

BRITISH COLUMBIA UTILITIES COMMISSION

**IN THE MATTER OF THE UTILITIES COMMISSION ACT
R.S.B.C. 1996, CHAPTER 473**

and

**British Columbia Hydro and Power Authority -
F2020-F2021 Revenue Requirements Application**

**Vancouver, B.C.
January 24th , 2020**

PROCEEDINGS

BBEFORE:

D. Morton,	Panel Chair/Commission Chair
A. Fung, Q.C.,	Commissioner/Deputy Chair
R. Mason,	Commissioner
B. Lockhart	Commissioner

VOLUME 9

ERRATA

Volume 5, January 20, 2020

Page 347, Line 26	"Chaudhary" should read "Choudhury"
Page 352, Line 15	"actually": should be "Actual"
Page 353, Lines 15, 21, 23 "	"Tsey Key Dene" should read "Tsay Keh Dene"
Page 354, Line 26	"Tsey Key Dene" should read "Tsay Keh Dene"
Page 368, Line 22	"liability" should read "reliability"
Page 370, Line 16	"MR. O'RILEY" should be "MR. WONG"
Page 381, Line 21	"principal" should read "principle"
Page 410, Lines 6,7	"with them more" should read "with the word 'more'"
Page 416, Line 24	"Mr. Nicholation" should read "Mr. Nikolejsin"
Page 421, Line 3	"Mr. Nicholation" should read "Mr. Nikolejsin"
Page 434, Line 11-12	"depreciate in review" should be "Depreciation reviews"
Page 443, Line 6	"lines" should be "50/50"
Page 465, Line 2	"ab it" should read "a bit"
Page 485, Line 26	"differently" should be "definitely"
Page 515, Line 11	"dCat" should read "DCAT"
Page 528, Lines 16,17	"Kia account" should read "key account"
Page 529, Line 6	"Prez" should read "PRES"
Page 534, Line 7	"Ms. Fasier" should read

Page 536, Line 8	"Ms. Fraser"
Page 544, Lines 24,25	"but in a billion" should read "put in a billion"
Page 550, Line 14	"MP" should read "M&P"
Volume 6, January 21, 2020	
Entire Volume	"SMP" should be "S&P"
Page 596, Line 26	"clear power" should be "clean power"
Page 609, Lines 19-24	"MR. O'RILEY" should be "MR. AUSTIN"
Page 636, Line 10	"Power Certification" should be "PAR Certification"
Page 649, Line 13	"St'at'yemc" should be "St'at'imc"
Page 656, Line 20	"ARC sites" should be "arch sites"
Page 687, Line 5	"supply chair" should be "supply chain"
Page 719, Line 12	"10" should be "100"
Page 741, Line 8	"IEP" should be "IRP"
Page 759, Line 3	"benching" should be "pension"
Page 760, Line 16	"execute" should be "executive"
Page 770, Line 18	"\$.5 million" should be "18.5 million"
Page 771, Line 18	"manger" should be "manager"
Page 779, Line 4	"2029" should be "2020"
Page 780, Line 18	"MR. MR. LAYTON" should be "MR. GHIKAS"
Page 786, Line 12	"this budget application" should be "the Supply Chain Applications"

Page 789, Line 17 "\$20 million" should be
"\$12 million"

Page 806, Line 3 "REA" should be
"RDA"

Page 814, Line 18 "DAR" should be
"DARR"

Page 814, Line 23 "regulatory panel" should be
"regulatory account"

Page 818, Line 13 "intellection" should be
"intellectual"

Page 820, Line 22 "regulatory account" should be
"one regulatory account"

Page 824, Line 10 "is a regulatory" should be
"is in a regulatory"

Volume 7, January 21, 2020

Page 899, Line 11 "MR. WONG" should be "MR.
LAYTON"

Page 1038, Line 21 "MR. LAYTON" should be
"MR. WONG"

Page 1042, Line 7 "return equity" should
be "return on equity"

Volume 8A, January 21, 2020

Page 1095, Line 26 "charts" should be
"charge"

Page 1097, Line 25 "Land" should be
"plan"

Page 1133, Line 2 "1.6213.3" should
be "1.16.13.3"

Page 1199, Line 11 "MR. LAYTON" should be
"MR. WONG"

Page 1202, Line 11 "step" should be
"debt"

Page 1213, Line 13 "yesterday I our" should be
" yesterday in our"

Page 1215, Line 15	"variance plan" should be "variance to plan"
Page 1226, Lines 23, 26	"MS. FRASER" should be "MS. RYAN"
Page 1229, Lines 1,9	"MR. LAYTON" should be "MR. WONG"
Page 1230, Line 1	"MR. LAYTON" should be "MR. WONG"
Page 1234, Line 21	--" should be "executive team"
Page 1240, Line 24	"RA" should be "RRA"
Page 1245, Line 3	"bit" should be "big"
Page 1247, Line 8	"my" should be "by"

APPEARANCES

P. MILLER,	Commission Counsel
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E. GJOSHE,	Self
P. WILLIS	Self
I. CULLIS	BC Non-Profit Housing Association

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VANCOUVER, B.C.

January 24th, 2020

(PROCEEDINGS RESUMED AT 8:00 A.M.)

THE CHAIRPERSON: Thank you. Please be seated.

BC HYDRO PANEL 3 – LOAD FORECAST AND COST OF ENERGY:

CHARLOTTE MITHA, Resumed:

BRUCE CHOW, Resumed:

HEATHER MATTHEWS, Resumed:

BILL CLENDINNING, Resumed:

JOHN RICH, Resumed:

MAUREEN DASCHUK, Resumed:

THE CHAIRPERSON: Good morning everyone. Good morning,
panel.

Before we begin, I just have a few words I'd like to say. First of all I'd like to thank everyone for helping on a timetable and scheduling basis, for helping to try to accommodate the admittedly tight schedule that we have.

The panel, we agree with BC Hydro's concerns around operational issues and the importance of trying to be as efficient as possible with key employees from BC Hydro. And we appreciate your presence here, and I appreciate everyone helping to try to expedite that process.

However, we also realize the importance of interveners' questions, and the importance of the

1 answers the panel provides. And this panel
2 appreciates that. And we value that highly. And
3 while it's a balance that we have to strike, I would
4 like to make it clear to everyone that we are not
5 asking you to rush through your cross-examination. We
6 are not asking you to talk fast, we're not asking you
7 to drop questions. In fact, we would appreciate it if
8 you didn't. We would appreciate hearing your
9 questions and we would appreciate hearing the panel's
10 answer to those questions.

11 If we don't make it through today, while
12 that will be not ideal, this is not an ideal world,
13 and there is no expectation that it is.

14 I think we heard yesterday everyone's
15 comments on the issue of a panel remaining, or a group
16 of people remaining empaneled over a protracted
17 period, and the concerns about that impact on their
18 ability to communicate with each other and communicate
19 with their counsel. But further to Mr. Austin's
20 suggestions, we are prepared to waive that, that
21 concern for this proceeding and, you know, we trust
22 that you won't -- that nothing untoward will happen in
23 that regard and that isn't a concern.

24 **Proceeding Time 8:03 a.m. T2**

25 So, let's not make that a constraint and
26 let's not make that a reason to rush through the

1 cross-examination. But again, it's a balance, and
2 that said we do appreciate everyone's efforts to be as
3 efficient as possible. Thank you.

4 MR. GHIKAS: Thank you, Mr. Chairman. And for my part,
5 you know, I would like to make sure that it's
6 absolutely clear that our practice is to try to make
7 sure that the witnesses are talking amongst themselves
8 and their discourse with other things is not directly
9 about what they should be saying and what they
10 shouldn't, it's rather getting undertakings addressed
11 and the like.

12 THE CHAIRPERSON: Understood.

13 MG. GHIKAS: And we'll do our absolute best to continue
14 with that process and those will be the instructions
15 to the witnesses.

16 THE CHAIRPERSON: Yeah. This panel has no concerns in
17 that regard, so just to make that clear. Thank you.

18 Now, Mr. Ahmed, I'm assuming you have some
19 undertaking -- you don't?

20 MR. AHMED: No, not this morning, Mr. Chairman.

21 THE CHAIRPERSON: Okay, very well then.

22 So, let's move then to -- unless there's
23 any other issues or any other comments, let's move to
24 MoveUP.

25 **CROSS-EXAMINATION BY MS. QUAIL:**

26 MS. QUAIL: Q Good morning panel and witnesses, I'm

1 And Mr. O'Riley said, "I would probably defer that to
2 the load forecast panel." So here we are.

3 So my question is, to what extent -- as you
4 may anticipate, the question is to what extent do BC
5 Hydro and FortisBC's load forecasts that they bring
6 before the Commission map out a coherent basis between
7 those two utilities for the regulator to deal with
8 these issues where there's overlap between the two
9 utilities?

10 MR. CLENDINNING: A Thank you for the question. So BC
11 Hydro and FortisBC Electric do exchange information.
12 FortisBC Electric do exchange information. FortisBC
13 Electric is obligated to provide BC Hydro with a ten-
14 year forecast. Beyond that for load forecasting, we
15 don't have an exchange of information actively going
16 on, however we do also collaborate with Fortis when it
17 comes to the integrated resource plan and we're in the
18 middle of doing that now, where we're collaborating on
19 developing the resource options and inventory. So
20 that is one of the generation resources that are
21 available to us.

22 So we do have interactions with them on a
23 regular basis. But unless Mr. Rich has anything to
24 expand on it at his working level, it's really just
25 the exchange of the anticipated load from their end.

26 MR. RICH: A Just to add to that. We do participate, I

1 think primarily -- actually with Fortis Gas. We
2 undertake a conservation potential review and they are
3 also participants in that process.

4 MS. QUAIL: Q The conservation potential review? Is
5 that --

6 MR. RICH: A That's right.

7 MS. QUAIL: Q Does that involve load forecasting in
8 that process?

9 MR. CLENDINNING: A It's primarily the DSM group, but
10 then to the extent that the DSM group and the load
11 forecast group interact then we're sort of familiar
12 with the sorts of activities that are undertaken as
13 part of that conservation potential review.

14 MS. QUAIL: Q Are there instances in those different
15 interactions you've described where you find that
16 FortisBC, either the gas or the electric part of that
17 company, and BC Hydro have disagreements on what the
18 forecasts look like, or does it not get that granular?

19 MR. CLENDINNING: A I don't think it gets that
20 granular. We share information on technologies and
21 where things go, and then we kind of go our separate
22 ways to be honest, and develop our own load forecasts.

23 MS. QUAIL: Q So is it fair to say then that there
24 isn't a process where Hydro is saying, "This is what
25 we forecast," you know, broad strokes, Fortis is
26 saying, "This is what we forecast," broad stroke, the

1 Commission has not provided some information about
2 where there may be agreements or disagreements in
3 those perspectives.

4 MR. CLENDINNING: A I think that's an accurate
5 description.

6 MS. QUAIL: Q Do you agree that it would be a good
7 thing to arm the regulator with this information to
8 help it oversee the energy transformations that are
9 now getting underway within the Commission's
10 jurisdiction?

11 MR. CLENDINNING: A I can see there would be some
12 benefit. How that would actually work in terms of
13 modelling, you know, we often have -- the government,
14 in terms of its -- does modelling, for example, for
15 CleanBC, setting up models to work off the same
16 baseline and process and methodology. So I think
17 there's an opportunity for increased collaboration,
18 but I don't think there's a -- to use an earlier
19 metaphor $A + B = C$ approach to getting this in order
20 to inform the Commission. But I think, you know, to
21 achieve provincial objections collaboration wouldn't
22 hurt in that area.

23 MS. QUAIL: Q Thanks. I'm going to move to the IPP,
24 particularly the 2010 Clean Power Call. And the
25 reference that I'm looking at here is Exhibit B- 29
26 and it's the BC Hydro responses to the panel IR3,

1 round 3, and it's IR 2.3.1. And there's a table at
2 page 3 of 3.

3 So I have an exhibit, and I have provided
4 this to counsel for BC Hydro.

5 **Proceeding Time 8:09 a.m. T04**

6 THE CHAIRPERSON: Is this the panel IRs?

7 MS. QUAIL: Yes.

8 THE CHAIRPERSON: That's B-31, is that correct?

9 MS. QUAIL: Sorry, the Exhibit B-31, yes it is, thank you
10 for that.

11 MS. QUAIL: Q So, this document, all that we've done
12 here is taken the data from that table to produce an
13 average price per megawatt hour. So we've just
14 divided those two figures to produce an average.

15 And this is Exhibit C1-7, if it can be
16 marked.

17 (DOCUMENT ENTITLED "COST OF IPP ENERGY" MARKED EXHIBIT
18 C1-7)

19 MS. QUAIL: Q And my question here simply is, do you
20 agree with the calculated average price that is shown
21 here for 2020/2021?

22 MR. CHOW: A Yes.

23 MS. QUAIL: Q I am moving to my next reference which is
24 Exhibit B-1, the application, page 4-29, there's table
25 4-12.

26 THE CHAIRPERSON: Sorry, for those of us that can't

1 write quickly, what was that again?

2 MS. QUAIL: Sorry, Exhibit B-1, the application, page 4-
3 29, table 4-12.

4 THE CHAIRPERSON: Thank you.

5 MS. QUAIL: Q This is a table showing IPP and long-term
6 purchase volumes. And I'm looking particularly at
7 under call process gigawatt hours, and the left-hand
8 column there, I'm looking at the 2010 clean power
9 call. And it shows that there are 20 EPAs in the 2010
10 clean power call out of a total 134 EPAs, and moving
11 over those provided, under the F2019 forecast, that's
12 the figures that I'm going to be going off of for the
13 next few questions. The Fiscal 2019 forecast, those
14 20 EPAs provided 2,647 gigawatt hours out of a total
15 14,631 gigawatt hours, is that correct?

16 MR. CHOW: A Yes.

17 MS. QUAIL: Q Thank you. So, we just did some more
18 dividing, and come to the conclusion that the 2010
19 clean power call EPAs constitute 14 percent of EPAs,
20 so that's 20 out of 134, and 16 percent of total EPA
21 energy, and that's 2,647 out of 14,631. Do you agree
22 with those numbers?

23 MR. CHOW: A I haven't checked the math, but it seems
24 correct.

25 MS. QUAIL: Q We used a calculator, so.

26 On the next page, there is table 4-13,

1 MS. QUAIL: Q Okay. I'm looking next at table 4-2 on
2 page 4-19. And I have just a couple more questions
3 and you may need to add that caveat again, I don't
4 think it changes the general -- the issues we're
5 driving at here, but I understand there may be that
6 caveat.

7 So this table is the cost of energy
8 forecast. And I'm looking now at non-Heritage energy
9 and the Fiscal 2019 forecast. And I see that that's
10 one thousand -- well, 1 billion 365 million and a
11 total of 1,673.4 million. Again, I don't know whether
12 a caveat applies to that as well, but you see those
13 numbers there?

14 MR. CHOW: A Yes.

15 MS. QUAIL: Q So what we're looking at then based on
16 that Fiscal 2019 forecast, the Clean Energy -- the
17 2010 Clean Energy Call, 20 projects providing 2,647
18 gigawatt hours, which is about 16 percent of the total
19 EPA sourced energy -- and that we've confirmed -- at a
20 cost of \$318.6 million, contributing over 23 percent
21 of the total cost of non-Heritage energy, and just
22 over 19 percent of B.C. Hydro's entire cost of energy.

23 THE CHAIRPERSON: Sorry, can you just go through those
24 numbers again? At least for me, if no one else.

25 MS. QUAIL: Yes, absolutely.

26 MS. QUAIL: Q So the 2010 Clean Energy Call resulted in

1 an apples for apples comparison, but I think it gets
2 the gist, the load forecast for fiscal 2020 -- and I
3 won't turn there but I'm taking this from the 20-year
4 load forecast. But if there's a controversy about the
5 number we can go there. But the number from the 20-
6 year load forecast, it's Table 2 on page 11, the
7 figure is 53,103 gigawatt hours.

8 The 2,647 gigawatt hours from the clean
9 power call, the 2010 clean power call is about 5
10 percent of the total load using that 53,103 figure as
11 the total, 2,647 is clean power calls, a portion of
12 that, and that's about 5 percent of total load. Is
13 that -- I mean, that's the math, but is that --

14 MS. MATTHEWS: A It seems approximately right.

15 MS. QUAIL: Q Okay. I have a question now coming out
16 of the evidentiary update Exhibit B-19. I don't have
17 a particular reference at this point. Hydro notes in
18 the evidentiary update that the cost of energy is
19 lower than previously estimated because of dry
20 conditions and other factors. Figure -- actually we
21 go here, figures 4 and 5 on page 11 of Exhibit B-19,
22 these are figures showing the energy cost savings.

23 MS. MATTHEWS: A Sorry, which figure?

24 MS. QUAIL: Q Figure 4 shows 2020 and figure 5 is 2021.
25 And the figures you'll see there are, for 2020 there's
26 cost savings of \$45.9 million. In 2021 the cost

1 savings are \$155.4 million, and it's our understanding
2 that a major factor in those cost savings is the
3 reduction of IPP purchases as compared to what was
4 previously estimated, is that correct?

5 MR. CHOW: A I think you have to be careful when you
6 say "savings" because it's in that change there are
7 adjustments there are not savings per se. And I'm
8 speaking again about the -- in the second line of
9 those -- of both charts. It's the accounting
10 adjustments. There are changes in accounting
11 treatment.

12 MS. QUAIL: Q Okay. Understood. To the extent that
13 there were energy costs savings, are we current in
14 understanding that a factor or a major factor in the
15 energy cost savings is the reduction in IPP purchases?

16 MR. CHOW: A You could say that the -- there was
17 reduced expectation for energy deliveries and
18 therefore reduced expectation for energy costs.

19 MS. QUAIL: Q What is the saving -- looking at the
20 extent to which that's capturing savings, what is the
21 saving due to the reduction in IPP purchases as
22 opposed to other changes?

23 MS. MATTHEWS: A Well, I think that the figure in the
24 graph shows the differences and I'm sure we'll get
25 into some more discussion about this. But yeah,
26 fiscal '19 turned out to be quite dry and in June,

1 run IPPs, is that what you're asking?

2 MS. QUAIL: Q No, I'm not asking about the impact of
3 the evidentiary update. What I'm asking about is that
4 these figures show a variety of inputs affecting
5 energy cost and a net energy cost savings, and what
6 I'm asking about is -- there's a curious phenomenon
7 here where Hydro spends less on energy in drier years,
8 so it seems paradoxical that an energy utility -- I
9 may be getting into argument here and perhaps we'll
10 save it. This is what we're trying to understand
11 here, is to what extent are we seeing cost savings in
12 dry years because Hydro doesn't have to purchase power
13 from IPPs?

14 MS. MATTHEWS: A Yes, and I think there was some
15 discussion of that on the policy panel and the answer,
16 I think, provided by Mr. O'Riley is correct in that, I
17 mean, when it's drier and so the costs that we're
18 needing to pay for the IPPs is lower, we might have to
19 make offsetting purchases. And really it's going to
20 depend on the extent of what those purchases are that
21 we need to make.

22 So, if BC Hydro is buying from Powerex,
23 what's the price of those versus the price of the
24 IPPs? And then to the extent that the market prices
25 are lower then that will show a savings and I think
26 that is what's being shown in those figures there.

1 MS. QUAIL: Q Just a final question on here and that
2 is, if there had been no purchases in that 2010 round
3 what would have been the net savings in the cost of
4 energy in 2020/2021?

5 MS. MATTHEWS: A I mean, that is a speculative question
6 and I think one of the things that we have to be
7 careful of is what would we have done in those cases.
8 So, you know, to truly answer that question we'd have
9 to do a counterfactual model to see what we would do,
10 and so I can't just provide an answer like that.

11 MS. QUAIL: Q I'm going to move to some questions
12 coming out of the -- about renewals and new purchases.
13 I'm going to refer to the Zapped Report. I have
14 copies of the page we're referring to, but if the
15 panel already has the entire documents I don't know if
16 you want this page?

17 THE CHAIRPERSON: I don't think we have the entire
18 document. We've got excerpts, so we'll take the page,
19 please. Thanks.

20 COMMISSIONER FUNG: But before you do that, Ms. Quail,
21 may I just follow up with a question to Ms. Matthews
22 on just your more recent line of questioning?

23 MS. QUAIL: Please, do.

24 COMMISSIONER FUNG: I just want to understand, do the
25 market electricity purchases that are shown in Figures
26 4 and 5 include purchases from Powerex or are they

1 MS. QUAIL: Yes, it is, just page 2.

2 MR. GHIKAS: It's just page 2 of the Zapped Report, do
3 you have that?

4 MS. QUAIL: So this will be Exhibit C1-8.

5 (ONE PAGE EXCERPT FROM ZAPPED REPORT MARKED EXHIBIT C1-8)

6 MS. QUAIL: Q So, on this page there are four
7 recommendations, those bullet points there. Three of
8 them are for government, but the first is A
9 recommendation to Hydro regarding its approach to
10 renewals of IPP contracts. You can see it says, "On a
11 renewal strategy that will moderate" -- it offers
12 recommendations on a renewal strategy that will
13 moderate the future financial impacts of the EPAs as
14 they mature, and there is an opportunity for renewal.
15 And then here is the recommendation, that,

16 "BC Hydro should make only one offer for renewal
17 of EPAs associated with projects that generate
18 Intermittent energy, and that offer is priced at
19 the real market value of the energy generated
20 the Mid-C rate."

21 To what extent is BC Hydro implementing this
22 recommendation?

23 MR. CHOW: A Yes, so at this point, for the test
24 period, there are really only a limited number of EPA
25 renewals happening. So there are six biomass energy
26 program contracts, that are biomass EPAs that are

1 expiring, due to expire, and they are all covered by
2 the biomass energy program. And then there were two
3 small hydro projects less than -- in total they are
4 less than 4 megawatts.

5 So what we've said in our filings is that
6 we are adopting a conservative internal approach for
7 at least for the hydro renewals, and that would be to
8 evaluate those at market value. And the -- of course
9 biomass energy EPAs that are expiring would be covered
10 by the biomass energy program, and is at a different
11 price to a prescribed program.

12 And overall, and beyond the test period, we
13 are looking at the integrated resource plan in 2021,
14 and the approach moving forward would be determined
15 within that process, and I think Bill can comment
16 further on that.

17 MR. CLENDINNING: A That's correct.

18 MS. QUAIL: Q And Hydro views the Mid-C rate as the
19 real market value of energy? Of the intermittent
20 energy that's generated?

21 MS. MATTHEWS: A The Mid-C market hub is only -- is the
22 closest market to us that a lot of the trading that BC
23 Hydro has from our imports and exports with Powerex
24 under the transfer pricing is all based on the Mid-C,
25 so it's a published value. So it's the best
26 representation and that's why we use it in the

1 transfer price agreement. And it's also -- there are
2 some EPAs that use market prices, and some of the
3 rates that are referred to market prices, and yes,
4 that's always the market price that we refer to.

5 MS. QUAIL: Q Thanks. In the application -- I am just
6 thinking about whether I need to take you there. I
7 won't go through all the turning of paper, it's not
8 particularly specific, but in the application Hydro
9 stated, and this has come up, that it's pursuing IPP
10 renewals to meet long-term energy needs, short-term
11 extension of some bioenergy contracts, as a bridging
12 mechanism for affected farms, and some small new First
13 Nation IPP contracts.

14 **Proceeding Time 8:34 a.m. T09**

15 And in particular Hydro has said it will renew IPP
16 energy purchase agreement where it's cost effective to
17 meet long-term needs. I can take you to the page if
18 that's at all controversial. Or I can move to my
19 question if it's --

20 MR. CHOW: A Sure. I recall that.

21 MS. QUAIL: Q Okay. So my question is, in terms of a
22 renewal being cost-effective, my question is what
23 planning criteria, assumptions and constraints did
24 Hydro use in its analysis of the cost effectiveness of
25 its recent IPP renewals and specifically did Hydro
26 assume that it would continue to be constrained by the

1 government self-sufficiency policy?

2 MR. CHOW: A So the most recent renewals that we did
3 outside of the biomass energy program were related to
4 the Hydro renewals that were discussed yesterday, it's
5 a separate proceeding that is still underway, but the
6 evidence that we filed in our application, Section 71
7 application for those renewals was based primarily on
8 the outcomes of the 2013 IRP which was -- you know,
9 incorporated the self-sufficiency.

10 MS. QUAIL: Q So Hydro did assume it would continue to
11 be constrained by government dictated self-sufficiency
12 policy when it determined whether these renewals were
13 cost effective, is that correct?

14 MR. CHOW: A That was part of the basis that the
15 analysis in the application considered.

16 MS. QUAIL: Q How does the cost of energy and the IPP
17 energy purchase agreement renewals compare to forecast
18 market prices, and in particular, would they be cost
19 effective relative to market purchases if and as
20 required?

21 MR. CHOW: A So that was all covered in the Section 71
22 application that -- and that proceeding is still
23 underway.

24 MS. QUAIL: Q Is Hydro's position that the question is
25 out of scope?

26 MR. CHOW: A Well, I think, if you refer to the

1 Commission's view on it, they are saying in the long
2 term -- for those 40-year contracts the Commission
3 indicated that it did not have information to make the
4 determination on whether or not they were cost
5 effective in the long term.

6 MS. QUAIL: Q Thank you.

7 MR. CHOW: A And they're waiting for the results of the
8 2021 IRP for information to make such a determination.

9 MS. QUAIL: Q The biomass EPA renewals, how does the
10 average cost of energy in those -- sorry, contract
11 extensions, how does the cost of energy compare to the
12 forecast market value of that energy?

13 MR. CHOW: A Can you clarify what extension you are
14 referring to?

15 MS. QUAIL: Q So my understanding is there is six
16 biomass EPAs expiring subject to renewal. Are there
17 others that have expired and been renewed? Biomass
18 EPAs?

19 MR. CHOW: A During the test period there are six and
20 they are all covered by the biomass energy program.

21 MS. QUAIL: Q Okay. So my question is how the cost of
22 energy in those EPAs, how does that compare to the
23 forecast market value of that energy?

24 MS. MATTHEWS: A I guess I'm going to just bring us
25 back a bit here, because I mean, the IPP costs are
26 higher than the market value of energy, but I think we

1 from BC Hydro that brings the value to \$85.

2 And then the second component is for other
3 energy. So that's for non-customers or for customers
4 that don't have a large load or have generation that
5 exceed their load, and that is paid out at \$80 per
6 megawatt hour in Fiscal '19 dollars, 2019 dollars.

7 MS. QUAIL: Q Thank you. Okay, I'm moving to a
8 different topic. And the reference is Exhibit B-31,
9 the responses to Panel IR 2.8.5.1. And I'm looking at
10 page 5 of 5 in that IR response. So that's Exhibit B-
11 31. Just every time someone saying it I always miss
12 it the first time, so I'm going to say it a second
13 time. So it's B-31 and I'm looking at the response to
14 IR 2.8.5.1 and specifically I'm at page 5 of 5.

15 MS. MATTHEWS: A Yes, we have the IR.

16 MS. QUAIL: Q Thank you. So on this page, so at the
17 second paragraph, BC Hydro is currently developing its
18 response to three recent FERC orders, including
19 engagement with transmission customers and interested
20 parties. And my question particularly is actually
21 about the second of those, so this is FERC order
22 number 842, which amends FERC's pro forma OATT to
23 require that newly connected generators have primary
24 frequency response capability, which is intended to
25 address deterioration of the overall frequency
26 response capability of interconnected systems such as

1 the Western Interconnection.

2 So my question about Hydro's response to
3 that, to FERC order number 842 --

4 MS. MATTHEWS: A Sorry, which page of the IR response
5 are you on?

6 MS. QUAIL: Q Page 5 of 5.

7 MS. MATTHEWS: A Ah, okay.

8 THE CHAIRPERSON: The very last page of that IR.

9 MS. MATTHEWS: A Okay. Thank you.

10 MS. QUAIL: Q You're welcome. So looking at that
11 second bullet point, FERC order number 842 and Hydro
12 is developing its response, including engagement with
13 transmission customers, interested parties. So my
14 first question regarding that order is in what way and
15 to extent is this FERC rule requiring that newly
16 connected generators have primary frequency response
17 capability problematic for BC Hydro?

18 MS. MATTHEWS: A I mean one of the difficulties for
19 having and replying to this is that no one on this
20 panel is actually the ones who have the detailed
21 knowledge of the OATT. And that had seemed to not be
22 part of the scope so we haven't prepped to be really
23 answering questions around the OATT.

24 MS. QUAIL: Q That's fair. Could we have an
25 undertaking to provide a response?

26

INFORMATION REQUEST

1 MS. MATTHEWS: A Yeah. Can you repeat the question?

2 MS. QUAIL: Q In what way and to what extent is the
3 FERC rule that requires that newly connected
4 generators have primary frequency response capability
5 problematic for BC Hydro?

6 THE CHAIRPERSON: Could you answer the question without
7 the OATT part? Could you answer the question, does
8 the fact that newly connected generators -- if newly
9 connected generators were required to have primary
10 frequency response capability, would that be an issue
11 for you? If you took the OATT out, is it possible or
12 do you need more detail about that?

13 MS. MATTHEWS: A I think I'd still have to take it as
14 an undertaking.

15 THE CHAIRPERSON: Okay. Thank you.

16 MR. GHIKAS: And I can confirm we can take that one as
17 an undertaking.

18 THE CHAIRPERSON: Thank you.

19 MS. QUAIL: Q So I have just a few questions that flow
20 from that that may also need to be undertakings. I'll
21 put them and -- okay.

22 So my next question is what is the state of
23 this capability? And that's the jargon, right? The
24 capability -- primary frequency response capability.
25 What is the state of this capability for existing IPP
26 owned generators that are connected to BC Hydro's

1 system? I imagine that's something to be answered by
2 undertaking?

3 **Proceeding Time 8:46 a.m. T11**

4 **INFORMATION REQUEST**

5 MS. MATTHEWS: A Yes.

6 MS. QUAIL: Q Yes. Flowing from that, are the existing
7 IPP owned generators that are connected to BC Hydro's
8 system contributing to what FERC has identified as the
9 deterioration of overall frequency response capability
10 of interconnected systems? Is that a matter for
11 undertaking?

12 **INFORMATION REQUEST**

13 MS. MATTHEWS: A Yes, we'll take it as an undertaking.
14 Whether we can actually answer that question, but
15 we'll take it as an undertaking.

16 MS. QUAIL: Q I appreciate that. My next question also
17 related is, we note that in the IR response Hydro says
18 it's developing its response, including engagement
19 with transmission customers. And our question is, why
20 is that an issue between Hydro and transmission
21 customers rather than Hydro and IPPs?

22 MS. MATTHEWS: A Yeah, I'm not able to answer that.

23 **INFORMATION REQUEST**

24 MS. QUAIL: Q And then I have a final question, and I'm
25 going to ask this question but if it is prejudicial to
26 BC Hydro's legal position in other legal

1 relationships, I understand if it needs to not be
2 answered but I'll ask it in case it's fair game.

3 And the question is, under the terms of the
4 existing IPP EPAs does Hydro bear the risk of changes
5 in FERC and other regulatory rules over the lifetime
6 of the agreements? And I assume that's for
7 undertaking as well.

8 **INFORMATION REQUEST**

9 MS. MATTHEWS: A Yeah, I mean, I believe they're
10 actually grandfathered so it's not a risk that it has
11 to be upgraded to it, but we can confirm that.

12 MS. QUAIL: Q Thank you.

13 MR. GHIKAS: So what we'll do is we'll take those
14 away --

15 THE CHAIRPERSON: As a series.

16 MR. GHIKAS: As a whole series, try to answer them as
17 best we can. I am having someone tell me, "Make sure
18 they know it's going to take a little while to get
19 that information." So, I'm conveying that now. This
20 isn't going to be something that we're going to turn
21 out in two days but it will be provided in the
22 intervening period.

23 THE CHAIRPERSON: Thank you.

24 MS. QUAIL: Those are all my questions.

25 THE CHAIRPERSON: Thank you, Ms. Quail.

26 Mr. Austin?

1 MR. AUSTIN: I'm going to take a minute to set up.

2 THE CHAIRPERSON: Yeah, okay.

3 Mr. Austin, before we start, I'll just
4 suggest to you we'll try to take a break around
5 9:30ish, so if you could let me know? Thanks.

6 **Proceeding Time 8:52 a.m. T12**

7 **CROSS-EXAMINATION BY MR. AUSTIN:**

8 MR. AUSTIN: Q Good morning Commission panel, good
9 morning BC Hydro panel. My name is David Austin, I'm
10 acting on behalf of the Clean Energy Association of
11 B.C.

12 First line of questioning is just in
13 relation to some of the other questions that have been
14 asked about IPP contracts, and we'll start with
15 Exhibit C1-7. And the question that I have for the BC
16 Hydro panel, are the underlying tables that are
17 purportedly the source of the calculations in Exhibit
18 C1-7 based on the actual payments to IPPs or some
19 other number?

20 MR. CHOW: A Right, and thanks for bringing that up.
21 So that particular data is the cost of energy data, so
22 that incorporates the accounting adjustments that we
23 spoke of earlier. So the actual payments to IPPs are
24 higher than that.

25 MR. AUSTIN: Q And that's because of the capital
26 leases?

1 MR. CHOW: A That's correct.

2 MR. AUSTIN: Q And in relation to Exhibit B hyphen -- I
3 have to be careful here, I'm not a hundred percent
4 sure because I was trying to take notes as this
5 question was being asked. In Exhibit B-29, is the
6 Table 4-19 a table that shows the cost of energy? Am
7 I on the right exhibit?

8 MS. MATTHEWS: A That's the one we were just being
9 referred to with the figure?

10 MR. AUSTIN: Q Yes.

11 MS. MATTHEWS: A Yes, that was the cost of energy.

12 MR. AUSTIN: Q I beg your pardon?

13 MS. MATTHEWS: A Yes, it was cost of energy figures.

14 MR. AUSTIN: Q In the cost of energy figures for BC
15 Hydro's portion of the cost of energy is the only
16 thing that's shown in there water rentals?

17 MS. MATTHEWS: A I think in that figure it also showed
18 the market purchase cost but I think if your question
19 is about the BC Hydro generation and the costs
20 associated with that generation then yes, the water
21 rentals are what is included in that cost. It's not
22 -- and I think this was a line of questioning to the
23 other panel as well, it's not a cost comparison on a
24 dollar per megawatt hour in the same way and I think
25 Mr. Wong's answer was along the lines of, in the
26 revenue requirements this is -- we've laid it out how

1 we do the accounting.

2 MR. AUSTIN: Q So it's essentially a comparison that
3 would be apples to kumquats?

4 MS. MATTHEWS: A Yeah. If you're talking about trying
5 to take the dollar per megawatt hour in the -- and
6 it's not actually in those tables, you have to go into
7 Schedule 4 of the appendix so that it's a heritage
8 dollar per megawatt hour, it's not the same apples to
9 whatever you had said, oranges. Compared to --

10 MR. AUSTIN: Q Kumquats.

11 MS. MATTHEWS: A Okay, kumquats. Because it's not a
12 dollar per megawatt including all of the components
13 that are part of the generation.

14 MR. AUSTIN: Q So for comparative purposes is there any
15 value in that calculation that was presented to you?

16 MS. MATTHEWS: A I don't actually think that what was
17 presented to us was actually trying to compare the BC
18 Hydro generation to the IPP generation. It seemed
19 like the line of questioning was actually just
20 comparing the IPP generation to the market costs but
21 if it was intended to compare to BC Hydro's generation
22 costs that wouldn't have been effective.

23 **Proceeding Time 8:57 a.m. T13**

24 MR. AUSTIN: Q Well, if my numerator is IPP costs, and
25 my denominator is the cost of energy that only
26 includes water rentals from BC Hydro's perspective, is

1 that not an attempt to make a comparison between IPP
2 costs and the total costs of energy in relation to BC
3 Hydro's cost of energy for its Heritage assets?
4 MS. MATTHEWS: A I think my answer still stands of how
5 I just answered it, but I think you are also asking me
6 to interpret what their line of questioning was about,
7 and I can't do that.
8 MR. AUSTIN: Q Thank you, we will deal with that in
9 argument.
10 MR. GHIKAS: Sorry, just before you move on, I think
11 Mr. Austin, we had the wrong exhibit numbers
12 referenced. I think the table that you were referring
13 to was in the application page 4-19, and it's table 4-
14 2. It might be worth just verifying that that is the
15 same table everybody was working off of?
16 MS. MATTHEWS: A In the evidentiary update?
17 THE CHAIRPERSON: The application.
18 MR. GHIKAS: The table people were referring to I think
19 was actually in the application itself.
20 MS. MATTHEWS: A Okay.
21 THE CHAIRPERSON: Do we agree that's confirmed then?
22 MR. AUSTIN: Q I have no idea. I wasn't the one that
23 did the calculations.
24 MS. MATTHEWS: A We can confirm that was one of the
25 tables that was talking about, and the tables actually
26 just have it in dollars, so it's not talking about

1 dollars per megawatt hour anyway.

2 THE CHAIRPERSON: Thank you.

3 MR. AUSTIN: Q I have some questions about some of the
4 comments yesterday about the ability to unwind third
5 party electricity purchase agreements. And I use the
6 term third party electricity purchase agreements
7 because BC Hydro includes in its definition of IPP
8 contracts, contracts entered into, entities such as
9 Columbia Power, and Columbia Basin Trust, and those
10 are essentially government entities. It includes
11 contracts it enters into with organizations whose
12 primary business is not generating electricity, for
13 example Alcan, whose primary business is generating
14 electricity -- or producing aluminum, not generating
15 electricity, and forest products companies whose
16 primary business is not generating electricity. So,
17 that's why I use the term third party electricity
18 purchase agreements.

19 Can BC Hydro unwind its 70-year investment
20 that is made in the John Hart project, and that
21 investment is about \$1.1 billion for about 133
22 megawatt?

23 MS. MATTHEWS: A I think the answer is no, the project
24 is built, it would be hard to unbuild the project.

25 MR. AUSTIN: Q So, if the retrospective financial
26 analysis is done for that project and it's now

1 compared to spot market prices and it turns out that
2 spot market prices are far lower than the John Hart
3 price, there is absolutely nothing BC Hydro can do
4 about that?

5 MS. MATTHEWS: A Yeah, that's correct.

6 MR. AUSTIN: Q Similarly for Ruskin, and that's about a
7 \$642 million project?

8 MS. MATTHEWS: A Yes.

9 MR. AUSTIN: Q And similarly for Site C?

10 MS. MATTHEWS: A Yes.

11 MR. AUSTIN: Q For the purposes of presenting the cost
12 of the John Hart project to ratepayers of BC Hydro,
13 has BC Hydro ever presented John Hart on the basis of
14 the total capital related costs and operating costs
15 over a 70 year period?

16 MS. MATTHEWS: A I don't remember the process that the
17 redevelopment of John Hart went through. I do note
18 that that happened quite a while ago. As part of that
19 there certainly would have been a looking forward when
20 you're building something as part of the business
21 case, you would be showing what the dollar per
22 megawatt hour was.

23 MR. AUSTIN: Q Can I stop you there? That's the dollar
24 per megawatt hour as opposed to the all-in cost of the
25 project on the basis of its capital related costs and
26 its operating costs?

Proceeding Time 9:01 a.m. T14

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MS. MATTHEWS: A Sorry, we were just clarifying that it was a CPCN and it was in 2013, but I think also to go back to your question, when we calculate that, it is the all-inclusive cost of what it is for any new project. At the time when you're looking at it and looking forward, you are including all that cost.

MR. AUSTIN: Q But it's not presented as the all-in cost the same way that IPP, meaning third party electricity purchase contract prices, and costs are presented.

MS. MATTHEWS: A I'm not sure about that. It seems like they'd be pretty comparable. I haven't gone and compared the differences between what's in and what's not, but surely in a business case, the intent is and what should be included is all the costs related to that project. The accounting ones that had just been mentioned, I don't know how that fits in.

MR. AUSTIN: Q Let's put it this way. If BC Hydro says that the cost of all the third-party electricity agreements is \$51 billion, is that presented on a dollar per megawatt hour basic or the all-in cost of \$51 billion, undiscounted?

MS. MATTHEWS: A I believe it was answered that that's the full cost that BC Hydro is going to pay to the IPPs for those contracts.

1 MR. AUSTIN: Q Right. So what's the full cost to BC
2 Hydro's customers of the John Hart project over 70
3 years.

4 MS. MATTHEWS: A So I don't know that answer offhand,
5 but that answer would have been included -- or all of
6 that information would have been included at the CPCN
7 at the time that that was submitted.

8 MR. AUSTIN: Q Well, I participated in that CPCN
9 project review and I don't remember it being presented
10 in that manner, and I was just wondering if BC Hydro
11 could undertake to present that cost.

12 THE CHAIRPERSON: I can see Mr. Ghikas is going to weigh
13 in on this, but perhaps we could constrain this to
14 someone could go back and look at what was in the
15 original CPCN and if that information was in the CPCN,
16 then, Mr. Austin, would that be all right?

17 MR. AUSTIN: Q Fine. Similarly, could they do that for
18 Ruskin?

19 MS. MATTHEWS: A So to verify, I'm confirming that when
20 we're doing those projects and what we're presenting
21 it includes the all-in costs of the project. That's
22 what we'll go back and find out.

23 MR. AUSTIN: Q For seventy years on a undiscounted
24 basis.

25 MS. MATTHEWS: A Yes, for the life of the project.
26 Yes.

1 THE CHAIRPERSON: You mean the projected maintenance and
2 operating costs.

3 MR. AUSTIN: Q Exactly.

4 THE CHAIRPERSON: If that information was in the
5 application, could you please provide it?

6 **INFORMATION REQUEST**

7 MS. MATTHEWS: A Yes, I think we can confirm whether it
8 was in the application.

9 MR. AUSTIN: Q To anybody's knowledge on the panel, has
10 Site C ever been presented on that basis?

11 MS. MATTHEWS: A I mean the Site C went through a whole
12 panel and a review, so I do think it's the same thing.
13 But again, I don't think we're wanting to go back and
14 relook at all of the information that's been presented
15 on all these projects.

16 MR. AUSTIN: Q Since Site C is a particular touchy
17 subject in this proceeding, I think I'll just leave
18 that one.

19 MS. MATTHEWS: A I think what we're doing is we'll
20 confirm that in -- how we do our business cases and
21 what's included and what's not when we do our business
22 cases and present that information and CPCNs or what
23 other proceedings it is.

24 MR. AUSTIN: Q With respect to John Hart, and I'd just
25 like to get this out of the back of my mind, can you
26 upgrade us on the status of the cost of doing seismic

1 upgrade to John Hart? I believe in an information
2 request that the Clean Energy Association of B.C.
3 made, it was said that that cost should be available
4 by the end of 2019.

5 MS. DASCHUK: A I'll take one. So I think the costs of
6 projects is best addressed by the Capital Panel, Panel
7 number 4, and they'd be able to provide a status
8 update on the John Hart seismic upgrade. And that's
9 not for the powerhouse itself. The seismic upgrade is
10 for the -- I think it's the spillway but I'll double
11 check on that.

12 **INFORMATION REQUEST**

13 MR. AUSTIN: Q Thank you. I'll take that up with Panel
14 4, thank you.

15 MS. MATTHEWS: A Thank you.

16 **Proceeding Time 9:06 a.m. T15**

17 MR. AUSTIN: Q I'd like to move onto another area of
18 cross-examination, and Ms. Matthews, you and I have
19 discussed some previous evidence given in a revenue
20 requirements application process, and in other BC
21 Hydro review processes in relation to explaining the
22 basics of the operation of the BC Hydro Heritage
23 assets. And for the purposes of your explanation, I
24 referred you to previous evidence in one of those
25 proceedings, and for the purposes of assisting you and
26 me with any subsequent follow up questions, I'd like

1 to introduce that material from a previous hearing.

2 And it will be Exhibit C10-17.

3 (EXCERPT FROM TRANSCRIPT – VOLUME 12, DATED OCTOBER
4 20, 2008, BC HYDRO F2009 AND F2010 RRA, MARKED EXHIBIT
5 C10-17)

6 MR. AUSTIN: Q Perhaps some of the people on the BC
7 Hydro panel could share copies of that?

8 Ms. Matthews, can you make your
9 presentation?

10 MS. MATTHEWS: A Yes, so I believe what Mr. Austin is
11 asking me to do is give a high level description of
12 how the system works. And so I will do that, but it
13 might be a few minutes here. I should say I am not at
14 this point I'm not going to get into the actual energy
15 studies, I am more just talking generalities.

16 MR. AUSTIN: Q We will get into those next.

17 MS. MATTHEWS: A So I mean in general we have I think
18 32 hydroelectric projects, and there is a big range of
19 sizes that we have. And in general for these projects
20 they can be mixed. So some are really rainfall
21 dominated, like Coquitlam that I was talking about
22 yesterday. The big ones, being the Williston
23 Reservoir in the Peace and the Kinbasket Reservoir in
24 the Columbia, those are big storage reservoirs, and
25 then downstream of them you have other big generators,
26 so Revelstoke is downstream of Mica and the Peace

1 Canyon is downstream of GMS, and then of course Site C
2 is being built downstream. And they tend to be more
3 snowmelt dominated. So the Columbia system is
4 actually snowmelt dominated about 70 percent, and 30
5 percent rain. Whereas the Williston is 60 percent
6 snow and 40 percent rain. They tend to get a lot of
7 their precipitation actually in the spring and into
8 the summer. We do also have some facilities, like
9 Strathcona, which has a really mixed signal, it can
10 get both the really rainfall dominated and the peaks
11 in winter, but it does also have a significant
12 snowfall contribution.

13 So, when we think of our system, our big
14 system is always the Peace and the Columbia, and often
15 we've always said that that's 80 percent. So 80
16 percent Peace and Columbia, versus 20 for the Lower
17 Mainland. But I went back and checked those numbers,
18 that was part of the other testimony that has been
19 referred to here, and it's -- I mean for one thing as
20 I had said earlier, that the IPP contribution has
21 actually increased a lot.

22 So, I am going to go through and just say
23 the percentages of how much energy in general comes
24 from each of those systems.

25 **Proceeding Time 9:11 a.m. T16**

26 And so for the biggest of the Hydro it's

1 the Peace at 28 percent, then the Columbia is 24
2 percent, the Kootenay and Pend d'Oreille is about 11
3 percent. The rest of the hydro, so on the Lower
4 Mainland, the bridge, Vancouver Island, that's all
5 about 12 percent. And the IPP contribution is 25
6 percent. So that's in general where the energy is
7 coming from of our generation.

8 THE CHAIRPERSON: Excuse me, Ms. Matthews. This may be
9 a trivial question, but -- or it may not make sense, I
10 don't know, but that's a percentage of your total
11 generation or is it somehow a percentage of the
12 generation that's required to meet domestic loads?

13 MS. MATTHEWS: A It's the total generation in gigawatt
14 hours. So it's -- we looked at a few years going back
15 and what our forecast is in 2020 and just looked at,
16 okay, how much is all of the generation. So some of
17 that will also be -- being exported, not just to meet
18 our load.

19 THE CHAIRPERSON: Understood. And then it's actual
20 generation or is it nameplate capacity?

21 MS. MATTHEWS: A This is actual generation, it's in
22 gigawatt hours. So the numbers on megawatts, our
23 installed capacity, would be different.

24 THE CHAIRPERSON: Okay. Thanks.

25 COMMISSIONER FUNG: Just one more follow-up question if
26 you don't mind, Ms. Matthews. Are these percentages

1 current as of what? What year?

2 MS. MATTHEWS: A Yeah, it's -- I mean I used our
3 forecast for Fiscal '20 and '17 to get a rough idea.
4 I haven't done a full analysis to come up with
5 anything, like to cover an average of everything. But
6 it's fair to say that in any given year these
7 percentages will go up and down by a few percentages.

8 COMMISSIONER FUNG: Okay, thank you.

9 MR. AUSTIN: Q Thank you. And I would encourage the
10 panel to ask as many questions as they want, because
11 when it comes to the operation of the BC Hydro system
12 there's no such thing as a question that shouldn't be
13 asked.

14 MS. MATTHEWS: A And then so the general pattern,
15 especially of our big reservoirs, is that we draft
16 them across the fall and across the winter meeting our
17 load, and so they meet their low point some time
18 usually in April, and then they refill when the snow
19 melt, the freshet starts, and then they usually meet
20 their peak somewhere between July and September. So
21 that's just the annual cycle that we go through.

22 Now typically -- and I think there was an
23 IR on this, typically the change in storage might be
24 about 1,500 gigawatt hours year over year, because we
25 do talk about that we have multi-year storage. So I
26 wanted to talk a little bit about that because that

1 can lead to some confusion -- or part of the question
2 is well, what is that and what does it mean?

3 So we don't operate to rule curves. Some
4 other utilities and big hydro systems have to work to
5 rule curves. So they're targeting to refill or not,
6 or reach certain levels and that's not how we operate.
7 We operate to price signals. And so that in any given
8 year we might end up storing into the system storage
9 or drafting from the storage.

10 And so, so that's really why it's called
11 multi-year generation. And I was thinking about that
12 because the -- I mean really I think one of the
13 answers of why we call it the multi-year storage is
14 that our critical period -- and we'll probably get
15 into some discussions of --

16 MR. AUSTIN: Q Maybe I could interrupt you and maybe
17 assist in the Panel's understanding of the operation
18 of the system. Would it be fair to say that the
19 reservoir storage is like a three-year bank account
20 that you can draw on in the case of what used to be
21 the critical water period for bad times before you
22 became destitute?

23 MS. MATTHEWS: A I'm probably going to describe -- I'll
24 describe critical period, but I'll describe it a
25 little bit differently, but, yes, our critical period
26 is three and a half years. And I did actually want to

1 do a comparison so that you can understanding the
2 difference let's say with the U.S. federal system,
3 just mainly on the Columbia, because they also have a
4 lot of storage in that system. But their critical
5 period is actually only one year now because of all of
6 their fisheries requirements.

7 **Proceeding Time 9:16 a.m. T17**

8 So even though they have a lot of the
9 storage, they have to hit these targets to refill and
10 they're not able to rely on year-over-year drafting,
11 so their critical period is now one year.

12 Now, so to move on a bit on what the
13 critical period is --

14 THE CHAIRPERSON: Sorry, before you move on, so you
15 mentioned that other systems use a -- and I'm sorry, I
16 might get the words -- work to rule, is it? Or rule
17 -- what was it? Something rule?

18 MS. MATTHEWS: A Rule curves.

19 THE CHAIRPERSON: Rule curves. So, why does BC Hydro
20 not do that? Why does BC Hydro use this alternate
21 methodology which is market price methodology?

22 MS. MATTHEWS: A Yeah, so our objective that we operate
23 the system to is to maximize the consolidated
24 operation net revenue, and I know that's sort of our
25 mantra that we say all the time, and what it means
26 when I say "consolidated" is that it's the BC Hydro

1 domestic buying and selling -- or selling our surplus
2 and buying for our deficit and the Powerex trade.

3 THE CHAIRPERSON: Understood. So --

4 MR. AUSTIN: Q Okay, maybe I could -- okay, go ahead.

5 THE CHAIRPERSON: So, is the reason that you use this
6 methodology whereas most other hydro based utilities
7 use the other methodology, is that because you've got
8 a perpetual surplus position and you've built the
9 system for export? Is that essentially --

10 MS. MATTHEWS: A No. And I should clarify that not --
11 I wouldn't say that the majority of other systems use
12 just the rule curves. I couldn't actually tell you
13 exactly what those are. The rule curves are usually
14 used when there's specific things that they have to
15 do. Like, for example, on the BPA system they're
16 under court ordered for their by-logic opinion and so
17 there's rules that they have to follow to be meeting
18 those parts.

19 They also have rule curves for their flood
20 control. So depending on what the snow is their
21 reservoir has to be at a certain level.

22 Now, for example, we actually do that for
23 Coquitlam as part of our water use plan, it came out
24 that there is a rule of where we have to have our
25 reservoir for downstream flood protection.

26 THE CHAIRPERSON: Well, you have maximum and minimum

1 reservoir rules, do you not?

2 MS. MATTHEWS: A Yes. So in our water licence we have
3 some basic rules and one of them is a minimum and
4 maximum water --

5 THE CHAIRPERSON: And you have streamflow volume rules,
6 do you not?

7 MS. MATTHEWS: A That's also part of our water licence
8 and generally when those water licences are set it's
9 set in terms of, you know, the maximum amount of water
10 that we can expect coming through those generators.
11 So it's not usually set as a way to constrain it
12 unless somebody else already has a water licence prior
13 to ours.

14 MR. AUSTIN: Q So just one question at this point in
15 time, the BC Hydro reservoirs behind Mica and the WAC
16 Bennet Dam are so large and flooded so much territory
17 that they have the ability to be viewed as a three-
18 year bank in relation to the critical water period and
19 perhaps you could -- is that correct?

20 MS. MATTHEWS: A Yeah, so let me go back and explain
21 the critical water period and how that fits in. And
22 that, I mean I'm sure in the IRP they'll end up
23 getting into a lot of discussion around reliability
24 planning criteria.

25 And before I go there, exactly on critical
26 period, I want to do a general background on

1 reliability planning criteria. And so the -- in the
2 past and historically, I mean, you've tended to have
3 two types of systems and a lot of the world has
4 thermal dominated systems and BC Hydro, obviously, has
5 a hydro dominated system and those two systems are
6 quite different.

7 So in a thermal dominated system you need
8 to bring in enough new units to meet your peak and
9 when you do that, because you can run those gas or
10 coal thermal plants all the time, you tend to have a
11 lot of energy. So what ends up being the thing that
12 drives when you need to bring on new resources is your
13 peak capacity.

14 Now, in a hydro dominated system it's
15 actually the opposite. So the energy that we get from
16 a typical hydro -- even the storage facility, it has a
17 capacity factor of about 55 percent versus a load
18 factor is about 73 percent, generally. So what
19 happens is that hydro dominated systems tend to
20 actually have a lot of capacity and what you do is
21 needing to build for the energy. So --

22 MR. AUSTIN: Q Could I interrupt you there and say, in
23 terms of the capacity factor, is it true what you have
24 is enough water in your reservoirs to run the
25 generators that you've got installed 55 percent of the
26 time?

Proceeding Time 9:21 a.m. T18

1

2 MS. MATTHEWS: A If you're running them -- what it
3 means is that if you average it across the year, and
4 the 55 I threw out, so don't quote the plus or minus
5 50 percent. It means that you're -- if you're running
6 it flat along the time, you'd be using it 55 percent.

7 MR. AUSTIN: Q In other words, is it true to say that
8 I've got enough gas in the reservoirs, meaning the
9 reservoirs being viewed as a gas tank and there's all
10 sorts of different analogies to view this, to run my
11 generators as you said, flat out, 55 percent of the
12 time --

13 MS. MATTHEWS: A 55 percent of the time.

14 MR. AUSTIN: Q Roughly.

15 MS. MATTHEWS: A Yeah, roughly 55, yeah. But let --

16 MR. AUSTIN: Q We're talking in generalities at this
17 point in time so people understand, if you are new or
18 haven't heard this before.

19 MS. MATTHEWS: A Yeah, no, that's correct. But let me
20 go back and finish in terms of the hydro system.

21 So in the hydro system the driving factor
22 is the energy usually. And so when you think about
23 planning criteria, and this is where I'll get into the
24 critical water, but for a thermal dominated system
25 you've probably heard the term a lot about loss of
26 load probability, and what's typically used in the

1 industry is the 1-in-10 year loss of load probability.
2 And it's really around the line, you know, you've got
3 these units on, you don't have to be worried about
4 your fuel supply, as Mr. Austin was indicating, and
5 it's really about forced outages and how things
6 happen.

7 Now, for Hydro's system, because you're
8 limited on energy, you have to look at that criteria
9 differently, and so what's been developed is this
10 concept of firm energy, which is very related to the
11 critical period.

12 And again, there's not that many systems in
13 the world that are kind of the purely hydro. And I
14 know that Bonneville uses the same kind of method and
15 the critical period approach. I actually don't have
16 the information to talk about, you know, Norray in
17 Brazil or the other -- and I mean, Manitoba Hydro or
18 Hydro Quebec are also hydro dominated but they are
19 also very different systems.

20 So sorry, where I was going with this is
21 that this concept of firm energy and critical period
22 was developed to be the planning criteria for when you
23 need to build new hydro energy but it doesn't -- and
24 the concept is that you look at your worst sequence of
25 historic flows and use that to see how much load you
26 can meet if you start with your reservoirs full, and

1 full that period draft them empty.

2 And what you're also really doing in this
3 period is you're not relying on imports and exports.
4 So we call it a system capability model. So it's not
5 modelling how we operate, it's modelling under these
6 kind of assumptions what is the most energy that you
7 can get out of the system.

8 And so when do that for our system, the
9 critical period is actually from the '40s which the BC
10 Hydro wasn't actually built yet then. But it's a
11 three and a half year period, and that is the driest
12 sequence that turns out to be the worst for us.

13 MR. AUSTIN: Q After the break I'll hand out a previous
14 undertaking, this time going back to 2004 and 2005,
15 with respect to the critical period.

16 Using my bank account analogy, is it fair
17 to say that when I'm looking at my critical water
18 period, I want the balance in my bank account at the
19 beginning to be high enough to withstand all the
20 withdrawals that are required to get through my three-
21 year drought period, or if I'm using my bank account,
22 my three-year bad time period, without going broke.

23 MS. MATTHEWS: A Right. So I mean, that's what I
24 described as the assumption of how it comes up with
25 this firm energy. Now there is no right way of how --
26 like in terms of the history of why that was landed on

1 the appropriate level. These things just get done
2 over time and then it seems to work, seems to have
3 worked for the system, seems to have worked for the
4 BPA system.

5 But I do want to emphasize that it is not
6 the same as operations. It doesn't include imports
7 and exports. It doesn't include the same objective.
8 So in actual operations, our objective is to maximize
9 the value by importing and exporting and making the
10 most of the system. The capability study is meant as
11 this -- like this is just the criteria. You apply
12 those assumptions and then the system result that you
13 get out of it, and now that becomes the criteria for
14 looking at when you need to be adding new resources.

15 MR. AUSTIN: Q I'd like to present you with another
16 analogy in terms of the confounding factor of imports
17 and exports into those reservoirs for the purposes
18 that trade along the borders of British Columbia.

19 **Proceeding Time 9:27 a.m. T19**

20 Would it be fair to describe your
21 reservoirs as a giant cup full of chocolate milkshake.
22 I've got two straws in there. I've got Powerex
23 sucking on one straw, I've got BC Hydro on behalf of
24 its domestic customers sucking on the other straw, and
25 over Powerex's shoulder is a hose with more chocolate
26 milkshake that comes into that cup from time to time.

1 And on the BC Hydro side, a hose over its shoulder
2 meaning chocolate milkshake coming in, because of,
3 believe it or not, precipitation.

4 MS. MATTHEWS: A I do really like chocolate. In terms
5 of the analogy, I think it's fair to say that the big
6 storage system is what absorbs any changes. So
7 anything else that is going on in the system, the
8 effect of that ends up in the storage. So, whether it
9 rains a lot, so Coquitlam is generating more today, or
10 we are importing or we're exporting, it all ends up in
11 the storage, and that's why we carefully track and
12 watch that storage. Because ultimately that's telling
13 us how we're doing versus where our plan is.

14 I guess the part on the BC Hydro and
15 Powerex side, and without getting into the details of
16 the energy studies again, we look at it from the
17 consolidated view and then the allocation comes after.
18 And the TPA is also set up like that, where the
19 allocation is after.

20 So, they can be importing and exporting out
21 of the system, and BC Hydro can, and that is all
22 governed under the transfer pricing agreement for how
23 we clearly split the responsibilities and roles
24 between those two companies, and so that we're aligned
25 on how we're using that system.

26 MR. AUSTIN: Q Thank you, I think it would be a good

1 time for a break? We probably need one.

2 THE CHAIRPERSON: We will come back at quarter to.

3 MR. AUSTIN: Thanks.

4 **(PROCEEDINGS ADJOURNED AT 9:30 A.M.)**

5 **(PROCEEDINGS RESUMED AT 9:44 A.M.)** **T20/21**

6 THE CHAIRPERSON: Please be seated. Thank you.

7 Mr. Austin, at the break we were looking
8 for some chocolate covered kumquats back there, but we
9 didn't see any.

10 MR. AUSTIN: Try in one of BC Hydro's reservoirs.

11 MR. AUSTIN: Q Before the break I was referring to the
12 critical water sequence that was set out in a BC Hydro
13 undertaking from a previous proceeding and I'd like to
14 hand that out now and mark it as Exhibit C-10-18. C-
15 10-18.

16 (BC HYDRO UNDERTAKING FROM 2004/05 AND 2005/06 REVENUE
17 REQUIREMENT HEARING, DATED JUNE 8, 2004, MARKED
18 EXHIBIT C10-18)

19 MR. AUSTIN: Q And before we refence that exhibit in
20 terms of cross-examination questions or before I
21 reference that Exhibit in relation to cross-
22 examination questions, I want to go back to the
23 concept of using Mid-C pricing for BC Hydro projects.
24 And the question that I have for the panel was the
25 John Hart \$1.1 billion project ever analyzed on the
26 basis of Mid-C pricing?

1 MS. MATTHEWS: A Again, I wasn't actually involved in
2 that time when it was done. I know that when we do
3 analysis we always look at the different scenarios.
4 We used to talk about the different price scenarios
5 that showed a range on the market. Whether that one
6 specifically compared to Mid-C at that time, I suspect
7 not. It was probably our low gas -- low electricity
8 price forecast in the range of it, but I don't know
9 explicitly.

10 MR. AUSTIN: Q Would it be fair to say that the prices
11 at Mid-C over the last 20 years have been volatile,
12 they are not firm, and you take whatever you can get
13 in that market because it is -- using another analogy,
14 this time fruit, it's the leftover vegetable market
15 bin?

16 MS. MATTHEWS: A I think when you talk about the market
17 you probably have to divide it up into there are
18 different markets in different time zones. So the
19 main market of being the day-ahead market is the -- I
20 think as you said, I don't know the leftover, but
21 generally what is the market is people, you know, have
22 to meet their own resource -- I mean the word that is
23 used a lot now is resource adequacy, and then the
24 market becomes a balancing part of that. So how much
25 any utility may rely on that for their reliability is
26 kind of up to those individuals, but the market is

1 really, after everybody's built their system and is
2 meeting their load, trying to what's the most economic
3 way to dispatch the system. So it becomes a balance
4 almost between that.

5 I should say though, I mean last year we
6 did sign the letter agreement with Powerex, so at that
7 case we were purchasing forward physical energy at a
8 set price, so then I don't think it's -- at that point
9 you actually know what it is, but till you've bought
10 it, you don't.

11 MR. AUSTIN: Q Would it be fair to say that if you rely
12 on the Mid-C market for your core energy requirements,
13 you rely on it at your peril as California found in
14 2000 in relation to relying on non-firm contracts to
15 supply its core requirements?

16 **Proceeding Time 9:49 a.m. T22**

17 MS. MATTHEWS: A Yeah, I would say that with the
18 different geographical reasons, different areas and
19 utilities might decide to rely on a certain part of
20 their need from the market, and that is really up to
21 them and their regulators. But you can't obviously
22 make that too big.

23 And the other problem is, if everybody is
24 relying on the market, then that is really when you
25 get into trouble, which might be a reflection of what
26 had happened back then.

1 THE CHAIRPERSON: And if everyone was relying on the
2 market, presumably that would drive prices in the
3 market up?

4 MS. MATTHEWS: A Yes, I would presume so. I mean the
5 market is just a reflection of supply and demand.

6 THE CHAIRPERSON: Right.

7 MR. AUSTIN: Q And potentially all it would take is one
8 big player to rely too heavily on that market and the
9 prices could behave like they did in 2000 when
10 California relied on non-firm electricity supply for
11 its core requirements.

12 MS. MATTHEWS: A I mean, I don't think I want to
13 speculate on how the market responds. There is a
14 whole lot of factors in there. There is also
15 transmission availability depending on where you are
16 and buying on that. And I'm not going to say anything
17 else further on what other utilities in the U.S. do.

18 MR. AUSTIN: Q Thank you. Let's go back to your
19 explanation of how the system is planned, in part, and
20 operated. In your description of how the system is
21 operated, you indicated that the inflows into
22 Kinbasket are about 70 percent related to snowpack,
23 and about 30 percent related to rain related
24 influence, is that correct?

25 MS. MATTHEWS: A Yes, that is correct.

26 MR. AUSTIN: Q The last time I went through this

1 exercise, the percentage was 80 percent snowpack, and
2 about 20 percent summer rain. Has that changed over
3 the intervening period?

4 MS. MATTHEWS: A These are the numbers I got most
5 recently from my hydrology group. To answer that
6 question specifically, we'd probably have to check
7 what the hydrology group had done back at that time to
8 explicitly come up with the number.

9 What I will say is that, I mean certainly
10 there's questions around climate change and how that
11 is affecting the system, and various parts. I mean,
12 as it gets warmer you do have more rain than snow. So
13 it could be a fair assumption that there is going to
14 be changes in that balance.

15 In terms of what we've looked at as inflows
16 into our reservoir, if we can see any real pattern on
17 the climate change, the answer is no. We are not
18 saying that we might not pick up a pattern at some
19 point. The part that we have seen is there is
20 certainly the freshet moving earlier. That's probably
21 the most obvious thing that we've seen from climate
22 change.

23 I mean, the other thing I would add is even
24 just as extra years are going on, any of the numbers
25 that we are doing now are based on a different data
26 set than the 10 years ago. So, numbers will change.

1 MR. AUSTIN: Q In relation to Kinbasket, do you know
2 when the majority of precipitation as it relates comes
3 into that reservoir? Is it still in the summer?

4 MS. MATTHEWS: A For Kinbasket?

5 MR. AUSTIN: Q Yes.

6 MS. MATTHEWS: A I don't think that has ever actually
7 been the case for Kinbasket. I think for Williston
8 there is certainly more precipitation that comes in
9 across the spring and into the summer. I don't think
10 I can answer it for Williston -- I mean, sorry, for
11 Mica other than it's less than Williston. So there's
12 less summer rainfall, I guess I would say, than in the
13 Williston basin.

14 **Proceeding Time 9:54 a.m. T23**

15 MR. AUSTIN: Q Now, I'd like to take you to Exhibit C-
16 10-18, which is the inflows that occurred during the
17 deepest recorded drought in British Columbia. And
18 when I said it was the deepest recorded drought, it
19 was the deepest instrument record drought, is that
20 correct?

21 MS. MATTHEWS: A Yes. Of the recorded measurements
22 it's the lowest inflows into the reservoirs, yes.

23 MR. AUSTIN: Q And not to confound things any more than
24 is absolutely necessary, but there are tree ring
25 studies and sediment studies that show droughts of
26 greater duration than the recorded drought of the 40s,

1 is that correct?

2 MS. MATTHEWS: A I don't know explicitly on that, but I
3 would certainly confirm that it's not like a drier
4 sequence can't occur. If you look for a bigger and
5 bigger record you will find, probably, there can be
6 lower inflow periods.

7 MR. AUSTIN: Q And when I did the last review of the
8 system operation the standard for planning the system
9 was the critical water sequence. And through an
10 amendment to SD10, is it fair to say that the system
11 is no longer planned on the basis of the critical
12 water sequence?

13 MS. MATTHEWS: A Yes. So, the Special Direction 10 did
14 change the planning criteria that BC Hydro applies.
15 So it used to be, if we go back to -- and I'm trying
16 to find the date, but it's the Special Direction
17 before the February 12th, so --

18 MR. AUSTIN: Q I believe it was 2007, was the original
19 date.

20 MS. MATTHEWS: A Right, and that's probably it. So the
21 Special Direction 2007 change to the self-sufficiency
22 as a planning criteria.

23 MR. AUSTIN: Q That was the original SD10, but wasn't
24 the amendment to SD10 made in 2010?

25 MS. MATTHEWS: A The latest one I have is February,
26 2012 as the latest amendment to Special Direction 10.

1 conditions, correct?

2 MR. CLENDINNING: A Yes.

3 MR. AUSTIN: Q If the planning standard hadn't been
4 changed from critical to average, is it correct to say
5 that that amount of energy would be at least 4,100 GWh
6 lower?

7 MR. CLENDINNING: A Approximately.

8 MR. AUSTIN: Q And as that is true, and if we still
9 were on the critical water sequence, then the surplus
10 deficit in line number 8 would effectively be
11 eliminated, correct?

12 MR. CLENDINNING: A Approximately.

13 MR. AUSTIN: Q And I'd like to refer you to Clean
14 Energy Association of B.C. Information Request 1.6.8,
15 and that could be found in Exhibit B-6. That is
16 Exhibit B-6, Clean Energy Association of B.C. 1.6.8.

17 MS. MATTHEWS: A Hang on just one second, we are trying
18 to clarify something in this table.

19 The one reason why we are hesitating here
20 is that the -- in general in the operations, we are
21 about 4,000 surplus at the moment, which is very
22 similar to the number that Mr. Austin has quoted. So
23 those seem to be matching up. We are just trying to
24 figure out where Island CoGen fits in this. Because
25 generally if that is added in, I would have expected
26 it to be higher, but we are just trying to figure out

1 that part.

2 MR. CLENDINNING: A And that will be with respect to

3 line 8 in the total surplus deficit as opposed to just

4 the Heritage.

5 MR. AUSTIN: Q No, I agree, I mean there is the IPP

6 entry, and I was specifically referring to the

7 Heritage assets and what happened when we move from

8 critical to average.

9 MS. MATTHEWS: A Yes, but this is showing a load

10 resource balance on the planning view, and that's why

11 -- sorry, that is on the Heritage, but we were just

12 trying to figure out where IG fits within that. But

13 we can undertake that and come back to it, because it

14 is not entirely clear to us at the moment.

15 MR. AUSTIN: Q So is it correct to say --

16 MR. CLENDINNING: A So what I can say is approximately,

17 subject to check.

18 THE CHAIRPERSON: Just to clarify, Island CoGen is not

19 a Heritage resource, is that what you're saying?

20 MR. CLENDINNING: A That's correct. But when Mr.

21 Austin asked us about line 8 in that table, the

22 surplus deficit, the question expands beyond the

23 Heritage assets.

24 THE CHAIRPERSON: Right, and there is no line for

25 Island CoGen, is that the case?

26 MR. CLENDINNING: A No, we want to check and see --

1 MS. MATTHEWS: A If it was included in --

2 MR. CLENDINNING: A -- included in one of the other
3 ones.

4 MR. AUSTIN: Q It will be included line 2 existing and
5 included IPP resources.

6 MR. CLENDINNING: A We'll check on it.

7 MR. AUSTIN: Q It should show up in line 2.

8 **INFORMATION REQUEST**

9 MR. AUSTIN: Q We'll get into a discussion about Island
10 CoGen later on in any event.

11 With respect to Exhibit D-6, Clean Energy
12 Association of B.C. Information Request 1.6.8, the
13 question is,

14 "Does BC Hydro distinguish between any surplus
15 energy available for planning purposes as a
16 result of the change to SD10 and as a result of
17 contractual commitment to IPPs? If yes, please
18 explain."

19 **Proceeding Time 10:04 a.m. T25**

20 And the short answer is:

21 "No, BC Hydro does not distinguish between the
22 various sources of surplus energy."

23 So Ms. Matthews, is that consistent with
24 your view -- and I know you're on the operations side
25 and Mr. Clendinning is on the planning side, that
26 what's ever in those reservoirs and wherever it came

1 from makes no difference to BC Hydro.

2 MS. MATTHEWS: A So I'll answer that from the operating
3 view, and I do notice in this questions, it says for
4 planning purposes and you can probably interpret that
5 question from a planning view or from an operating
6 view. And I think in this answer we have actually
7 done it more from the operating view. So I mean --

8 MR. AUSTIN: Q You've actually covered both views in
9 this answer if you read it carefully.

10 MS. MATTHEWS: A So I mean when -- in operations we
11 have the system as it is and it's my group's job to
12 operate it and we're just focussed on operating the
13 system to maximize value. So anything else is, we
14 call it a sunk cost. So it doesn't matter what the
15 cost of anything is when we get it, we're only looking
16 at the variable costs coming forward, and our
17 decisions are based on that part of it. Because
18 anything else is sunk.

19 MR. AUSTIN: Q Would it be fair to say that Mr.
20 Clendinning carefully assembles all sorts of sources
21 of supply to meet the expected demand load forecast
22 and you, Ms. Matthews, come along from an operations
23 point of view and say, "That's really nice, Mr.
24 Clendinning, but we're here to maximize revenue"?

25 MS. MATTHEWS: A Yeah, I think that what I said is once
26 it's in -- I have to work with what I have and so,

1 yeah, I only look at the operating costs going forward
2 and the economic decision, what's in the past is kind
3 of irrelevant for the decisions I need to make going
4 into the future.

5 MR. AUSTIN: Q And you'd do that over a one-year
6 horizon, a two-year horizon or longer horizon? In
7 other words, how long a leash do they give you?

8 MS. MATTHEWS: A Well, the time horizon for which I'm
9 accountable is the operating horizon, which we define
10 as three years, being the current fiscal year and the
11 following two. So within that period I'm accountable
12 to make sure that we have enough generation on to meet
13 load. So anything falling within that, it doesn't
14 mean I don't talk to others in the company obviously,
15 if we're needing to do something. But that's my
16 accountability.

17 MR. AUSTIN: Q And you have the competing demands of
18 Powerex versus demands of BC Hydro representing its
19 domestic customers, correct?

20 MS. MATTHEWS: A I don't call them competing demands,
21 because the demands of meeting BC Hydro loads
22 customers has to be taken care of first. So yes,
23 Powerex imports and exports out of the system for
24 trade, but I and my team have full ability to put
25 constraints on what they do, and we set those
26 constraints on what they can and can't do, because

1 ultimately I'm responsible for operating the system.
2 They like to trade and sometimes there can be
3 discussion back and forth on if they are wanting to do
4 something and we're saying no. Like especially when
5 we're coming up to a peak. Like we're going to be
6 conservative making sure we're holding back.

7 So like last week when we had the high
8 winter peak, so it's us who are setting like what are
9 we needing to have, and if there's leftover
10 capability, then Powerex can use, but we decide how we
11 use our resources.

12 MR. AUSTIN: Q But essentially using my milkshake
13 analysis, chocolate milkshake analysis, that Powerex
14 is sucking on one straw and BC Hydro's domestic
15 customer are also sucking on another straw.

16 **Proceeding Time 10:09 a.m. T26**

17 MS. MATTHEWS: A Well, both are using the reservoir,
18 yes, I agree on that.

19 MR. AUSTIN: Q And there was one area that came up
20 yesterday and that's in relation to the spring
21 freshet. So I'd like to show you a graph and get your
22 explanation of the spring freshet that overlays on top
23 of your explanation of the operation and management of
24 the core system and Mr. Clendinning's planning for the
25 core system. No one said this was easy.

26 And this will be Exhibit C-10-19.

1 (GRAPH HEADED "LOAD COMPARED TO SYSTEM ENERGY
2 INCLUDING IPPS" MARKED EXHIBIT C10-19)

3 MR. AUSTIN: Q Can you give us a brief explanation of
4 what happens to BC Hydro system during the spring
5 freshet in relation to inflows?

6 MS. MATTHEWS: A Yes, so as I think I described
7 earlier, our big system, the Kinbasket and Williston
8 reservoirs, we tend to draft them to their low point
9 just before the freshet, which is in April, and we do
10 that so that we can capture as much as we can of the
11 freshet flow into those systems.

12 MR. AUSTIN: Q Looking at Exhibit C10-19, is it
13 accurate to say that the majority of inflows into BC
14 Hydro's portfolio of resources comes from BC Hydro
15 Heritage assets?

16 MS. MATTHEWS: A I mean I think previously I talked
17 about that the IPP contribution was 25 percent to our
18 period -- or to our generation. So the rest of it is
19 BC Hydro Heritage, and so, yes, most of the energy
20 into the entire system is BC Hydro Heritage.

21 MR. AUSTIN: Q And when I look at that graph it shows
22 the contribution of third-party electric contributions
23 to that portfolio about 1800 gigawatt hours, is that
24 correct, during the spring freshet?

25 MS. MATTHEWS: A Well, the graph that you're referring
26 to is the one that was originally in the IR question

1 and the one I was talking to was for 2018, so it is
2 updated and it probably provides a better picture of
3 what the current one is. So yesterday -- and so
4 that's IR to Mr. Ince 1.7.5 in Exhibit B-7. And
5 that's probably the more recent of the data.

6 **Proceeding Time 10:14 a.m. T27**

7 MR. AUSTIN: Q Right. Is there a material difference
8 between the two of them?

9 MS. MATTHEWS: A Slightly in that it's higher because
10 there is more IPPs at that time.

11 MR. AUSTIN: Q Right, but still the major contribution
12 is from BC Hydro's Heritage assets?

13 MS. MATTHEWS: A Yes, I mean there's no doubt Hydro's
14 assets are the biggest amount of energy, and also
15 those storage facilities that were built in the
16 Kinbasket and the Peace were meant to capture that big
17 spike. But certainly the IPPs have added to the
18 contribution of the energy in the freshet and it has
19 gone up over the last ten years. Like, for one --
20 river hydro from about 500 to 3,000 in that time
21 period, so that's a big increase. I totally agree
22 with you that it's still small compared to the overall
23 BC Hydro part, but those reservoirs were also designed
24 to capture that. So they're kind of already capturing
25 as much as they can of the runoff that happens in that
26 point.

1 So the whole point of these pinch curves,
2 as we call them, is that we still now are in the
3 position of having these forced exports in this ring.
4 MR. AUSTIN: Q In relation to those pinch curves, is it
5 correct to say that prior to the decline in the
6 industrial load, and in particular the forest products
7 companies decline in load, there was more domestic
8 load available to absorb any contributions to the
9 portfolio that BC Hydro's reservoirs could not absorb?
10 MS. MATTHEWS: A Certainly additional load, especially
11 if that load is in the freshet period, which is why we
12 also have that freshet rates for the industrials, it
13 helps on the freshet issue in terms of forced exports
14 at that time.
15 MR. AUSTIN: Q So the concept of 24-hour-a-day, 7-day-
16 a-week load in the spring helps to ameliorate any
17 surpluses you may have with respect to the portfolio
18 of assets during the spring freshet?
19 MS. MATTHEWS: A I'd say any load, 24 hours yes, but
20 probably any load helps to reduce that.
21 MR. AUSTIN: Q Let's take it down to a little bit more
22 granular level. During the spring freshet is there a
23 lot of residential load at two o'clock in the morning?
24 MS. MATTHEWS: A I mean, the residential load is at its
25 lowest point at 2:00 in the morning, yes.
26 MR. AUSTIN: Q And similarly the commercial customers

1 don't make much of a contribution to the load during
2 the spring freshet at two o'clock in the morning?

3 MR. RICH: A Yes, that's correct.

4 MR. AUSTIN: Q And I don't know if this is the right
5 question for this panel but if BC Hydro was able to
6 track more load from the oil and gas industry would it
7 help ameliorate any surplus freshet energy problem you
8 might have?

9 MR. CLENDINNING: A I think it would help in that
10 period, but I think you'd have to look at what would
11 the impact be on our other peak periods? For example,
12 like last week. So, I think there's some tradeoffs to
13 be made by that, adding new load. So while in the
14 freshet maybe we'll take anything that we can get, the
15 profiles of customers -- it would depend on their
16 overall daily and seasonal and monthly usage.

17 MR. AUSTIN: Q Now that we've set the table in relation
18 to the core BC Hydro system contributions by IPPs, can
19 you please now take us through how you assess the
20 risks and manage those assets over a one year period?

21 **Proceeding Time 10:19 a.m. T28**

22 So I guess this gets us a bit into the
23 energy studies discussion, because what the energy
24 studies do is that they model really our load resource
25 balance. And I know we use that term a lot, and I
26 might just explain it because we do use it in

1 different time settings.

2 For example, when Mr. Austin referred us to
3 Table D-1 in the long-term planning view, that's
4 really a load resource balance at an annual level, and
5 at an annual level it's both on energy and capacity.
6 And then the energy studies in the end is creating
7 that at a monthly value. The energy studies does do
8 some month calculations that affect it, but
9 essentially what we are doing is getting a monthly
10 load resource balance.

11 And just to finish that off. When we're
12 actually in operations, like the shift office that I
13 had talked about previously, what they are doing is
14 doing a load resource balance for the next hour. So
15 we use that term a lot and we can use it in different
16 times, but for the energy studies what it is a load
17 resource balance on the energy out across the
18 operating time period.

19 And so what the energy studies also really
20 do is it -- it's really looking at the probabilities.
21 So there is the key factors that are the drivers into
22 the energy studies are the inflows, and that's the
23 biggest one. Also the load. And then the market
24 prices. So those three tend to be the big ones that
25 change things a lot.

26 Also included that can have an impact is

1 any outages or system constraints that we have in.
2 So that's all in the energy study.

3 So what they do is they model it out and
4 they give an optimal set of where you are now versus
5 all the things that can happen. And so we see that
6 going out, and that gives us the price signals. And
7 generally what we want to do is operate the system in
8 the most economic way. But we do take, I'll call it,
9 intervention going outside of that purely economic
10 part in two places, and that's around having low
11 reservoir levels and around potential for spill.

12 And actually, just before I go there to
13 finish up a bit more on the energy studies, is that in
14 the economic view that the energies are doing in that
15 optimization, they are also taking into effect the
16 economic tradeoff of when the reservoirs are higher
17 you can get more generation out of them, but you also
18 have a spill risk. And so they are taking account of
19 that tradeoff in the studies. But then when we get
20 into real time, we do have other considerations.

21 So like for example, around the risk of
22 spill, there is also other considerations for
23 environmental and social reasons why we might not want
24 to spill a damn, so we may not do the purely economic
25 part. And then on the low side, what we're really
26 doing is watching that low point of our reservoirs and

1 looking at how many of our sequences, so -- and when I
2 say "sequences" it's the historical -- I think we're
3 at 46, it might be, years that then give that
4 probabilistic distribution that we're looking at. So
5 we're looking at, okay, what's the probability that we
6 might get really low in those reservoirs and at what
7 point are we comfortable or not with it.

8 So to answer your question about the risk,
9 we use energy studies to give the economic picture and
10 then we evaluate and look at -- I tend to call them
11 the tails. They are the outliers on the distribution.
12 So we keep an eye on our tails.

13 MR. AUSTIN: Q I'd like to go through this in just a
14 bit more detail because it's very important to
15 understand in relation to your decisions. Not your
16 decisions, BC Hydro's decisions in relation to would
17 it allow Powerex access to in relation to energy, and
18 also meeting its domestic energy requirements.

19 **Proceeding Time 10:24 a.m. T29**

20 And I'd like to refer you to Clean Energy
21 Association of B.C. information request 1.5.1, and
22 that is Exhibit B-6. So that's Exhibit B-6, Clean
23 Energy Association of B.C. Information Request number
24 1.5.1.

25 MS. MATTHEWS: A Yes.

26 MR. AUSTIN: Q And under the heading test period, it

1 says,

2 "For the test period, BC Hydro used an ensemble
3 of inflow forecast based on historic inflows to
4 determine the energy forecast of modelled plants
5 and the application as found in columns 10 and
6 11 of schedule 4.0 in Appendix A."

7 So, is it correct to say that your energy
8 studies are based on what you have in terms of water
9 in the reservoirs, and then using a one year period,
10 you look forward in terms of potential inflows
11 resulting from precipitation?

12 MS. MATTHEWS: A Yes, so what the energy studies do is
13 at their point of time they use the current available
14 information of the system. So they start at current
15 conditions. And for the application this was based in
16 October, and so when you're in October you don't yet
17 have information on the snowpack. So you've got that
18 range of ensembles from history, but really that's
19 just going to be saying that you are expecting
20 average. And I should be clear, I mean in our answers
21 we often use the word "expected," and that is really a
22 statistical, probabilistic term. It means the average
23 in the middle. It's not like I expect to do this
24 tomorrow and I know that is what I'm going to do. So,
25 I think sometimes people misunderstand that word, but
26 it's expected it's really, like remaining the average

1 going forward.

2 MR. AUSTIN: Q So essentially what the models do is
3 predict -- I'll take that back. What the models do is
4 assume average inflows over whatever horizon they are
5 looking at. So, in the case of a one year study, they
6 assume from whatever date that they run, the
7 precipitation will be average for the next year?

8 MS. MATTHEWS: A Let me just explain it a little bit
9 more, because it is slightly different. For one, the
10 energy studies do go out past the three year period,
11 and that's just to make sure that there is not some
12 end effect at the end. So it's not just one year when
13 we are doing them, it goes out that one year, the two
14 years, the three years.

15 And the way we do our ensemble forecast, is
16 that like again, if we are here in January, and what's
17 the rain going to be on August 15th we really don't
18 know.

19 **Proceeding Time 10:28 a.m. T30**

20 So if I was to ask anyone in the room how
21 would they determine that, they'd probably look at the
22 historical record, you know, put a probabilistic
23 distribution about it and a pick the middle.

24 So in terms of rain, as we're doing in
25 energy studies now, you're using that historic. Now
26 what really comes into -- so, and for precipitation,

1 precipitation and for temperature.

2 Now, in let's say where we are in January,
3 if I'm trying to predict what the inflow to the
4 reservoir is in April 1st, then I could go back and
5 look at the historic record and say, okay, I guess it
6 to just be average. But because I know something
7 about the snowpack now and that information provides
8 me, I'll call it skill of what that inflow to the
9 reservoir might be on April 1st, so that gets
10 incorporated into our inflow model part that then
11 feeds the energy studies.

12 So to your question, when we're in October
13 and looking out much further for the year, it really
14 is going to be just reflective of what average water
15 might be. As we come through the year and we know
16 something about it -- like for example, the
17 evidentiary update is based on the June energy study
18 and we knew at that time that there had been very
19 low/slow flow, we had really dry -- we call them
20 antecedent conditions, the preceding conditions,
21 that's going to actually affect -- so you're not
22 actually expecting average going forward, it's
23 probably going to be lower than average.

24 So I guess to answer your question,
25 depending on what time of the year your energy study
26 is, it will be taking that information into account.

1 MR. AUSTIN: Q So let me try and help you out in
2 respect to -- with respect to an example. When the
3 first snow force ratings come in in January, is it
4 fair to say that those snow force ratings are based on
5 the assumption -- or the underlaying assumption is by
6 January I will know -- I will have a very good idea
7 what 30 percent of the snowpack should be at that
8 point in time?

9 MS. MATTHEWS: A I can't quote the number of 30
10 percent, but there is an IR, I can probably find it,
11 but it's -- I think it was one of the Panel questions
12 and it shows how our uncertainty goes down with time.
13 So when you start at the beginning of the year you
14 have much more uncertainty, and every month you go
15 forward of course you're getting less. So, yes, by
16 January you have more information of the snow. It can
17 actually still change a lot across January, February,
18 March, so I wouldn't want to guess on your 30 percent,
19 but conceptually you have information.

20 MR. AUSTIN: Q No, I'm not suggesting that I've got 30
21 percent of my annual snowpack, but the figure 30
22 percent is used to represent what percentage of the
23 snowpack should be in place by that date.

24 MS. MATTHEWS: A So if we're doing the energy study in
25 January, we would be using the current conditions of
26 what the snow is in January.

1 MR. AUSTIN: Q But beyond January I don't have actuals.
2 MS. MATTHEWS: A Correct.
3 MR. AUSTIN: Q All I have is --
4 MS. MATTHEWS: A Forecast.
5 MR. AUSTIN: Q -- it might snow, it might rain, it
6 might not.
7 MS. MATTHEWS: A Right. No, that's right. So as the
8 hydrology models do it, they start with the current
9 snowpack, and then for a historic year of precip and
10 temperature it would actually build that snowpack and
11 unbuild or turn it inflows coming into the reservoirs.
12 So that's all part of what comes out of the hydrology
13 model.
14 MR. AUSTIN: Q And you don't have to turn to this
15 Information Request if you don't want to because I'm
16 just going to be referring to one online of it, it's
17 Exhibit B-5, B.C. Utilities Commission Information
18 Request 1.31.1. It's Exhibit B-5, B.C. Utilities
19 Commission Information Request No. 1.31.1. And under
20 the heading "Incorporation of Variability in
21 Hydrology", hydrology such as the inflows to each
22 reservoir is the largest driver of uncertainty in the
23 energy studies.
24 MS. MATTHEWS: A Yes. No, that's correct. I talked
25 about the three main drivers is inflow, load, and
26 market prices, and certainly inflows is the biggest

1 range of how it impacts the outcome

2 **Proceeding Time 10:33 a.m. T31**

3 MR. AUSTIN: Q And biggest by how much?

4 MS. MATTHEWS: A Let's see. Just give me a second.

5 No, I probably can't quite figure it out in
6 terms of impact on, let's say overall on cost. But
7 it's probably -- I'm kind of guesstimating, it would be
8 at least -- if I look at it in terms of outcome on
9 dollars on the cost of energy, it would probably be at
10 least 50 percent of that.

11 MR. AUSTIN: Q Okay.

12 MS. MATTHEWS: A So I mean maybe it's 50 percent that
13 and 25 percent each for market prices and for load.
14 That, of course, can still change a lot. Like if the
15 market is super volatile in one year But in general
16 and on average that's probably fair.

17 MR. AUSTIN: Q I'd like to refer you to Exhibit B-6,
18 Clean Energy Association of B.C. Information Request
19 1.7.7. That's Exhibit B-6, Clean Energy Association
20 of B.C. Information Request No. 1.7.7.

21 MS. MATTHEWS: A Okay, yes, I have it.

22 MR. AUSTIN: Q And I'd like to refer you to the
23 response, the second paragraph. And it says:

24 "There is some inherent unpredictability in
25 weather and this grows with forecast lead
26 time; i.e. the weather forecast for the next

1 day tends to be more accurate than a weather
2 forecast for ten days later. Regular
3 verification of point numerical weather
4 forecasts is performed to assess
5 predictability and identify areas for
6 improvement."

7 And then the next paragraph says, last two sentences:

8 "Precipitation forecasts generally have no
9 skill but are shown to have marginal skill
10 regionally at certain times of the year.
11 For example, northwest B.C. in spring, south
12 interior in the summer, in parts of south
13 coast region in the fall."

14 Next sentence:

15 "Skill generally decreases at longer time
16 horizons of four to six months, seven to
17 nine months and ten to twelve months."

18 So for the purposes of the accuracy of the
19 results of the energy studies, is it fair to say that
20 the longer you go out, the less accurate they are
21 because of the large hydrological component of those
22 energy studies which is essentially the weather?

23 MS. MATTHEWS: A I'm going to actually distinguish
24 between weather forecasting and between what we do in
25 the energy studies because it's actually different.
26 So I mean, the answer is definitely that the weather
forecasts, and it talks in the near term, it's better

1 for the next day than ten days out. really physical
2 models that model the weather, it's pushing it if you
3 go to ten days. Even five days can be -- it gets
4 worse as you go on.

5 This question is really about getting
6 outside the early weather. Can you use these other
7 climate indicators like sea surface temperature and
8 whether it's an la niña or el niño year to give you an
9 indication of in the next three or six months are you
10 going to be warmer or dryer than normal, or are you
11 going to be -- whether -- or dryer. And I think this
12 may have come up in another part of this discussion
13 earlier.

14 So in our load forecast and in our
15 hydrology forecast -- or in our load forecast we
16 don't, you know, change it based on those, I'll them
17 seasonal -- it's not really a weather forecast, it's
18 more like a seasonal direction.

19 **Proceeding Time 10:38 a.m. T32**

20 And certainly the scale for precipitation is usually
21 very poor and it can be a bit better for temperature.
22 It's something that we always watch to know if there's
23 a leaning, but we're also very careful about deciding
24 to then incorporate and make decisions on that.

25 So with the energy -- so I disagree with
26 the part of then that the energy studies gets less and

1 less accurate as you get up because the energy studies
2 is not actually trying to forecast the weather. As I
3 had asked the question, you know, earlier, if you're
4 going to guess at whether it rains or not in April,
5 what you'd do is you look back at historic. So we're
6 not trying to use physical weather forecasting models
7 to do it, we're just looking at what's the probability
8 and we know the probability. We know it's not right.
9 Like, we're not trying to guess, that's the point.

10 What we're doing is we've got a range of
11 probabilities and then as we go forward we're always
12 adjusting as we get more information. And what we're
13 doing is we're not betting that it's going to be wet
14 and we're not betting it's going to be dry, we're just
15 going forward economically kind of always aiming for
16 the middle and adjusting as it goes.

17 So I disagree with that you had said, that
18 part. I do agree with it if you think about it in
19 terms of actual weather forecasting, but that's really
20 only two weeks.

21 MR. AUSTIN: Q I'll look at the second part of this and
22 I'll put it in context. I have my energy studies. A
23 very large component of those energy studies is what
24 happens with respect to hydrology, which is
25 precipitation. For the purposes of my modeling aren't
26 I trying to forecast precipitation which translates

1 into hydrology which translates into how I operate my
2 system?

3 MS. MATTHEWS: A That is true, but I think you have to
4 think of what we mean by a "forecast". So when we
5 think of a forecast obviously we're trying to make it
6 as accurate as we can, but we know we can't guess the
7 weather. We --

8 MR. AUSTIN: Q Thank you.

9 MS. MATTHEWS: A We expect it to be different. What
10 we're doing is tracking where we are in the
11 probability and adjusting as we go forward. And also
12 another big part of that, and I'm sure we'll get into
13 this at some point when we discuss the models more, is
14 that we really want to check that the imports aren't
15 biased, and I know yesterday there was discussion on
16 that on the load forecast. But we're not trying to
17 guess the weather, we're going on the expected which
18 is the mean of all the historic.

19 THE CHAIRPERSON: Ms. Matthews, I wonder if I could
20 just jump in here. I think I understand what you're
21 saying about -- and you're saying that your energy
22 model doesn't forecast the weather, when you say "we",
23 I think that's what you mean, right?

24 MS. MATTHEWS: A Yeah.

25 THE CHAIRPERSON: Your model doesn't forecast the
26 weather, it uses averages. So however, this IR does

1 seem to talk about weather forecasts. So is this IR
2 then talking about some weather forecasts for some
3 other reason other than your energy model? Because
4 I'm a little confused why we're looking at an IR
5 that's talking about the weather forecasts that BC
6 Hydro relies on and various modeling you do around it
7 and so on -- you know, the words are there. But if
8 you don't actually do that then this must be talking
9 -- this IR must be about weather forecasting for some
10 different purpose, is that correct?

11 MS. MATTHEWS: A Well, the question asks, "providing
12 any copies or links that BC Hydro has commissioned
13 with respect to unpredictable weather patterns." So
14 all it is is talking about how we forecast weather and
15 I think there is interest of, can you adjust if you
16 see these El Niño questions and so that's really what
17 it's addressing.

18 THE CHAIRPERSON: Right, but your response says that
19 "regular verification of point numerical weather
20 forecasts is performed."

21 MS. MATTHEWS: A Yes.

22 THE CHAIRPERSON: So you're doing that for some other
23 reason then, other than your energy model. Is that
24 the right conclusion to draw here?

25 MS. MATTHEWS: A Oh, yes. So, I mean, the energy
26 study, when we do it, at a point in time actually

1 includes the weather forecast for the first ten days
2 or so. But regardless of the energy studies, because
3 for the energy studies that's almost irrelevant.

4 **Proceeding Time 10:43 a.m. T33**

5 But in the operations that we're doing in this within
6 month timeframe, we are most certainly looking at that
7 near-term forecast. So we get a -- we produce weather
8 forecasts each day of what the next ten days are, and
9 we use that a lot for especially the smaller basins.
10 We do also predict and make those forecasts for the
11 big basins. So the planning engineers are also
12 looking at what is happening within the week, so that
13 is what we use those weather forecasts for, not so
14 much the energy studies.

15 THE CHAIRPERSON: Thank you for that.

16 And Mr. Austin, if you could let me know
17 when is a reasonable time for a break, it doesn't
18 necessarily have to be now.

19 MR. AUSTIN: I just want to finish up with this.

20 MR. AUSTIN: Q And what is the difference between the
21 weather and the precipitation forecasts that are
22 referred to in the last sentence of that IR response?

23 THE CHAIRPERSON: Well, the precipitation forecast here
24 is still talking about a weather forecast within this
25 seasonal, and whether there is any skill on can you
26 use those surface sea temperature and things like

1 that, to give you a better indication.

2 Now, the sort of forecasts that come out of
3 a seasonal forecast, if you are going to do one, are
4 not "It's going to rain on April 13th," it's more like
5 your chances are it's going to be wetter, or it's
6 going to be drier," and they might give you an
7 indication of how much. But usually not even then.
8 It is usually more like directionally, it's going to
9 be a bit wetter than normal. It's going to be drier
10 than normal. It's not a -- like on this day it's
11 going to rain this much sort of forecast.

12 MR. AUSTIN: Q I'd like to refer you to Exhibit B-6,
13 Association of Major Power Customers of B.C. IR
14 1.15.3. Exhibit B-6, Association of Major Power
15 Customers of B.C. IR 1.15.3.

16 MS. MATTHEWS: A Yes.

17 MR. AUSTIN: Q And I'd like to refer you to the
18 histogram entitled "Distribution of Fiscal 2019 system
19 inflow."

20 MS. MATTHEWS: A Yes.

21 MR. AUSTIN: Q Please correct me if I'm wrong, but I
22 read this to mean that the model was predicting a
23 distribution of system inflows, which are based on the
24 weather. And what we got or what happened is that the
25 actual observed was nowhere near what was forecast.
26 Is that not correct?

1 MS. MATTHEWS: A I'd probably say it a little bit
2 different. Because again, the models that we use in
3 energy studies aren't trying to predict the weather.
4 What we are using is the historical what has happened
5 to do the comparison.

6 So, what this is showing is that from that
7 distribution that we had, the actual dry period that
8 we had across Fiscal '19 was outside the range of what
9 we've had historically. And I don't have the exact
10 numbers, but it was very close to one of our critical
11 period years, so it was an extremely dry year, more
12 like one of those years from the 40s, and so it is not
13 -- it was outside our distribution from what is used
14 in the model.

15 MR. AUSTIN: Q So in this particular instance, the
16 study was not accurate?

17 **Proceeding Time 10:48 a.m. T34**

18 MS. MATTHEWS: A The study, I mean it comes down to how
19 do you determine if a probabilistic forecast is
20 accurate. That's really the overall question, because
21 we don't actually expect it to be accurate. We expect
22 on an ongoing basis that you're going to not have a
23 bias in the outcome. I've explained that before. All
24 we're doing is following where the expected is, we're
25 not making a bet on whether it's going to be dry or if
26 it's going to be wet. We're watching our risks on our

1 tails and we're adjusting as we go forward. So it's
2 -- we're not -- I guess I disagree with it. It isn't
3 accurate, because that's not how you judge a
4 probabilistic forecast.

5 MR. AUSTIN: Q But if you made a decision based on the
6 output of that model, and the actual observed turns
7 out to be something very different, then the decision
8 you made based on that model would not be correct.

9 MS. MATTHEWS: A We face every day making decisions in
10 uncertainty. That's actually what my job is. So
11 that's part of what we do all the time. If we had a
12 perfect forecast of everything we'd all be rich
13 probably and life would be easy.

14 But the other thing I would say is that I
15 think if you really want to look at the success of
16 fiscal '19 you actually just have to look at the
17 results. We managed through the most difficult period
18 that we've had and we've saved money for the
19 ratepayers. And that's something I'm actually very
20 proud of, and so I think that's where you actually
21 look if you look at what was the success of that year.

22 MR. AUSTIN: I think it's a good time for a break,
23 because the witness obviously needs some chocolate
24 milk.

25 THE CHAIRPERSON: Okay, on that note, we'll be back at
26 five past eleven.

1 **(PROCEEDINGS ADJOURNED AT 10:50 A.M.)**

2 **(PROCEEDINGS RESUMED AT 11:07 A.M.)**

T35/36

3 THE CHAIRPERSON: Please be seated, thank you.

4 Mr. Ahmed?

5 MR. AHMED: Thank you, Mr. Chairman. I do have a
6 couple undertakings at this time.

7 THE CHAIRPERSON: Thank you.

8 MR. AHMED: The first one is titled BC Hydro
9 Undertaking No. 13 and the transcript reference for
10 that is in Volume 8A and it begins at page 1206 and
11 this was a question with respect to revenues that are
12 derived from the transmission electric tariff and
13 where they're captured.

14 Just one clarification that I was also
15 asked to make with respect to this, you'll see in that
16 undertaking there's a transcript excerpt of an
17 exchange with Ms. Fraser and midway through the first
18 page where Mr. Fraser's begin,

19 "The transmission cost associated with the sales
20 that Powerex makes of the Canadian entitlement
21 on behalf of BC Hydro is a point-to-point
22 transmission cost that is recovered through our
23 electric tariff."

24 I'm advised that actually would be more accurately
25 described as a recovery of the Canadian entitlement on
26 behalf of the government rather than BC Hydro. Just a

1 technical difference there.

2 I believe the exhibit number for this
3 should be Exhibit B-40 and I have one more undertaking
4 as well to file.

5 (BC HYDRO UNDERTAKING NO. 13 MARKED EXHIBIT B-40)

6 THE CHAIRPERSON: So, Mr. Ahmed, are you asking that we
7 correct the --

8 MR. AHMED: I don't think the transcript needs to be
9 corrected, I think it's -- I just wanted that
10 clarification to be clear on the record. I don't know
11 that it makes a big difference, but --

12 And the next undertaking is titled BC Hydro
13 Undertaking No. 15. That was a request made by Mr.
14 Ince. The transcript reference for that is Volume 8B
15 and beginning at page 1321 and that was a request for
16 actual and forecast sales variances by month for the
17 months that are available since August 2019. And I
18 believe the exhibit number for that should be B-41.

19 (BC HYDRO UNDERTAKING NO. 15 MARKED EXHIBIT B-41)

20 THE CHAIRPERSON: Thank you, sir.

21 MR. AHMED: Thank you, Mr. Chair.

22 THE CHAIRPERSON: Mr. Austin.

23 MR. AUSTIN: Q I'd like the panel or in particular the
24 now chocolate milked up Heather Matthews to go back to
25 Exhibit B-6, Association of Major Power Customers of
26 B.C. IR 1.15.3, and the histogram for the distribution

1 of Fiscal 2019 since the -- the forecast in March,
2 2018. And the question I have is, what decisions
3 would BC Hydro, in conjunction with Powerex or in its
4 own right, have made on the basis of this histogram?

5 MS. MATTHEWS: A And sorry, you're referring to the
6 last histogram in the IR, which is Fiscal '19, the
7 March 2018?

8 MR. AUSTIN: Q Yes.

9 THE CHAIRPERSON: 1.15.3, that -- is that the one?

10 COMMISSIONER FUNG: Yes.

11 THE CHAIRPERSON: Yeah, okay.

12 MS. MATTHEWS: A The only thing is -- so that's the end
13 of Fiscal '19 and it's showing the observed as of
14 Fiscal '19, so I don't think we'd be making any
15 decisions based on that histogram because all it is
16 doing is comparing what the observed was compared to
17 -- like, so from the observed from March 2018 to what
18 actually happened. So it's a hind look, it's not
19 looking forward so we wouldn't make any decisions.

20 MR. AUSTIN: Q In relation to the studies that you do
21 have you ever done a retrospective analysis to
22 determine whether they were more accurate than 50
23 percent of the time?

24 **Proceeding Time 11:11 a.m. T37**

25 MS. MATTHEWS: A Yes, and I think you are referring to
26 the energy studies in general?

1 MR. AUSTIN: Q Yes.

2 MS. MATTHEWS: A Yeah, so we have -- we used to do what
3 we call a, "within the paint" analysis. So you look
4 back and say "Okay, well where did we end up, and
5 what's that scatter?" And is it biased or unbiased.
6 And we look at -- when I say "within the paint," it is
7 because we use the 10 and 90th percentile. So we are
8 looking at, like for 80 percent of time are you within
9 that band? Apparently we have done that in the past.

10 What we found, though, is that it is not
11 actually useful for us to improve the models going
12 forward. So it didn't actually tell us anything new
13 that we could make an improvement on. So what we tend
14 to do instead is focus the verification, I'll just
15 call it, on the input variables, and making sure that
16 they are not biased. So, on the hydrology, on the
17 market prices, and of course the load forecasting team
18 looks after the load forecast.

19 But within our models, around all of those
20 things we put variability. So we do also, are
21 constantly updating those for the most recent data,
22 and checking to see if we are capturing that
23 variability correctly, or I should say in an unbiased
24 way.

25 MR. AUSTIN: Q I'd like to refer you to Exhibit B-6,
26 Clean Energy Association of B.C. Information Request

1 1.6.1. That's Exhibit B-6, Clean Energy Association
2 of B.C. Information Request 1.6.1.

3 And would it be fair to say that going into
4 Fiscal '19, there wasn't a particularly dry period
5 prior to Fiscal '19?

6 MS. MATTHEWS: A It wasn't into the extreme levels. I
7 mean, we had had, if you look at those three years
8 going in, we had two years below average, and one year
9 a bit above average. I will note that that is
10 actually all of our inflow. On the Williston
11 Reservoir I believe we've had three years of low
12 inflows going in. And of course that affects our
13 storage. So, that is quite an important aspect of
14 where we then started into going into Fiscal '19.

15 THE CHAIRPERSON: But Ms. Matthews, based on C-10-18,
16 what is described here as a historical -- well in
17 words described it as one of the driest periods ever,
18 or the driest recorded ever, was it? In our
19 discussion? These three years?

20 MS. MATTHEWS: A Sorry, is --

21 THE CHAIRPERSON: C-10-18.

22 MS. MATTHEWS: A Yes. So yes, what is described in C-
23 10-18 is from the critical period of the '40s. So
24 that's our worst inflow sequence years.

25 THE CHAIRPERSON: So Fiscal year '10 and '11 are within
26 that range, aren't they? Or very close to it.

Proceeding Time 11:16 a.m. T38

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MS. MATTHEWS: A They are close to it. One caution I would suggest for comparing these, because I'm just noting it's back from 2005, each year when we add a different record our kind of normal changes, so you can't directly compare this because our record is getting bigger. So you can say our average might always be changing a little bit, but as a general those two years are definitely drier years.

THE CHAIRPERSON: But these aren't averages though. These are specific percents for a year.

MS. MATTHEWS: A Yeah, yeah, so percent of normal and I guess what I'm saying is that for these energy studies when we talk about normal we use the entire flow sequence that we have, and then each year we add another piece of record onto it. So your what I call average will actually change every year as you add on a new piece of data.

THE CHAIRPERSON: I do -- I understand that.

MS. MATTHEWS: A Okay.

THE CHAIRPERSON: But maybe I'm not asking my question correctly. If you compare fiscal year '11, which is 85.9, that's exactly the same as 1942, 1943 year, is that correct?

MS. MATTHEWS: A It is, and I guess what I'm trying to say is that the normal that might have been used for

1 this might be slightly different than this, so it's
2 maybe not quite the same, but it's close. So
3 definitely that's a dry year. And I --

4 THE CHAIRPERSON: Well, the number that is 85 percent
5 of, is that what you're --

6 MS. MATTHEWS: A Yes. Yeah. And I was looking,
7 because I actually thought I had this recalculated
8 based on our new normal, but -- I think I have it
9 somewhere in my binder, but --

10 THE CHAIRPERSON: Thank you. Okay. Thanks.

11 Sorry, Mr. Austin.

12 MR. AUSTIN: That's fine.

13 MR. AUSTIN: Q I'll tell Ms. Matthews exactly where I'm
14 going with this, is that the members of the Clean
15 Energy Association of BC don't understand how BC Hydro
16 found itself in the position of having to import as
17 much electricity as it did on such an urgent basis
18 given its understanding of how the BC Hydro system is
19 operated and the inflows into the reservoirs in the
20 leadup to the year where so much electricity has been
21 imported on such an urgent basis.

22 And I'd like to refer you -- that's not a
23 question. And I'd like to refer you to Exhibit B-6,
24 Clean Energy Association of BC Information Request
25 1.7.2. That's Exhibit B-6, Clean Energy Association
26 of BC Information Request 1.7.2.

1 out of the summer from that year our reservoirs were
2 lower than where they usually are, and there was a
3 number of factors to that. I mean, in particular the
4 summer that year we saw really high market
5 opportunities to be selling and we did make those
6 sales. It was at \$76. And then so --

7 MR. AUSTIN: Q Okay, can I stop you right there. So
8 using my milkshake analogy, Powerex sucked hard on the
9 straw.

10 MS. MATTHEWS: A No, that was B.C. domestic sales. So
11 we had a surplus that was forecast.

12 COMMISSIONER LOCKHART: Ms. Matthews, can I just
13 interrupt? When you "that year" you're talking about
14 -- this news release is dated April of 2019, so are
15 you referring to the summer of 2018?

16 MS. MATTHEWS: A Yes, that's correct.

17 COMMISSIONER LOCKHART: So the previous year?

18 MS. MATTHEWS: A Yes.

19 COMMISSIONER LOCKHART: Okay.

20 MS. MATTHEWS: A Yeah, so coming across the summer, or
21 coming out of the summer, we had made a lot of sales
22 in July and August because the price was really high.
23 At times it was over a hundred.

24 MR. AUSTIN: Q Okay, sales in B.C. or for the export
25 market?

26 MS. MATTHEWS: A Sorry, BC Hydro was exporting, so we

1 had set a special sale price and the markets were high
2 and so Powerex was making sales, but those were
3 allocated to domestic.

4 THE CHAIRPERSON: Sorry, what does that mean?
5 "Allocated to domestic".

6 MS. MATTHEWS: A Right, sorry. So now I'm going to
7 have to step back and explain the transfer pricing
8 agreement just a little bit here.

9 So BC Hydro wants to import or export from
10 the system when we have a surplus, and we also want to
11 import to meet our load, whereas what Powerex does is
12 that they import for the purpose of reselling later to
13 make trade revenue. So the purposes of what the two
14 companies do are quite different. They are trying to
15 trade income, we're trying to maximize the surplus
16 when we have it, and sell it to Powerex to sell into
17 the market, and then we're also buying when we need it
18 to meet our domestic needs, which could be for a
19 number of reasons.

20 So how we do that -- so in the energy
21 studies it just models what the economics is of the
22 system. It doesn't -- and then afterwards it makes an
23 estimate of what the allocation is between trade and
24 domestic. And so when BC Hydro forecasts that we
25 have surplus, we'll set a threshold price, and the
26 Powerex is the one who is making decisions about when

1 imports and exports are occurring. And then after the
2 fact what happens is that gets allocated to either
3 trade or domestic based on the threshold price that we
4 have.

5 So if we have a threshold sale price set at
6 let's say -- let's call it \$50 and on that day when
7 it's sold into the market the price is \$100. It's
8 above our threshold sale price, so the allocation
9 would go to BC Hydro. And then it's just the opposite
10 on purchases.

11 And I'll explain a little bit more, which
12 is a bit out of context but I think then it gives the
13 full picture, is that there are time when BC Hydro
14 says, like if we're coming up into a cold spell, like
15 what happened last week, we might mount a bit more
16 diversity of our resources. So we have enough
17 generation on line, but we might say, Powerex,
18 actually we want to be importing 100 megawatts, or 200
19 megawatts whatever it is, and then that becomes a
20 specific request that actually isn't tied to a price.

21 **Proceeding Time 11:26 a.m. T40**

22 We actually tell them we want you to bring that in for
23 us.

24 So, similarly on the export side in
25 freshet, when we have forced exports we can do the
26 same. We know those have to be taken by domestic, and

1 we need to get these out. So we do both, and here I'm
2 really talking about setting the threshold price, and
3 then depending what happens they get allocated.

4 So, in the summer of 2018, as we came
5 through and we have a forecast of surplus, we had a
6 threshold sale price set, and the prices were really
7 high, so a lot of sales were made from the system, and
8 those were allocated to domestic. Then towards the
9 end of the summer we got to the point where we were
10 actually on balance. And BC Hydro, we really try not
11 to sell and then need to buy back, that really is
12 Powerex's job, so we removed our threshold sale price
13 at that point. But that was towards the end of the
14 summer. So, those sales were economic.

15 I mean, at that time, we did not know that
16 we were going to have the worst year of our historical
17 record, and we also didn't know that the pipeline
18 would blow up. So when we come to that unusual set of
19 circumstances, and the concern -- I mean, I think the
20 part of being critical, we at that time, even in the
21 fall, we weren't as concerned of it being so critical
22 because of the water. We were also very concerned
23 because of the pipeline.

24 And so when we go back to managing risk,
25 like when we signed the letter agreement -- actually,
26 we had no idea what this winter would turn out. There

1 was all probability that it might be warm and wet.
2 And our mark to market note gains, we may have had a
3 loss on it. But at that time, because there was the
4 risk that we really might not -- we really might be in
5 trouble if we get to those low ends, we couldn't just
6 not do anything about it. And so that goes all to the
7 letter agreement and what we did.

8 I guess to the over-question of okay, well
9 how did we get in that spot, and if you have this
10 multi-reservoir, why did you get that low? And again,
11 we are following those price signals. We are looking
12 and monitoring those risks, but the -- I mean, making
13 those sales was the appropriate thing to do at that
14 time. I think we sold them at 76, in the end we
15 bought back at about 50. We made a gain of \$26, on
16 what we did in the most difficult year.

17 So we do have to be very careful and watch
18 those tells. But I think the flexibility of the
19 system, I mean we always talk in concept how important
20 the flexibility of the system is, but last year was I
21 think the first time where I really felt it. And you
22 really realize how benefit [sic] that system is, and
23 the flexibility that we have, especially when we could
24 look forward and say, "Okay, with the pipeline and
25 really high prices in December, we are not wanting to
26 be buying then, and we had the ability to look

1 forward."

2 Now, coming to the February and March, that
3 was also an event that was, I would say, outside the
4 historical dataset of what we had. We had a six-week
5 cold period. And it was still cold in March. Now, in
6 March and end of February it's not as cold as let's
7 say it was last week. But for that time of year, it
8 was still extremely cold, and that six-week period was
9 -- actually coming back to the weather forecast that
10 we had coming into that section, that seasonal
11 forecast was actually saying it should be warmer than
12 normal, and we ended up having like a six week very
13 cold period.

14 But so that actually proved out that that
15 was really the sort of risks that we were protecting
16 against, and it actually happened to occur -- I don't
17 think in the fall I had any idea or thought that --
18 you know, that that sort of thing is definitely is
19 going to happen but we had to protect against the
20 chance that it might.

21 **Proceeding Time 11:30 a.m. T41**

22 THE CHAIRPERSON: So, if I may?

23 MR. AUSTIN: Go ahead.

24 THE CHAIRPERSON: So you just used the term "protecting
25 against risks". So I think what I'm hearing you say
26 is that there was -- I think there was three

1 particular risks that crystalized earlier last year.
2 One is a cold February, second is a drought and third
3 is the Enbridge pipeline explosion. And you wouldn't
4 normally even attempt to protect against the pipeline
5 explosion, presumably, let alone all three of those
6 risks occurring at the same time. Is that --
7 MS. MATTHEWS: A Yes, that's fair to say.
8 THE CHAIRPERSON: That's fair?
9 MS. MATTHEWS: A That's correct.
10 THE CHAIRPERSON: But I think I'm hearing you say
11 though that in spite of that it was still, in
12 retrospect, turned out to be the right decision to
13 make the sales in 2018 that you did because you made
14 enough money off those sales to cover even those three
15 unexpected events all together.
16 MS. MATTHEWS: A Yes.
17 THE CHAIRPERSON: Did I hear you say that? And I --
18 MS. MATTHEWS: A Yes. No, that's correct that the -- I
19 mean, I think the sales that we made in the summer
20 were maybe slightly less than actually what we had
21 bought back, I'd have to check the numbers, but
22 certainly I stand by that those sales that we made in
23 the summer were the correct things to do and I'd do
24 them again.
25 THE CHAIRPERSON: So with hindsight you would go back
26 and do exactly the same thing anyway?

1 MS. MATTHEWS: A Yes.

2 THE CHAIRPERSON: Okay, thank you.

3 MR. AUSTIN: Q I'm not disputing that the outcome was
4 financially successful for BC Hydro. What I'm trying
5 to determine whether the outcome was skill or luck.
6 And I'd like to refer you to Volume 1 of the revenue
7 requirements transcript, which is a transcript of the
8 workshop on March the 15th, 2018. So that's Volume 1,
9 page 54 of that transcript. Volume 1, page 54, line
10 14.

11 "MR. O'RILEY: We don't typically update the
12 load forecast for weather. There is always
13 volatility around the weather and we had a very
14 cold February, we had a very mild January, a
15 very mild December, so a lot of those things
16 come out in the wash."

17 So I'm having difficulty understanding how
18 I put into context your need to service domestic
19 customers over the winter, which was mild in parts and
20 cold in others, and so, why should that make any
21 difference in relation to the immediacy and urgency of
22 having to import electricity?

23 MS. MATTHEWS: A So I'll address the first part on what
24 is quoted here from Mr. O'Riley and talking about the
25 load forecast, because I think that's actually more a
26 load forecast that Mr. Rich puts together and I think

1 he had even talked about earlier that it's a weather-
2 normalized load forecast. So that official load
3 forecast doesn't change with weather.

4 Now, what we do in the energy studies is
5 that we don't expect a normal year and there's a model
6 that basically adds the variability of the weather to
7 what it will do to our load.

8 **Proceeding Time 11:35 a.m. T42**

9 So in our model it covers that there is
10 going to be years with really cold levels and it also
11 covers that there is warm years and that is all part
12 of variability of the outcomes in the energy studies
13 that we're looking at. So they're -- definitely we
14 have captured a few cold years. And there's one
15 really cold year a couple of years ago. There's
16 another one from the '60s and I think '87 is a really
17 cold year. So when we were looking at the results of
18 the energy studies and wanted to be concerned of our
19 tails, it was those years with cold winters that we
20 were worried about.

21 And actually, I don't think people actually
22 appreciate with the gas pipeline and last year, how
23 much of a near miss it was for the industry in
24 general. Not so much for Hydro, we were fine and I'm
25 not going to talk too much about the gas, but had
26 December -- December was above normal. So was

1 January. By the time January was done the pipeline
2 was back to 85 percent. If we'd even had a normal
3 year of weather in December and January, the gas
4 situation would have been very, very difficult.

5 And I know that there's -- I mean Fortis,
6 I'm sure, has provided the Commission a lot of
7 information on that, so I don't want to get into it
8 more. But the part that I was talking about for
9 February in terms of I don't think we have a February
10 like that, or I know we don't on our historical
11 record, but when we were starting out in the fall, we
12 knew that there was the risk of a potentially really
13 bad December.

14 Not only that, we had the risk of if that
15 happened, we'd probably have people plugging in --
16 like Fortis would be telling people to conserve gas
17 and go buy an electric heater from, you know, Canadian
18 Tire and plug it in. And so we did have risk that
19 there would be fuel switching and that was something
20 we were really concerned on.

21 So I disagree with the comment that it's
22 not sure if it is luck or skill. I mean, that's what
23 the energy studies does in terms of looking at the
24 range of possible outcomes. I wasn't trying to guess
25 what the year would turn out to be, but I was being
26 careful to make sure that we managed those tails.

1 And really for all probability, it might
2 have not turned out to have that February, and we
3 might have, you know, bought energy at -- I think it
4 was in the -- I just can't remember, 30s, 40 dollars
5 or the total cost was, I think, \$50 that we might not
6 have needed. But that still would have been worth it
7 and we could have still then, you know, eventually
8 sold that back into the market at perhaps, you know,
9 usually probably around that cost anyway.

10 So the whole thing on mismanagement is
11 you're not actually trying to guess what the year is
12 going to be. And what I really find is that -- I mean
13 that's why we have to look at the data. Like
14 everybody tends to have current-itis on what is
15 happening now. Like I mean think of last summer. May
16 and June how dry that was. And there was fires
17 already starting up north, and there was a lot of talk
18 about how bad the fire season was going to be. Like I
19 think everybody was betting on a dry summer, but we
20 just have to look at the data and the probabilities
21 and still protect the ends. And that's what we did
22 and do.

23 So I guess what I'm saying is like we -- we
24 always -- all we can really do is look at what those
25 probability are as the range of outcomes. We base our
26 decisions on the economics where we are, and we watch

1 operate to the economics, we don't operate to a
2 critical period. We don't set that, we want to have
3 reservoirs at this level for a certain time. And
4 partly why we don't do that is because we actually
5 have the flexibility of the system to adjust.

6 Because remember when we went back and
7 talked about the critical energy study, it was done on
8 the basis of there are no imports and exports. So
9 when we're in operations our objective function is
10 different, we're maximizing value, but that doesn't
11 mean that we still don't really watch our tails in
12 risk and make sure that we're able to meet load and
13 that we're not taking on too much risk.

14 MR. AUSTIN: Q I'm not disagreeing with that, but would
15 it be fair to say that once the change was made for
16 using average water as a replacement for critical
17 water, you will now have to import more frequently
18 than you ever did under critical water because 4100
19 GWh of output from the Heritage Hydro assets is what
20 you manage to instead of the lower figure of 4100 GWh
21 less?

22 MS. MATTHEWS: A Yeah. So, I mean the question is
23 really around our planning criteria. And planning
24 criteria, I mean it's on a spectrum, and if you move
25 that spectrum one way or the other, by the time you
26 get into operations where I am, it's going to effect

1 on average how much you have to buy and sell, and I
2 completely agree with that.

3 Now, I think this question about where we
4 should be on the spectrum and where the right place
5 is, I think we've said in the IRs that the planning
6 criteria will probably be a topic of a big discussion
7 in the IRP, pending anything coming out of the
8 government review. And it's something that actually
9 hasn't had a big discussion for quite a long time and
10 it's probably one that's due and needed, and I'm sure
11 it's going to be a very interesting discussion and
12 lots of questions at that time about where the
13 appropriate place is.

14 I know the other thing that's important in
15 all this as we consider it, is it's not just the extra
16 4,000 or not, it's what that energy is, how you can
17 forecast it, and the variability around it, I'll call
18 it. Like it does seem like what we've looked at and
19 we're looking at some of the data a lot more that -- I
20 call it our swings, our swings from high to low, like
21 we used to always think of the Heritage energy as, you
22 know, swinging plus or minus 5,000 as the year and I
23 think in one of the IRs' response, says we've said
24 it's plus or minus 7,000 now, and we think we might be
25 underestimating some of the contributions.

26 So that is something that's definitely a

1 precisely inflows into the reservoirs will be because
2 as of October 1st the inflows into your main
3 reservoirs, meaning Kinbasket and Williston, are going
4 to be hugely reduced, because the precipitation starts
5 to get locked up in the form of snowpack?

6 MS. MATTHEWS: A That's true if what you are asking me
7 for is the response, like on the fiscal year. But the
8 actual answer is that the reason October 1st is used is
9 because you actually have no idea from the October 1st
10 to the next October 1st, you have no indication of
11 snowpack or anything like that. But for the course --
12 for the point of the RRA, where all of the information
13 is in fiscal year, you've now completed half the year,
14 and you have a lot better indication of where your
15 water is and what the forecast is.

16 MR. AUSTIN: Q Because going back to Information
17 Request 1.7.2, it says "however, dry conditions
18 develop during the summer and early fall of 2018."
19 And this morning I was asking questions about when
20 there is rainfall with respect to Williston, which is
21 predominantly the summer, and then I was asking the
22 question about Mica and you're going to get back to us
23 on that one.

24 But how much of the total inflows into the
25 reservoirs occurs in October or November, because this
26 press release and the answer to the IR seem to

1 months, depending on how you come out of the fall as
2 being dry or wet, you can actually change that, kind
3 of groundwater impact by about 2,000 gigawatt hours.

4 So what happened last year, and I'll admit
5 that I didn't actually fully appreciate this at the
6 time, although my team did because this is always a
7 thing in the model, is as you come into the fall do
8 you make an adjustment on using the historical or what
9 we call the ESP forecasts? And so when we're in an
10 average time of year we prefer to use the historical
11 data because the historical data gives you a wider
12 range. ESP forecasts, and that's the type we do in
13 January where you start at a certain condition and you
14 know you snowpack and you use the historic and go
15 forward, they tend to have a narrower ranges so when
16 we have no real information we'd rather use the
17 historic.

18 So as it came dry across the summer in
19 Williston and still into September, then into October
20 we're actually knowing that that might have an effect
21 on the inflows across the year. So it's a question of
22 when we fully acknowledge this or change -- I
23 shouldn't say acknowledge it. Whether we change that
24 when in our models. And that was actually the same --
25 so that wasn't a big change. Like on our overall
26 system for 2018 it was about 1,000 gigawatt hours but

1 it did come into play in the fall.

2 Now, for 2019 it was a risk that we were
3 well aware of and were watching very closely because
4 in June, as you see where we came out, we were at, I
5 think, the 60 to 30 percent of our water year
6 forecast, so we were extremely low. So we were
7 actually really worried about this groundwater risk if
8 it remained dry across the summer and so we were
9 watching that and balancing it off with other things.

10 And in the end, the summer, I don't know if
11 you have friends or relatives who live up in Prince
12 George they'll know it was actually a really wet year
13 and so if anything we moved from the dry into the high
14 and we didn't have any of that groundwater risk.

15 So that's what this is explaining in here
16 and why it's not just that one month in October. We
17 were watching it as it developed but we're waiting
18 until the -- we're not fully seeing it where it locks
19 in until the winter, until October 1st.

20 THE CHAIRPERSON: Sorry, you mentioned an ESP model.
21 What is that, please?

22 MS. MATTHEWS: A It stands for Ensemble Streamflow
23 Predictions and it's really what I had described
24 before as -- so, in our hydrology model in January
25 we'll have the current snowpack and current conditions
26 and then we'll run an ensemble for, let's say, 1990 of

1 the temperature and precip and it will build the
2 model, bring the model down and create a flow. So
3 we're using the current conditions. And so that's a
4 different way of giving out probability going forward
5 as opposed to just taking the historic inflows.

6 THE CHAIRPERSON: Thank you.

7 MR. AUSTIN: Q Why in your public pronouncements or
8 even in response to the Clean Energy Association of
9 B.C.'s Information Request 1.7.2 don't you explain the
10 groundwater risk?

11 MS. MATTHEWS: A Well, I think it describes it in that
12 dry conditions across the summer and the inflows are
13 lower. It didn't get into the whole detail of the
14 modeling because it's -- I mean, in general I think we
15 find that our models are probably complicated in that.

16 MR. AUSTIN: Q Because for the purposes of the response
17 it seemed that we were having something that the CEABC
18 never heard of, which was an autumnal drought. And
19 given that there's very little in terms of inflows
20 into the main reservoirs in October and November from
21 precipitation events, how would anyone know that the
22 problem was groundwater inflows?

23 **Proceeding Time 11:54 p.m. T46**

24 MS. MATTHEWS: A I mean again, I think the reply does
25 answer it in terms of that -- and groundwater is kind
26 of in quotations, I think. But I mean we've answered

1 it in that those dry conditions across the summer and
2 fall are what caused us to then know that we've got
3 less coming forward. You're right that we could have
4 put in more information to explain it in here, but I
5 think we were capturing the general message of what
6 the change was, and it was really was round that dry
7 summer and fall.

8 MR. AUSTIN: Q I'd like to back to your
9 characterization of electricity sales that were made
10 in May and -- excuse me, in July and August. And
11 despite how they were allocated under the transfer
12 pricing agreement, where did the electricity actually
13 go?

14 MS. MATTHEWS: A I can't actually answer that question
15 because I don't actually look at that part. I mean,
16 thinking back to that summer, I'm trying to remember
17 if I can think of anything of what was happening
18 between the two different markets of, you know, the
19 Pacific Northwest versus California. I mean a lot of
20 the exports at certain times of year end up being in
21 California, but that's not -- I don't have those
22 numbers and I don't know.

23 MR. AUSTIN: Q I'm not asking you for that level of
24 precision, but in terms of where the electricity went,
25 is it correct to assume that it went beyond the
26 borders of British Columbia?

1 MS. MATTHEWS: A Yes, we were exporting.

2 MR. AUSTIN: Q But when electricity is imported into
3 the province by Powerex that is later resold into
4 export markets, do you ever ask Powerex where that
5 electricity came from?

6 MS. MATTHEWS: A No. I mean the job of Powerex is to
7 go to different markets, but both temporally and
8 geographically and run their business of finding
9 trade.

10 MR. AUSTIN: Q And so you have no idea of whether the
11 electricity that's coming in is thermally generated
12 electricity or renewable electricity?

13 MS. MATTHEWS: A I mean what I and my team do watch is
14 that -- I mean every week when we are looking back, we
15 look at the imports and the trends that happen, and
16 certainly there's been changes over time. So I think
17 the concept that the imports into the Hydro system are
18 all at night from thermal is not right. We do see a
19 lot of times now during, you know, the middle of the
20 day is actually when imports are happening and I think
21 the general background of what's happening in the U.S.
22 market and in California and the amount of solar, so
23 there are certainly times when we're importing the
24 solar in the middle of the day. Like I don't ask
25 Powerex that, but I can see just from the shape of it
26 that you can probably make a guess that that's

1 also compare to the other states, and even California,
2 and look at their generation, we have a really high
3 percentage of clean energy. And so if overall we are
4 exporting, we are actually reducing GHGs in those
5 other jurisdictions, and I believe we actually export
6 more to Alberta than we import. And the other part is
7 our imports in general. I mean, I think there was
8 been discussion on the Canadian entitlement, and that
9 does come into the system, and that is also clean.

10 So on the GHG, certainly the tracking of
11 it, and making sure there is not leakage, and having
12 the rules in place is important, but in general, if
13 you are going to talk about the imports, you also have
14 to actually talk about the exports.

15 THE CHAIRPERSON: Right. But Ms. Matthews, BC Hydro
16 does have obligations under the *Clean Energy Act* to
17 generate a certain percentage of clean or renewable
18 energy, correct?

19 MS. MATTHEWS: A Yes, that's right.

20 THE CHAIRPERSON: But you have no obligations under any
21 -- I'm asking, do you have any obligations under any
22 enactment or legislation regarding the energy that you
23 sell in British Columbia, or that you provide to
24 British Columbians?

25 MS. MATTHEWS: A No, the only part we have is the 93
26 percent clean target of generation.

1 THE CHAIRPERSON: Right. So you are not constrained in
2 the energy that you import. You are not constrained
3 in any way about what that energy -- the source of
4 that energy, or how it's generated, or how much is
5 generated from what source, is that correct?

6 MS. MATTHEWS: A Yeah, no, that's correct, we're not
7 constrained. I mean, we do need to report on those
8 imports, and there are some regulations that we have
9 to meet on where they're from, and we do do that,
10 that's our only requirement.

11 MR. CLENDINNING: A I'll add to that, under the
12 planning view we have that obligation, but when
13 Heather is operating the system, and the forecast and
14 the resource --

15 THE CHAIRPERSON: Where does that obligation arise from
16 the planning view?

17 MR. CLENDINNING: A So I am referring in terms of the
18 self-sufficiency requirement, when we're planning the
19 system that is independent of these imports and
20 exports for the planning horizon, the three to 20
21 years, about what resource stack we are going to be
22 handing over to the operations folks, once that stack
23 is there, Ms. Matthews is referring, she is free from
24 those obligations at that point.

25 THE CHAIRPERSON: So this is a question that I asked
26 Mr. O'Riley a few days ago. How does that self-

1 sufficiency obligation work? We take a look at the
2 demand over the course of a year, and provided you've
3 got, the generation you have matches that demand,
4 that's considered self-sufficient? It's not that on a
5 day-to-day basis, all the energy that you provide to
6 my house doesn't all have to be generated here in B.C.
7 You could purchase the energy to supply to my house
8 from outside of B.C., provided over the course of a
9 year that is offset with -- is that correct?

10 MR. CLENDINNING: A On the planning view, we don't
11 allow for imports and exports --

12 THE CHAIRPERSON: Correct, but on the operational view
13 you do.

14 MR. CLENDINNING: A -- period, but once Heather is
15 handed basically the resource stack, then at that
16 point she is allowed to -- she can --

17 THE CHAIRPERSON: So you can't supply energy to my
18 house that is purchased from --

19 MS. MATTHEWS: A Yeah, that's right, and I guess, the
20 difference also between planning and operations is we
21 don't try to track that. Like we don't need to -- it
22 doesn't matter how the math ends up on it, whereas in
23 the planning view, it's really again about making
24 decisions on when we're needing to purchase or build
25 or procure more DSM. So, we don't -- like whether
26 it's a one year, or three years, I'm never looking at

1 exporting, like if we're -- if you're really wanting
2 to look at the GHG balance, you need to also consider
3 imports and exports.

4 MR. AUSTIN: Q I'll just try and frame an example a
5 little bit more precisely. If there's a coal-fired
6 generating plant in Alberta, is it fair to say that
7 the start-up time and shutdown times for coal-fired
8 generation plants whether they be in Alberta or
9 anyplace else, is quite lengthy and expensive?

10 MS. MATTHEWS: A I don't know about quite lengthy and
11 expensive, but coal-fired plants, I think in general,
12 they try to run them base load and not turn them off
13 and on. I think that's what you're referring to.
14 They might still have it a lower level and ramp it up
15 to a higher level for a period without [sic] the day
16 and then ramp it down.

17 MR. AUSTIN: Q So they might BC Hydro as a customer to
18 prevent a complete shutdown.

19 MS. MATTHEWS: A Again, I wouldn't say that. It
20 depends where they are. They can bring it down, they
21 can back it off and they can also sell it to other
22 people, other utilities.

23 MR. AUSTIN: Q Just one other final question. It's
24 just more of a clean-up matter. I'd like to refer the
25 panel to Exhibit B-1, Appendix G, page 2.

26 Perhaps we can save that one for after

1 lunch, because I may have the wrong exhibit number.

2 THE CHAIRPERSON: Okay. Thank you, Mr. Austin. Do you
3 have any estimate of the time, just so that we can do
4 some calculations during lunch?

5 MR. AUSTIN: I think now that we've gone through this
6 area, maybe another hour.

7 THE CHAIRPERSON: Okay, thank you, sir. So let's come
8 back at quarter past one then.

9 MR. AUSTIN: And my apologies for taking so long going
10 through this area. I thought it was an important area
11 to go through.

12 THE CHAIRPERSON: Thank you.

13 **(PROCEEDINGS ADJOURNED AT 12:08 P.M.)**

14 **(PROCEEDINGS RESUMED AT 1:16 P.M.)**

T49/50

15 THE CHAIRPERSON: Please be seated. Hope everyone had
16 a good lunch. Welcome back. Unless there's any other
17 business we'll get started.

18 Mr. Austin?

19 MR. AUSTIN: Q BC Hydro Panel, I just wanted to clear
20 up one thing in relation to my cross-examination in
21 relation to the operation of the BC Hydro system.
22 Could you please refer to Exhibit B-19. Exhibit B-19,
23 Appendix G, page 2. So that's Exhibit B-19, Appendix
24 G, page 2.

25 Have you found that?

26 MS. MATTHEWS: A Yes.

1 MR. AUSTIN: Q At the very top of the page it says:
2 "Overall actual domestic energy sales in fiscal
3 2019 were 251 GWh or five percent lower than the
4 fiscal 2019 RRA plan."

5 And in the middle paragraph on the page, last
6 sentence, it says:

7 "The total number of residential accounts was
8 2,000 or 0.1 percent higher than forecast in
9 fiscal 2019 and temperatures were slightly
10 colder than normal during the year."

11 Now, I brought to your attention page 54 of Volume 1,
12 and there seemed to be some discussion by the Panel
13 about the very cold February, and mild January, and
14 mild December and things coming out of the wash
15 relating to planning, but I don't see any similar
16 apparent qualification with respect with respect to
17 this description of the weather.

18 MS. MATTHEWS: A Well, this looks like it's an annual
19 basis, so on an annual basis it describes it as
20 slightly cooler than normal.

21 THE CHAIRPERSON: Right.

22 MS. MATTHEWS: A So I guess I'm not seeing your
23 question.

24 MR. AUSTIN: Q My concern originally was why is one
25 cold February in the context of an entire winter
26 something that should cause BC Hydro to hit a major

1 speedbump, to cause it to have to import large volumes
2 of electricity?
3 MS. MATTHEWS: A So I think we talked about a number of
4 things that were going on for last year or I guess
5 fall of 2018. So as we came out of the summer and
6 into October, and then we had that ground water
7 effect, so at that point we had been -- like coming
8 out of August we had been forecasting to be about
9 even, and then we were looking at -- I can't remember
10 the number exactly, but that are shortfall going
11 forward. And actually I might just define a couple
12 terms here, because we use them and they sometimes
13 mean different things.

14 So when I use the term "surplus" or
15 "deficit" in a year, it's not the same as surplus
16 sales. Think of it as inflows, plus EPAs, minus your
17 load. So it's not taking anything on what you might
18 do in the reservoir, it's just purely for that year in
19 those EPAs minus load.

20 And then when I use the term "shortfall",
21 it's from a point of time looking forward. So
22 similarly if you look at the total numbers for the
23 year, I think the imports and exports are total
24 imports, or you could almost say wash, because we sold
25 a bunch in the summer, and then bought it back in the
26 winter. So that's true.

Proceeding Time 1:21 p.m. T51

1
2 But the point where we were in October is
3 we were looking at a shortfall of, I think, it was
4 about 1,600 for the fiscal year, and then in April
5 there was a risk of 1,000, so I think the total was
6 about 2,600. And that generally is not a crisis at
7 all. As Mr. Austin said, we can be importing that.
8 And also there was water in our reservoirs to be
9 managing it. And we took the steps of purchasing
10 forward to manage that.

11 Then when we got to -- I mean, once
12 generally our wetter or colder weather is in December
13 and January. Especially when I look back at those
14 cold years like I mentioned. '87 is a particularly
15 cold one. Like those are, when you have really cold
16 December and January. So, I mean frankly by the end
17 of January I thought we were well past our risk and
18 not an issue, and then we started getting into that
19 cold spell in February, and I wasn't too concerned
20 either, because it was actually a good chance to make
21 some exports, and again markets were high. But that
22 period then extended for six weeks. So that was what
23 was unusual about that, and again, I talked about that
24 type of event had not been in our historical record.

25 I think the other thing about it, is that
26 with things just working out the way they did, we were

1 good and fine. We had the ability to go lower, but
2 even in February, I'm still managing my risk that
3 could be even worse than it is. So, that's partly why
4 we had a need to be making sure in March and April
5 that we had the availability to import a lot of
6 energy. Because you can have a cold spring, and a
7 cold spring in April is not like December where it is
8 negative, but it does delay the freshet.

9 So generally the freshet starts somewhere
10 end of April or May, but it doesn't really get going
11 until into May, so we still actually have fairly low
12 inflows. And at that point our reservoirs are low and
13 if there is nothing else coming in, like the tank is
14 empty. So even in February as we got cold, that was
15 actually okay. But we were managing our risk out in
16 March and April. And then also that is a time when
17 generally it's good to import in terms of the prices
18 are low. And so through March and April we basically
19 had the tie-line pinned in terms of importing in as
20 much as we could. We were up at the kind of
21 operational limits trying to bring in as much energy
22 as we could. So I guess I don't think it is
23 inconsistent.

24 MR. AUSTIN: Q I think perhaps that is a matter for
25 argument but --. I'd like to move on to a completely
26 different area, and we have some witness aids which

1 were given to BC Hydro in advance.

2 I've been advised that they have to be
3 marked as exhibits. One should be marked C-10-20.
4 And that will be the one that is based on the Clean
5 Energy Association of B.C. IR 4.58.1. That is C-10-
6 20.

7 (CLEAN ENERGY ASSOCIATION OF B.C. IR 4.58.1 SIX LINES
8 MARKED AS EXHIBIT C10-20)

9 MR. AUSTIN: Q And the exhibit that is marked CEABC IR
10 4.58.1 that shows service percentage by BC Hydro
11 percentage for five areas in the Montney should be
12 marked C-21.

13 MS. MATTHEWS: A C-10-21?

14 MR. AUSTIN: Q C-10-21, my apologies.

15 (CEABC IR 4.58.1 SERVICE PERCENTAGE MARKED AS EXHIBIT
16 C10-21)

17 MR. AUSTIN: Exhibit C-10-20 has two lines on the
18 graph, to make it simple. And C-10-21 has six lines
19 on the graph.

20 The one with the two lines on it is C-10-
21 20, the one with six lines is C-10-21.

22 It confirms the commonly held belief that I
23 am terrible at numbering exhibits.

24 Panel, I would like to refer you to Exhibit
25 C-10-21, which has two lines on the graph, and these
26 are based on tables that the BC Hydro provided the

1 do, in this case, I think Mr. O'Riley answered some of
2 those questions on the first day and yesterday as well
3 on the operations panel in terms of the sales
4 function. So, Mr. Rich and I don't oversee the sales
5 function, we do look at what their plans are and
6 evaluate them but I'm not equipped to really answer
7 that question beyond what the previous panels have
8 answered.

9 MS. DASCHUK: A I'd be happy to take some questions on
10 Panel 4 specifically related to the projects that
11 we're including in the north Montney transmission
12 project, the Bear Mountain voltage conversion project
13 and the Prince George to Terrace capacitors project.
14 All of those projects are intended to support the
15 capture of more of the oil and gas sector.

16 THE CHAIRPERSON: But to be clear though, those
17 projects are intended to support this red line on this
18 graph, is that correct? Or support the energy
19 represented -- they're not intended to support an
20 increase over --

21 MR. RICH: A That's correct. So, the Peace region
22 electricity supply project is intended to support the
23 growth in the Dawson/Groundbirch area and so even the
24 committed growth that's happening now necessitates
25 that project and the associated project, Bear
26 Mountain, also facilitates growth in that region. The

1 north Montney one supports the potential growth in the
2 GMS region and that's the one where there's a bit of a
3 chicken and egg because there's a lot of projected gas
4 production that's going to happen in that area to
5 support LNG Canada. They are interested in taking
6 service from BC Hydro, they haven't committed yet but
7 given the differences in lead times between building
8 transmission and support that growth.

9 THE CHAIRPERSON: Right. But to ask the question in a
10 slightly different way then, does this collection of
11 capital projects you've just referred to, would it
12 support a greater growth than we see in this red line?

13 MS. DASCHUK: A The intention would be if there is
14 interest from the customers because right now these
15 are projects in very early stages. In no way would it
16 affect the test period because these are financial
17 decisions that haven't been made. But from a longer-
18 term perspective they are intended to allow us to
19 capture more of the oil and gas sector
20 electrification, provided those customers are willing
21 to do so.

22 THE CHAIRPERSON: Thank you.

23 COMMISSIONER FUNG: If I could just follow up on that,
24 Ms. Daschuk or Mr. Rich? So those projects that you
25 just mentioned, are they already included in the solid
26 red line?

1 MS. DASCHUK: A No.

2 COMMISSIONER FUNG: So they're somewhere between the
3 dotted line and red line, is that correct?

4 MR. RICH: A Well, the press project would be required
5 to support the solid red line.

6 COMMISSIONER FUNG: Right. What about the others that
7 you've just mentioned?

8 MR. RICH: A Well, I'm going to step back. I wonder
9 what would be helpful. We have, actually, as part of
10 an IR response actually a map of the Peace region and
11 I'm wondering if that would -- I think that would be a
12 complement to witness aids here if you want to turn to
13 that and it may help to explain it. So I'm referring
14 to Exhibit B -- is that 5 or 6? I've got to put my
15 glasses -- B-6 and it's response to Ince 1.6.6.

16 COMMISSIONER FUNG: 1.6.6, thank you.

17 MR. RICH: A And Mr. Austin, it may actually help to
18 look at your other witness aid as well when I
19 described this. Is that --

20 MR. AUSTIN: Q Absolutely because I fully support the
21 panel's question of what's included in that solid red
22 line.

23 MR. RICH: A Have you got the -- okay.

24 COMMISSIONER FUNG: Yeah.

25 **Proceeding Time 1:34 p.m. T53**

26 MR. RICH: A So if you look at the other witness aid,

1 C-10-20 and you look at the six lines and they're
2 identified by each of the sub-areas that are within
3 the Peace regions, you see Dawson Creek, and
4 Groundbirch, Tumbler Ridge, Chetwynd, GMS, and Fort
5 St. John in the Peace map. And so, most of the gas
6 production growth, and in particular the gas
7 production growth that we're supporting through
8 electrification, is occurring in the Dawson Creek and
9 Groundbirch area. And if you look at the witness aid
10 C1020, you see that's where the greater
11 electrification percentages are.

12 In terms of the projects, the Peace Region
13 Electricity Service project and the Bear Mountain
14 project will support those loads, and then further
15 increases in those loads, and those future increases
16 would be above and beyond the solid red line. So
17 where we say we think we've got 60 percent
18 electrification of the current and future gas
19 production in that area, the PRES project would be
20 required to serve that, and then as well as enable any
21 future increases in those areas.

22 The Gordon Shrum area is the other area
23 where most of the gas production is happening. And
24 it's in that area where, at this point in time because
25 of a lack of, frankly, service requests from the
26 customers so we're in discussions and therefore

1 they're not in the forecast but they are interested in
2 electricity service, it's that region that would be
3 supported by the North Montney transmission project.

4 COMMISSIONER FUNG: Thank you.

5 MR. RICH: A And so a lot of the production growth that
6 you see in the dotted line is related to that,
7 primarily that GMS area, as well as continued growth
8 in the Dawson Creek and Groundbirch areas.

9 MR. AUSTIN: Q So when I look at Exhibit C-10-20 and I
10 look at the yellow line on the bottom, that assumes
11 that the North Montney line will come into service in
12 2023, is that correct?

13 MR. RICH: A No, it's not correct. It doesn't assume
14 anything with respect to the North Montney line. And
15 says, "If there is commitment from customers that
16 requires the North Montney line, then we will build
17 the North Montney line." So right now in the forecast
18 we actually assume that there's actually a few
19 customers that will take electricity service because,
20 as I stated yesterday, based on current natural gas
21 prices, the economics generally favour self-supply and
22 favour in preference to service from BC Hydro.

23 MR. AUSTIN: Q Though without that North Montney line
24 there will be no electrification in the North Montney,
25 is that correct?

26 MR. RICH: A Well, that's correct. And this is why I

1 describe it as a bit of a chicken and egg where we
2 want to spend some money in advance because of the
3 lead times associated with transmission so that we are
4 ready and available to serve them if and when they
5 make a decision to take service from Hydro.

6 MR. AUSTIN: Q And in relation to Exhibit C-10-20, if
7 you look at the solid red line in the middle of the
8 graph, that's the weighted average capture rate. On
9 the basis of BC Hydro's most recent load forecast, it
10 shows the capture rate declining over time. Why is
11 that?

12 MR. RICH: A Well, it's mainly because our forecast is
13 largely made up of -- well, it's not largely, 100
14 percent made up of customers that are requesting
15 service. So we're not putting into our forecast any
16 future generic project that hasn't been developed yet,
17 or identified yet, or is seeking service from BC
18 Hydro, notwithstanding our view that gas production in
19 the North Montney region will continue to grow over
20 time just given the attractiveness of that basin.

21 MR. AUSTIN: Q And in relation to Exhibit C-10-20, when
22 you and your load forecast team look at the potential
23 for electrification, is it correct to assume that you
24 estimate the load that customers or potential
25 customers may be required on the basis of something
26 called the energy intensity factor?

Proceeding Time 1:38 p.m. T54

1
2 MR. RICH: A No, we use that to validate the customer
3 service requests. So, fundamentally, our load is
4 based on what our customers are actually requesting.
5 So, as part of the information they provided, they say
6 we need 100 megawatts, we need 80 megawatts, we need
7 50 megawatts, that's the basis of our forecast. Where
8 the work intensity comes in is we've described in the
9 application a top-down, bottom-up approach. The
10 customer service requests really drives the forecasts,
11 and that is the bottom-up. The top-down is more of a
12 validation exercise saying given the databank of
13 producers that already are customers, and the work
14 intensity requirements that they need, we use that as
15 a basis for saying, for testing the extent to which
16 their requests seem reasonable.

17 COMMISSIONER LOCKHART: Mr. Austin, I need your help
18 here. I'm looking online at Exhibit B-23-3, and I
19 don't see these diagrams. Do you have a PDF page
20 reference to them?

21 MR. AUSTIN: Q No, I don't.

22 COMMISSIONER LOCKHART: And I'm looking online at B-23-
23 3.

24 MR. GHIKAS: I think if I can be of assistance,
25 Commissioner Lockhart, I think what Mr. Austin has
26 done is put a graph together based on data provided in

1 that exhibit, so that you will not see that picture in
2 BC Hydro's materials.

3 MR. AUSTIN: What you will see in BC Hydro's material
4 is tables that contain the information for the numbers
5 that we used to graph this. What you'll see in 4.58.1
6 is an awful lot of tables.

7 COMMISSIONER LOCKHART: So this is not -- I'm pointing
8 to the chart in your exhibit. That is not BC Hydro's
9 chart?

10 MR. AUSTIN: No.

11 COMMISSIONER LOCKHART: I see.

12 THE CHAIRPERSON: It is BC Hydro's data though.

13 COMMISSIONER LOCKHART: Data that made the chart, so
14 you have made the chart. I see.

15 MR. AUSTIN: I accept no personal responsibility for
16 making the chart, because I didn't do it. Someone
17 else did. But when you look at all the tables, and
18 4.58.1, the tendency is for your eyes to glaze over.

19 COMMISSIONER LOCKHART: Thank you, I appreciate that
20 clarification.

21 MR. AUSTIN: Q Now, with respect to the projected
22 capture of load, and the potential gas production, is
23 it correct to assume that it only relates to potential
24 gas processing load?

25 MR. RICH: A Primarily, but also, and this leads to
26 your other witness aid, but also straddle plants. So,

1 in the application we split the oil and gas sector
2 load into two segments of the shale gas segment, which
3 is largely the natural gas production and processing,
4 and then the example in the other witness aid is so-
5 called straddle plant and that would be captured in
6 our other large oil and gas operations segment part of
7 the load forecast.

8 MR. AUSTIN: Q Well, perhaps I had better hand that
9 witness aid out, which really is an exhibit, and that
10 will be Exhibit C-10-22.

11 (ENBRIDGE ARTICLE MARKED EXHIBIT C10-22)

12 MR. AUSTIN: Q Okay now that you have Exhibit C-10-22,
13 in front of you, can you carry on with your answer?

14 MR. RICH: A Yes, and so this witness aid is actually a
15 great tangible example I think which is trying to make
16 your point as well as explain how we incorporate these
17 things in the load forecast So actually I thank you
18 for this witness aid.

19 **Proceeding Time 1:44 p.m. T55**

20 And I think the point you're making is that
21 there's a lot more upstream electrification potential
22 in our forecast and we certainly agree with that and
23 the CEABC has put out studies that are reasonable
24 potential and we've put out studies and I think we've
25 provided them in previous applications or proceedings.
26 I'm thinking in the Site C inquiry for example and

1 certainly in the IRP we will be including
2 electrification scenarios in addition to the
3 low/medium/high forecasts that we normally put
4 together.

5 So, an initial qualification, none of this
6 has anything to do with the test period but I think
7 it's important to explain the concepts from a long-
8 term forecast.

9 MR. AUSTIN: Q Well, perhaps I can interrupt, if you
10 don't start to get moving during the test period then
11 the probability of capturing loads substantially
12 reduces, doesn't it?

13 MR. RICH: A Well, I think we are moving because we do
14 have -- we are spending money, development money, on
15 the North Montney transmission project for example.

16 MR. AUSTIN: Q Go ahead.

17 MR. RICH: A Okay. So, and I'm being careful not to
18 disclose any commercial sensitivities but it does --
19 it's in the public domain that they're talking about
20 electricity transmission lines. So I will say that
21 this proposed project for example is not in the
22 October, 2018 forecast, it's not in the June, 2019
23 forecast. How it will end up in the forecast is if
24 they make a request for service or there's a
25 reasonable expectation that they will request for
26 service and that's what gets us into thinking about

1 them.

2 And depending on where they are in the
3 interconnection process, amongst other considerations,
4 that's when we apply a probability assessment to,
5 number one, the likelihood this project will proceed
6 and number two, if they proceed, the likelihood
7 they'll take electricity service from BC Hydro. So I
8 would expect, given the stage of discussions, that
9 they may very well end up in the next load forecast
10 that will be in the IRP.

11 MR. AUSTIN: Q And that's in relation to what you
12 described as a straddle plant and it's often referred
13 to as a deep-cut plant. And can you please explain in
14 terms of gas processing what a shallow-cut plant is
15 and what a deep-cut plant is?

16 MR. RICH: A Well, this is where I wish I had one of my
17 staff on the panel instead. I think generally
18 speaking a shallow-cut is reducing the temperature of
19 the gas to draw out some level of liquids and a
20 straddle plant is reducing the temperature even
21 further to withdraw even more liquids.

22 Shallow-cuts tend to be -- there's a lot of
23 gray area in terms of where they are physically
24 located but generally we think of the shallow-cut
25 plants as being located more upstream where the
26 natural gas production and processing occurs and so

1 that's why those are generally captured as part of our
2 shale gas segment forecast. In projects like this the
3 natural gas liquids removal plants are more downstream
4 and so we've put them in the other large oil and gas
5 operation segment.

6 MR. AUSTIN: Q Would it be fair to say that a deep-cut
7 plant requires significantly more energy per MMBtu of
8 gas processed than a shallow-cut plant?

9 MR. RICH: A Yes, I would agree with that.

10 MR. AUSTIN: Q Would that be roughly in the order of 80
11 percent less?

12 MR. RICH: A I don't know the exact number but it's
13 definitely more. I mean, there's more work energy
14 required to compress the gas further.

15 MR. AUSTIN: Q And in relation to this proposed
16 Enbridge plant described in Exhibit C-10-22 is it
17 correct to say that the expected load is in the order
18 of 150 megawatts? And that number is out in the
19 public domain?

20 MR. RICH: A I don't know if the number is in the
21 public domain so I'd rather not comment on it not
22 knowing whether it is or not.

23 MR. AUSTIN: Q If I told you that at the Clean Energy
24 Association of B.C. annual conference in the fall
25 there was a representative from Enbridge and they said
26 it's 150 megawatts approximately, is that in the

1 public domain?

2 MR. RICH: A If that's what they said then yes, that's
3 in the public domain.

4 MR. AUSTIN: Q Thank you. And why weren't you at that
5 conference?

6 MR. RICH: A I was probably answering IRs.

7 **Proceeding Time 1:49 p.m. T56**

8 MR. AUSTIN: Q At that time there weren't very many
9 IRs.

10 Now in relation to the potential electric
11 load to be served by BC Hydro, none of these graphs
12 show the potential load that could be conserved in
13 relation to natural gas pipelines, is that correct?

14 MR. RICH: A That's correct.

15 MR. AUSTIN: Q And with respect to these graphs, there
16 is nothing in the graphs that show the potential
17 electric load for electrification of wellhead
18 facilities, which would consist primarily of
19 compression?

20 MR. RICH: A That's correct. None of the customers who
21 are requesting service are requesting service for
22 those parts of their operations.

23 MR. AUSTIN: Q To your knowledge, does BC Hydro ever
24 approach the gas industry on the basis of "what do we
25 need to convince you to electrify?" As opposed to
26 waiting for a request?

1 MS. DASCHUK: A So, I'll take that. Again, I want to
2 reinforce the point that Mr. Clendinning made. The
3 load forecasting team is not a sales team. They are a
4 team that interprets information that we get from
5 multiple sources, including our key account managers,
6 our sales team, industry experts. Our goal is to be
7 impartial and to remove the bias from what someone
8 might perceive as an overly aggressive sales forecast
9 and including that in our load forecast.

10 So, I would submit that that is not our
11 focus. Our focus is providing to you specifically the
12 most reasonable estimate of the load based on all of
13 the sources of information that we have.

14 MR. AUSTIN: Q Could you just try to answer the
15 question? To your knowledge, does BC Hydro
16 proactively approach customers in the oil and gas
17 industry to electrify?

18 MR. RICH: A So we do have a business development
19 group, and along with key accounts, they are having a
20 lot of discussions with industry about how to
21 electrify their loads.

22 MS. DASCHUK: A I'll also state that I am a member of
23 an executive committee that is dedicated to the
24 supporting the oil and gas sector, and in that
25 committee which includes Janet Fraser, Keith Anderson,
26 who is the vice president of our customer group, and

1 others from across the company including our project
2 delivery group, our asset managers who are
3 collectively looking at opportunities and how we can
4 support industry. There is a second executive
5 committee, and that one is focused on the
6 transportation sector.

7 So, there are two sectors where the
8 executive and various members of the company have
9 dedicated resources to investigate opportunities on
10 how we can encourage electrification, and acquiring
11 new customers in industrial process electrification,
12 and in transportation.

13 MR. RICH: A If I can add, I mean we tend to always
14 focus on the mid-forecast, but in the course of
15 developing low and high forecasts, the high forecast
16 will include, in the oil and gas sector, for example,
17 if the probability of projects occurring are higher,
18 or if the likelihood of electrification is higher,
19 that would be reflected in the high forecast for the
20 oil and gas sector. So it's not as if we are ignoring
21 it, it is just we do develop an uncertainty band
22 around that.

23 So, in the case of the Enbridge project for
24 example, we would provide an assessment on an expected
25 basis. But if the likelihood that they will take
26 electricity service is higher, that will be manifested

1 and a higher probability weighted.

2 MR. AUSTIN: Q Would you agree with me that if BC Hydro
3 and or the gas industry don't electrify a lot more of
4 their gas processing, gas transmission, and wellhead
5 load, their probability of the province of British
6 Columbia meeting its greenhouse gas reduction
7 objectives is close to zero?

8 **Proceeding Time 1:54 p.m. T57**

9 MR. CLENDINNING: A So BC Hydro is one component of the
10 province's ability to meet its greenhouse gas targets.
11 I would say that the greenhouse gas emission you
12 mentioned are an important part of the overall
13 magnitude of our emissions, but I couldn't
14 characterize for the electrification of that in the
15 absence of looking at all of the other means of
16 decarbonizing the economy, biofuels, you know, other
17 DSM saving, other non-electrical approaches to the
18 problem, that it would approach any particular
19 probability.

20 MR. AUSTIN: Q Would you agree with me that if I used
21 natural gas to process natural gas and I use it for
22 the purposes of natural gas pipelines, and I use it
23 for the purposes of compression in gas wellheads, an
24 awful lot of greenhouse gas emissions are created?

25 MR. RICH: A I would say greenhouse gas emissions are
26 created, but I couldn't characterize an awful lot

1 unless there was a relative scale. And I think that
2 really puts this into the purview of government policy
3 in terms of those overall objectives. Again, BC Hydro
4 is a significant part of us tackling the climate
5 crisis, but it's certainly not the only component.

6 MR. AUSTIN: Q Can you think of any other way that the
7 natural gas industry could reduce its emissions other
8 than through electrification in a substantial way?

9 MS. DASCHUK: A We're not experts in the natural gas
10 industry. Through our conversations with customers we
11 do understand that they are developing more efficient
12 combustion so that they would use less natural gas to
13 get the same effect. So we would be competing with
14 not an inefficient use of natural gas, but the most
15 efficient use of natural gas.

16 MR. AUSTIN: Q If I electrify the compression required
17 for a natural gas pipeline, is it fair to say that I
18 would get a 100 percent reduction in greenhouse gas
19 emissions?

20 MR. RICH: A If the alternative is using electricity
21 from the BC Hydro system versus using natural gas,
22 then yes.

23 MR. AUSTIN: Q And similarly with respect to natural
24 gas processing plants, if I use electricity instead of
25 natural gas for the cooling load required at a natural
26 gas processing plant, can I expect greenhouse gas

1 emission reductions in the order of 60 to 70 percent?
2 MR. RICH: A Yeah, I mean I don't know the exact number
3 in reduction, but clearly the theme is the more you
4 use electricity from the BC Hydro system, the more --
5 the fewer GHG emissions you will -- will be released
6 into the atmosphere.

7 MR. AUSTIN: Q And could you give me a quick update on
8 the status of the North Montney project and when the
9 earliest service date might occur?

10 MS. DASCHUK: A I'd like to refer that to Panel 4,
11 which is the capital projects group.

12 MR. AUSTIN: Q I'd like to refer the Panel to Exhibit
13 B-23-4, Clean Energy Association of BC Information
14 Request 4.58.4. That's Exhibit B-23-4, Clean Energy
15 Association of BC Information Request 4.58.4.

16 MR. RICH: A Yes. I have it.

17 MR. AUSTIN: Q Could you please explain the calculation
18 at the bottom of the page in the context of the carbon
19 tax that's applicable when gas is used at a natural
20 gas processing plant for cooling, otherwise known as
21 compression?

22 **Proceeding Time 1:59 p.m. T58**

23 MR. RICH: A Right. So the Information Request was to
24 calculate how much a \$50 per tonne tax would add to
25 the cost of the work, the compression requirements.
26 And the corrected answer is \$2.63 per megawatt hour of

1 work energy.

2 MR. AUSTIN: Q No.

3 MR. RICH: A Sorry, the wrong answer was. The right
4 answer is, \$30.66 per megawatt work energy. Sorry, I
5 had 2.63 for thousand cubic feet in my head when I did
6 the original calculations. My apologies.

7 MR. AUSTIN: Q There is no need to explain the
8 correction. It's assumed that given the volume of
9 work that you have to do that there will be errors in
10 it, and if we actually read the IRs, we will find
11 them.

12 MR. RICH: A Thanks for the quality check.

13 MR. AUSTIN: Q You're welcome. Now, yesterday you were
14 saying that the gas industry doesn't seem to be
15 inclined to want to use electricity because of the low
16 price of natural gas. Doesn't the carbon tax result
17 in a potentially different point of view?

18 MR. RICH: A It does. It certainly closes the gap. I
19 guess my view on this is the carbon tax schedule has
20 been in place for a while now. So the potential
21 projects, they are aware of this, and so when they
22 undertake their own business cases, they will have
23 factored that in prior to making a decision, or not,
24 to request service from BC Hydro.

25 I will also say that in the business
26 development group, when they are talking about what

1 will it take to make it work, this is the kind of
2 discussions they have around relative cost to self-
3 supply versus service from BC Hydro.

4 MR. AUSTIN: Q Would it be a good idea for BC Hydro to
5 speak to Enbridge and ask it why it's interested in
6 electrification given its energy requirements per
7 MMBtu of gas processed are much higher than shallow
8 cut producers, and take that information to shallow
9 cut producers and other deep cut producers to convince
10 them to electrify?

11 MS. DASCHUK: A Again, the purpose of the load
12 forecasting team is not to try and sell new business,
13 and I am not a part of the business development group.
14 I think it would be -- I'm not sure if I understood
15 the question correctly, but if BC Hydro through its
16 interactions with one customer learns something that
17 gives that customer a competitive advantage relative
18 to their competitors, it would not be appropriate for
19 us to share that with other competitors. So, we do
20 walk a fine line of making sure that we are not
21 inappropriately giving competitive advantage to
22 someone.

23 MR. RICH: A If I can also add, we tend to think about
24 the upstream natural gas sector as one homogenous
25 group, and it is made up of a whole bunch of different
26 companies. Different corporate objectives. Some are

1 old school, some are new school, some have sort of
2 stronger social environmental commitments than others.
3 And so, my comments yesterday was sort of a general
4 commentary about generally speaking, self-supply has
5 tended to favour self-supply versus not, and some
6 customers or potential projects have come to us, have
7 gone a certain way down the interconnection process,
8 and then have made a decision to pull out, "we've made
9 a decision to do this."

10 Other customers have said, for broader
11 reasons, wanting to support provincial goals for
12 example, says, "no, we're committed." And that's why
13 you are seeing a growth in our load for those
14 customers. But it's just more competitive relative to
15 where natural gas prices were a number of years ago.

16 **Proceeding Time 2:03 p.m. T59**

17 MR. AUSTIN: Q I'd like to turn to the topic of
18 interconnection and is this panel prepared to deal
19 with the interconnection to the BC Hydro system at 2
20 megawatts or above?

21 MS. DASCHUK: A It depends on what questions you're
22 asking. So on panel number 4 -- I'm also on panel 4,
23 as you know, and in panel 4 I would be prepared to
24 speak about the interconnections group, its
25 relationship to the capital planning, but I'm not sure
26 what nature of question you want to ask today.

1 MR. AUSTIN: Q How long it takes and how much it costs
2 and how it compares to neighbouring jurisdiction.

3 MS. DASCHUK: A Given the time that we have, I mean I
4 could speak about that today. I think it's more
5 appropriately handled by panel 4 and if we're trying
6 to cover more material I ask the panel, would you
7 prefer me to cover that today or at panel 4?

8 MR. AUSTIN: Q I'd be quite happy if you defer that
9 question to yourself. Do we have agreement on that?

10 MS. DASCHUK: A I am prepared for that, yes.

11 THE CHAIRPERSON: Can I just ask a question regarding
12 this calculation that we were just talking about?

13 As I understand the process of extracting
14 natural gas and then compressing it and processing it
15 and so on, they take a little bit of the gas that
16 they've taken out of the ground and then they use that
17 to run their compressors --

18 MR. RICH: A Correct.

19 THE CHAIRPERSON: -- and whatever process heater,
20 whatever else they might need. They're not actually
21 purchasing that natural gas from anyone, correct? So
22 they're not actually paying a carbon tax on it, are
23 they?

24 MR. RICH: A They're paying a carbon tax on the
25 emissions. So the gas that's burned is -- that's
26 what's attached.

1 THE CHAIRPERSON: Is it? Because I thought you pay a
2 carbon tax on fuel when you purchase it.

3 MR. RICH: A No, it's a carbon tax on the emissions, on
4 the CO2 content of the emissions.

5 THE CHAIRPERSON: Okay, thank you.

6 MR. AUSTIN: Q Would it be correct to say it's a tax on
7 the fuel consumed in the processing?

8 THE CHAIRPERSON: So they have to report the amount of
9 fuel consumed and then they get imputed a tax on it?

10 MR. AUSTIN: Q Can you say, "Yes," instead of just
11 nodding your head?

12 MR. RICH: A Oh, sorry. Yes, I believe that's the
13 case.

14 THE CHAIRPERSON: Okay, thanks for clarifying.

15 MR. AUSTIN: Q If I could just have a moment.
16 Just one final question before I move on to
17 another area. Is it correct to say that of the gas
18 that comes out of the wellhead that goes onto an LNG
19 taker that roughly 25 percent of it is consumed in the
20 process of moving the gas from the wellhead to a gas
21 processing plant, processing the gas in a gas
22 processing plant, putting it in a pipeline and using
23 compression to get it to the LNG plant and then
24 processing it into LNG?

25 MR. RICH: A I don't know the answer to that question.
26 Obviously there is consumption to get it from point A

1 to point B, but I don't know the exact number.
2 MR. AUSTIN: Q I'd like to move to a completely
3 different area and I'd like to refer you to Exhibit B-
4 13, Clean Energy Association of B.C. Information
5 Request 2.31.1. That's Exhibit B-13, Clean Energy
6 Association of B.C. Information Request No. 23 --
7 2.31.1.

8 That's Exhibit B-13, Clean Energy
9 Association of B.C. Information Request No. 2.31.1.

10 MS. MATTHEWS: A Okay, we have it.

11 MR. AUSTIN: Q And if this is not the correct panel
12 then please advise me of such. And the question is,
13 how will the second tunnel increase generation
14 capability? And it says:

15 **Proceeding Time 2:08 p.m. T60**

16 "Rio Tinto/Alcan has advised BC Hydro that the
17 second tunnel was being constructed primarily
18 for de-risking and safety reasons, as the
19 original tunnel could be subject to collapse, as
20 with other tunnels with a similar age and
21 profile. The addition of a second tunnel
22 reduces friction and in turn energy losses, and
23 as a result is expected to increase capacity by
24 about 100 megawatts to 140 megawatts in energy
25 by about 50 average megawatts, approximately 450
26 GWh per year of energy subject to hydrology,

1 maintenance, and reservoir, and operating
2 conditions."

3 Is there anybody on the panel that can tell me whether
4 BC Hydro either checked that calculation or whether
5 it's reasonable to assume by having a second diversion
6 tunnel that you could increase the generation output
7 of the Kemano Generating Station by 6 percent?

8 MS. MATTHEWS: A So, yes, I can speak to it. In terms
9 of have we checked that number, I suspect not. We've
10 probably gotten a number from them. I would say
11 though that we've had discussions with them -- I mean
12 on the capacity side it has 100 to 140. So until --
13 it's like whenever you bring a new piece of equipment
14 in you use some engineering equations to estimate what
15 the friction will be, but until you actually see how
16 it performs, you don't exactly know. So I think
17 that's why there's a range.

18 And we are getting updated information from
19 them. We're meeting with RTA and they'll give us like
20 what their expected is at the moment, but until we
21 actually see it come in line we wouldn't know exactly
22 what it is.

23 MR. AUSTIN: Q Do you have any idea whether when you
24 engineer a diversion tunnel, that the expected losses
25 are in the order of 3 percent?

26 MS. MATTHEWS: A I don't actually know.

1 MR. AUSTIN: Q Okay. If the increase in generation is
2 not solely related to a reduction in friction losses
3 and is in whole or in part related to increasing water
4 flows to the Kemano powerhouse, is there anything in
5 the agreement between Alcan and BC Hydro for the
6 purchase of electricity to prevent that?

7 MS. MATTHEWS: A I think there's two parts of the
8 question thereof -- I mean, what it is that's causing
9 that increase. Anything in terms of how they're using
10 their system differently or not would be part of their
11 own water licence, so that's nothing to do with BC
12 Hydro. And we might hear about things, but I haven't
13 heard anything.

14 But in terms of the second part of your
15 question, which was on what it effects under the EPA,
16 the -- I mean for one thing we are still having some
17 discussions with RTA coming up fairly soon actually in
18 terms of making sure that our interpretation of the
19 contract is the same as theirs.

20 So I'll caveat that far, and since I
21 haven't actually personally had discussions with them
22 yet on that topic I don't want to go too far, but
23 general -- so I'll speak of it more generally. But
24 generally under the EPA -- and I think this was
25 discussed actually on an earlier panel, where there's
26 a Tier 1 amount that BC Hydro buys and reschedule, and

1 firm supply of capacity of energy if BC Hydro doesn't
2 hold the gas transportation contract?

3 MS. MATTHEWS: A So there's various IRs that describe
4 this and there's a number of gas contracts. So BC
5 Hydro does have the one between like Sumas to the
6 plant, and then I believe the one that you're talking
7 about is from -- I actually don't know where it
8 starts, Station 2 probably down to Sumas and that was
9 the one that was assigned to Powerex.

10 So when we were purchasing gas for the
11 plant, we obviously actually do that through the
12 transfer price agreement, and so what the -- having
13 that transportation contract in BC Hydro's ownership,
14 I'll call it, allows us to do is actually identify the
15 point where we're wanting to be paying for the gas
16 from Powerex, and I'd have to find the IR, so I'm just
17 going to call it Station 2, but I'm not sure if that's
18 completely correct. So we could be basically paying
19 the price at that point.

20 In the end there is gas available and the
21 price that BC Hydro or the consolidated, it's going to
22 look at when running IG would be identical anyway. So
23 by not having the transportation we don't have the
24 price fix at Sumas 2. At the same time, even if we
25 did have it priced at Station 2 and we were using it,
26 there would be an opportunity cost.

1 So let's say for last year when gas prices
2 were really high, one, we didn't want to run IG
3 because of the potential impact on other customers and
4 making the whole situations worse. But we'd really be
5 looking to, okay, do we want to run IG if it's that
6 expensive to run, or what else can we do, especially
7 when we are running it like for capacity in winter. I
8 mean if we really needed to we would, but that's
9 probably less likely.

10 So the firmness of that gas transportation
11 to our firmness of ability to rely on gas for Island
12 generation I don't think is a factor. Again the
13 overall outcome is more the ability for domestic
14 versus trade, to have the gas point at Station 2 or at
15 Sumas.

16 MR. AUSTIN: Q As we've heard so many time, or maybe a
17 few times from Mr. Ghikas, Powerex is not regulated by
18 the BC Utilities Commission.

19 MS. MATTHEWS: A That's correct.

20 MR. AUSTIN: Q But BC Hydro is.

21 MS. MATTHEWS: A Correct.

22 MR. AUSTIN: Q And with the gas transportation contract
23 on the Enbridge line now being with a non-regulated
24 BCUC body, what can you say to the Commission about
25 any restrictions it might place on Powerex with
26 respect to selling that transportation space on the

1 Enbridge line?

2 **Proceeding Time 2:18 p.m. T62**

3 MR. GHIKAS: So, I think that is a legal question
4 ultimately, and I invite my friend to make submissions
5 on that if he wants in his final argument, and I can
6 certainly respond to that in final argument. But it
7 is a legal question.

8 MR. AUSTIN: Perhaps we can take the break?

9 THE CHAIRPERSON: Come back at 25 to. Thank you.

10 **(PROCEEDINGS ADJOURNED AT 2:20 P.M.)**

11 **(PROCEEDINGS RESUMED AT 2:36 P.M.) T63/64**

12 THE CHAIRPERSON: Please be seated.

13 MR. AUSTIN: Q BC Hydro panel, I'd like to move on to a
14 new area.

15 THE CHAIRPERSON: Mr. Austin, just a moment.

16 MR. AHMED: Thank you, Mr. Austin. I do, Mr. Chair,
17 have one undertaking we can provide now as well.

18 THE CHAIRPERSON: Thank you.

19 MR. AHMED: It's titled BC Hydro Undertaking No. 6 and
20 the transcript reference for that is not yet available
21 but it's -- oh sorry, pardon me, Undertaking No. 16.
22 It's from today so we don't yet have a transcript
23 reference but that was a question in respect to net
24 purchases from Powerex for trade activity and where
25 they're located in Appendix A of Schedule 4 of the
26 evidentiary update. And I believe that should be

1 Exhibit B-42.

2 (BC HYDRO UNDERTAKING NO. 16 MARKED EXHIBIT B-42)

3 THE CHAIRPERSON: Thank you, Mr. Ahmed.

4 And before we get started, also, Mr.
5 Austin, just on where we're going to end up here
6 today. Frankly I don't think we're going to end up
7 anywhere near getting through the schedule of cross-
8 examination, so mindful of the fact it's been a long
9 week and we've put a lot of hours in here today and
10 it's Friday, I'm going to propose that we break to as
11 close as to reasonably around 4:30 as we can given --
12 I assume that we have agreement with that then. So
13 that's good, thank you.

14 MR. AUSTIN: Q BC Hydro panel, I'd like to move to
15 another area and I'd like to refer you to Exhibit B-6,
16 Clean Energy Association of B.C. Information Request
17 1.8.5. That's Exhibit B-6, Clean Energy Association
18 of B.C. Information Request 1.8.5.

19 MS. MATTHEWS: A Yes, I have it.

20 MR. AUSTIN: Q And the Clean Energy Association of B.C.
21 asked the question,

22 "Please describe the electrical transmission
23 constraints on importing electricity into B.C."
24 And without reading out the whole response, I'll read
25 it out in part, it says,

26 "Generally transmissions constraints anywhere

1 different levels. And I believe this table is showing
2 it more in terms of hours.

3 MR. AUSTIN: Q And in terms of megawatts, what's the
4 intertie capacity between British Columbia and
5 Alberta?

6 MS. MATTHEWS: A I believe it is about 500 megawatts,
7 in around that order. I am trying to see if it's
8 listed here.

9 MR. AUSTIN: Q And I'd like to enter as an exhibit BC
10 Hydro response to British Columbia Utilities
11 Commission Information Request in the Waneta 2017
12 Transaction process. And that should be marked
13 Exhibit C10-23.

14 (EXHIBIT B-8 FROM BC HYDRO WANETA 2017 TRANSACTION
15 MARKED C10-23)

16 MR. AUSTIN: Q Just let me know when you've finished
17 reading it.

18 MS. MATTHEWS: A Okay, I've finished reading it.

19 MR. AUSTIN: Q And as I understand this Information
20 Request, the B.C. Utilities Commission was asking BC
21 Hydro about the repatriation of the Canadian
22 entitlement and its impact on the potential value of
23 the Waneta transaction. In the course of doing that,
24 if you look at point number 3 in that Information
25 Request, it says,

26 "Access to the electricity markets and delivery

1 we were planning our system we should not rely on --
2 that we're going to be able to get -- be able to buy
3 energy when we wanted on that day and not build
4 capacity in B.C.

5 So I think this is actually a different
6 part. That's what that's about.

7 And then this IR response 237.1, I mean
8 it's just asked what the historical intertie levels
9 are, and as I said at the start, it's about 2,000
10 megawatts. We've just left it at that. We didn't go
11 into any of the information on -- there's a difference
12 between just also the transmission and what the market
13 liquidity is or where you can buy, and these are just
14 the straight numbers, I believe, of what the intertie
15 capability is multiplied by the number of hours in a
16 day less about, at any given time and point in time,
17 can you buy it.

18 So I actually, I think, agree with what
19 you're pointing out here is that, you know, we don't
20 want to have to rely on purchases and plan to rely on
21 purchases at a certain point of time in the day ahead
22 market. The question -- so I think we answered the
23 question to the IR too, in terms of what was being
24 asked for.

25 MR. AUSTIN: Q So would it be fair to say that there
26 are restrictions because of transmission constraints

1 from the importation of electricity from the United
2 States because of the congestion in the I-5
3 transmission corridor in the Seattle region?

4 MS. MATTHEWS: A Yes, especially at different times of
5 the year. And it's the I-5 corridor. There's
6 probably other reason why things are constrained as
7 well, but yes, at certain times that I-5 corridor does
8 have restrictions.

9 MR. AUSTIN: Q Okay. I'd like to move to another area
10 and this is in relation to the management of the
11 Williston reservoir where Site C is being built. Am I
12 correct in my understanding that the maximum level of
13 Williston will be five feet lower, and I have no idea
14 why I read it in feet as opposed to metres. However,
15 the Williston reservoir will be five feet lower
16 meaning from its maximum elevation for the purposes of
17 constructing the Site C project. Is that correct?

18 MS. MATTHEWS: A Yes, I think we, in one of the panel
19 IRs put that information in, and yes, sorry, we do use
20 feet often with the reservoirs because it gives you a
21 round number and so the numbers tend to be easier to
22 remember.

23 MR. AUSTIN: Q And what's the expected cost – and I
24 know it's difficult question to answer because it will
25 depend on the weather – of using a lower elevation for
26 the operation of the Williston Reservoir than its

1 maximum operation?

2 MS. MATTHEWS: A So yes, it is a difficult to answer
3 because it will really depend on what the weather is
4 and what the flows are. In particular it's -- as
5 we're not using that space, it's really more impactful
6 around the potential for spill.

7 **Proceeding Time 2:51 p.m. T67**

8 And so when we're lower in the summer,
9 which is about -- or let me step back. Whenever the
10 reservoir is lower, there's some loss of head gain,
11 and so that's going to apply more during that summer
12 period. The overall operation of where the reservoir
13 is coming in the fall at that point shouldn't be too
14 affected, so there is some head loss if we don't have
15 as high in the summer on average. The real question
16 of the buffer is probably more related to spill and
17 that's where the value does range a lot depending on
18 what's going on.

19 The other reason why it's hard though --
20 and this is actually -- I mean we talked a lot earlier
21 about how we manage our risks and all of that
22 discussion was actually how we manage the risk of
23 having our reservoirs low, but I did mention there's
24 the other risks that we're managing of when the
25 reservoirs are high and how we manage that spill risk,
26 and I think I had said that, you know, the model gives

1 you the economic and it's okay to spill, but we do
2 make changes and intervene to try to avoid spill
3 because spill is always costly.

4 And so, one of the things with Site C that
5 we're looking at very closely as we manage it in the
6 operations is how then that affects our risk profile
7 around spill and what other outages we can move around
8 on the system to kind of gain us some of that
9 flexibility back. So it's -- and we do have a lot of
10 outages on the system.

11 I mean, I think for the Capital Panel
12 there's a lot of capital work going on, there's a lot
13 of big projects, compared to if you go back ten years,
14 and so we do have a number of bigger outages on for
15 capital work that are not as easy to move. Some of
16 them we have adjusted and pushed out, and then the
17 more maintenance outages we're looking to move around
18 depending on where our spill risk is. And obviously
19 if we're having, you know, keeping the Williston
20 reservoir lower, we're also watching then the impact
21 on Kinbasket and the potential for increased spill
22 there. So it's not -- it's the system together that
23 we're watching.

24 MR. AUSTIN: Q To the extent that you can calculate
25 that cost, either in advance or in retrospect, is that
26 cost going to be absorbed by operations or attributed

1 to the Site C project?

2 MS. MATTHEWS: A That's part of the cost of energy
3 costs, so similarly, I mean Site C, so obviously
4 people are very interested in it, but it's actually
5 the same for all of our capital projects and in some
6 of the other discussion in the paper -- around the
7 situation that happened last year, there was
8 discussion about these really long outages at Peace
9 Canyon and the impact on the overall system from that
10 of keeping us low, and that also increases spill risk.

11 So in general when a capital project
12 affects the operations, it's really an opportunity
13 cost of the cost of energy, and that gets brought in
14 to the cost of energy, it's not a cost that gets
15 attributed to any of our capital projects and Site C
16 is no different.

17 MR. AUSTIN: Q I'd like to move on to another area of
18 cross-examination, it's my penultimate area of cross-
19 examination. And I'd like to refer the panel to
20 Exhibit B-23-3, Clean Energy Association of BC
21 Information Request 4.60.1. Exhibit B-23-3, Clean
22 Energy Association of BC Information Request 4.60.1.

23 **Proceeding Time 2:56 p.m. T68**

24 And the question the Clean Energy Association of BC
25 asks is,

26 "How does this 1 percent growth expectation

1 compare to that of other record utilities in
2 jurisdictions across Canada and the United
3 States? Which of these other utilities have a
4 carbon tax similar to British Columbia's or a
5 low-carbon electrification plan similar to the
6 CleanBC plan designed to allow a major expansion
7 of a fossil fuel export industry such as LNG in
8 British Columbia?

9 And I'd like to draw the panel's attention
10 to page 2 of that response and the second full
11 paragraph from the bottom of the page which says,

12 "In addition, Alberta introduced a new climate
13 plan in October 2019, which includes measures to
14 reduce provincial GHG emissions while allowing
15 the province to continue as a major fossil fuel
16 exporter."

17 And I appreciate the time given to this IR response
18 was very short, but with respect to Alberta does
19 anybody on the panel know whether it can reduce its
20 greenhouse gas emissions using clean renewable
21 electricity?

22 MR. CLENDINNING: A I don't.

23 MR. AUSTIN: Q Anybody else?

24 MR. RICH: A Well, I can say that part of their
25 electricity market, they're looking at retiring their
26 coal plants and replacing them with more less

1 greenhouse gas intensive natural gas as well as wind,
2 so to that extent there is some restructuring
3 happening within the electricity sector that's
4 supportive of their climate plan.

5 MR. AUSTIN: Q What percentage of the Alberta
6 generating base, which correct me if I'm wrong is
7 larger than British Columbia's, is fossil fuel
8 generation versus renewable generation?

9 MR. RICH: A I don't know the exact number, but it's
10 mainly a fossil fuel based --

11 MR. AUSTIN: Q Okay, thank you. My final area of
12 cross-examination relates to the Columbia River non-
13 treaty storage agreement between the Bonneville Power
14 Administration and British Columbia Hydro and Power
15 Authority. And earlier in the proceedings I asked Ms.
16 Matthews if she would provide her interpretation of
17 this agreement because I received or heard at least
18 three interpretations of this agreement and because of
19 amendments, second thoughts or whatever, the
20 interpretations have changed over the years.

21 So perhaps, Ms. Matthews, you could give me
22 on behalf of the Clean Energy Association of B.C. your
23 interpretation, meaning BC Hydro's current
24 interpretation?

25 MS. MATTHEWS: A Certainly, and I would clarify that I
26 don't think BC Hydro's view of it has actually changed

1 at all in this time. How we describe it probably has
2 changed and it's a complex agreement, so I can
3 certainly understand that.

4 MR. AUSTIN: Q Fair enough, I don't disagree with that
5 and I wasn't suggesting there was anything untoward
6 being done in terms of the dissertations that I've
7 received over the years.

8 MS. MATTHEWS: A And I'll try to be fairly brief but
9 I'm going to go back into a bit of history and a bit
10 of background to understand it because you can't
11 actually understand the non-treaty agreement without
12 actually understanding a little bit about the Columbia
13 River Treaty, and partly I think we caused confusion
14 when just talk about one without explaining the other.

15 And what Mr. O'Riley had said was correct.
16 I mean, it is a coordination agreement and that's what
17 makes the NTSA different and that's what makes it that
18 we can only have that agreement with Bonneville Power.

19 But the general kind of quick background of
20 the Columbia River Treaty, so I suspect people are
21 probably aware that it required Canada to build three
22 dams in Canada, so Arrow, Mica and Duncan, and the
23 storage at those was seven at Arrow, seven at Mica and
24 one at Duncan, just approximately. Just for
25 correspondence actually -- or for comparison -- and
26 sorry, those are in million acre-feet, and again that

1 is Imperial units.

2 Grand Coulee which has a lot more
3 generation, I think it's about 6,000 megawatts, is 5
4 million acre-feet of storage as a comparison, so we
5 have a lot more storage up in Canada.

6 **Proceeding Time 3:01 p.m. T69**

7 When BC Hydro decided to build the dam they
8 actually made Mica higher, so it has an additional 5
9 million acre feet, that we call "non-treaty storage".
10 So the total at Mica is 10 million acre-feet. And
11 I've never actually found anything that documents why
12 that was done, but I can make the assumption that the
13 engineers who were building the dam were making the
14 tradeoff of as you build the dam higher, it costs you
15 more, but you get more head gain. So, that's where it
16 landed at that.

17 But what the Columbia River Treaty does as
18 a really simple description is that for inflows that
19 are coming into the Canadian dams, there has to be a
20 certain release out of the Canadian dams. So, because
21 of that, BC Hydro is not actually able to use that 5
22 million acre-feet of space at Mica without an
23 agreement with Bonneville Power. So we use it for
24 head elevation, but we can't actually draft it and
25 fill it for other benefits without the agreement of
26 Bonneville. And original non-treaty storage agreement

1 was actually when we built Revelstoke dam. And
2 because we needed to actually fill the reservoir, but
3 under the Columbia River Treaty, we actually couldn't
4 actually take that water out and put it into storage.
5 So that was actually the first time that the agreement
6 was done. And the Columbia River Treaty is all about
7 creating and sharing benefits. And so that was one
8 way to handle that issue.

9 And so, how it has developed then, and how
10 it stands is that the treaty gives these base flows of
11 what comes out of the Canadian dams, and that is
12 mainly down at Arrow. I'll talk a bit about -- I'll
13 come back to that topic.

14 And then the non-treaty, so let's say this
15 week the flow release out of Arrow is 40 KCFS,
16 thousands of cubic feet per second. If we decide to
17 release more water out of non-treaty, we might add 10
18 KCFS to that discharge coming out. Or if we are
19 storing into that storage, we might reduce it. So the
20 non-treaty storage agreement essentially provides the,
21 what we call the Canadian entity, which is BC Hydro
22 and the U.S. entity, the ability to under mutual
23 agreement, and that's an important part, because other
24 than a couple of exceptions, it all has to be done by
25 mutual agreement to basically change the flows out of
26 Arrow.

1 And again, the reason this storage was put
2 up in Canada in the first place, is also that you have
3 11 dams downstream. So Grand Coulee is the big one,
4 but then Chief Joseph, the midseason, three or four
5 down at the bottom. So, there is a lot of head and
6 electric potential as you go down. And the concept
7 under the treaty and under the non-treaty storage is
8 that you create and share benefits.

9 So, under the non-treaty storage, when we
10 release out water, more water is going down through
11 those U.S. dams, and it is creating energy downstream.
12 So, we can take that as based on the Mid-C dollar
13 value, and then restore it back. That is when we pay
14 the U.S., based on the Mid-C. So really, it does
15 become an arbitrage on the price for when we want to
16 release to basically take payment, and when we store
17 it, where we pay to store back.

18 And then so it is largely used for creating
19 value. It does also provide other benefits. Like
20 because of it, we can actually also rely on more firm
21 energy from Mica and make sure we don't trap energy at
22 Mica in the same way. So, that is actually in the
23 Heritage numbers that get presented.

24 And then I guess the other thing that I was
25 just going to talk about really quickly is because I
26 talked about how under the Columbia River Treaty, you

1 know, it impacts how much water comes out of these
2 dams in Canada.

3 **Proceeding Time 3:06 p.m. T70**

4 But in the end that's really coming out of
5 Arrow and there's certain flood control restrictions
6 that we have to meet for the U.S. of where the
7 reservoir needs to be. Like now in January, February
8 and March it will change as the forecast changes. So
9 that's a requirement that we have to meet, but other
10 than that, we have flexibility of where we take the
11 water out of Mica. So we're actually able to move
12 water back and forth between Mica and Arrow, is a
13 simple way to think about it.

14 And really, when you think about Arrow, it
15 only has -- well, when it was built it didn't have any
16 generation build. Arrow Lakes had hydro from CPC put
17 in the station in the early 2000s or so, and that's
18 180 megawatts, so it's very small. And then you've
19 got, you know, BC Hydro's really big, important for
20 our system, upstream as being, you know, Mica and
21 Revelstoke, and then you've got the U.S. system
22 downstream that has a whole bunch of generation and
23 essentially Arrow becomes this buffer between our
24 system upstream and downstream so that the
25 restrictions or the -- I shouldn't call them
26 restrictions. The requirements in the treaty of how

1 we're using Mica doesn't get in the way of how we use
2 Mica to meet our own load because we have that
3 flexibility as long as we meet the flood control
4 curves.

5 So that's the kind of overview I think of
6 the treaty and the non-treaty storage.

7 MR. AUSTIN: Q Thank you. I forgot I had one other
8 area and I'm not sure whether this panel has the
9 expertise to answer this but in relation to BC Hydro's
10 assets, and to paraphrase the great electrical system
11 operator called Kenny Rogers, in terms of those
12 assets, what criteria does BC Hydro use to fold them,
13 hold them, walk away and run?

14 MS. DASCHUK: A So I think there's two ways to think
15 about that. Certainly the integrated resource plan is
16 the power system strategy, and so we will be filing,
17 as you know and have heard many times, the next IRP
18 will be filed in February of 2021.

19 When we have existing assets, and we'll
20 hear more about this, I'm sure you can ask questions
21 on Panel 4, we do have assets where we have to make
22 some choices about whether we're going to continue
23 with those assets and we can characterize those as the
24 available units, the smaller units that we have on the
25 system. And part of those decisions are made in
26 conjunction with the integrated resource plan. Also

1 through the stations asset planning group, Mr. Andy
2 Darby, who will be speaking on Panel 4 specifically as
3 it relates to generation assets that we have in our
4 portfolio.

5 MR. AUSTIN: Q Thank you very much. I'll hold the rest
6 of my questions for Panel 4.

7 Thank you very much, Panel 3. I appreciate
8 your cooperation.

9 THE CHAIRPERSON: Thank you, Mr. Austin.

10 Mr. Keen? Mr. Keen, we'll try to take our
11 last break of the day around 3:30-ish, if that's okay.

12 MR. KEEN: I was going to say "Good morning." Good
13 afternoon, Mr. Chair, Panel and Panel.

14 I've spoken with my friend. A lot of the
15 area that we were going to pursue on behalf of AMPC
16 this afternoon related to interconnections, and
17 specifically interconnection timing and staff, and I'm
18 advised that Ms. Daschuk will be dealing with exactly
19 those matters on Panel 4.

20 **Proceeding Time 3:11 p.m. T71**

21 THE CHAIRPERSON: Right.

22 MR. KEEN: So I will be relatively brief this afternoon
23 in consequence, which I don't think anybody is going
24 to object to.

25 THE CHAIRPERSON: No objection here from me.

26 **CROSS-EXAMINATION BY MR. KEEN:**

1
2 MR. KEEN: Q So with that, I think Mr. Rich and Mr.
3 Clendinning, I've got a few questions for you and
4 perhaps one or two to Ms. Daschuk while we're here.
5 And what I'd like to do, Mr. Rich or Mr. Clendinning –
6 this is for either of you – is just go through my
7 understanding of what I heard you -- what I heard from
8 your exchange with Mr. Ince dealing with the load
9 forecast and elasticity, and specificity industrial
10 elasticity.

11 So when it comes to the load forecast for
12 industrial customers there is the probabilistic
13 approach. It's applied to each individual customer,
14 there's a methodology that's applied, and there's a
15 binary calibration for the test period that's supplied
16 as part of that probabilistic approach. And then
17 after that, along with all of the other customer
18 groups, there's an elasticity factor that's applied.
19 Is that summary fair?

20 MR. RICH: A That's correct.

21 MR. KEEN: Q And then relative to the last revenue
22 requirement application, the methodology changed in a
23 couple of ways. You changed your source of inputs, as
24 I gather, in relation to the Conference Board of
25 Canada, that changed, and then that binary element
26 that we just talked about, that was introduced, and

1 then as well the elasticity factor was doubled, is
2 that right?

3 MR. RICH: A That's correct.

4 MR. KEEN: Q Are there any other major changes that I
5 ought to have mentioned there?

6 MR. RICH: A I think we -- well, I think so, I'm just
7 running through the mental math here. We also updated
8 the economic elasticities in the residential,
9 commercial models as well as the temperature
10 thresholds in terms of response to temperature in both
11 residential and commercial sectors.

12 MR. KEEN: Q And that broad elasticity factor that I
13 mentioned, it is indeed broad and it applies to each
14 customer class, right, in 0.1?

15 MR. RICH: A That's correct. That was the DMV's -- the
16 consulting outfit that we hired to review our current
17 assumption and their recommendation was that it was
18 still appropriate to maintain that approach.

19 MR. KEEN: Q So the industrial elasticity and the
20 residential elasticity is the same?

21 MR. RICH: A Yes, I guess with the qualification that
22 when we do the customer-by-customer large industrial
23 assessment that amongst the considerations are the
24 production costs associated with each customer, even
25 to within the forestry sector almost on a production
26 line by production line basis. So I would say that

1 the influences of electricity on overall production
2 costs are implicitly embedded in that assessment.

3 MR. KEEN: Q On that point, on that production line
4 point, there is -- part of your exchange with Mr. Ince
5 that dealt with an analogy that I quite liked, a hot
6 tub versus an electric heater. I think you remember
7 that discussion. And his suggestion was that those
8 two uses within a residential household would have
9 different elasticities applied to them. You would
10 expect the use of a hot tub to be more elastic
11 relative to price than would space heating. You
12 recall that exchange?

13 MR. RICH: A Yes, I do.

14 MR. KEEN: Q All right. And you could apply that
15 analogy as well to an industrial production line,
16 fair?

17 MR. RICH: A I agree.

18 MR. KEEN: Q There are industrial customers that will
19 have different operations that have different energy
20 cost, and their operations may react differently to
21 the price electricity, that's fair?

22 MR. RICH: A Yes.

23 MR. KEEN: Q All right. And I understand there's
24 something called a load stock model that models within
25 an operation or within a customer's use of electricity
26 the different ways that the electricity will be used,

1 am I right?

2 MR. RICH: A So if you're referring to the stock and
3 flow model that Mr. Clendinning described yesterday,
4 that's a model that's in development. It's not part
5 of our load forecasting methodology currently.

6 MR. KEEN: Q I think it's been described in the
7 information request responses as in beta form, is that
8 right?

9 MR. RICH: A That's correct.

10 MR. KEEN: Q And does that exist for all customer
11 classes?

12 MR. RICH: A No, the intent for now is to apply it to
13 the residential sector.

14 **Proceeding Time 3:16 p.m. T72**

15 MR. KEEN: Q And so you would have an aggregation of
16 data relating to water heaters, space heaters.
17 Presumably not heated driveways, but illustratively
18 that sort of thing, right?

19 MR. RICH: A Well, yes, that's correct. That base
20 data, if you will, is already embedded in the
21 statistically adjusted end-use model we have for the
22 residential sector. That's the anchor, if you will,
23 and in the application then we described the end-use
24 efficiency projections that come from the U.S. Energy
25 Information Administration.

26 The intent in the future would be to use BC

1 Hydro stock and flow data to provide those longer term
2 projections and ultimately replace information that we
3 get from the U.S. with our own.

4 MR. KEEN: Q And the reason you have that stock and
5 flow model is to better respond to different levels of
6 price sensitivity, is that fair?

7 MR. RICH: A I don't know if it's intended to respond
8 to different price elasticities. It's intended to
9 capture the uses of electricity amongst our
10 residential customers.

11 MR. KEEN: Q Uses in response to price.

12 MR. RICH: A No, price elasticity is not one of the
13 economic drivers in that model, no.

14 MR. KEEN: Q Thank you, Mr. Rich.

15 Ms. Daschuk, I think these are for you.
16 Two quick searchable questions, I hope.

17 If I can get you to turn up Exhibit B-1,
18 Table 5A-13 and electronically that's PDF page 388.
19 And the hard copy that's page 5A-36. Am I right in
20 that Table 5A-13 is showing as the number of forecast
21 FTEs for the interconnections group?

22 MS. DASCHUK: A Yes.

23 MR. KEEN: Q And this is the group that would handle
24 interconnection requests by large industrial
25 customers, or prospective large industrial customers?

26 MS. DASCHUK: A They are the group that manages the

1 interconnections process. So, at a broader BC Hydro
2 level there are people who work in Janet Fraser's
3 group, Keith Anderson's group who work with customers.
4 Once they get an interconnection request, it comes
5 into the interconnections group.

6 Part of the reason I wanted to have this
7 conversation on Panel 4 is within Jay Kumar's group –
8 he's the head of the lines asset planning – he has
9 individuals that do the technical studies on the
10 interconnections, the linear asset portion. Andy
11 Darby looks at the substations to see how best to
12 incorporate those requests, and our engineering group
13 also provides technical support for those studies.

14 So I wouldn't want to suggest that the only
15 people working on interconnection within my business
16 group are these 47 people. I would say that they are
17 the entry point that leads into the rest of the
18 organization.

19 MR. KEEN: Q Thank you. That is another reason that I
20 think I will leave the rest of my questions for Panel
21 4.

22 MS. DASCHUK: A I appreciate that, thank you.

23 MR. KEEN: Q My pleasure.

24 Panel, those are my questions for today, at
25 least.

26 THE CHAIRPERSON: Thank you, Mr. Keen.

1 Ms. Worth.

2 MS. WORTH: Mr. Chair, Members of the Panel. I can
3 advise that one of the benefits of going later in the
4 day is that a lot of the matters that we were
5 intending to actually canvas have been dealt with, so
6 I actually only have one question.

7 THE CHAIRPERSON: Okay.

8 MS. WORTH: Very brief and we can fully deal with matter
9 before the 3:30 break.

10 **Proceeding Time 3:21 p.m. T73**

11 **CROSS-EXAMINATION BY MS. WORTH:**

12 MS. WORTH: Q So Panel, my one question is about the
13 BCUC decision regarding the EPAs for Sechelt Creek,
14 Brown lake and Walden North Hydro and how it relates
15 to the --

16 So I think it's fairly well established now
17 on the evidence and then also on testimony today that
18 BC Hydro's position is that it's not acquiring any new
19 resources other than a small number of First Nations
20 energy projects and some EPA renewals. But then
21 November 8th, 2019 BCUC issued its decision for the
22 application that I just cited outlining concerns with
23 the 40-year term of the EPA renewals and declined to
24 make any determination with regards to whether EPA
25 renewals should be accepted at this time.

26 And I note that Mr. Weafer actually

1 provided a copy of the decision that I'm speaking
2 about, yesterday. It was not marked as an exhibit but
3 British Columbia Hydro and Power Authority application
4 for electricity purchase agreement renewals for
5 Sechelt Lake Hydro, Brown Lake Hydro and Walden Lake
6 Hydro. It's dated November 8th.

7 And I'm just going to read briefly a
8 passage that's found on page 6, which is the panel
9 determination and there was, on the second and third
10 paragraphs there, something that I want to read for
11 context to my actual question. So in this it says:

12 "The panel views the 40-year term of each EPA
13 renewal to be problematic considering the level
14 of market and price risk and exposures placed on
15 ratepayers. In the absence of an updated and
16 approved IRP we are unable to determine that
17 these contracts are in the public interest over
18 the 40-year term. These EPA renewals would be
19 best adjudicated within the context of an
20 updated IRP. In light of the above findings the
21 panel declines to make any determination with
22 regards to whether EPA renewals with the Sechelt
23 Creek IPP, Brown Lake IPP and Walden Lake IPP
24 are in the public interest and accepted for
25 filing under section 71 at this time."

26 So what I'm going to ask is whether that

1 decision would have any implications for the cost of
2 energy, including the revenue requirements
3 application, as it relates to either of these three
4 projects or more broadly any other EPAs that might be
5 up for renewal during the test period?

6 MR. CHOW: A Yeah, so we're in the process of
7 discussions with the IPPs on the BCUC's decision. And
8 the decision is that -- or the BCUC has made a
9 suggestion that BC Hydro work with the IPPs to shorten
10 the term of the agreements to no longer than three
11 years from November 8th, 2019. But it agrees that
12 there's no price change over that term. So during the
13 test period there's no actual impact on the forecast.

14 MS. WORTH: Q Thank you very much for that
15 clarification.

16 Those are my questions, subject to any
17 questions from the panel.

18 THE CHAIRPERSON: No. Thanks, Ms. Worth.

19 MS. WORTH: Thank you.

20 THE CHAIRPERSON: So why don't we take our break now
21 then, come back at 25 to, thanks.

22 **(PROCEEDINGS ADJOURNED AT 3:24 P.M.)**

23 **(PROCEEDINGS RESUMED AT 3:34 P.M.)**

T74/75

24 THE CHAIRPERSON: Please be seated.

25 Good afternoon, Mr. Willis.

26 MR. GHIKAS: I believe --- I'm getting this secondhand

1 here, but I believe Mr. Chow indicated to me that he
2 had a correction he wanted to make.

3 THE CHAIRPERSON: Sure. Mr. Chow?

4 MR. CHOW: A Yes, I was just following up on the
5 conversation with Ms. Worth. We were talking about
6 the EPA renewals and the decision from the Commission.
7 And I was looking at the transcript from yesterday and
8 my discussion with Mr. Weaver [*sic*], and he'd asked me
9 if I had taken issue with certain aspects of the
10 Commission's decision, and I replied no. But what I
11 want to make clear is, while we don't agree with
12 everything in the decision, we respect it, and we are
13 working with it.

14 But in terms of the original application,
15 we still stand by the application that we made, and we
16 presented a lot of evidence over that period of time.
17 And answered a lot of information requests on the
18 subject of those EPA renewals, and at the end of the
19 day, we felt that we'd made a compelling case that
20 they were cost effective, but the Commission
21 disagrees, and we accept that decision.

22 THE CHAIRPERSON: Okay, thank you.

23 Mr. Willis.

24 **CROSS-EXAMINATION BY MR. WILLIS:**

25 MR. WILLIS: Q Thanks, Mr. Chairman, Commission
26 members, and BC Hydro panel. I have just a few

1 questions. At the end of the day you don't have much
2 more to ask.

3 In reading your BC Hydro submission, the
4 one thing that I noticed with respect to load
5 forecasting, is there are different times that you do
6 a full load forecast, and to me that makes it hard for
7 a third party like myself to evaluate the load
8 forecast when they're done at different times. And I
9 believe I heard that you do a type of annual forecast,
10 annually?

11 MR. RICH: A Right.

12 MR. CLENDINNING: A We endeavor to do a comprehensive
13 load forecast annually, yes.

14 MR. WILLIS: Q So my question is, would it be possible
15 to do a 20-year full load forecast every year, let's
16 say in a January? If that happened, I think it would
17 be easier for third parties to evaluate your load
18 forecast, and also from your perspective you could
19 modify it as you had input?

20 MR. CLENDINNING: A So that is our objective, and
21 coincidentally it is in January that technical
22 components of that are done, subject to the executive
23 approval and board review that I mentioned, that
24 usually comes in the period after. But that is our
25 goal. However, we do face different regulatory
26 filings, Site C placed a significant load at the time

1 on the team, and so we have to trade those off, and
2 that is where we, in the responses to information
3 requests, that one of the differences between
4 comprehensive load forecast and where we do a load
5 forecast update, and pick sort of key material
6 elements that we want to get the best information out
7 there we can with the time that we've had. But it is
8 certainly our goal to try and produce a comprehensive
9 load forecast every year. I'll call it technically
10 complete in January.

11 MR. WILLIS: Q So that is your intention? That's good.

12 MR. CLENDINNING: A That is our objective, yes.

13 MR. WILLIS: Q The other question involves smart
14 meters. That is a very powerful tool, and I know it
15 costs a lot of money, but it gives you a lot of data.
16 And I'm just wondering how you are using that data
17 from a load forecast perspective?

18 MR. RICH: A Well, I can give you a tangible example
19 that applies to this application is that we actually
20 use the SMI data to update the temperature thresholds
21 in terms of our customer responses to temperature. So
22 that is entirely based on our SMI data.

23 MR. WILLIS: Q Okay, because I'm thinking, I know that
24 on the residential model, you divide it into I think
25 Lower Mainland -- four regions. And then you develop
26 kind of a -- you forecast for each of those regions

1 and then build it up.

2 **Proceeding Time 98:38 a.m. T76**

3 MR. RICH: A That's correct.

4 MR. WILLIS: Q You could even disaggregate it farther
5 by taking -- by using the smart meter data by looking
6 at residential single family homes, apartments and so
7 on. Have you thought of that?

8 MR. RICH: A Yeah, we have. I guess I describe it as
9 you can't renovate Rome in a day, so there's lots of
10 nice things to have. And so I guess to me, the actual
11 priority where we are using SMI data is to really dig
12 into the commercial sector. That's where there was a
13 projected drop relative to the last forecast and we
14 are using SMI data to really get underneath what is
15 quite a diverse sector. I mean there's literally
16 about 45 sub-businesses that make up the commercial
17 sector. And so that's where we're actually applying
18 our SMI data to really understand what's happening.

19 MR. CLENDINNING: A I'll add to that, to say that in my
20 experience over the past two years, it's really helped
21 us get underneath not necessarily so much the changes
22 to the models themselves, but when we run into
23 something we don't understand it helps us get to that
24 why. It's another avenue of information that we have
25 available independent of the residential commercial
26 end use studies that we do directly soliciting

1 information from customers. So it's another tool and
2 the box that helps us understand the why behind
3 phenomena that may not be matching well with our
4 model.

5 MR. WILLIS: Q Yeah, because it seems to be that the
6 SMI data could help you understand the impact of LED
7 lights, electric vehicle charging, all that which is
8 very hard, must be very hard for you estimate what the
9 impact of that will be. And you could use SMI data to
10 help you in that area.

11 MR. CLENDINNING: A To a certain extent. You know,
12 some of the uses within a household are, you know,
13 behind the meter, to use that phrase, but yes.

14 MR. WILLIS: Q Thanks. Last question. I believe that
15 BC Hydro sponsors energy managers at many of their
16 large industrial customers and their commercial
17 customers.

18 MR. CLENDINNING: A I believe so, yes.

19 MR. WILLIS: Q If these energy managers, one of their
20 roles is to understand how these facilities use
21 energy, it would seem to be, since the ratepayers are
22 paying partially their salary, that one of the tasks
23 that these energy managers could have would be to be
24 responsible at least for coordinating the load
25 forecast for each of these customers. Is that a
26 possibility?

1 MR. RICH: A So I'll have to say subject to check.
2 This isn't our area of expertise, but there's the key
3 account managers that we've had a lot of discussion
4 about throughout the proceeding and, you know, they
5 deal with some of our large industrial customers in
6 different customer segments and I think that's
7 separate from energy managers that may be involved in
8 a more commercial context. And I know that Hydro has
9 had programs in the past to support companies having
10 an energy manager. I don't know that those were BC
11 Hydro programs. I don't know whether that program is
12 still in play but --

13 MS. DASCHUK: A Panel 5 -- you would be able to speak
14 to Panel 5 on DSM. That would -- the conservation and
15 energy manager group would be able to explain whether
16 those were funded and how those work.

17 MR. WILLIS: Q Sure. And Mr. O'Riley mentioned about
18 salary and I can -- in the large organization that BC
19 Hydro has, that's always a challenge and I'm just
20 wondering if that's not an area where the salary could
21 be a problem. You've got the DSM group with their
22 energy managers and you've got you people doing the
23 load forecasting, and maybe there could be a better
24 collaboration of information exchange.

25 MR. RICH: A Yeah, so I think we collaborate very
26 effectively, certainly on the DSM portion with the

1 conservation energy management group. As I mentioned
2 yesterday there is a DSM load forecast working group
3 and so we prioritize our activities for the year. And
4 then with key accounts, that's also in the customer
5 service group, that's our direct interphase with our
6 particularly large industrial customers. It's through
7 our key accounts that we really get to understand the
8 actual loads and frankly production schedules for the
9 next year. That translates into our load forecast.

10 So I think the level of collaboration is
11 quite good.

12 MR. CLENDINNING: A I talked about that in my testimony
13 yesterday and my counterpart who will be on Panel 5,
14 Mr. Steve Hobson, and we meet on an about an every two
15 week basis and have much more close operations between
16 our team, not only on the load forecast but in terms
17 of potential resources from DSM when it comes to
18 things like the integrated resource plan.

19 MR. WILLIS: Q But particularly for industrial
20 customers, where I think that's your big problem, load
21 forecast. And you have that resource out there that
22 you could maybe make sure you tap into.

23 **Proceeding Time 3:44 p.m. T77**

24 MR. CLENDINNING: A Yeah, so Mr. Rich can elaborate
25 that we rely on the key account managers to provide us
26 with, you know, what information industrial customers

1 and all the customers that they serve are willing to
2 provide us to help inform the load forecast. So
3 there's a very tight integration there today, but some
4 customers can only share so much.

5 MR. WILLIS: Q Sure.

6 MR. CLENDINNING: A And what we can get from them, that
7 does make its way from the key account managers to Mr.
8 Rich's team.

9 MR. WILLIS: Okay, that's all the questions I have.
10 Thank you.

11 THE CHAIRPERSON: Okay, Mr. Willis, just to follow up
12 on the SMI data conversation, to the extent that you
13 do time of use forecasting, I assume you do some do
14 you or -- was wondering if the SMI data is useful for
15 that. Like is that an area that you're looking at?

16 MS. DASCHUK: A Maybe this is a question that we can
17 also address to the Capital Panel. When we make
18 capital investment decisions, they are based on the
19 peak demand, and the peak demand is based on the time
20 of use. So if we're deciding that we need to build a
21 new substation or build a new line, that's where that
22 would come in.

23 THE CHAIRPERSON: Understood. But I was thinking more
24 that you would do that kind of forecasting to possibly
25 support the development of a rate in the future. So
26 if you were going to do that, you would need to have

1 an understanding of what customers' patterns were and
2 not just what the peak demand is, but, you know, when
3 during the day -- you know, how the demand is
4 distributed throughout the day. But if you don't --
5 if you're not doing anything in that area, then the
6 answer is no, obviously. But --

7 MS. DASCHUK: A No, what I will say is -- and I think
8 Mr. Morison alluded to this on the previous panel.
9 I'm now the executive who's responsible for the future
10 grid strategy. That doesn't mean all the resources
11 reside within my group. Mr. Morison, his group has a
12 large component of that. We're currently in the
13 process of developing that strategy and how we're
14 going to make better use of that data that we have. I
15 expect that that plan would be available later in the
16 year. So we definitely acknowledge that there's a
17 valuable asset there and we're going to make the best
18 use of it that we can.

19 MR. CLENDINNING: A And if I could add to that.

20 THE CHAIRPERSON: Sure.

21 MR. CLENDINNING: A It really is all about those three
22 days last week when it comes to peak and time of use.
23 So it's interesting that it -- you know, the peak
24 occurs in March or October and, you know, that has
25 certain implications for Ms. Matthews' group. And in
26 terms of the building of the system itself and

1 building additional capacity resources, it is about
2 those days. To that extent, yes, we do the peak
3 forecasting.

4 We haven't done any work that I'm aware of
5 to this point on what does that play out on a day-to-
6 day basis for customers over time and potential
7 support of a time of use rate, but for us the key
8 interest in that is a resource of megawatts, and Mr.
9 Ince put it, it's for those days.

10 THE CHAIRPERSON: Of course, understood. Understood.
11 Thank you.

12 MR. WANG: There are just some witness aids being passed
13 around.

14 THE CHAIRPERSON: Thank you.

15 **CROSS-EXAMINATION BY MR. WANG:**

16 MR. WANG: Q Mr. Chair, Commission and Panel, panel
17 members, my name is Holman Wang, that's W-A-N-G, here
18 representing the Zone II Ratepayers group. And my
19 area of questioning is generally around displacing
20 diesel generation with cleaner renewal resources in
21 the NIA. And if you look at page 1 of the witness
22 aids in response to Zone II RPG IR 1.4.1, BC Hydro
23 stated:

24 "The work to develop an approach to diesel
25 reduction as described above is ongoing."

26 I leave it to anybody to answer. Does this ongoing

1 work refer to the NIA as a whole or they're even more
2 segmented strategies with respect to diesel reduction?
3 MS. DASCHUK: A So as it relates to the diesel
4 reduction strategy I'd be happy to speak to that. The
5 strategy is not a holistic strategy, meaning there's
6 one strategy for non-integrated areas. In fact, it is
7 14 strategies, one for each of the non-integrated
8 areas. They're each of them quite unique and have
9 their own community interests, and so we -- one of the
10 key elements of our strategy development is to work
11 with the communities to understand what they want and
12 what their needs are, and so that's why we actually
13 believe that we need 14 plans that would roll up into
14 one strategy.

15 MR. WANG: Q All right. So with respect to the
16 response that's on page 1 of the witness aid, it said:

17 "BC Hydro anticipates documentation related to
18 BC Hydro's updated approach to diesel reduction
19 to be available in fall 2019 or winter 2020."

20 Do you see that?

21 MS. DASCHUK: A I see hat.

22 MR. WANG: Q All right, so with respect to
23 documentation are we expecting 14 different documents
24 or are we to expect an overarching document?

25 MS. DASCHUK: A It would be an overarching document
26 with subsections that would describe the strategies

1 for individual areas.

2 **Proceeding Time 3:50 p.m. T78**

3 That strategy work has been delayed in part
4 because of the work that we're doing on the
5 comprehensive review. Part of the NIA diesel
6 reduction strategy is how BC Hydro is going to involve
7 both the provincial and federal governments in how
8 that strategy would be funded.

9 MR. WANG: Q Okay, so you've just mentioned delay, so I
10 take it that there's nothing to produce at this time
11 that is in further response to that timeline?

12 MS. DASCHUK: A I don't have a specific timeline for
13 when the strategy would be available. I can say that
14 it is not finalized.

15 MR. WANG: Q All right.

16 THE CHAIRPERSON: Excuse me. And when it is available
17 is that documentation public?

18 **INFORMATION REQUEST**

19 MS. DASCHUK: A That's a good question. Can I check on
20 that?

21 THE CHAIRPERSON: Certainly, and perhaps you could also
22 let me know whether it would be filed with the
23 Commission when it was ready.

24 MS. DASCHUK: A Yes.

25 COMMISSIONER LOCKHART: Sorry, and, Ms. Daschuk, when
26 you say it's not finalized you mean the timing isn't

1 finalized or the strategy isn't finalized?

2 MS. DASCHUK: A Neither. The strategy is definitely
3 not finalized. As I mentioned, this is very
4 complicated. Each of these 14 non-integrated areas is
5 different and the needs are different and we have also
6 -- I think it's important to think about the funding
7 and to what extent the funding would be borne by the
8 ratepayers through the Commission and to what extent
9 they would be funded by taxpayer dollars. Those are
10 answers that I don't have at this time.

11 THE CHAIRPERSON: Thank you.

12 MR. WANG: Q All right. I will refer your attention to
13 witness aid page 3 of 17, this is a transcript of the
14 cross by Ms. McLean of Mr. O'Riley from January 21st
15 and I'm just looking at line 22. You see that Ms.
16 Daschuk?

17 MS. DASCHUK: A Yes.

18 MR. WANG: Q Okay. And so it says here, this is Mr.
19 O'Riley's testimony:

20 "We are actively working with the government
21 looking with individual First Nation and also
22 looking out at what's being done in other places
23 like in the Northwest Territories and Nunavut
24 where almost all of their system is remote to
25 find viable solutions."

26 My question is, do you have any documents that would

1 reflect this investigation on what is happening in the
2 Northwest Territories and Nunavut with respect to
3 diesel reduction?

4 MS. DASCHUK: A I had a witness brief prepared for me
5 to support me in this hearing and it outlines a number
6 of different things. BC Hydro is a member of the
7 North American Off-Grid Utilities Association and we
8 work through them. In addition we also have ongoing
9 separate conversations and conduct independent
10 research on how other jurisdictions are addressing the
11 non-integrated areas in diesel reduction.

12 I have a list of the different findings
13 that we have through our research and the different
14 approaches that different governments have taken and
15 different utilities have taken.

16 I don't believe there's anything
17 confidential in this information and I think that it
18 would be appropriate if we could share that, so that
19 we could share with you the research that we have on
20 what other jurisdictions are doing. I can give you an
21 example, if that would be helpful?

22 MR. WANG: Q Certainly.

23 MS. DASCHUK: A So in the Northwest Territories, the
24 Northwest Territories Power Corporation led the
25 addition of a solar farm battery storage system under
26 a micro-grid controller to their existing diesel

1 system in Colville Lake. And the Northwest
2 Territories Power Corporation continues to own,
3 operate and maintain the fuel system.

4 There was a pilot to learn about how such
5 systems work and the size of that project was 1.885
6 megawatts.

7 MR. WANG: Q All right, and is this just a briefing
8 document that you have been given that you're
9 referring to in terms of what you're willing to
10 disclose? Or are there additional underlying
11 substantive documents that either relate to
12 investigation or communications between governments?

13 **Proceeding Time 3:54 p.m. T79**

14 MS. DASCHUK: A This particular document that I'm
15 referring to is the document that was prepared to
16 support me in this hearing today. I will assume that
17 behind this is the meeting minutes of organizations
18 such as the North American Off Grid Utilities
19 Association. And within the actual strategy itself,
20 once we produce it, we would include as background
21 information the research that we've done to identify
22 what the opportunities are, what's worked in other
23 jurisdictions, what their challenges have been and how
24 we plan on overcoming some of those challenges.

25 MR. WANG: Q Okay, so I just want to be clear on what
26 you're prepared to bring forward to the Commission at

1 this point and what you're willing to undertake to
2 disclose.

3 MR. GHIKAS: Sure, I mean I think what Ms. Daschuk is
4 actually referring to is notes that she's prepared for
5 the hearing, so those themselves would be privileged,
6 but we can certainly -- you know, if Mr. Wang would
7 like certain information that's set out in that
8 document, we can prepare it in the form of an
9 undertaking. So perhaps you can just clarify what it
10 is specifically that you're looking for, whether it's
11 just the listing or whether there's some underlying
12 information.

13 MR. WANG: Q I think at this point we're looking for
14 information that would substantiate and give us
15 insight into BC Hydro efforts to explore these, you
16 know, diesel reduction strategies based on
17 examinations of these other jurisdictions that Mr.
18 O'Riley has referenced. So we are looking for that
19 kind of supportive material.

20 MS. DASCHUK: A So I think there's two aspects to that.
21 One is what have we actually found when we talked to
22 other jurisdictions. The second part is how are we
23 incorporating that into our discussions with each of
24 the communities.

25 What I can say is that each of the
26 communities is different and has a different approach

1 to it. But there are four pillars that underlie the
2 basic approach of the diesel reduction plan, and that
3 is -- if you don't mind me actually reading the
4 materials that I have. Thank you.

5 MR. WANG: Q Go ahead.

6 MS. DASCHUK: A Support communities to develop
7 expertise and experience in energy efficiency and
8 clean generation. Retrofit existing homes and
9 buildings to make them highly energy efficient.
10 Develop renewable heating systems, including heat pump
11 technology and district energy systems. Implement
12 renewable energy projects to offset all or most of the
13 remaining diesel generation, including rooftop solar
14 voltaic and community scale renewable systems.

15 So those are the four basic pillars.
16 Underneath that, for each one of the communities there
17 is a set of activities that are taking place. So for
18 example, we would, in some communities, be working on
19 a community energy plan. That community energy plan
20 is the equivalent of a mini-integrated resource plan
21 for that community.

22 We would be working with them on a demand
23 side management plan, and we can speak to that on
24 Panel 5 about the NIA DSM program.

25 And there are other initiatives that work
26 to build overall capacity within various communities,

1 energy champions within those communities to support
2 the development of an energy capacity within those
3 communities.

4 MR. WANG: Q Okay, thank you for that answer. I'm just
5 going to turn to my friend, Mr. Ghikas.

6 Did my last request seem sufficient for
7 now?

8 MR. GHIKAS: Yeah, I think that's fine. We will take
9 that undertaking, Mr. Chairman, and to the extent that
10 need any clarification we'll get it from just talking
11 offline to my friend.

12 **INFORMATION REQUEST**

13 THE CHAIRPERSON: Okay. Can I just sort of chime in
14 here too, though. I heard Ms. Daschuk mention that
15 there was some research that had been done through
16 this organization and I think an offer to share that.
17 Will that then be part of this information that comes
18 forward?

19 MS. DASCHUK: A I'm not personally involved with the
20 North American Off Grid Utilities Association and I'm
21 not sure to what extent their materials are -- I'm
22 able to share to those.

23 THE CHAIRPERSON: Understood.

24 MS. DASCHUK: A But to the extent that we I can, I
25 think we can be --

26 THE CHAIRPERSON: That would be great. If you could let

1 us know.

2 MS. DASCHUK: A Absolutely.

3 THE CHAIRPERSON: Thank you.

4 MR. WANG: Thank you, Mr. Chairman.

5 MR. WANG: Q I will refer now to page 9 of the witness
6 aid, and this is an excerpt from the RRA. And you
7 see in line 1, Ms. Daschuk, it makes reference to the
8 power acquisitions and contract management group?

9 **Proceeding Time 3:59 p.m. T80**

10 MS. DASCHUK: A Yes. I was just going to say that's
11 not my group, so I am going to turn it over to --

12 MR. WANG: Q: Okay. And sorry, who should I address
13 this to? Ms. Mitha?

14 MR. CHOW: A. It will be between Heather and myself.

15 MR. WANG: Q All right, and at line 24 of the same
16 page, it says,

17 "During the test period, major initiatives
18 undertaken by this KBU will include..."

19 Do you see that?

20 MS. MATTHEWS: A Yes.

21 MR. WANG: Q All right, and then I am turning over to
22 the next page, and I'm looking at line 4, and it says,

23 "Managing the commercial elements of BC Hydro's
24 contracts in the non-integrated area which are
25 expected to increase during the test period due
26 to the government of B.C.'s *Clean B.C. Remote*

1 *Community Clean Energy Strategy*, which aims to
2 reduce diesel powered electricity generating
3 stations in remote communities."

4 And I just note that the remote community
5 clean energy strategy is often put into an acronym
6 RCCES, I will refer to that as "recess". So this
7 appears to be the only reference to RCCES in the RRA.
8 Is this an existing strategy that is actually being
9 implemented on a day-to-day basis?

10 MS. MATTHEWS: A So I will talk to this, and then I
11 will probably pass it back to Ms. Daschuk. So, I
12 mean, one of the things that I mentioned when the
13 panel was introduced was that I now have the IPP
14 group. And so there has been some slight changes in
15 the overall organization. So when this was kind of
16 published, it was -- it's now out of date.

17 So, the group has had a couple resources
18 who have been working on this overall strategy, which
19 is actually the same one that you asked in that first
20 question for. Those people in that role of doing
21 that, is actually no longer in this group and in this
22 budget. But what my group, the IPP group does, is
23 once an IPP contract is in place from the remote
24 communities we do implement it. So my team is
25 involved in the negotiations and the implementing it,
26 but the overall strategy for the non-integrated area

1 is no longer in this group, and that is over to the
2 integrated planning.

3 So yes, this was done, there is resources
4 there. It's actually the same strategy that you were
5 talking about earlier on in the cross here.

6 MR. WANG: Q Okay, so that would be the integrated
7 planning group that has responsibility for developing
8 the strategy?

9 MS. DASCHUK: A I'm afraid it gets a little bit
10 complicated. There are a couple of individuals that
11 are currently in the finance organization that have
12 been leading this. Part of the strategy that we are
13 developing is to make it clear where within the
14 organization accountability lies for the NIADs or
15 reduction strategy. The leading view is that I will
16 be the person accountable for that. But that a
17 decision that will be made as part of the strategy.

18 Today there are individuals that are
19 working with each of the individual communities on
20 their diesel reduction plans. They don't currently
21 report to me, but I anticipate that in a future
22 application they will. Also, I think there is a
23 reference to this later in your materials, the costs
24 associated with a diesel reduction strategy and the
25 benefits associated with the diesel reduction strategy
26 are not in this application, because the strategy

1 that is currently being discussed and my team is
2 involved in that and so are other from across the
3 company that work in the remote areas. So, no, there
4 are individual things going on for individual remote
5 communities.

6 MR. WANG: Q Okay.

7 MS. DASCHUK: A As well as the DSM, IE DSM plan, which
8 is part of this test period, where Mr. Steve Hobson
9 would be able to speak to that on panel 5. So there
10 are things that are taking place.

11 I think what we're signaling is we're
12 trying to bring it all together so that it's not
13 what's happening in each of the different places.
14 We're really trying to pull it into an integrated and
15 a cohesive plan. That integrated cohesive plan isn't
16 ready yet. I guess I'm signally to you what we're
17 trying to do and what we're working on as opposed to,
18 "Here it is." It's not ready.

19 MR. WANG: Q Okay, and I have a question that I think
20 should be easier to answer. RCCES itself is just one
21 branch of another overarching strategy, correct?
22 RCCES is not the strategy itself or -- just an
23 implementation of RCCES is not in itself the strategy.
24 I'm just trying to understand whether there's
25 something else that you're talking about that's being
26 developed that incorporates RCCES or are we just

1 talking about implementing RCCES?

2 MS. DASCHUK: A So I'm going to try and maybe I'm not
3 going to hit the mark here but RCCES is the Government
4 of British Columbia's strategy, it's not BC Hydro's
5 strategy.

6 MR. WANG: Q Right.

7 MS. DASCHUK: A So BC Hydro is developing its own
8 strategy, totally separate from RCCES, but it is being
9 guided by the objectives of the B.C. Government and
10 its objectives of reducing greenhouse gas emissions in
11 non-integrated areas.

12 MR. WANG: Q Okay, thank you. I understand the
13 distinction.

14 I just want to turn your attention to page
15 16 of 17 of the witness aid and I'm looking at some of
16 Ms. Fraser's evidence from yesterday, and these are
17 excerpts from the transcript and I'm looking at line
18 24 on page 16 of 17. And she's referring to low-
19 carbon electrification and I'll get to my point in a
20 moment, I will just read this section.

21 "While we don't have any targets for low-carbon
22 electrification we are anticipating that the
23 decisions that come out of the comprehensive
24 phase 2 will advance that discussion. So the
25 answer to your question is for overall we don't
26 have target and we could get there once we

1 That is something that we are not -- we have limited
2 involvement from a BC Hydro perspective, but we are
3 doing what we can to support that. That would be one
4 example of things that we are doing.

5 Another example would be where we have a
6 community-led energy plan that is being completed with
7 BC Hydro's participation. There is a pre-feasibility
8 study and a short list of renewables that could be
9 used within that community. DSM activities including
10 building energy assessments, home assessments, basic
11 upgrades through the NIA DSM program, and
12 participating in the Great Bear Initiative, which is a
13 capacity building project funding for a climate action
14 coordinator and training and peer learning. So those
15 are a set of activities that we are doing within one
16 community that support diesel reduction within the
17 test period.

18 MR. WANG: Q Okay, thank you. I just want to make a
19 distinction between sort of planning efforts and
20 implementation during the test period. Particularly
21 as you mentioned, there is no specific forecast
22 expenditure for diesel reduction during the test
23 period. That's at page 11 of the witness aid, I don't
24 think we need to go there at this point. And then
25 also I reference what Ms. Matthews said about ongoing
26 consultation.

1 So my question is, what about
2 implementation during the test period, is it simply
3 precluded because there is no budget? Or alternative
4 if there is no budget now, can implementation be
5 brought forward during the test period because of
6 customer demand?

7 MS. DASCHUK: A We have a process within the capital
8 planning which is called a "Next plan process" and
9 that's where new projects that have a request for
10 funding can come forward. They're not in the capital
11 plan, but there is a process where initiatives can
12 come forward, should the opportunity require capital.

13 So, I do feel that if there were
14 opportunities they could be advanced within the test
15 period. What that would essentially mean is, because
16 we have an overall capital envelope that we are
17 managing too within the test period, if we were to
18 spend more money in one area, we would have to reduce
19 in another. So it's a way that we would balance
20 across the entire capital portfolio, and I believe
21 that Ms. Pinksen, who will be speaking on the capital
22 planning team panel 4, can give good examples or how
23 that exactly would work.

24 So I do feel that we could move forward
25 with initiatives in the test period, if a good
26 opportunity were to be brought forward.

1 I also note that there are confidential
2 discussions currently underway within several
3 communities that are at various stages of progression.
4 It's entirely possible that those discussions could
5 advance and be implemented within the test period.

6 That being said, we are already getting
7 close to one year into the test period, so actual
8 implementation of a new solution is unlikely to be
9 realized in this test period, and would likely be part
10 of the next test period.

11 MR. WANG: Q Thank you. I'm going to turn your
12 attention to witness aid page 7 of 17, and again I'm
13 looking at another reference to the RRA, it's section
14 4.3.3, and I am looking specifically at line 15 here,
15 and it reads, "In support of Clean BC..." oh no, I
16 should just say that the heading title was
17 "Opportunities to reduce supply cost commitments in
18 non-integrated areas are more limited."

19 **Proceeding Time 4:19 p.m. T83**

20 And at line 15 it says:

21 "In support of CleanBC and BC Hydro's clean
22 energy commitment, we actively looked for
23 opportunities to displace diesel generation
24 with clean or renewable resources in non-
25 integrated area communities when it is cost
26 effective to do so."

1 All right. Just park that for one moment
2 and then I'm just going to take to one more place, and
3 that's page 2 of the 17. And this is a response to
4 Zone IIs IR 2.29.2 and in the interests of time I'm
5 just going to get to the relevant passage. I'm
6 looking at the 4th paragraph down in the response and
7 it says:

8 "As of 2016 BC Hydro and Tsay Keh Dene
9 communities leaders have initiated semi-
10 annual meetings or as required to discuss
11 community growth and planning. Potential
12 projects and initiatives are evaluated to
13 ensure they are technically viable, cost
14 effective and meet load requirements."

15 So I just want you to talk to me at a high
16 level about what technically viable and cost effective
17 means, and when we get to those thresholds where we
18 can say a project can go ahead. If that's not too
19 broad.

20 MS. DASCHUK: A Yeah, no. I mean I think we can break
21 that down into two components. One is the technical
22 viability. In some cases proposals are brought
23 forward that are experimental, and I think BC Hydro
24 looks at that from two perspectives. One is the non-
25 integrated areas could be a great place for us to try
26 out new technologies and to do some experimentation to
see what might work.

1 That said we also have to make sure that
2 there is a reasonable chance that the proposal that's
3 being put forward is technically viable. If it isn't,
4 then we don't do anything to actually reduce the
5 reliance on diesel generation.

6 We also want to look at things like how
7 reliable is the solution. Can the customers count on
8 that to provide reliable electricity for them. So
9 there is a very strong technical element to ensuring
10 that the solution that's being put forward is one
11 that's reasonable. We're willing to go a little bit
12 out into trying some new things, but they do have to
13 still fall into a realm of possibility.

14 On the issue of cost, Mr. O'Riley did make
15 a comment on this in his testimony and I believe
16 you've provided that in your witness aid, where he
17 said that the current ballpark average of diesel cost
18 is \$300. And I'm going to look to Mr. Chow and Ms.
19 Matthews to confirm that that was a reasonable
20 estimate of diesel costs.

21 MR. CHOW: A It's a general benchmark.

22 MS. DASCHUK: A Yeah, and I think in Mr. O'Riley's
23 comments he also mentioned that it may be required for
24 us to go above that to try and implement some of these
25 solutions, where they have other benefits other than
26 just the provision of electricity, like the greenhouse

1 gas reductions.

2 One of the things that we would be looking
3 at is to see what participation would we be able to
4 get from both the federal government and the
5 provincial government to address some of the
6 differences in the cost between the \$300 which is what
7 we're paying today and something else. I know it's a
8 priority for both the provincial and the federal
9 governments and we'd like them to be a part of the
10 overall solution when it comes to the economics of our
11 strategy.

12 Did you want to add to that?

13 MR. CHOW: A I'd just like to add that when we
14 undertake these projects for -- if it ends up with an
15 EPA at the end of the day, then of course that would
16 be subject to review by the Commission and that would
17 be, you know, the Commission has its goals for cost
18 effectiveness as well that we would have to consider.

19 MR. WANG: Q And I want to be absolutely clear that the
20 cost effectiveness would be analyzed after a source of
21 government funding or lack thereof is identified? So
22 the other alternative would be you assess cost
23 effectiveness on its own and the government funding
24 could just be some after-the-fact cost recovery
25 source? If that question makes sense. Or do you need
26 to -- do you need to analyze that input first.

1 MS. DASCHUK: A I think it's all part of the same.
2 It's an integrated decision.

3 MR. WANG: Q Okay.

4 MS. DASCHUK: A And part of the reason for that is that
5 when we do these energy purchase agreements we do have
6 to go to the Commission and the commission will make a
7 determination if those energy purchase agreements are
8 in the best interest of ratepayers. If we can
9 proactively work with governments to offset some of
10 the costs, then when we present that energy purchase
11 agreement to the Commission for approval, it would
12 reflect the cost net of the inputs from the various
13 government entities. So I think we have to do it in
14 combination.

15 **Proceeding Time 4:19 p.m. T84**

16 MR. WANG: Q Okay, but there wouldn't be a scenario
17 where you would make an application to the Commission
18 and thereafter seek government funding as a source of
19 cost recovery?

20 MS. DASCHUK: A I think that would be a risk of getting
21 the energy purchase agreement approved, because the
22 Commission may decide that without -- but for the fact
23 that we would get some federal or provincial funding,
24 the energy purchase agreement would not be in the best
25 interest of ratepayers.

26 MR. WANG: Q All right. Thank you. And in terms of

1 these funding opportunities, these injections of
2 capital as is described in the RRA, would that be on
3 an *ad hoc* basis that you would apply for a grant or
4 are there standing programs for matching funds such
5 that if BC Hydro committed a certain dollar amount
6 that the government would automatically match that?

7 MS. DASCHUK: A I believe part of the reason that we
8 haven't submitted the strategy is we're still looking
9 into the various opportunities that we have available
10 to us.

11 MR. WANG: Q All right.

12 MR. CLENDINNING: A I think -- I would add to that. I
13 think that typically the model is where the community,
14 or the IPP, or whoever, the group that is leading the
15 project would seek out the funding and BC Hydro has
16 supported them in their efforts through providing
17 consulting -- you know, consultants that specialize in
18 these grant applications.

19 MR. WANG: Q And so does that mean it's more or less
20 project to project, and *ad hoc*, as opposed to any kind
21 of sort of standing source of matching funding from
22 the government that -- or am I just making a
23 distinction that's not there?

24 MR. CLENDINNING: A From my understanding they're *ad*
25 *hoc* applications that each project would make and BC
26 Hydro is actually not involved in that part of it.

1 MR. WANG: Q I see.

2 MR. CLENDINNING: A It's the proponent that is leading
3 the application for the funding.

4 THE CHAIRPERSON: Ms. Daschuk, are you planning to
5 include your more comprehensive plan for the
6 non-integrated areas as part of the IRP filing? Is
7 that -- or do you see that as -- is it sort of a
8 separate standalone issue?

9 MS. DASCHUK: A Our initial scope of work for the IRP
10 coming in 2021 is that it's for the integrated system
11 and that begs the question where does the remainder of
12 it come? And I think the answers to that will start
13 with the strategy that Ms. Daschuk is talking about
14 and we see that as being independent. Whether that
15 comes in whole or in the 14 parts, I think that's
16 still to be determined as well in terms of what we
17 would come back to the Commission with.

18 THE CHAIRPERSON: Because looking, you know, for
19 example, at what the Commission said in the Brown Lake
20 decision, you know, it can be difficult for us to make
21 determinations on specific projects unless we have
22 some idea of a comprehensive strategy.

23 MR. CLENDINNING: A Right.

24 THE CHAIRPERSON: So presumably the same may apply
25 here. You know, you talk about us making decisions on
26 contracts and none in integrated areas. It would be

1 helpful if there was a strategy, you know, a context
2 in which we could evaluate those decisions.

3 MR. CLENDINNING: A I agree.

4 MR. WANG: Q So we look forward to your strategy.

5 MS. DASCHUK: A So we're saying that they would be
6 separate. So it would do --

7 THE CHAIRPERSON: It would be separate, yeah.

8 MS. DASCHUK: A We will do the integrated resource plan
9 for the integrated power system and we'll do a
10 separate plan for the non-integrated.

11 THE CHAIRPERSON: Okay. Thank you.

12 MR. WANG: Q I'm coming very close to the end of my
13 questions here. Two more questions. So in the
14 absence of a strategy document that exists now, is
15 there a document, a temporary document, or some other
16 set of principles that guides your diesel reduction
17 strategy now? I know you've articulated some general
18 principles with respect to the four pillars. Is there
19 anything beyond that?

20 **Proceeding Time 4:24 p.m. T85**

21 MS. DASCHUK: A There are four key objectives that we
22 have for our strategy. That is to meet the community
23 goals, which include working very closely with the
24 communities themselves; using the right technology at
25 the right time, and as I mentioned that's giving us
26 also the opportunity to try some new technologies;

1 ensuring that we're addressing BC Hydro operational
2 requirements and the integration with the system that
3 we have in those communities; and ensuring that
4 ratepayers' interests are protected. So, those are
5 four objectives that we have for the strategy.

6 The rest of the document is in a draft
7 stage, we're still working through it, so I don't have
8 even a draft document for you to share and I would
9 need to go through the appropriate approvals.

10 I'm also cognizant that a lot of work has
11 been going into the comprehensive review and there may
12 be some indication through the comprehensive review
13 about directions that we need to take as BC Hydro in
14 support of the B.C. province's provincial goals as it
15 relates to the diesel reduction strategy.

16 MR. WANG: Q Is BC Hydro experiencing difficulties in
17 managing its diesel reduction projects in the absence
18 of a strategy? Of a current strategy.

19 MS. DASCHUK: A In the absence of the overarching
20 strategy that the panel referred to, each of the
21 individual and non-integrated areas is being handled
22 on a individual basis. So there is no overarching
23 strategy but what I can say is that there is progress
24 being made in each of the various areas irrespective
25 of not having the overarching strategy.

26 COMMISSIONER FUNG: Could I just ask you a follow up

1 question if you don't mind?

2 MS. DASCHUK: A Sure.

3 COMMISSIONER FUNG: Is it BC Hydro's intention to go
4 out and consult broadly on this strategy or not?

5 MR. CHOW: A So our engagement -- if by the term
6 "broad" if you mean are we going to be asking people
7 across British Columbia what their views are on the
8 diesel reduction strategy that's not part of the plan
9 but there is broad consultation within each of the
10 individual communities.

11 COMMISSIONER FUNG: Thank you.

12 MR. WANG: Q Hopefully this is my last question and
13 then I have one more request after that. But just in
14 terms of timing, is the timeline for this overarching
15 strategy on a separate track from phase 2 or are you
16 anticipating that the phase 2 process is going to
17 inform this overarching strategy?

18 MS. DASCHUK: A I expect the phase 2 will inform it and
19 that's part of the reason that we haven't submitted it
20 because we're waiting for further inputs from phase 2.

21 MR. WANG: Q So the timing will be -- of this
22 overarching report will be delayed until the phase 2
23 report comes out?

24 MS. DASCHUK: A I think that's reasonable, yes. To say
25 that we would not want to file the strategy and then
26 find that there's something in the strategy that's

1 inconsistent with the phase 2 report so it's prudent
2 for us to wait.

3 MR. WANG: Q All right. I'm just going to turn to page
4 12 of 17 of the witness aid and I just have a request
5 for additional information. That will be my last
6 question.

7 There's a poorly reproduced table at the
8 bottom of page 12 of 17, it's Appendix O, and it is
9 Table 10.1 and it reads, "NIA total gross requirement
10 sales history and forecast after rate impacts and
11 after DSM". Is it possible to have the first three
12 columns broken down into commercial, residential and
13 industrial load as an undertaking?

14 MR. CLENDINNING: A I actually have Appendix O here so
15 we're just trying to take a look at the table to try
16 and confirm for you today before we go what we've got,
17 so bear with us.

18 MR. WANG: Q Sure.

19 **Proceeding Time 4:29 p.m. T86**

20 MR. CLENDINNING: A I'd have to go back and confirm
21 whether we actually have a breakdown by customer
22 classes for each of the NIAs. I think we do. I just
23 have to take it back and confirm with my staff.

24 MR. WANG: Q All right, then I will leave that as an
25 undertaking, if possible, to break those columns in
26 Appendix O down into commercial, residential, and

1 industrial loads.

2 **INFORMATION REQUEST**

3 MR. RICH: A The reason I am hesitating is depending on
4 the community, the forecast may be as simple as a
5 trend analysis or simple regression based on the
6 historical community growth, and not really broken out
7 by customer class. And so I just need to confirm
8 that. It may differ depending on the community.

9 THE CHAIRPERSON: Thank you.

10 MR. CLENDINNING: A We'll provide whatever we have in
11 hand.

12 THE CHAIRPERSON: I appreciate that, thank you.

13 MR. WANG: Q Thank you, I appreciate everyone's
14 indulgence, those are my questions, thank you.

15 THE CHAIRPERSON: Thank you, Mr. Wong. Mr. Ghikas?

16 MR. GHIKAS: Yes, I just had one thing to say. I just
17 wanted to express on behalf of BC Hydro the
18 appreciation of the panel, participants, and perhaps
19 in particular the people at Allwest for bearing with
20 us. I appreciate everybody pulling to try to get as
21 much as we can done this week, even if we didn't meet
22 our stretched target of getting it all done. I did
23 want, and BC Hydro wanted me to express that
24 appreciation.

25 THE CHAIRPERSON: Well, thank you very much for that.
26 I think it has been a very productive week, and so on

1 behalf of the panel I would like to thank everyone, BC
2 Hydro witness panels, all of the intervenors, and also
3 the staff at Allwest. Thank you.

4 So, unless there is anything else, just
5 finally then before we break for the week, I just want
6 to confirm that we will be back at 9 o'clock on
7 February 24th, 25th, and 28th. And we also have dates
8 set aside in our calendar, and I think in Allwest
9 calendar for the 2nd, 3rd, and 4th of March should we
10 require those.

11 We will finish with this panel as our first
12 item of business on the 24th. I am not sure where we
13 go from there. I don't know, Mr. Miller, do you want
14 to tell us? Or do you want to worry about it when we
15 get back on the 24th?

16 MR. GHIKAS: I have some sense as to where I think we
17 left things, and that was that after finishing off
18 with this panel, we were going to call the capital
19 panel. AMPC's witness will be here on the 2nd of those
20 days, which I guess is the 25th. I am not anticipating
21 being super long. Mr. Austin can't be relied on to
22 give you a reliable estimate anyways.

23 THE CHAIRPERSON: Or number the exhibits.

24 MR. AUSTIN: We can't rely on BC Hydro's panel members
25 to give short, concise answers.

26 MR. GHIKAS: So he is coming on the second day. So to

1 the extent that we don't get the capital panel done,
2 we'd stand them down, and then come back and finish
3 them, and then the DSM panel, and hopefully we get
4 done on the Friday.

5 THE CHAIRPERSON: Sounds good. All right, well thank
6 you again to everyone. Have a safe trip home, and --
7 Commissioner Lockhart has questions.

8 COMMISSIONER LOCKHART: Sorry, I did have questions.

9 A couple of questions. When the IR
10 response from BCOAPO, or the Zone II ratepayers group
11 was filed in -- I guess the question was initially in
12 August, and the response came in September regarding
13 the diesel strategy, and the response was that the
14 updated approach to diesel reduction would be
15 available in fall of 2019, and now we are hearing that
16 it's really waiting for Phase 2. What happened to --
17 that seems like quite a different timing. What
18 happened to change that?

19 MS. DASCHUK: A I think part of it's a very challenging
20 -- IA diesel reduction is actually very challenging.
21 And as we endeavor to build a strategy and to
22 understand how we would develop what was the
23 overarching strategic elements and what were the
24 specific elements of each of the individual
25 communities that just became more complicated than we
26 had originally anticipated.

Proceeding Time 4:19 p.m. T87

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COMMISSIONER LOCKHART: I see, okay, thank you. And second question, Ms. Daschuk, I heard referred to hoping to work with the provincial and the federal governments regarding I guess cost contribution or some kind of economic contribution. And then I hear Mr. Chow talking about really proponent-led funding required for any projects. So are those two separate things? EPAs require proponent-led funding but separately the diesel reduction is hoping for a specific contribution from the federal and provincial governments?

MS. DASCHUK: A I'm probably out of my depth here on the details of the strategy. My understanding is that we would even be looking within BC Hydro to get some support for bringing resources in to BC Hydro to help us with this, because we do see this as incremental effort, incremental attention that needs to be paid to it. And so if we can get some additional support for funding our own resources, that would be part of it.

And then I believe there is also the part where each of the individual energy agreements would also be potentially applying for funding.

But beyond that, I would have to defer back to the organization to make sure I understand that clearly.

1 COMMISSIONER LOCKHART: All right, thank you.

2 MR. CHOW: A Yeah, and I think I was speaking more to
3 historically how it's worked and I think things are
4 evolving in that way, away from -- you know evolving
5 to a new framework where there's greater involvement
6 from BC Hydro in the various aspects of the projects.

7 COMMISSIONER LOCKHART: So EPA proponents won't
8 necessarily have to rely on bringing their own funding
9 but BC Hydro will be able to support them.

10 MS. DASCHUK: A Well, part of what I don't know at this
11 time is what support there would be from the
12 provincial government and what that would actually
13 look like, and so it's hard for me to say exactly how
14 that funding mechanism would work, and that's part of
15 the reason why I think we need to wait and see what
16 that looks like.

17 COMMISSIONER LOCKHART: All right, thank you. I
18 appreciate that. Thank you, Mr. Chair.

19 THE CHAIRPERSON: You're welcome. All right. Well,
20 thank you very much everyone. Have a safe drive home
21 and a good weekend. We are adjourned.

22 **(PROCEEDINGS ADJOURNED AT 4:36 P.M.)**

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I HEREBY CERTIFY THAT THE FORGOING
is a true and accurate transcript
of the proceedings herein, to the
best of my skill and ability.



A.B. Lanigan, Court Reporter

January 24th, 2020