performance
13 overall when you look at the -- the portfolio on
14 cost and schedule. We've also had very good
15 performance on quality and safety outcomes and
16 environmental outcomes, which we also pay a lot of
17 attention to.

18 We received the submission from the Boughton
19 law firm, and -- and there were a number of -- of
20 errors in the document, which is understandable
21 because there's lots of numbers out there when it
22 comes to -- to projects. And I'm not being
23 critical about that.

24 So we have provided some corrected numbers,
25 which we have on a table. And the punch line for

1 that is for the generation projects, in excess of
2 \$50 million, for the ones that had been completed,
3 we are within 3.1 percent of the -- the budget that
4 was -- that was identified. And if you add in the
5 -- the -- completed and in-progress projects, over
6 \$50 million; we're within .3 percent on the -- on
7 the generation side. And we have similar figures
8 for transmission on the -- on the chart.

9 Part of the question was to reconcile with
10 the 73 percent figure in the -- in the government
11 review document. And what the government did is
12 they -- they picked a subset of projects over a
13 relatively short horizon; it was not much more than
14 a year, and found that we were under budget
15 73 percent of the time. And -- they actually
16 intended that to be a -- a criticism. The -- the
17 great thing about projects is you can't win either
18 way.

19 And the criticism was that we had so-called
20 "fat estimates" in the -- in the -- budgets, so --
21 and I -- I think the response to that was you are
22 going to see -- if you pick out subsets of
23 projects, you're going to see more variability in
24 the -- in the estimate.

25 So we have been, you know, stepping back. We

1 had been ramping up our -- our capital delivery
2 program over the last ten years or so, and we're --
3 we're doing about \$2 billion a year of projects as
4 a company, including generation, transmission,
5 distribution, and -- and some technology projects.

6 And we have -- we have significantly ramped
7 up our capability to -- to deliver projects,
8 including the management systems that go around
9 that.

10 So I -- I do take quite personally the
11 criticism of project management capability, and
12 it's -- it's a fairly easy target because you can
13 always pick out projects. And when you've got
14 hundreds of projects, there's always the odd one
15 that has challenges.

16 But I think what we would propose is to put
17 on the record the updated table, and -- and we
18 think that supports our -- our solid performance as
19 a project delivery organization.

20 THE CHAIRMAN: Yes, please. That is
21 important.

22 In my comment last December, before you got
23 here, was that if you guys could keep delivering
24 like that, we'd put you in charge of acquiring
25 fighter aircraft.

1 MR. CHRIS O'RILEY: So I've got Question 5.

2 And this relates to the non-Treaty storage
3 agreement. And I -- I want to say with the
4 greatest respect to the -- the law firm, the
5 Boughton law firm, that they have, I think,
6 completely misunderstood the non-Treaty storage
7 agreement. And -- and so it's difficult to address
8 their points directly, but -- but I will -- I will
9 try.

10 And I -- I do say that with the utmost
11 graciousness because the non-Treaty storage
12 agreement is probably the -- one of the two or
13 three most complicated things you're going to find
14 in BC Hydro. And that is saying something.

15 THE CHAIRMAN: You can take it for granted
16 that the panel doesn't understand it, so ...

17 MR. CHRIS O'RILEY: Yeah. So I'm not going to
18 get -- get into that.

19 But at a high level, the non-Treaty storage
20 agreement is a co-ordination agreement between
21 BC Hydro and Bonneville Power about how flows are
22 managed, and it's necessary on the Columbia River.
23 And it's necessary to take full advantage of the
24 extra storage that was built at Mica Dam, the extra
25 five million acre feet of storage that was built

1 over and up of what was required under the Columbia
2 River Treaty.

3 So what I think is relevant for the
4 proceeding and the -- and the panel is -- is that
5 the full capability, the absolute capability of the
6 Columbia generation system, including the capacity
7 and the energy at Mica, and including the benefits,
8 the beneficial impacts of the non-Treaty storage,
9 are included in all the portfolios that are under
10 consideration.

11 There is no capacity that's been held back
12 from any of the portfolios preferentially.

13 So all, currently, 1,800 megawatts of Mica
14 capacity is all in the portfolios.

15 And when we finish the projects, to upgrade
16 Mica, all 2,800 megawatts will be all in all the
17 portfolios, so there's nothing that's been held
18 back.

19 And I should note that the non-Treaty storage
20 agreement expires -- current agreement; we've had a
21 number over the careers, expires in 2024. And --
22 and that date was picked because it's coincident
23 with the earliest termination date for the Columbia
24 River Treaty.

25 It's -- its my expectation that regardless of

1 what happens with the Columbia River Treaty, we'll
2 re-negotiate some form of non-Treaty storage
3 agreement, and the benefits of that have been,
4 assumed to be included, beyond 2024. And we think
5 that's a reasonable assumption.

6 THE CHAIRMAN: I don't want to get into any
7 of the details of an ongoing negotiation here, but
8 do I understand it correctly that Hydro is
9 effectively leading the Canadian side on this?

10 MR. CHRIS O'RILEY: Well, that would be giving us
11 too much credit.

12 THE CHAIRMAN: No, I mean, leaving aside the
13 egos of governments, you guys are actually leading
14 on this?

15 MR. CHRIS O'RILEY: BC Hydro is providing
16 technical support to a very able team in the
17 Province that is leading the negotiations, and the
18 discussions around the Columbia River Treaty with
19 the U.S., so we are very involved.

20 Ms. Kurschner, who you met, is the
21 coordinator for -- her title under the Treaty is
22 coordinator of the Canadian Entity. I'm the Chair
23 of the Canadian Entity. And so we engage with the
24 Province on the analysis and -- and negotiating
25 positions around the Treaty. And that work is

1 under way.

2 THE CHAIRMAN: Good. What's the timetable?

3 Or do you know yet?

4 MR. CHRIS O'RILEY: The earliest date at which
5 the Treaty can be terminated is -- is 2014. And I
6 think -- I believe that's the fall of 2014.

7 THE CHAIRMAN: September 16th, says
8 Mr. Mattison.

9 MR. CHRIS O'RILEY: September 16th. I will -- I
10 will take Mr. Mattison's word on that.

11 That's a somewhat artificial date because you
12 can always terminate in 2015, and have the
13 contract -- or agreement terminate in 2025.

14 So what -- what BC -- BC and Canada have --
15 have done is put out a position on it, and as have
16 the United States. And you can appreciate they are
17 -- they are somewhat far apart.

18 I think all parties have concluded that
19 there's a lot of benefits to the Treaty, and it
20 would be capricious to terminate early.

21 So I think, most likely, there will be a much
22 slower process to seek any mutually beneficial
23 changes to the arrangements within the Treaty
24 itself.

25 So we're not expecting any big decisions in

1 -- in the next little while.

2 THE CHAIRMAN: So, as Bernard Shaw said to
3 the lady, we settled to principle and it's a matter
4 of price?

5 MR. CHRIS O'RILEY: I -- I think what we've
6 concluded is we -- there is tremendous value in the
7 -- in the power and the flood control benefits,
8 and, particularly, the flood control benefits that
9 the U.S. enjoys, and -- and -- you know, they are
10 going to want to carry those on more likely than --
11 than not.

12 THE CHAIRMAN: And there is no pressing
13 deadlines in all of this; people will keep talking
14 until you come to agreement?

15 MR. CHRIS O'RILEY: Yeah. The most pressing
16 deadline -- and I say that because it's not that
17 pressing -- is the fall of 2014. And I -- I think
18 that the importance of that deadline has diminished
19 somewhat.

20 THE CHAIRMAN: Okay. Thank you for that.
21 And thanks for the explanation on non-Treaty
22 storage.

23 What's our next question?

24 Yes.

25 Broughton and others brought up the question

1 of the Kleana project.

2 MR. RANDY REIMANN: So we have spent some time
3 working with the proponent, and looking at the
4 Kleana project, and I guess a starting point for
5 this is just --

6 THE CHAIRMAN: Closer to your mic, please.

7 MR. RANDY REIMANN: A starting point for this
8 would be to say that the Kleana project and -- and
9 the Site C project are not similar projects in any
10 way, shape, or form.

11 The Kleana project doesn't -- has very little
12 dependable capacity, and it has no storage. And so
13 it -- it doesn't provide the same product that we
14 would get from Site C. So that -- that was part, I
15 think, of the question to say that it's comparable
16 or -- or attractive.

17 I guess the other -- so as we looked at this,
18 we had taken a look at what the unit energy cost
19 was, and -- and the position in the Broughon IR was
20 to say that looking at a dollars-per-kilowatt
21 basis, it looks attractive.

22 But given the energy profile it has and what
23 it delivers, that's really the wrong metric. And
24 -- and we get into that a bit in the clean energy
25 rebuttal; they had made the same sort of point,

1 that on a dollar-per-kilowatt basis, this
2 run-of-river looks good. But that's really the
3 wrong metric.

4 And if -- if you take a look at what those
5 projects deliver in terms of a firm energy product,
6 we find that the price of the project, the Site C
7 project versus the Kleana, is much different. And
8 a rough assessment of this project has the adjusted
9 unit energy cost of it north of \$140 per megawatt
10 hour.

11 So in terms of the analysis that we've done
12 in the portfolio PV analysis, the Kleana project is
13 not substantially different than the run-of-river
14 options that we'd shown in there. A similar sort
15 of price; a similar sort of profile in terms of the
16 energy delivered.

17 And, in fact, what we see is that wind is the
18 preferred resource, and -- and that's somewhat
19 different than our last call, but, as we've all
20 discussed, the wind projects have been coming down
21 in cost. And we are now predicting that wind would
22 be the more successful resource, and that's what
23 our portfolio selected.

24 So the bottom line is Kleana -- we -- we
25 rarely go -- and I think I've made this point

1 before -- we rarely include individual projects
2 because, typically, proponents won't give us their
3 actual financial and technical information in an
4 open process that we can then share. So we don't
5 tend to model individual projects, we tend to model
6 class of projects, and try to do assessments that
7 are similar. And we've had a reasonably good track
8 record with that.

9 So bottom line is no different than what
10 we've modelled, and it wouldn't have changed the
11 outcomes of the portfolios. So ...

12 MR. CHRIS O'RILEY: Yeah, if I could add. I
13 think it was in the -- the Boughton Submission,
14 there was discussion about the flexibility to
15 better match the supply to load with products like
16 Kleana and other IPP contracts. And -- and while
17 we acknowledge that is -- is true to some extent;
18 in practice, we should be careful not to overstate
19 that.

20 Our present value model assumes perfect
21 foresight in matching -- bringing IPP contracts on
22 to match the load. And that's, frankly, a generous
23 assumption for the clean portfolio.

24 We do -- when we design a call, we typically
25 have to size that at a certain level so we can

1 capture the larger resources like Kleana. And --
2 and achieve a scale benefits that come with that.
3 So you end up with this mismatch in -- in supply
4 and demand, even with these portfolios.

5 And we have seen, at various times, pressure
6 to advance calls in support of the -- the economic
7 development objective of -- and aspect of the clean
8 sector. And that can tend to leave you with a bit
9 of an imbalance between supply and demand.

10 And we also know that once a call is started,
11 even on a contingent basis, it can be difficult to
12 -- to turn it down or slow it down once they --
13 once it's under way.

14 So we -- even with the clean generation, we
15 can't plan to a head of a pin, and you can end up
16 with surpluses and -- that you have to market, and
17 sometimes at really difficult times of year.

18 MR. MIKE SAVIDANT: Your question also asked a
19 bit about the environmental impact of the Kleana
20 project. And, as Randy said, they are not directly
21 comparable. So you're not going to look at it
22 exactly the same way. But I -- I was a little bit
23 surprised by the submission because early on in
24 this process, we were looking at portfolios prior
25 to the wind cost decrease, that Mr. Reimann talked

1 about, and they were much more -- they had a more
2 run-of-river to them. And what we actually saw in
3 the portfolios was a much larger terrestrial
4 footprint.

5 So what -- what the submission doesn't
6 include -- and -- and I can't talk to whether or
7 not their -- their footprint at site is appropriate
8 or not, I don't know, but what it doesn't include
9 are the transmission lines and the roads to get
10 there.

11 So when you look at IPP resources, wind and
12 run-of-river resources, a lot of the footprint
13 comes from how you get there. How you get there in
14 terms of roads. How you get the power out of there
15 in terms of transmission lines.

16 And when you look at run-of-river,
17 run-of-river tends to be in more remote locations,
18 have longer -- longer requirements. Wind in the
19 Peace has shorter transmission and road
20 requirements than, say, run-of-river in -- in a
21 range of places.

22 In the early portfolios we looked at, we saw,
23 you know, per unit of firm energy delivered;
24 run-of-river tended to have more of a footprint
25 than Site C. Wind is lower. But run-of-river did

1 have a higher footprint per unit of firm energy
2 delivered.

3 What you see in the current portfolios is
4 really what wind does, and so that's why we're
5 talking about it in the EIS, that your footprint, a
6 lot of the attributes does tend to depend on where
7 -- what resources you select in your call and where
8 they are located.

9 THE CHAIRMAN: Thank you, that's very
10 helpful. And I suppose it's not the first time
11 ever that someone has used a hearing to gain a
12 marketing advantage.

13 But that aside, it raises the interesting
14 question of suppose -- as you say, you've replaced
15 Burrard now. And then you build Site C. What do
16 you do next?

17 Too far away to think about?

18 MS. SUSAN YURKOVICH: Mr. O'Riley talked about some
19 of the things that we are pursuing. And, in fact,
20 in these hearings, we have heard about geothermal
21 and solar and tidal and some other options.

22 While at this juncture, some of those are not
23 yet proven technologies; they can't be reliably put
24 into our planning stack.

25 As we noted, we are very interested in those

1 moving along. There are a number of folks who have
2 noted that this is the last project that is in our
3 planning stack to develop, and as the project -- as
4 the Province continues to grow, we will need
5 additional resources, both energy and capacity.
6 And, you know, as we move forward, they need to
7 come to a place where they are proven, and,
8 hopefully, where we can reliably have them to meet
9 the needs of our Province and our customers.

10 THE CHAIRMAN: Understand. There's no sense
11 taking decisions before one has to.

12 Go to question 13, please. Geothermal.

13
14 "In 1983, in the last Site C
15 proceeding, the Utilities
16 Commission said you ought to study
17 geothermal in north-eastern BC;
18 have you done so? Are you doing
19 so?"

20
21 MR. RANDY REIMANN: Thanks Chris.

22 Yeah, we are, actually. We are studying.
23 And, interestingly, given some of the evidence
24 that's been provided in this process, we, in fact,
25 are together with the provincial government, are

1 funding the favourability map that is studying
2 those geothermal resources that CanGEA referenced
3 in -- in their information.

4 And so -- yeah. In a more general sense,
5 ever since I think the 2002 energy plan or energy
6 policy, Hydro's role is not to do R&D, and to do
7 research development.

8 We were expected to continue to do the two
9 river projects and maintain them. But all other
10 was expected to be put to the independent power
11 producers to explore and develop those.

12 And any R&D funding that we sort of had
13 before to prove out or getting into those
14 technologies at that point, we really shifted away
15 from that.

16 But having said that, we have been
17 interested, I guess, as a first line of expected
18 response was that we had hoped that IPPs would get
19 into developing the geothermal. And after a number
20 of acquisition processes -- South Meager Creek was
21 -- was with western geothermal, and we had had some
22 good hopes that that was going to be bid on because
23 we would love to see some energy resources with a
24 good amount of dependable capacity.

25 So it would be a very attractive resource to

1 us. But it didn't go up. They ended up having, as
2 I think was explained in -- in attachment the
3 latest CanGEA filing, but they had problems with
4 fractures and not being able to retain any of the
5 fluids of the drilling that they'd done up there.
6 And it just sort of highlights for us that this
7 drilling part of geothermal is -- is still a
8 high-risk thing.

9 So we -- we still had interests and thought,
10 well, we would like to advance this. So the two
11 things that we have or are doing. One is is
12 funding that favourability map, that includes the
13 exploration of that sedimentary basin in the
14 northeast. And that's in process. We haven't seen
15 the results of that yet, but we'll consider it in
16 due course.

17 And we've also funded a person to work with
18 the ministry to help think our way through how
19 permitting or whatever issues may be there in terms
20 of stalling these entities.

21 And so at the end of the day, we still see
22 that there's significant risk for where you have to
23 do greenfield drilling. And our perception is is
24 that most of the geothermal that's going on in the
25 world is in proven areas where they understand the

1 geology and its expansions to existing, there is a
2 bit of greenfield.

3 But with respect to the heat in the northeast
4 and the saline there. We had looked at that, and
5 given it some thought. And a rough unit energy
6 cost of that sort of resource was looking to be in
7 the area of \$130 per megawatt hour, was kind of our
8 sense. And that's a plant-gate price, that's not
9 actually getting it connected into the transmission
10 system and delivered.

11 And -- and it's interesting that there was
12 nothing in the CanGEA report about pricing or costs
13 of this stuff, but ...

14 So it's our expectation that it was expensive
15 and still somewhat remote. And so we are just
16 waiting to see the results of that analysis.

17 THE CHAIRMAN: I wrote an article about
18 Canadian renewal energy prospects back in the
19 1970s, and we were talking about Meager Creek back
20 then.

21 What is the current level of effort on
22 geothermal? Are we talking a 100,000 a year or a
23 million or what?

24 MR. RANDY REIMANN: For Hydro's --

25 THE CHAIRMAN: For Hydro.

1 MR. RANDY REIMANN: Yeah. So, our funding? No.
2 It's -- it's under \$100,000. And, again, we don't
3 really have funding to do R&D. That's -- we're not
4 expected to do that. In fact, we're expected not
5 to do that.

6 THE CHAIRMAN: Where does that expectation
7 come from? Is that the board or the government or
8 what?

9 MR. RANDY REIMANN: That was in the 2002 Energy
10 Plan.

11 THE CHAIRMAN: Are you trying to goose along
12 Geoscience BC or NRCan to assist with the
13 exploration?

14 MR. RANDY REIMANN: I'm not sure we've taken any
15 definitive steps towards trying to have those
16 entities -- we -- Geoscience BC is, in fact, the
17 other funder of the favourability map, though.

18 So I guess we'll have to see what that comes
19 up with, and if there's some merits that are
20 advancing that.

21 THE CHAIRMAN: You say that there's not much
22 experience with putting holes in the ground, and,
23 yet, the story that we've heard of and the maps
24 that we've seen up here suggests that northeast BC
25 is a veritable pin cushion.

1 Do you collaborate with or query folks in the
2 gas industry what they are finding?

3 MR. RANDY REIMANN: So let me distinguish the two
4 types of resources, as we understand it.

5 There's the high temperature, either flash or
6 binary technology, but it's trying to really get
7 into the hotspots. And those higher-quality
8 temperature sites are unproven and undrilled.

9 My understanding of the sedimentary basin
10 that we're looking up here and the water is in the
11 140-degree-Celsius range.

12 And so my understanding of that is that that
13 -- that is a low-grade heat. And if successful,
14 the plant would be in the
15 130-dollar-per-megawatt-hour range.

16 So it's -- it's north of what we'd be paying
17 for the wind; albeit, it has the capacity benefit.

18 So it's -- it's expensive, but -- but there's
19 other issues, as I understand it as well, is that
20 the -- the tenure to drill and develop these sort
21 of facilities actually sits with the oil and gas
22 producers.

23 And if -- if -- and I think the concern there
24 is you don't want to be giving drilling rights to
25 any other entity that could then compromise the way

1 the oil and gas is recovered.

2 And so I -- I think it sits with the oil and
3 gas. And to date, we haven't had a lot of
4 discussions, primarily, because it seems to be a
5 more expensive resource. But that's not their
6 primary business.

7 So when the CanGEA proposed this
8 favourability map, I think we funded it, and
9 Geoscience BC funded it. I don't think any of the
10 IPPs participated in that funding, nor did they get
11 any oil and gas developers to do it.

12 So we haven't seen a lot of interest, but,
13 honestly, haven't tried to go up there and --

14 THE CHAIRMAN: But you haven't been out
15 beating the bushes for it either. Yeah.

16 No, it is interesting. I mean, the oil and
17 gas companies have certainly got commercially-sharp
18 pencils, and if they saw some capability for a
19 joint production effort, they might be interested.

20 But I do take the point about low-quality
21 heat. Lower-temperature heat up here, as far as we
22 know it. It's kind of like a CANDU reactor.

23 MR. RANDY REIMANN: Yeah. And I guess we've seen
24 and had that question about Alberta has got all
25 these wonderful resources as well, but as far as we

1 know, no geothermal has been developed in Alberta.
2 There was one project we had heard of that didn't
3 get taken to completion.

4 THE CHAIRMAN: And the igneous prospects in
5 the southern coast range have not been drilled in
6 the last 30 years?

7 MR. RANDY REIMANN: I'm mostly aware of the
8 Meager Creek site. I'm not sure how much else has
9 been done. Not a lot, as far as I know. Not
10 anybody that I've heard from.

11 THE CHAIRMAN: What is your mandate in terms
12 of investigating novel energy sources?

13 At one point in some material I was reading,
14 you were talking about keeping an eye on all kinds
15 of technology developments that were happening out
16 there.

17 What do you do about that? And how much
18 effort do you spend scanning that horizon?

19 MS. SUSAN YURKOVICH: Thank you, Mr. Chair.

20 So I would just note with respect to the
21 discussion around geothermal, and, in fact, other
22 new alternative sources of energy, the 2003 Energy
23 Plan really sets out that Hydro would utilize its
24 expertise in large hydro and undertake those
25 projects. And then for all other independent power

1 projects, geothermal, wind, run-of-river, any of
2 those other technologies, that that would be for
3 the private sector to provide.

4 Because we are -- we are interested in
5 geothermal, I think despite the fact that our --
6 the BCUC in our '05/'06 revenue requirement
7 application, specifically, excluded us undertaking
8 R&D, we do think it's important to advance this
9 because it could be one of those sources that meets
10 the need going forward. And so we are interested
11 in that and funded the study, as Mr. Reimann
12 indicated.

13 I think we spend a lot of time in our
14 demand-side management programs thinking, looking
15 around and scanning the globe for initiatives
16 around conservation and energy efficiency, which is
17 clearly a part of our mandate, and where we are
18 choosing to get the vast -- meet the vast majority
19 of our future load growth. And in that area, we
20 have a lot of work under way and people engaged
21 with other jurisdictions to determine -- to look
22 for new technologies and new programs that we could
23 implement.

24 THE CHAIRMAN: 2005 or 2006 BCUC was
25 faithfully applying the government's policy and

1 telling you not to do it, more or less?

2 MS. SUSAN YURKOVICH: Yes.

3 MR. CHRIS O'RILEY: Yeah, I -- I think they
4 didn't like us spending the money. I think -- I
5 don't think it was that big of a conversation.
6 Utility commissions have a hard time with R&D
7 dollars, traditionally.

8 MR. RANDY REIMANN: The one other, I think, area
9 where the government was looking at trying to
10 enhance or develop some of these technologies was
11 by looking at feed-in tariffs. And -- and they did
12 give that some consideration, but, ultimately,
13 decided that that can be an expensive route, and
14 they decided that they didn't think it was
15 beneficial to fund that.

16 THE CHAIRMAN: As a former resident of
17 Ontario, I applaud that.

18 Okay. Back to 7, now, I think is where we --
19 yes, 7.

20 MR. CHRIS O'RILEY: And I think we addressed this
21 question. This was the question of how much
22 non-firm hydro we were including in the portfolio
23 as -- as firm.

24 THE CHAIRMAN: No, it's a question about
25 critical versus average years.

1 MR. CHRIS O'RILEY: Well -- okay. Well, I'll
2 have a go at it, then.

3 So with our heritage hydro, we look at the
4 critical water, and then we have an allowance for
5 4,100 gigawatt hours of -- of market, which is
6 another way of saying we -- we plan to average.
7 So, I -- you know, you could look at that both
8 ways.

9 When it comes to the -- the non-firm run --
10 well, when it comes to run-of-river IPP, we -- we
11 start with the contractual firm and the contractual
12 non-firm, and then we put that into our -- our mix
13 of IPP contracts and with the system. And we
14 calculate a firm reliance, which is greater than
15 the contracted firm.

16 THE CHAIRMAN: "Firm" is a function of the
17 amount of water that's flowing?

18 MR. CHRIS O'RILEY: It is. It's also --

19 THE CHAIRMAN: Yes. And following the
20 review by the Deputy Ministers of a year or two
21 ago, Hydro moved back from using critical water as
22 its definition for self-sufficiency and other
23 purposes to using average water, but I understand
24 you did not do the same thing for IPPs. Is that
25 correct?

1 MR. CHRIS O'RILEY: For run-of-river hydro IPPs,
2 that is correct. For wind, we use average. For
3 biomass, we use average.

4 THE CHAIRMAN: Yeah, yeah. It's the
5 waterpower I'm interested in.

6 MR. CHRIS O'RILEY: Yeah. So it -- it's the
7 issue of the -- the 15 percent, which is the --
8 what we calculate the -- the non-firm percentage to
9 be on a portfolio basis. And that's the difference
10 between 85 percent, which we call firm on a
11 portfolio basis, and the 100 percent, which equals
12 average.

13 So -- so this is the question of the -- the
14 15 percent we talked about this morning.

15 And our -- the -- the reason we can't rely on
16 that is it tends to come in the freshet. And we
17 don't have the capability to store and move that
18 into other times of the year. So that's why
19 we're -- that's why we're distinguishing between
20 the -- the run-of-river IPP and other resources
21 like wind.

22 THE CHAIRMAN: Okay. Understood.

23 Next. Yeah.

24 MR. MIKE SAVIDANT: So, Mr. Chair, we've provided
25 the table in -- in the slide deck, slide 7, that

1 shows the revenue requirements attributable to
2 Site C for the first several years. I can take you
3 through how -- how that's determined.

4 Sorry, we lost our slide operator.

5 Slide 7.

6 THE CHAIRMAN: Slide 7 is historic prices.

7 MR. MIKE SAVIDANT: Not handout 7, slide 7. In
8 the slide deck.

9 THE CHAIRMAN: We've got two decks here,
10 which is what's confusing.

11 MR. MIKE SAVIDANT: So there -- there's three
12 main components of that revenue requirement. We've
13 shown it here for the first four years, those are
14 in nominal dollars.

15 And then we have a hand-out -- and I won't
16 get you to turn back to that right away, but we
17 have a hand-out that shows it for the 70-year
18 evaluation period.

19 Amortization is the first component; that is,
20 effectively, the \$7.9 billion capital cost
21 amortized -- a straight-line amortization over a
22 70-year period. You'll find 7.9 billion divided by
23 70 is 113.

24 Then we look at the finance charges. So
25 since the change, the November 26th announcement,

1 this project is effectively being financed -- the
2 incremental financing for this is at debt, the cost
3 of debt, which, as I mentioned earlier, we've
4 assumed is just under 5 percent in the long-term
5 cost of debt.

6 So for each year, you're going to have a
7 declining capital balance, and you evaluate your
8 interest financing charge at 5 -- 4.82 percent on
9 that declining capital balance.

10 So 7.9 billion times, roughly, 5 percent,
11 you're in the \$390 million range.

12 I'll mention fiscal 24 is half-year rule, so
13 that's why it's lower than everything else.

14 Then you get into operating costs, and
15 there's a few components of that. There's the --
16 there's the actual operations and maintenance for
17 the plant. That's, roughly, 7.5 million in real
18 dollars, that would be escalated by inflation.

19 You would have water rentals. Water rentals
20 used to be indexed to rates, but they are now
21 indexed to inflation as well. So they are roughly
22 thirty -- I think they're in the low 30s of
23 millions of dollars, and they would increase also
24 at inflation.

25 And then you have grants in lieu and school

1 taxes, which have been talked about previously in
2 this -- in this hearing.

3 So those three components are the major
4 components of the revenue requirements.

5 What we've also shown on this table to answer
6 I believe your question -- one of your six
7 questions is what the -- what the revenues that
8 would come in from the surplus would be.

9 So the net revenue requirement is the 341
10 million. That's included in the rate graph that we
11 show, the rate-smoothing graph that we've shown
12 there.

13 So that -- that would have an impact on rates
14 for a few years, but it would decline. And after,
15 roughly, ten years, it would be reducing rates for
16 the rest of the operating life of the project.

17 I -- I will note. It -- it's a different
18 analysis in the NPV analyses. We have the UEC
19 analysis. The UEC is evaluated at -- it includes
20 utility risk and the cost of equity. It includes
21 everything like that.

22 On handout 4, we've kind of indicating --
23 indicated the difference between those, the revenue
24 requirement tends to be lower than the UEC very
25 quickly after the project comes in to service.

1 MS. DANIELLE MELCHOIR: Would you like me to put that
2 handout up?

3 No.

4 THE CHAIRMAN: Sorry, I can't hear you.

5 MS. DANIELLE MELCHOIR: I can put the handout up if
6 you wanted to look at that?

7 THE CHAIRMAN: Yes. Thank you.

8 MS. DANIELLE MELCHOIR: Thank you.

9 That one?

10 THE CHAIRMAN: Okay, good. Can we go on to
11 question 9, please.

12 MR. MIKE SAVIDANT: So the accounting treatment
13 of losses is, to some extent, shown in the revenue
14 requirement. So what happens when a project comes
15 into service, the costs of that project are
16 recovered from ratepayers.

17 So that total cost, which -- and then the
18 cost is -- the cost, whether or not the electricity
19 is being exported or going to ratepayers, would be
20 recovered.

21 During the period where there's the
22 short-term surplus, there is revenue component as
23 well that will also go into -- will reduce rates.

24 After that surplus period, there won't be --
25 I mean, that surplus declines over time; it

1 eventually goes to zero.

2 THE CHAIRMAN: Well, that surplus depends
3 who you're being able to flog it at a nice price.

4 MR. MIKE SAVIDANT: Which, we believe, we'll be
5 able to do.

6 And so as that surplus declines, then it --
7 you don't see a revenue, what you're doing is
8 you're spreading those costs out over an expanded
9 customer base. And that's all reflected in the
10 rate analysis.

11 THE CHAIRMAN: All right. So if you're --
12 and I'm -- I'll see if I understand you.

13 If your assumption about export prices
14 doesn't hold up, then that means simply that the
15 amounts that would be recovered from ratepayers
16 would rise; is that right?

17 MR. MIKE SAVIDANT: That's correct.

18 THE CHAIRMAN: Okay. If -- you know, you've
19 spent about a quarter billion on Site C so far.
20 And you'll have a few more dollars out before
21 Halloween when Ministers will make their decision.
22 What happens then if Ministers decide the project
23 doesn't go ahead?

24 MS. SUSAN YURKOVICH: If the project was decided
25 that they would put it down and -- and it would be

1 abandoned, effectively, it would go to the bottom
2 line of the Province.

3 THE CHAIRMAN: It would be expensed in this
4 year, in effect?

5 MR. MIKE SAVIDANT: Sir, to some extent, that
6 would be decided by the BCUC. We would have to go
7 to a hearing.

8 I mean, the BCUC has overseen and approved
9 both the Stage 1 and Stage 2 funding.

10 THE CHAIRMAN: M'mm-hmm.

11 MR. MIKE SAVIDANT: I -- I don't want to
12 speculate on what they would actually do. I think
13 there would be a likelihood that those would be
14 recovered from ratepayers no matter what.

15 There's some question in terms of whether --
16 what would happen with the funding for this
17 environmental assessment process Stage 3.

18 THE CHAIRMAN: You would always charge it to
19 your mythical equity.

20 Okay. Question 10.

21 And, I confess, I'm a little confused on
22 this. And I read some newspaper reports and
23 something in one of your documents. The newspaper
24 reports were suggesting that you had reduced
25 expenditures on DSM, and one of your reports was

1 suggesting that, as a cash conservation measure,
2 you were going to do it sometime in the next few
3 years.

4 First off, what are the facts?

5 MS. SUSAN YURKOVICH: I'll let Mr. Reimann answer
6 this question. But what we have done -- we are
7 maintaining our expenditures at historic --
8 essentially, at the historic levels that -- of the
9 last three years. We are reducing how quickly we
10 expand, but we are keeping our target in place.

11 I'll let Mr. Reimann give you some more
12 details.

13 MR. RANDY REIMANN: Thanks, Susan.

14 Yeah. So the exercise that we went through
15 in the integrated resource plan was to address what
16 costs could we minimize over the next three years,
17 but still, essentially, keep cost-effective options
18 on the table as we get out into the 2020 timeframe.

19 And -- and so as we looked at the demand-side
20 management, as Susan's described, as -- we'd had a
21 ramp-up that was going to be accelerating the
22 activities on demand-side management faster than we
23 have been historically. And we looked at that and
24 said how much can we temper that?

25 And so what we landed on was that by,

1 essentially, maintaining the expenditures at the
2 same rate as we've done the last four years, doing
3 that for another three years, that we would still
4 be able at the end of that period to ramp-up
5 activity and get back to that same DSM targets, the
6 DSM Option 2 gigawatt hour savings of 780 gigawatt
7 hours by fiscal '21 --

8 THE CHAIRMAN: Yeah, so that -- in effect,
9 what you're doing is postponing the expenditures
10 and having a steeper ramp starting in year four,
11 then get to where you otherwise would be at the
12 cost perhaps of some gigawatt hours consumed in the
13 short run that might not otherwise be; would that
14 be a fair -- is that what you mean?

15 MR. RANDY REIMANN: Yeah, that's -- that's
16 essentially it. And then, of course, as you get
17 into doing a steeper ramp, it has the effect of
18 increasing the risk of not meeting your targets,
19 but we think it's manageable.

20 THE CHAIRMAN: I must say, when -- your talk
21 about the risk of DSM, when the amount that you're
22 allowed to spend on it is dictated by the Province;
23 I understand why you think it's risky.

24 MR. RANDY REIMANN: So the -- I mean, the cost of
25 the DSM programs, as a whole, are relatively

1 inexpensive. Our greater concern is whether or not
2 we can actually convince everybody to do everything
3 that we'd like them to. And so it really becomes
4 almost more of a deliverability risk. How quickly
5 can you change society's perspective?

6 To the extent -- like, the costs that we've
7 predicted so far of what we think we can actually
8 get people to do seems to be relatively
9 cost-effective.

10 THE CHAIRMAN: Okay. Go on to the next one.

11 MR. RANDY REIMANN: So on the LGS rates, I guess
12 the trick here is is that we've had the LGS rates
13 out there for a little better than a year. And
14 we've actually done some review of it, and reported
15 that back to the Commission. And what we found is
16 that the LGS rates are underperforming what we'd
17 anticipated of the response that we'd see, maybe to
18 a third of what we'd anticipated.

19 And -- and, thus far, with the MGS, or medium
20 general service, we haven't been able to sort of
21 discern any effect.

22 So we are kind of in the process now of
23 trying to understand. So exactly why is that? And
24 one of the things we're looking at is the
25 complexity of the rate structure itself.

1 And as we went out and surveyed people on
2 this, came to the realization that not a lot of
3 them were even aware of the rate. So we need to do
4 more education, and maybe some simplification.

5 We may be a little aggressive in terms of
6 what we're counting on in our DSM plans from rates.

7 THE CHAIRMAN: Okay, I understand what
8 you're talking about. From the response to the
9 question, it appeared quite paradoxical.

10 12.

11 MR. RANDY REIMANN: So this kind of carries on
12 from the prior question. When we -- when we design
13 in our -- our DSM programs, and, for instance, the
14 DSM targeted Option 2, what we do is we give our
15 DSM planners a price signal. And we ask them.

16 So using that as the maximum that you'd be
17 willing to pay for incremental savings, how would
18 you go about designing programs. And -- and the
19 target that we'd given them for the DSM Option 2 is
20 \$100 a megawatt hour. And so it's -- what you end
21 up seeing reported a lot is for a particular
22 target, all the savings -- and it's a weighted
23 average of everything in it; when you start
24 comparing between them, you start seeing that, no,
25 we are going up the supply curve.

1 And so we'd done some analysis, the whole of
2 all the DSM Option 3 versus Option 2 was maybe in
3 the area of \$75 a megawatt hour, but it was
4 actually as a marginal price signal going up to
5 \$130 a megawatt hour.

6 So this -- this whole demand-side management,
7 developing the programs and predicting customer
8 response and -- and price signals and all this is
9 quite a complex undertaking, but I guess we'd argue
10 that we are pretty much taking it up.

11 And so in the IRP, what we've identified is
12 that we think our long-run marginal cost is in the
13 range of 85 to \$100 a megawatt hour.

14 And in that range, the things that would show
15 up as supply was both DSM up to a certain
16 investment level and IPP renewals.

17 And so we're renewing them at whatever cost
18 we can negotiate. And maybe not paying fully up to
19 the long-run marginal cost, but ...

20 THE CHAIRMAN: Okay, that makes sense.

21 MR. RANDY REIMANN: Yeah.

22 THE CHAIRMAN: So everything that the
23 Industrial Electricity Policy Review Task Force
24 final report, a noun train of astounding length,
25 recommended you're already doing; right?

1 MR. RANDY REIMANN: Essentially.

2 THE CHAIRMAN: Including for residential and
3 commercial customers?

4 MR. RANDY REIMANN: So --

5 THE CHAIRMAN: The DSM target price that you
6 give your planners, the marginal cost number is the
7 same across all customer classes?

8 MR. RANDY REIMANN: Yes, generally. But in terms
9 of an equity in -- of having all classes treated
10 equally and all having the ability to reduce
11 consumption to get the benefit of savings, we do
12 get into some low-income programs that are above
13 that. And so with that exception. But outside of
14 that, yes, the three sectors are treated equally.

15 THE CHAIRMAN: Okay. Next one.

16 Oh, we did that one.

17 14.

18 MS. SUSAN YURKOVICH: Mr. Chair, if I might ask
19 Melissa Holland to join us at the microphone, our
20 director of projects for transmission and
21 distribution for question 14.

22 THE CHAIRMAN: Great. Welcome.

23 MS. MELISSA HOLLAND: Thank you.

24 So I was here, you may recall, in December.

25 So I'm back. Thank you.

1 And in December, I, in response, Madam
2 Beaudet, to one of your questions. I talked about
3 how BC Hydro does not have the powers to block
4 access to Crown land, and what the project has --
5 has committed to do and -- and has very
6 successfully done in other areas of the Province is
7 work with the Province to put in place gates or
8 other mechanisms to -- to limit access.

9 We have seen success in using gates to reduce
10 access when that is undertaken typically in
11 combination with conservation officers to -- to
12 enforce that. And I think you'll recall you -- you
13 heard from -- I believe it was one of the
14 counsellors of West Moberly that people just drive
15 around gates. So a gate isn't the only -- the only
16 solution.

17 But what we would like to continue to do is
18 explore those opportunities, both with the Province
19 and with communities, about how we can reduce --
20 reduce access.

21 In terms of the project itself, there are
22 existing access roads that we will need to use for
23 the purposes of -- of construction. Those access
24 roads exist right now to maintain the existing
25 transmission corridor.

1 And as we work our way through detailed
2 design, and, again, with -- work with the
3 communities, we believe we will be able to identify
4 opportunities either where we can deactivate and
5 reduce access to -- to the transmission corridor.

6 THE CHAIRMAN: I'm glad to hear that.

7 Are there opportunities, for example, to
8 qualify West Mo and Saulteau citizens as
9 conservation officers?

10 MS. MELLISA HOLLAND: I'm not sure that I'm
11 familiar enough of what the training requirements
12 are for those kind, but we could certainly take
13 that away as an undertaking --

14 THE CHAIRMAN: We'll just let that sit out
15 there as suggestion.

16 MS. MELLISA HOLLAND: Yeah.

17 THE CHAIRMAN: Okay.

18 MS. SUSAN YURKOVICH: Mr. Chair, if I might, we
19 also, should we move forward to construction, will
20 have a program, environmental monitoring, and
21 it's -- we often -- we ensure those programs do
22 include First Nations and expect we will do so on
23 this project as well.

24 As far as the requirements for conservation
25 officers, I think there may be -- I think there may

1 be some people here from the Province who would be
2 better able to speak to that.

3 THE CHAIRMAN: Is Mr. Addison here?

4 MR. CHRIS ADDISON: Yes. Good afternoon.

5 The requirements to become a conservation
6 officer are quite extensive. And we do have a
7 couple programs in the region to encourage First
8 Nations people to become involved in that program.

9 It requires interest among individuals as
10 well. It's something that we've been interested in
11 over time. We haven't moved a whole bunch of the
12 programs too far forward recently, but it's -- but
13 it's there as an option. But it -- but it does
14 require the individual's interest as well.

15 It's quite an extensive training program.
16 There's usually a Bachelor's degree required, all
17 for a job that doesn't pay overly well, so ...

18 THE CHAIRMAN: Thank you.

19 I must say, I've often thought that we have
20 people living in the mid-north who are looking for
21 work and we have a requirement to look after the
22 land and it seems to be moving in the right
23 direction, but maybe a little slowly. Yeah.

24 MR. CHRIS ADDISON: I know. Conceptually, it
25 really does seem like a good fit, so we're hopeful

1 about the future in that regard.

2 THE CHAIRMAN: And it's even possible that
3 with Hydro taking an interest, this might
4 accelerate it somewhat?

5 MR. CHRIS ADDISON: M'mm-hmm.

6 THE CHAIRMAN: Yeah. Thank you. Thank you
7 both.

8 Oh, Madam.

9 MS. BEAUDET: You've addressed the existing
10 roads. What about the road -- part of the road
11 that you have to extend northeast of the
12 transmission line when you widen the -- what you
13 call the right-of-way? Would that be left as is to
14 be used in the future? Or would you remove that?

15 MS. MELLISA HOLLAND: There are two parts to the
16 construction for the transmission corridor. My
17 understanding is that access to the corridor is
18 already in place. And in some places, we do need
19 to brush out or upgrade that existing access. And
20 we can certainly discuss whether we -- again, with
21 input from the communities -- whether we allow some
22 of that access to re-grow in.

23 We aren't anticipating having to build any
24 new roads to the corridor. Once you're in the
25 corridor, there's several things that have to

1 occur: one is the wood has to come out. And the
2 clearing is anticipated to be done during the
3 winter.

4 And in that case, then, you don't have to
5 bring -- you don't have to construct new roads
6 because you're taking the wood out of -- out of --
7 out over frozen ground.

8 Then you have to construct the foundations
9 and the towers and -- and do the stringing for the
10 transmission line.

11 And for that, about 10 percent of the
12 construction has to be done during the winter
13 because of some very boggy ground that doesn't lend
14 itself particularly well to -- to road
15 construction.

16 And so that leaves you with sort of the other
17 portions of the line. And in those portions, what
18 we -- a typical construction practice would be to
19 build, what we call, F-tracks; small, temporary
20 tracks along the corridor that take you to tower
21 sites. Typically, those are -- are de-activated.
22 And they are temporary for the purposes of
23 construction.

24 For maintenance and operation, you do want
25 access to the corridor. It's the easiest way to

1 get in if something goes wrong. We do have areas
2 in the Province where we have to fly crews in, but
3 if there's a road in already, it's -- it's
4 certainly preferable to -- to use that.

5 But, again, my -- my earlier comments, we do
6 believe that there are some opportunities to reduce
7 overall access to the -- to the corridor, and while
8 the corridor will be cleared for construction,
9 which opens up the corridor along its -- its
10 length, we can de-activate some of those roads.

11 There isn't a continuous road that you build
12 along the right-of-way to get to every tower site.
13 You come into the line, you build a few towers
14 there, you come in in a different area, you access
15 a few more towers there. So there isn't, if you
16 will, a road highway down the corridor that gets
17 built.

18 MS. BEAUDET: Thank you.

19 THE CHAIRMAN: Do you still use herbicides
20 along the right-of-ways?

21 MS. MELLISA HOLLAND: In the transmission
22 vegetation management plan, there is a toolbox, if
23 you will, of, I guess, tools that can be applied.
24 We use things like mowers. We do do some treatment
25 of very specific tall-growing or aggressive plants,

1 and that can be done with a -- with a herbicide
2 application; typically, it's a stem treat.

3 Ideally, you want to, after you've cleared,
4 encourage the growth of low-growing vegetation,
5 which tends to prevent the tall trees from coming
6 in.

7 We do have a vegetation management cycle that
8 we go through to check for tall-growing trees and
9 -- and so there's sort of a clearing -- clearing
10 prescription.

11 So there's a number of different ways that we
12 deal with vegetation in our rights-of-way.

13 THE CHAIRMAN: Is this -- is the program
14 that you choose based on cost minimization or
15 trying hard to avoid chemicals?

16 MS. MELLISA HOLLAND: I think it's based on a
17 number of factors, and that includes terrain and
18 where you can get equipment in.

19 It includes what kind of vegetation do you
20 see growing there and how quickly does it -- does
21 it grow. The -- the chemical aspect, we are part
22 of the provincial program to deal with what kinds
23 of herbicides are -- are safe to use in managing
24 our -- our rights-of-way.

25 So there's a number of factors that go into

1 choosing what tool, and the tool kit you use to
2 manage your vegetation.

3 THE CHAIRMAN: Thank you.

4 15.

5 Yeah. I think this was just a confusion. Or
6 a clarification question. Who can speak to 15?

7 MR. MIKE SAVIDANT: I can answer it.

8 So when -- I'll note the 32.5 percent was
9 prior to the November 26th announcement. We now
10 expect that 20-year real dollar rate growth to be
11 21 percent.

12 Site C and other capital projects was
13 included in it, both the -- both the 32.5 percent
14 and the 21 percent. It's included in those
15 numbers.

16 THE CHAIRMAN: Thank you.

17 16.

18 MR. RANDY REIMANN: So the answer to why four
19 tables and not two is, yes, it was a clerical
20 error. They -- they were just duplicated in there.

21 So there's two tables: there's an energy and
22 a capacity table attached to this undertaking.

23 The other question is: what was different to
24 what was shown in the final IRP? And the answer is
25 that, as the government requested additional

1 strategy for the clean energy sector, the standing
2 office program acquisition was bumped up to a
3 nominal 150 gigawatt hour per year, which would
4 deliver in the order of, after attrition and
5 expected response --

6 THE CHAIRMAN: Okay. So we should read the
7 final IRP, and ignore all the rest?

8 MR. RANDY REIMANN: Agreed.

9 THE CHAIRMAN: Thank you.

10 17.

11 MR. RANDY REIMANN: The ranges they are between
12 the EIS and the IRP are the same ranges: 800 to
13 6,600 gigawatt hours.

14 What was in the IRP is a bit more emphasis on
15 the expected range of 3,000 gigawatt hours. And so
16 some of that was shown, but it's within the range
17 and -- of what we showed in the EIS.

18 THE CHAIRMAN: Good.

19 18.

20 MR. CHRIS O'RILEY: So I have this.

21 The Skagit Valley Treaty profitability.

22 So just a reminder, this Treaty was signed in
23 1984 between Canada and the U.S. Canada on behalf
24 of British Columbia. And under the Treaty, it
25 voided a previous agreement that had been in place

1 between BC and -- and the U.S., that would have
2 allowed the raising of the High Ross Dam by Seattle
3 City Light and flooding back into Canada in the
4 Skagit valley.

5 And under the Treaty, which covers an 80-year
6 period: 1986 to 2065, Seattle would pay British
7 Columbia the avoided-carrying cost of the higher
8 dam, the so-called High Ross Dam. And in return,
9 BC would provide the power that would have been
10 provided by the higher dam, which was about 300
11 gigawatt hours a year.

12 And the BC government, I think, immediately
13 downloaded the responsibility for implementing the
14 Treaty to BC Hydro, both sides, the costs and the
15 -- the benefits.

16 And under the agreement, there's a -- there
17 are two financial payments. There's 35 annual
18 payments of a fixed amount: \$21.848 million from
19 Seattle City Light to BC Hydro, and there's no
20 indexation of that.

21 There are 80 annual payments of \$100,000 that
22 are indexed to inflation.

23 And that represents the avoided operating
24 costs of this -- this High Ross Dam.

25 And the -- and in return, BC Hydro sends --

1 makes an annual delivery of power of about 300
2 gigawatt hours to Seattle, equivalent to what they
3 would have got.

4 So the -- kind of the accounting challenge
5 with that is that there's a mismatch between the
6 deliveries and the payments.

7 So 80 years of deliveries, 35 years of -- of
8 large payments, and 8 years of small payments. So
9 when we receive the money from Seattle, we put it
10 into an account. And we have set that account up
11 so it will build a -- it, effectively, will match
12 the power deliveries we're sending back.

13 So in 2013, we recognized from that account
14 \$14.8 million, so that was the revenue we deemed to
15 recognize, and that would have gone in our revenue
16 requirement application.

17 And the question was about the profitability
18 of that. Our all-in average cost of energy, when
19 you include the heritage generation and our IPPs,
20 was -- in 2013 was about \$38 for -- for generation.
21 There's about \$11 for transmission. So it works
22 out to \$49, which happens to come out to 15 million
23 a year.

24 So we pretty much break even on the
25 deliveries to Seattle. And I -- I would say that's

1 probably accidental because this thing was done
2 years ago. And -- and will carry on for another --
3 going on another 50 years.

4 We don't have a forecast of our cost of
5 energy and what this revenue will be in 2024. I --
6 I anticipate it will have gone against us at that
7 point. And we'll be -- we'll be selling at --
8 we'll be incurring a net cost from -- from that
9 transaction.

10 THE CHAIRMAN: So, in effect, for the next
11 half century, we're going to wind up paying the
12 Americans not to flood a valley of ours?

13 MR. CHRIS O'RILEY: Well, we're giving them
14 power, and they're giving us money back.

15 THE CHAIRMAN: Sounds like a brilliant
16 negotiation, whenever it occurred.

17 Okay. 19.

18 A deal is a deal, and I guess we've got to
19 live with it.

20 MR. CHRIS O'RILEY: Yeah. And -- and, like I
21 said, I -- I'm not sure. It was done at a time
22 when -- if you go back to 1984, there was a bit of
23 power around here, so you can see the -- the
24 benefits of that arrangement. It was effectively a
25 long-term sale of power, which at the time made

1 sense for the company and the Province, so ... At
2 a -- at a fixed price, so ...

3 THE CHAIRMAN: It sounds like a Premier of
4 Newfoundland I once knew.

5 Question 19.

6 MR. MIKE SAVIDANT: I can answer this, Mr. Chair.
7 The figures in this -- sorry, the numbers that
8 built this figure were from modelling studies. And
9 the thing about these modelling studies is they
10 require information on U.S. operations on the
11 Kootenai and Pend Oreille Rivers. They both flow
12 from the United States up into Canada, hit the
13 Columbia, and then run back down.

14 The U.S. has an approach where they do their
15 long-term data a decade at a time. So they do a
16 lot of QC, we're told, that's -- that's one of the
17 key reasons.

18 We just received the data for the last 2000
19 to 2010 late last year. We're currently using it;
20 we're building the modelling studies right now, and
21 we'll have that data probably later this year.

22 THE CHAIRMAN: I was sure there was a
23 rationale reason for it, but that one is
24 interesting.

25 MR. SAVIDANT: I don't know what it is.

1 THE CHAIRMAN: Yes. That covers the
2 questions that the panel had for you.

3 Mr. Wallace, have you had any further
4 representations?

5 MR. WALLACE: Mr. Chair, there have been
6 quite a number of questions, which I have looked at
7 and want to consider for a few moments. I wonder
8 if we might take a break, and then deal with any
9 that come up from that.

10 THE CHAIRMAN: Yes. We can certainly do
11 that.

12 I wanted to ask, also, whether Hydro has any
13 questions it wishes to propose to any other
14 interested parties?

15 MR. PETER FELDBERG: At this point, Mr. Chairman,
16 we haven't identified any.

17 THE CHAIRMAN: All right. We'll break for
18 15 minutes and come back.

19

20 **(Brief break)**

21

22 THE CHAIRMAN: Can we reconvene, please.
23 Mr. Wallace.

24 MR. BRIAN WALLACE: Thank you, Mr. Chairman.
25 The questions have been coming in during the

1 day. And there are -- a number of them dealt with
2 demand-side management, elasticity of demand, GHG
3 emissions and so on. All issues which I am
4 satisfied have been thoroughly canvassed at the
5 hearing.

6 There was a question relating to the
7 accounting for sales of surplus power, but it's a
8 matter which can be seen from the -- the annual
9 report, and the annual report of BC Hydro was part
10 of the record.

11 So I'm -- a large number of these questions I
12 do not propose to put to BC Hydro.

13 There are a couple, though, of questions
14 which I would like to put to BC Hydro's witnesses.

15 The first is a question relating to --

16 Sorry.

17 -- the use of gas to firm up non-firm energy
18 in the context of BC's heritage -- BC Hydro's
19 heritage resources as opposed to -- as opposed to
20 the run-of-the-river project, which is the context
21 in which we've been discussing it.

22 The questioning comes with a fairly long
23 preamble, and it -- but the premise of it is that
24 if you were to look at the gas alternative as a way
25 to deal with high/low water years, and then

1 supplement it with surplus in high-water years,
2 you'd end up with an average, which doesn't offend
3 the 93 percent criterion, and would be a different
4 way to look at firming up non-firm energy.

5 So I have two questions about that. The
6 first is a general one, which is: Has Hydro looked
7 at the use of gas that way in its appropriateness
8 in the context of the 93 percent, and that
9 question, I would like addressed this afternoon,
10 the more detailed one because the material, which
11 is on the screen was produced by Mr. Hendriks, and
12 I -- it -- it is taken, he tells me, from material
13 that's in the record. But it's been compiled and
14 put together by him.

15 And so I think it's only fair to ask for any
16 comments on the document itself to be produced by
17 BC Hydro at a later date, perhaps Tuesday of next
18 week.

19 So with that, if -- I would ask if BC Hydro
20 could comment on looking at gas in this way as
21 opposed to in the context of run-of-the-river.

22 MR. RANDY REIMANN: So we have, in the way we've
23 modelled and accounted for the 93 percent factor or
24 requirement, looked at average. And so there'd be
25 years of more gas usage and years of less gas

1 usage, and what we're modelling and what we have
2 proposed in the ERP and it's accepted as to look at
3 that as average.

4 So I think the answer to your question is,
5 yes, we -- we have. And other than that, I guess
6 we'd like to take the document away and look and
7 understand the context of it.

8 MR. BRIAN WALLACE: I think that we have to leave
9 it at that. I can't really pursue it in more
10 detail at this point because it is too detailed a
11 question, and there's background material that
12 says --

13 THE CHAIRMAN: I think it's a very good
14 question, and, in effect, it was what I was trying
15 to get at this morning, and I think I missed.
16 Could you give us a note on that sometime early
17 next week, Tuesday, Mr. Wallace suggests?

18 MR. BRIAN WALLACE: Let me just pull up the
19 second question.

20 This question is --

21 THE CHAIRMAN: Just a second. Can we have a
22 note on that --

23 MS. SUSAN YURKOVICH: Yes, we will.

24 THE CHAIRMAN: Okay. Thank you.

25 MR. BRAIN WALLACE: Thank you.

1

2

UNDERTAKING 93: With respect to a question relating

3

to the use of gas to firm up non-firm energy in the

4

context of BC's heritage resources as opposed

5

to the run-of-the-river project, the questioning

6

coming with a fairly long preamble, but the premise

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of it is that if you were to look at the gas

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high-water years, you'd end up with an average,

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which doesn't offend the 93 percent criterion, and

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would be a different way to look at firming up

13

non-firm energy.

14

Has Hydro looked at the use of gas that way

15

in its appropriateness in the context of the

16

93 percent? The more detailed question to be

17

answered by Tuesday, as the material produced by

18

Mr. Hendriks, is taken from material that's in the

19

record but it's been compiled and put together by

20

him. BC Hydro to provide comments on the document

21

itself.

22

23

MR. BRIAN WALLACE:

This question relates to the

24

water rental rates used in BC Hydro's analysis,

25

it's represented at being, I understand, \$5 per

1 megawatt hour, but the material seems to suggest
2 it's actually 7 or 8 megawatt -- dollars per
3 megawatt hour. And that -- and so I'm confused by
4 what the rate amount -- amount is.

5 The financial suggests 5 to \$8. The note
6 this morning was that they were \$5. And I'm not
7 sure what the correct answer is and whether or not
8 the -- it makes any difference.

9 MS. SUSAN YURKOVICH: We'll have Mr. Savidant
10 respond to that question.

11 MR. MIKE SAVIDANT: So in the analysis that was
12 undertaken in the IRP and the EIS, we were using
13 Tier 3 water rental rates for Site C. Those are in
14 fiscal -- in calendar 2013, those were \$7.23.

15 All the analysis done in the IRP and EIS that
16 was done prior to the November 26th announcement;
17 after that, those water rental rates, after 2018,
18 will go down to, roughly, \$6.01. These all
19 escalated in inflation. I believe the \$5 I
20 referenced was the difference between the Tier 2
21 water rental rates and the Tier 1 water rental
22 rates.

23 MR. BRIAN WALLACE: Thank you.

24 THE CHAIRMAN: Thank you.

25 So Tier 1 and Tier 2 remain, and Tier 3 has

1 been cancelled as of?

2 MR. MIKE SAVIDANT: I believe the -- it's been
3 announced that it's cancelled. It's cancelled as
4 of, I think, 2018. So prior to the project coming
5 into service.

6 THE CHAIRMAN: Okay. Thank you.

7 MR. BRIAN WALLACE: Mr. Chairman, those are all
8 the questions that I have, that I am satisfied
9 haven't been canvassed by the --

10 THE CHAIRMAN: There was one leftover
11 question from Saulteau regarding eagles, which I
12 suspect cannot be answered today, but, Christine,
13 have you got the eagles thing?

14 MS. SUSAN YURKOVICH: Mr. Chair, if I might ask
15 Mr. Hilton to come to the mic and answer that.

16 MR. SHAWN HILTON: Good afternoon. You may
17 remember me from last week. I'm feeling better.

18 The issue of buffer distance and where we've
19 used it here is in relation to, what we call,
20 provincial best management practices or BMPs.
21 There's a number of BMPs that the Provincial
22 government has put forward, and -- and puts forward
23 on their websites dealing with a variety of
24 construction-related activities for a variety of
25 different wildlife.

1 There are two that -- that would pertain to
2 this. One is, what they call, develop with care.
3 And it's available on the website for everybody to
4 review and see for a variety of things. And it has
5 buffer distance mentioned for a number of different
6 species, for rural communities, urban communities,
7 undeveloped areas.

8 There's another one called a rapture BMP,
9 which offers additional recommendations for how you
10 would go about doing work in a particular area.

11 It's designed for developers to review, as
12 well as for practitioners like myself. Or other
13 people to use as a source of information to help
14 guide in activities.

15 In the case for the 500-metre buffer, it is a
16 recommended buffer set forward by BMPs at certain
17 times of year for -- for no clearing or no
18 disturbance around nest sites, and that's where
19 we've taken this number from.

20 THE CHAIRMAN: Was there another -- oh,
21 what -- there's a second question there. Could you
22 come and give that one a shot, too.

23 MR. SHAWN HILTON: Sure. So the first question
24 is, if I look here.

25

1 "What procedures for bald
2 eagle nest locations will be
3 followed by BC Hydro?"

4

5 I -- I do have a written response for that in
6 a book, and I -- and I may suggest that it might be
7 something that we would follow up and give it very
8 succinctly.

9 For -- for your benefit, the way we have
10 outlined it is that we recognize that there's a
11 number of bald eagle nests along the river. It
12 needs to be censused again closer to the time of
13 construction so that we get an understanding of
14 where those nest sites are.

15 We've put forward in the mitigation measures
16 that -- and around about a 2:1 ratio that nest
17 sites would be replaced.

18 And the idea behind it is knowing that
19 construction takes about nine years, by the time of
20 clearing to be undertaken and the time for the
21 reservoir to fill.

22 The expectation for us was if we remove the
23 nest sites, and erect them in an area adjacent to
24 the reservoir will be in the first year or so, they
25 may not be used over that course of a period.

1 So, instead, was to create buffers around the
2 existing nest sites, do our work in the area,
3 hopefully maintain nest sites in the reservoir that
4 would not be at risk of being flooded out during
5 the construction of head ponds and so forth, but
6 try to maintain some nesting in there.

7 And then at the end, when the reservoir was
8 to be filled would be to try to look -- either you
9 leave the nest structure where they are and they
10 would be flooded, or in the case of removing them,
11 but having the other structures in place.

12 The intent, as well, is to do the work at a
13 time when the nests would not be used. So
14 inactive.

15 Okay.

16 Ms. Melchior handed this. There are a number
17 of mitigation measures, but Volume 2, Section 14,
18 Table 14.16 on page 14-60 has some of these
19 measures spelled out.

20 THE CHAIRMAN: Thank you very much.

21 MR. SHAWN BOLTON: Okay.

22 THE CHAIRMAN: Well, we are now at the end
23 of the schedule.

24 Ms. Yurkovich, do you have any closing
25 remarks for these hearings?

1

2 **Closing remarks by BC Hydro:**

3 MS. SUSAN YURKOVICH: Yes, Mr. Chair, if I might.

4 It's hard to believe that I'm going to wake
5 up tomorrow morning and not come to this room and
6 see you all.7 In the last few weeks, we have heard from
8 communities, from First Nations, from landowners,
9 and individuals who have provided their thoughts
10 and their concerns. They have identified the
11 issues that are important to them. Some have also
12 articulated their support.13 And I would just like to thank all of the
14 people who have come out to participate as part of
15 these hearings. Many of them who have been here
16 almost daily. And I -- and, in fact, some of these
17 same folks have been part of actively diligence our
18 consultation process over the last six years.19 And I just -- I want to say that I recognize
20 and I greatly respect the effort that they have
21 undertaken, and the passion that they have brought
22 to these proceedings.23 I would, on behalf of our team, like to take
24 a minute to thank the Secretariat. These have been
25 long and logistically-challenging things to

1 schedule. And -- and to -- to operate and I -- and
2 I -- I really -- I really want to acknowledge all
3 the work that Courtney and Brian and the team have
4 done.

5 And, also, to Nancy and her court reporting
6 team who have taught us to speak slowly and to
7 spell our last name.

8 And to the folks from the AV team who have
9 helped put this panel hearing on.

10 And then, finally, to the panel, you've had
11 an extraordinary amount of material to move
12 through. It's been a huge task for you all. And I
13 know that you have reviewed the large volumes very
14 carefully. They are reflected in the detailed
15 questions that you have asked of us.

16 And we have worked very hard to be as
17 responsive as we can. We hope that we have
18 provided you with the information that you require
19 to undertake your deliberations.

20 And just on behalf of the BC Hydro team, we
21 would like to thank you for your dedicated work
22 here, and we want to wish you well in your
23 deliberations.

24 Thank you, Mr. Chair. And thank you to Madam
25 Beaudet and Mr. Mattison.

1

2 **Closing remarks by the Chairman:**

3 THE CHAIRMAN: Thank you.

4 Well, we are now at the end of a pretty
5 intense five weeks of hearings. And I would also
6 like to thank all of the participants for their
7 patience and their good humour, mostly. And their
8 hard work in educating this panel.

9 Even the weather seemed to cooperate. I
10 can't believe that we haven't had complete upsets
11 because of some blizzard or something.

12 I, too, would like to thank some of the folks
13 who have helped us here. Alex Barbour over there
14 in the corner running all of the audio-visual
15 equipment.

16 Nancy Nielsen, her father, Kent, Steve Lee,
17 Leanne Kowalyk, Diane Huggins, and Kerry Kinsella,
18 the team doing these transcripts that you not --
19 you don't just get them tomorrow morning, you
20 usually get them tonight.

21 Susan Yurkovich and, what we fondly refer to
22 as the "Hydro Hoard," you folks have been open with
23 information, have been hard-working and diligent at
24 producing answers to sometimes outrageous
25 questions, mostly from the panel.

1 You've been highly professional and
2 hard-working.

3 I might say it's not easy being the target.
4 And carrying the burdens of the history, you have
5 the Bennett dam on your backs, and that's not the
6 easiest thing to explain sometimes.

7 The First Nations, each of them individually.
8 And Treaty 8 Tribal Association, who welcomed us
9 into their communities, and provided some of the
10 most penetrating questions about the project.
11 Their professional work in this respect has been
12 exemplary.

13 Many individuals from all around the
14 Province, and those who spent their own personal
15 time and treasure attending these hearings. And we
16 appreciate that enormously.

17 The government departments, we sometimes
18 forget the deep wells of expertise in our federal
19 and provincial governments, and we are grateful for
20 their unfiltered advice.

21 And the local governments, who have
22 ably-represented their constituents' concerns.

23 So it's been quite a show. It is now up to
24 us to write a report, which will go to governments
25 on or about the 23rd of April.

1 The governments get to choose when to publish
2 this, but they have promised to do so unredacted.
3 And they will produce their final decisions within
4 six months of getting the report.

5 So that's the process.

6 I'd now like to call on Tribal Chief Liz
7 Logan for a closing prayer.

8 TRIBAL CHIEF LIZ LOGAN: Well, it's actually going to
9 be George Desjarlais who does the closing prayer,
10 so you guys can stand while you're listening to me,
11 or you can sit.

12 THE CHAIRMAN: We need the exercise.

13 TRIBAL CHIEF LIZ LOGAN: All right.

14 Good afternoon, Mr. Chair, Madam Beaudet, and
15 Mr. Mattison. This has been a long two months,
16 yes. And I know that our involvement in this
17 process is over, but your hard work is just
18 beginning.

19 We ask that the Creator will give you wisdom,
20 patience, confidence, and good health to complete
21 the hard work that you have been tasked with. And
22 we ask that the ancestors watch over you and guide
23 you in your deliberations and recommendations to
24 these two governments.

25 It is the Dane-Zaa way to welcome our guests

1 into our territory. And we did that in December.
2 And it's also our custom to say farewell to our
3 guests and send them on their way.

4 We'd sit with you, feed you, and tell you
5 about who we are. And tell you about our culture
6 and our traditions. Sometimes we'll hold a
7 ceremony for our guests. But being inside of this
8 building, we were restricted from burning a smudge,
9 which is one of our ceremonies to bless us, to
10 clear our minds, and to cleanse ourselves from any
11 negativity before we embark on any business.

12 But we did have a prayer, as well as drum
13 song by the Doig River drummers to help with the
14 discussions that took place here.

15 It is our custom to share with our guests,
16 and we feel that we've done that.

17 You sat with us. You've eaten with us.
18 You've listened to us. And you've even danced with
19 us. You've even beared witness to our
20 ever-challenging relationship with this government,
21 with industry, and, in this case, BC Hydro.

22 We hope that we've demonstrated to you during
23 this time together how important our historic
24 Treaty is and how we honour those rights and those
25 promises that we agreed to between our ancestors

1 and the government of Canada.

2 The Elders tell us that this Treaty was an
3 agreement to share, coexist, and to live in peace
4 with the settlers. And we have done that. But we
5 are currently being pushed off and out of our land,
6 and we are now being told by our Elders that enough
7 is enough, and to stand up and fight for it. And
8 that's what we're doing.

9 The Elders have given us a mandate to protect
10 the land and our rights, but at the same time, they
11 have also mandated us to create economic certainty
12 for our people.

13 I want to make this clear: we're not opposed
14 to development. We just ask that there be a
15 balance and development be done with as minimal
16 impact as possible.

17 In the case of Site C, we're not opposed to
18 meeting the energy -- the future energy needs of
19 this Province. But this project and its impacts
20 far outweigh any benefits.

21 We have been and still are willing to work
22 with the Province and BC Hydro to solve this energy
23 need in a balanced manner.

24 We hope that we've demonstrated how important
25 our relationship to the land is, and we hope that

1 we are able to articulate to you who we are as
2 people. We are connected to the land. We are of
3 the land.

4 And that the rivers were our means of
5 connecting with our families upstream and
6 downstream, especially the Peace River, which is
7 the largest river in this territory.

8 We hope that you've heard the reasons why
9 we're so concerned about losing this valley.

10 Our people have a deep connection with this
11 land because our ancestors told the stories and
12 legends that are connected to that valley. And,
13 most importantly, because our ancestral remains lay
14 in that valley, and it is against our beliefs to
15 disturb them in their final resting place.

16 A key point raised by many of the
17 grandmothers is that water is life because water is
18 spirit. And without spirit, we have no life.

19 The Elders would say when you take the water
20 out of the body, you cannot call in the spiritual
21 energies. Without water, our bodies are dead. Not
22 only because of the dehydration that happens in the
23 physical domain, but because of a lack of the
24 spirit energy that signifies life.

25 The sacredness of water starts early in life

1 when the Elders told the children to never pee in
2 the water. While we did not fully understand the
3 significance then, things really came into focus
4 once we began receiving teachings from the
5 grandmothers. Simply, we don't pollute this water
6 that we drink. We are taught that we must honour
7 the water spirits. The rivers connect us as
8 people, and that we may -- that we need water to
9 survive.

10 We also use water in all of our ceremonies.
11 We have many traditional teachings and laws and a
12 lot of those teachings and ceremonies are related
13 to water.

14 Some are as simple as giving thanks and
15 leaving tobacco or food when you take water.
16 Cleanse with water in our ceremonies like our sweat
17 lodges. Only use what you need. Don't waste
18 water. Don't throw a burning match in the water
19 when crossing over the water, et cetera. There are
20 many, many teachings and the meaning behind these
21 and the reasoning behind these all differ between
22 the Dane-Zaa people.

23 Women are called "carriers of water." And
24 we're taught to respect the water. And honour the
25 spirit of water before using it. That is one of

1 the fundamental principles underlying all
2 traditional water teachings.

3 Women have always been the caretakers of
4 water in traditional cultures because of their
5 integral connections to Mother Earth. The earth
6 gives life, food, medicine, clothing, and shelter.
7 She gives life because we are, as women, we give
8 life; we are connected to her in that way.

9 It's women again who are the caretakers of
10 the water, therefore, several of us women would
11 like to sing a song before George does the closing
12 prayer to send you safely on your way.

13 We will be singing the women's warrior song.
14 And if there are any women in the audience who
15 would like to join us, please do so. And if you
16 don't know the song, I still ask the women to
17 please stand and join us.

18 And thank you, panel. And I wish you and
19 your staff a safe journey tonight.

20

21 (Women's warrior song)

22

23 TRIBAL CHIEF LIZ LOGAN: George, if you could please
24 come up and do the closing prayer for us.

25 George asks that, as is our tradition, that

1 all cameras and videos be turned off for his
2 blessing song. It's a sacred sundance song, and to
3 -- we ask that you please respect this wish.

4 MR. GEORGE DESJARLAIS: That includes this mic.

5 THE CHAIRMAN: Yes.

6 MR. GEORGE DESJARLAIS: The song I'm about to sing is
7 usually the last song that is sung once the
8 sundance is over. It's called the blessing song.
9 And it's a prayer song. And the prayer that I had
10 written was basically just given by Tribal Chief
11 Logan. So all I'll do is sing this song to bless
12 everyone that is here, to bless everything that has
13 happened, everything that was talked about, so that
14 everybody will go home in a good way, and,
15 hopefully, arrive, the place that they have left a
16 month and a half ago.

17

18 **(Blessing song by George Desjarlais)**

19

20 **(The hearing closed at 3:23 p.m.)**

21

22

23

24

25

REPORTER'S CERTIFICATION

1
2
3 I, Nancy Nielsen, RCR, RPR, CSR(A), Official
4 Realtime Reporter in the Provinces of British Columbia
5 and Alberta, Canada, do hereby certify:
6

7 That the proceedings were taken down by me in
8 shorthand at the time and place herein set forth and
9 thereafter transcribed, and the same is a true and
10 correct and complete transcript of said proceedings to
11 the best of my skill and ability.
12

13 IN WITNESS WHEREOF, I have hereunto subscribed
14 my name this 24th day of January, 2014.
15
16
17
18

19 **Nancy Nielsen, RCR, RPR, CSR(A)**
20 **Official Realtime Reporter**
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