MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

NEEDS FOR AND ALTERNATIVES TO

REVIEW OF MANITOBA HYDRO'S

PREFERRED DEVELOPMENT PLAN

Regis Gosselin   - Chairperson

Marilyn Kapitany   - Board Member

Larry Soldier   - Board Member

Richard Bel   - Board Member

Hugh Grant   - Board Member

HELD AT:

Public Utilities Board

400, 330 Portage Avenue

Winnipeg, Manitoba

March 31, 2014

Pages 4343 to 4600

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12  Peter Miller     (np)         )

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14  Antoine Hacault               )MIPUG

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17  Michael Anderson (np)         )

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20  Corey Shefman    (np)         )

21

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23  Michael Weinstein (np)        )

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1 --- Upon commencing at 10:00 a.m.

2

3   THE CHAIRPERSON: Good morning.   I

4 believe that we're ready to resume the proceedings of

5 the hearing.   I hope everyone had a good weekend, and

6 I hope that you're refreshed for this week's events.

7 So I'll turn over the microphone to Mr. Peters,

8 please.

9   MR. BOB PETERS: Thank you.   Good

10 morning, Mr. Chairman, Board members, ladies and

11 gentlemen.   I would just like to speak to a few of the

12 timetabling changes that were communicated by email

13 to, I believe, most everybody this weekend, and for

14 the benefit I suppose of the transcript, to make sure

15 that we're all keeping current.

16   Certainly today's start at 10:00 a.m.

17 is partly as a result of, I'm sure, Dr. Sinclair's

18 travel adventures yesterday.   But we're glad he's here

19 today and will understand his colleague will be

20 joining him this afternoon.

21   What also happened last Friday is

22 Manitoba Hydro had indicated that additional time was

23 required to deal with some financial analysis

24 information.   And as a result of that, the schedule

25 had been revised to hopefully use Friday, April the

4348

1 4th, to ask additional questions of Manitoba Hydro's

2 witnesses. That now does not appear to be a viable

3 option.

4   And so instead of Manitoba Hydro

5 appearing on April the 4th, we want to thank Mr.

6 Monnin, Mr. Weinstein, and their client MNP, who has

7 on short notice agreed to come in for this coming

8 Friday on macro-environmental issues. And, so Friday,

9 April the 4th, will be the day set aside for MNP.

10 They were previously scheduled to testify on Tuesday,

11 April 22.

12   Before I leave April the 4th, the

13 parties should be aware that at 12:45 p.m. that day

14 there is a presenter that has been scheduled and is to

15 appear for a brief presentation. And that again is

16 12:45 on Friday, April the 4th.

17   Speaking of presenters, on Monday,

18 April the 7th, there is yet another presenter who has

19 asked for a short time before the panel to present.

20 And he will present at 12:45 on Monday, April the 7th,

21 according to our current schedule.

22   If we turn ahead in the schedule till

23 Easter Monday, as it's known, or April 21, that is a

24 date that the panel had indicated they were

25 considering using that day for the hearing of

4349

1 evidence. And in Manitoba Hydro's letter of Friday

2 afternoon, they had suggested that that Easter Monday

3 would be a better day to have Interveners cross-

4 examine Manitoba Hydro's finance and other witnesses

5 on the updated filings that are expected to be made.

6   The expectation is Manitoba Hydro's

7 filings will now be completed by April 11, and

8 therefore Manitoba Hydro put forward April 21. I will

9 indicate that while April 21 hasn't been -- is just

10 being presented to the panel this morning for

11 consideration, you've also heard that MNP has given up

12 April 22. So we -- we now have a potential of two (2)

13 days available, April 21 and April 22, in which

14 Manitoba Hydro's witness panels would be recalled to

15 deal with their updated financial and economic

16 analysis, as well as undertakings.

17   I have asked counsel for the

18 Intervenors to let me know when they're in a position

19 to know what their time requirements are likely to be.

20 And, Mr. Chairman and panel members, depending on that

21 information, I will be in a better position to report

22 to the Board if we need one (1) full day for the

23 recall of Manitoba Hydro's panel or more than one (1)

24 full day.

25   And if we need more than one (1) full

4350

1 day, I expect we're encroaching on Easter Monday. And

2 if we don't, then the panel may just want to sit on

3 Tuesday, the 22nd of April.

4   I then have sheepishly, as I look

5 across to Mr. Hacault, one other item that I have

6 added to the timetable. And I -- I did take a bit of

7 poetic licence. I will indicate that clearly, that

8 Mr. Hacault and I had been discussing the relocation

9 of the testimony of his witness, Mr. Patrick Bowman on

10 behalf of MIPUG. MIPUG is presently scheduled on May

11 the 5th. That is a Monday. It also happens to be the

12 Monday of the national conference for the Canadian

13 Association of Members of Public Utility Tribunals,

14 and there was an effort to try to preserve a few days

15 that week to allow attendance at that conference.

16   And I was in discussion with Mr.

17 Hacault about moving it up to the Saturday, May the

18 3rd, and as I looked at the schedule, I -- I think --

19 and Mr. Hacault will certainly speak for himself, that

20 it was a -- an option that was being considered on a

21 best efforts basis, but I also look and I see Mr.

22 Orle's client MKO has witnesses planned for Friday,

23 May the 2nd, and we're just not certain as to the

24 duration of time we will need on Friday, May the 2nd

25 with MKO witnesses.

4351

 1   And because that hasn't been finalized,

 2 there is, dare I say, a window of opportunity for Mr.

 3 Bowman to perhaps begin his testimony on the Friday,

 4 May the 2nd. That's, Mr. Chairman and panel members,

 5 still in flux, and I'll communicate with my colleague

 6 opposite to -- to see if we can firm that up, but

 7 indicating that May 2nd and May 3rd are now the target

 8 dates for MIPUG evidence.

 9   The last item, Mr. Chairman and panel

10 members, to just add to the schedule is that on

11 Wednesday, May the 14th, the panel is travelling to

12 Thompson, Manitoba, and will be sitting on a -- to

13 hear presentations both in the afternoon and the early

14 evening in Thompson, and so that's a matter that

15 should also be added to peoples' schedule.

16   I have a few paper copies that I'll

17 leave at the back table for those who didn't want to

18 print out their own or want a copy this morning, but

19 subject to any questions you have of me, Mr. Chairman

20 or panel members, those complete my comments of this

21 morning.

22   THE CHAIRPERSON: Thank you, Mr.

23 Peters. The panel has no questions to ask you at the

24 present time.

25   MS. PATTI RAMAGE: Oh, Mr. Chair, just

4352

1 before we move on from this, I think the parties in

2 the room should be aware that Manitoba Hydro had

3 proposed its financial panel for the April 21st date,

4 or April 22nd, and I just -- in terms of planning, we

5 had thought the economics were going to go April 4th,

6 and I see what's gone on in -- in terms of moving off

7 that date, but parties should be aware Mr. Cormie will

8 not be available on April 21st.

9   So in terms of the economics piece, we

10 are going to have one (1) person -- we haven't been

11 able to consult with our panel members, but we know

12 for sure today that Mr. Cormie won't be available that

13 day, so perhaps people can take that into

14 consideration in terms of the areas they wish to

15 follow-up on.

16   THE CHAIRPERSON: Thank you, Ms.

17 Ramage. With that, I'll turn the microphone over to

18 Me. Monnin. Bonjour, Me. Monnin.

19   MR. CHRISTIAN MONNIN: Bonjour, Mr.

20 President. It's my pleasure to be here this morning

21 with Dr. Robert Sinclair --

22   THE CHAIRPERSON: Just a second,

23 please. I -- I'm -- I will turn the microphone over

24 to Mr. Williams. I'm sorry about that.

25   MR. BYRON WILLIAMS: I -- I'm the one

4353

1 who should be apologizing for interrupting. Mr.

2 Chair, just a -- a -- I guess three (3) points. If

3 Mr. Peters, in terms of the schedule -- I understand

4 the panel is going to be up in -- in Thompson the week

5 of -- and Wednesday, May 14th.

6   Are we still assuming that -- that

7 closing arguments will proceed on the 14th? I see Mr.

8 Peters's head nodding.

9   MR. BOB PETERS: I -- I think Mr.

10 Williams misspoke. Thompson, Manitoba, is Wednesday,

11 May the 14th, and closing submissions will be

12 Thursday, May 15th from the PUB, from Consumers'

13 Association, and from Green Action Centre, whose

14 witnesses will have finished a -- a couple of weeks

15 earlier than that, so that is still the plan.

16   MR. BYRON WILLIAMS: Okay. And -- and

17 certainly from our client's perspective, I'll offer

18 this input now in terms of schedule, because for the

19 financial and economic panel of Manitoba Hydro, our

20 client's preference would be that it be on -- begin on

21 the 21st, rather than the -- the Tuesday. And I would

22 note that we have witnesses coming up towards the end

23 of that week who will be probably incorporating

24 material from the cross-examination into their --

25 their evidence.

4354

1   So we're -- we're mindful of the many

2 time pressures on the panel. But from the selfish

3 perspective of CAC (Manitoba), they would prefer to

4 start on the -- the 21st, for -- for what it's worth,

5 sir.

6   And finally -- and certainly our client

7 just wants to go on the record as -- as noting that in

8 terms of the very valuable evidence of Potomac, there

9 is still an ongoing dialogue between the Public

10 Utilities Board and Manitoba Hydro, as we understand

11 it in terms of material, that it continues to be

12 blacklined, and that issue is not resolved.

13   And from our client's perspective, it

14 leaves them in some prejudice today, in the sense that

15 there is material that they would have liked and

16 expected access to in preparing their cross-

17 examination that is -- is not currently available to

18 them.

19   So with the greatest of respect, our

20 client would object to commencing the -- the

21 presentation at this point in time. We certainly

22 expect that objection to be overruled, and -- and we

23 are prepared to continue with our examination. But I

24 just want to go on the record as noting our client's

25 concerns and observing that it does, in our view,

4355

1 prejudice our preparation today.

2   THE CHAIRPERSON: Thank you, Mr.

3 Williams. Your objection is noted. The information

4 that is available on the public record so far is

5 available -- that, in our opinion, is one that -- or

6 is information than can -- can be put on the public

7 record. We will be examining this issue further

8 tomorrow in the CSI section. And the outcome of those

9 discussions will perhaps reflect in a broader public

10 record, but time will tell. So thank you very much

11 for those comments.

12   Back to you, Me. Monnin.

13   MR. CHRISTIAN MONNIN: Merci, Mr.

14 President. It's my pleasure to be here this morning

15 with Dr. Robert Sinclair, Potomac Economics. Just a

16 couple of administrative matters before I move to

17 housekeeping questions.

18   Dr. Patton is in transit as we speak.

19 He anticipates to be here approximately one o'clock.

20 At that point in time, he would like to -- to meet his

21 counsel and -- and just have a brief -- a brief

22 meeting. We will then propose to have him sworn in --

23 or, rather, qualified as an expert, sworn in, if all

24 goes according to planned, and he can sit in with the

25 -- the balance of the cross-examination in the CSI.

4356

 1   The -- the last caveat with Dr. Key --

 2   Dr. Patton is that for tomorrow morning he is present

 3   in Winnipeg, but he has a prior conference call that

 4   he must attend to. And once he's done that, he will

 5   return for continued cross-examination.

 6   That being said, I propose to commence

 7   the questions to have Dr. Sinclair qualified. Well,

 8   that's of two (2) minds. Do we swear him in before or

 9   should we get him qualified prior to? Very well. Mr.

10   Simonsen...?

11

12   IEC POTOMAC ECONOMICS PANEL:

13   ROBERT SINCLAIR, Affirmed (Qual.)

14

15   QUALIFICATION OF WITNESS:

16   MR. CHRISTIAN MONNIN: Third -- third

17   time's a charm, as they say. Dr. Sinclair, you are

18   here on behalf of Potomac Economics, which has been

19   retained by the Manitoba Public Utilities Board, the

20   PUB in order to assist the PUB to conduct a Needs For

21   and Alternatives to review of Manitoba Hydro's

22   Preferred Development Plan and in accordance with the

23   terms of reference and Potomac Economic's scope of

24   work dated September 20th, 2013, to critically review

25   certain aspects of Manitoba Hydro's Preferred Devel --

4357

1 Development Plan and filing some support thereof.

2   Is that correct?

3   DR. ROBERT SINCLAIR: Yes.

4   MR. CHRISTIAN MONNIN: Potomac

5 Economics prepared a report in accordance with the

6 terms of the reference and the scope of work, correct?

7   DR. ROBERT SINCLAIR: Yes.

8   MR. CHRISTIAN MONNIN: Was the report

9 prepared by you or under your supervision and control?

10   DR. ROBERT SINCLAIR: Yes, with -- by

11 me and also by David Patton.

12   MR. CHRISTIAN MONNIN: And there's

13 also a slide presentation which you'd be relying upon

14 today for -- to go over the -- your report.

15   Was that prepared by you or under your

16 supervision and control?

17   DR. ROBERT SINCLAIR: Yes, prepared by

18 me with also -- reviewed and with the assistance of

19 Dr. Patton.

20   MR. CHRISTIAN MONNIN: Dr. Sinclair,

21 your curriculum vitae has been filed with the PUB as

22 part of Exhibit Hill Co. Number 8, Tab 1(a), in --

23 specifically.

24   Can you describe your qualifications

25 and experience related to the work undertaking by

4358

1 Potomac with respect to these proceedings?

2   DR. ROBERT SINCLAIR: Yes. I have a

3 PhD in economics from the University of Pittsburgh,

4 where I studied microeconomics and reg -- regulation

5 and antitrust. I also have been an energy consultant

6 for twenty (20) years -- more than twenty (20) years.

7 And in that role I have testified a number of times on

8 matters relating to electric utility regulation and

9 competition

10   I've worked for over ten (10) years in

11 market monitoring, where we are in the -- the

12 responsibility to monitor markets, including assessing

13 market outcomes, participant behaviour in those

14 markets, and also the -- the structure of those

15 markets and the -- the effect of operations on the

16 market outcomes.

17   In those rules, we've worked closely

18 with prices. We've worked closely with the market

19 clearing mechanisms, designing them, monitoring them.

20 And based on that experience, we're able to make

21 assessments about future conditions in the markets and

22 prices and output.

23   MR. CHRISTIAN MONNIN: Thank you, Dr.

24 Sinclair. Can you general -- generally describe the

25 type of clientele that you work for?

4359

1   DR. ROBERT SINCLAIR: As market

2 monitors, we generally work with RTOs, large

3 transmission operators that also operate centralized

4 markets, energy markets, capacity markets. Typically,

5 for those clients we will conduct reports, do studies

6 on market efficiency, market outcomes, as I said,

7 behaviour of market participants.

8   We also have cases where we monitor

9 transmission networks, their operations, and their

10 effect on markets. And we have also, over time,

11 worked with the individual clients involved in matters

12 relating to competition in electricity markets.

13   MR. CHRISTIAN MONNIN: Thank you, Dr.

14 Sinclair. With that, Mr. President, we'd ask that Dr.

15 Sinclair be accepted by the Board as an expert for the

16 purposes of giving evidence on the report of Potomac

17 Economics.

18   THE CHAIRPERSON: I just have one (1)

19 question, Dr. Sinclair. With respect to capacity

20 markets, you monitor them for which regional

21 organizations?

22   DR. ROBERT SINCLAIR: We monitor the

23 capacity markets in MISO. There's also capacity

24 markets in ISO New England and the NYISO. And we

25 sometimes get involved ancel -- in a related context

4360

1 with capacity markets in PJM, although we're not the

2 market monitor for PJM.

3   THE CHAIRPERSON: Thank you for that.

4 I'd like to hear from the Intervenors, please. Mr.

5 Williams, would you like to start?

6   MR. BYRON WILLIAMS: Certainly, from

7 our client's perspective, we -- within the area of

8 evidence presented by Potomac, we wholeheartedly

9 endorse their expertise in -- in offering the opinions

10 that they have presented here.

11   THE CHAIRPERSON: Me. Hacault...?

12   MR. ANTOINE HACAULT: Likewise on

13 behalf of MIPUG, Manitoba Industrial Power Users

14 Group, we have no objections to the expertise of Dr.

15 Sinclair as presented.

16   THE CHAIRPERSON: I don't see Mr. --

17 Mr. Gange, so I'll assume that he's -- he's -- you

18 wish to comment?

19   MR. BYRON WILLIAMS: I do not believe

20 he will be here for the next two (2) days.

21   THE CHAIRPERSON: Mr. Orle, please?

22   MR. GEORGE ORLE: No objection to the

23 qualifications as an expert. Thank you.

24   THE CHAIRPERSON: And on behalf of

25 MMF, Mlle. Saunders?

4361

 1   MS. JESSICA SAUNDERS: Yes, MMF has no

 2 objections to the qualifications.   Thank you.

 3   THE CHAIRPERSON: And Ms. Ramage...?

 4   MS. PATTI RAMAGE: Manitoba Hydro --

 5 we -- we have a few brief questions before proceeding.

 6   MS. PATTI RAMAGE: One of the -- of

 7 the topics you -- I just heard you mention was that

 8 you were looking at competition in electricity

 9 markets.

10   Just to confirm, would that mean market

11 manipulation?

12   DR. ROBERT SINCLAIR: Yes, among other

13 things, it would include that.

14   MS. PATTI RAMAGE: What else would it

15 include?

16   DR. ROBERT SINCLAIR: It would include

17 market dominance, as far as being a large player

18 unilateral market power. It would include -- it would

19 include operations by the RTO, the transmission

20 operator, in undertaking certain operations that may

21 affect competition, and it may also affect -- be

22 affected by participants that are buyers in the market

23 attempting to depress prices, as well as sellers

24 attempting to raise prices.

25   MS. PATTI RAMAGE: Thank you. In

4362

1 reviewing the various CVs that were filed by Potomac,

2 I noted that Potomac's -- has invested in developing

3 and updating real time and day ahead automated

4 mitigation procedure software for the MISO ancillary

5 services market.

6   Can you just explain what that is?

7   DR. ROBERT SINCLAIR: Okay. Automated

8 mitigation is a -- like -- like the term says, an

9 automated process whereby offers and bids in the

10 market are analyzed by a computer program in order to

11 detect whether they are outside certain ranges, and

12 whether -- if they're outside certain ranges, they

13 have an adverse market impact, such as raising prices,

14 or in the case of a -- a buyer, lowering prices.

15   And this process is -- is automated in

16 accordance with terms of the tariff, so it's -- it's

17 no discretion allowed, but it's an attempt to mitigate

18 market power in advance of the market actually being

19 cleared.

20   MS. PATTI RAMAGE: Thank you. Another

21 model I saw reference to was reference price

22 calculation software that supports the conduct and

23 impact -- and impact market power mitigation framework

24 of MISO.

25   What would that model deal with?

4363

 1   DR. ROBERT SINCLAIR: Okay. So the

 2 automated mitigation, going back to the last question,

 3 is a conduct in impact process whereby first of all,

 4 conduct of the participants is measured so that a --

 5 an offer or a bid is within a certain range. We have

 6 threshold ranges, and if it is outside that range, the

 7 impact of that conduct is tested in a simulation of

 8 the market, basically.

 9   In order to apply that conduct impact

10 framework, the -- the offers and the bids must be

11 judged against some threshold, and we call these

12 reference values. And basically, for instance, for a

13 generator, a reference value would be some estimate of

14 its marginal cost. And if that offer is outside some

15 range of that marginal cost, then it fails the conduct

16 test, and then is measured in the second part of the

17 test for impact on the market, so the reference value

18 is the -- is -- is the basis of the threshold for the

19 conduct in the market.

20   MS. PATTI RAMAGE: So would I be --

21 would it be accurate to say that you're looking at

22 past performance of markets, or how the market

23 participants behave on a day-to-day basis?

24   Is that what those models do?

25   DR. ROBERT SINCLAIR: We do look at

1 past performance, but the -- the automatic -- the

2 automated mitigation process, the conduct impact test

3 is a prospective test looking at the current offers

4 and bids, and mitigating them before the market

5 actually clears.

6   MS. PATTI RAMAGE: So in terms of

7 perspective, is that near-term perspective, or what?

8   DR. ROBERT SINCLAIR: That's near --

9 that's day ahead, yes.

10   MS. PATTI RAMAGE: So would you agree,

11 then, that the focus of your business is -- tends to

12 be looking at what happened in the past, and the near-

13 term future to identify and remedy market design

14 flaws?

15   That's what the -- the role of the

16 market monitor is, and that's the business focus?

17   DR. ROBERT SINCLAIR: Certainly we do

18 a lot of work looking at past conduct, and we

19 certainly, on a day-to-day basis, look at the

20 immediate run perspective, but we also do a lot of

21 work in looking forward, especially in the capacity

22 markets. We look forward on profitability, future

23 profitability based on prices.

24   We have also done a great deal of work

25 in forecasting future revenues in -- in the context of

4365

1 supply procurement monitoring. I didn't mention that

2 as much when I -- in the introduction, but we also do

3 work where -- similar to this proceeding, where we are

4 asked to assess the reasonableness of a capacity

5 procurement by a utility where we will examine future

6 prices to see -- to determine the reasonableness,

7 determine whether the revenue is sufficient to justify

8 the cost. So in addition to the everyday market

9 monitoring, we also are involved in more longer term,

10 more forward looking types of analysis.

11   MS. PATTI RAMAGE: Is that longer term

12 five (5) years out or twenty (20) years out? What

13 would...

14   DR. ROBERT SINCLAIR: The -- I have to

15 think of the various cases we do, but they typically

16 go out the life of a plant which would be closer to

17 twenty (20) or thirty (30) years.

18   MS. PATTI RAMAGE: So would it be

19 fair, then, to say that your work as MISO monit -- or

20 as MISO market monitor and your other work, they blend

21 and give you the tools and insight that makes you

22 attractive to parties looking for insights where -- in

23 terms of where the market is headed?

24   DR. ROBERT SINCLAIR: Yes.

25   MS. PATTI RAMAGE: That's Manitoba

4366

1 Hydro's questions, and Manitoba Hydro has no objection

2 to Potomac being qualified.

3   THE CHAIRPERSON: Yes, the panel will

4 accept Dr. Sinclair as an expert witness for the

5 purposes of this hearing. So well -- welcome back to

6 Winnipeg, Dr. Sinclair.

7   MR. CHRISTIAN MONNIN: Mr. President,

8 if I may. Just one (1) last housekeeping item for --

9 for exhibits for Dr. Sinclair and Dr. Patton's

10 presentation. There is the Potomac report, which is

11 the March 2004, redacted. And in discussion with Mr.

12 Simonsen earlier, that would be Exhibit 2.1 of

13 Potomac.

14

15 --- EXHIBIT NO. POT-2-1:   Potomac Economics Report on

16   Export Prices and Revenue

17

18   MR. CHRISTIAN MONNIN: There's also an

19 errata which has been CSI scrubbed, as we say. And

20 that should be 2.2 of Potomac.

21

22 --- EXHIBIT NO. POT-2-2:   Potomac Economics Report

23   Errata

24

25   MR. CHRISTIAN MONNIN: The scope of

4367

1 work is -- it's although on the website it's not part

2 of the exhibit. We will be introducing the scope of

3 work for Potomac dated September 20th, 2013, as -- as

4 Exhibit number 3.

5

6 --- EXHIBIT NO. POT-3: Scope of Work for Potomac

7 Economics

8

9 MR. CHRISTIAN MONNIN: And, finally,

10 the slide deck which is part of the presentation today

11 will be incorporated as Exhibit number 4.

12

13 --- EXHIBIT NO. POT-4: Potomac Economics

14 Presentation

15

16 THE CHAIRPERSON: Now, doc -- Dr.

17 Sinclair, you've been spared the -- you've been spared

18 the usual proviso that Mr. Peters provides to

19 witnesses, and I'll -- I -- I don't wish to spare you

20 of that. So I think I will ask him to repeat it,

21 please.

22 MR. BOB PETERS: Yes. Thank you, Mr.

23 Chairman. And, Dr. Sinclair, as I'm sure your counsel

24 has indicated, the terms of reference to the Public

25 Utilities Board allow for evidence to be heard on --

4368

1 in public with respect to as much evidence that is not

2 commercially sensitive information. And that

3 commercially sensitive information is only to be heard

4 in camera.

5   This morning is the public session, and

6 so we are asking you to guard against putting on the

7 public record any information that has been noted by

8 Manitoba Hydro and the Public Utilities Board as -- as

9 commercially sensitive information. I would suggest

10 that if you are in doubt, you take a -- take the time

11 to consult with your counsel, who may also take the

12 time to consult with other counsel, just to make sure

13 we're walking that clear line. Thank you, sir.

14   MS. PATTI RAMAGE: Mr. Chair, before

15 going forward, I just have a question of clarification

16 on the exhibits. The Potomac report is -- that's

17 identified as Exhibit 1. Is -- says, "March 2014,

18 redacted." And it's the January 15th, but there have

19 been a couple of versions of different redactions.

20   And I'm wondering if they are going to

21 be in any way identified, should that be necessary, or

22 -- or how we're going to deal with the versions of the

23 report. That may be something we don't need to deal

24 with right now and can be a housekeeping matter, but I

25 know I have trouble keeping track of versions.

4369

 1   MR. BOB PETERS: Well, just to be

 2 clear, Mr. Chairman, there are two (2) public

 3 versions. Both of them are on the PUB website. And

 4 one (1) had been filed previously, and I think it was

 5 from mid-January. And then more recently there's been

 6 a -- a version that has been refiled that contains

 7 some errata that had been noted by Potomac Economics.

 8 So I believe it's Potomac Exhibit 2.1 is the version

 9 that is most current and the one that we'll be dealing

10 with this morning, unless counsel has a different

11 suggestion. Thank you.

12   MR. CHRISTIAN MONNIN: For the record,

13 that's -- that's my understanding, what is accurate.

14   THE CHAIRPERSON: Ms. Ramage, did that

15 address your concerns?

16   MS. PATTI RAMAGE: If we have any,

17 we'll -- we'll discuss it with counsel. But I -- I

18 think we're covered off.

19   THE CHAIRPERSON: I think the

20 preliminaries are over. Me. Monnin...?

21

22 EXAMINATION-IN-CHIEF BY MR. CHRISTIAN MONNIN:

23   MR. CHRISTIAN MONNIN: If nothing

24 further from you, Mr. President, we're ready to have

25 Dr. Sinclair proceed with his presentation.

4370

1   DR. ROBERT SINCLAIR: Good morning,

2 Mr. Chairman. It's good to see you again. Good

3 morning to the rest of the panel. Good to see those

4 of you whom I've met. Mr. Bel, nice to meet you. Dr.

5 Grant, nice to meet you. I don't think we've met

6 before. Good morning to the Board counsel and the --

7 and the staff and other Intervenors, and good morning

8 to Manitoba Hydro.

9   As I said, my name is Robert Sinclair,

10 and this is my presentation to summarize the points of

11 our expert report. I'll will go over my credentials

12 briefly. I've already talked about them a little bit.

13   I have a PhD in economics from the

14 University of Pittsburgh, and I've studied areas of

15 industrial organization, antitrust-related issues.

16 I've been a consultant since 1993 and providing expert

17 testimony on a number of issues, as -- as I had noted

18 earlier.

19   I also want to introduce Dr. David

20 Patton, who will be here this afternoon and part of

21 tomorrow. And we apologize for Dr. Patton's lack of

22 availability. The scheduling was just starting to

23 take place very recently, and he had some hard

24 commitments that were difficult to overcome, but he --

25 he'll be happy to be here.

4371

1   He also had a PhD in economics in

2 related areas of industrial organization, antitrust.

3 He's been an energy expert since 1990, including

4 serving on the Federal Energy Regulatory Commission,

5 and he's the president of Potomac Economics.

6   As I mentioned a little bit about what

7 our firm does, we are the leader in the field of

8 market monitoring. We monitor most of the large RTOs,

9 including the Midcontinent ISO, what we refer to as

10 MISO, also NYISO, ISO New England, and ERCOT. And we

11 do some work also for the CALISO, calculating

12 reference prices.

13   In addition to this, we have a number

14 of other cases that we tend to work on, monitoring

15 work, monitoring transmission operations so that these

16 operations do not have an adverse effect on market

17 outcomes. We have some work over in Europe where we

18 also advise on market monitoring issues. Generally,

19 again, our work is involved with ensuring competitive

20 outcomes and competitive behaviour in the electricity

21 markets.

22   I'm going to summarize the scope of our

23 -- our work. We were asked by the PUB to examine

24 expectations in export markets, primarily MISO, since

25 MISO is the primary market where Manitoba Hydro

4372

1 expects to make most of their additional sales under

2 the Preferred Development Plan.

3   So our focus primarily involves the

4 forecast of MISO prices, again, because this is the --

5 the main market where Manitoba Hydro expects to be

6 involved.

7   We address three (3) main issues in our

8 presentation. The first is we discuss our forecast of

9 MISO prices. We also address related market issues,

10 export issues, especially how they may affect

11 quantities of exports to the MISO market. And

12 finally, we address certain points raised by Manitoba

13 Hydro on rebuttal.

14   So let's move to the first of these,

15 which is the forecast to MISO prices. Well, before

16 that, let's, just for everybody's benefit -- of

17 course, everybody understands this project quite well,

18 but I think it's useful to look at it again.

19   So Manitoba Hydro is proposing to spend

20 some money on constructing generation capacity to

21 serve their load, but they're proposing to -- to build

22 more than is necessary for their load in order to, in

23 addition to serving load, create export market

24 capacity.

25   And so we have the development cost

4373

1 plus what we might call extra development cost to

2 build the extra capacity. And if you deduct from that

3 the market revenue, the additional market revenues

4 from the extra capacity, we have the total cost to

5 Manitoba. This is a fairly simplistic review of the

6 relationship here, but I think it makes the point.

7   So the -- the question is: What's the

8 purpose of our presentation? And really, what -- we

9 were focussed on whether these extra development costs

10 are going to be off -- offset by the export revenues.

11 That's basically what the -- what the -- the main

12 question that our report addresses.

13   And -- and our own report is focussed

14 more on the market revenues. So we're really

15 interested in what are the quantities of sales that

16 Manitoba Hydro will make in accordance with the plan,

17 and also the export prices.

18

19   (BRIEF PAUSE)

20

21   DR. ROBERT SINCLAIR: So really we --

22 we were asked to address export quantities and export

23 prices. Generally speaking, the quantities that

24 Manitoba Hydro is putting forth in this proceeding are

25 based on excess capacity that they plan to build and

1 have available for some portion of the -- the project

2 horizon, and also some water optimization which

3 determines how much they can sell off peak or on peak.

4   We found some minor issues associated

5 with these -- these quantities, and we'll talk about

6 those, but generally we find that the quantity

7 forecast is -- is reasonable. We don't have a lot of

8 issues with that.

9   With respect to export prices, most of

10 our energy and our analysis went into developing

11 export prices because they have a greater deal of

12 uncertainty. And for reasons described below, we

13 developed our own forecast to assess the Company's

14 forecast. In part, we did this because we were

15 limited in our ability to examine the underlying logic

16 and the underlying data that supported the price

17 forecast, and we'll talk about that.

18   So I just want to mention very

19 generally the -- the Manitoba Hydro price forecast.

20 Manitoba Hydro uses six (6) consultants to establish

21 their export prices. And these forecasts include

22 three (3) products. And I agree these are the

23 important products that you want to look at in -- in a

24 forecast. And these were the on-peak energy prices,

25 the off-peak energy prices, and also the capacity

4375

1 prices. And these three (3) prices will make up just

2 about all of the revenue that Manitoba Hydro will be

3 earning -- is proposed to earn over the horizon of the

4 project.

5   As I said, the availability of the

6 underlying data for the forecast was restricted. So

7 as a result, we developed our own forecast that would

8 enable us to assess the Company's forecast. So

9 basically we examined the Company's forecast and we

10 found that at some point we could no longer -- we

11 could no farther go into the details.

12   And so we felt that the best way to do

13 this was to develop our own detailed forecast and

14 compare that to what the Company's have -- had

15 developed. And part of our intention was to develop a

16 forecast that is highly transparent, easily

17 understood, but also has rigorous and detailed

18 elements to it that can be relied on for these

19 purposes -- of this hearing.

20   So now I want to go ahead and talk

21 about our energy price forecast, and there's both an

22 on-peak and off-peak energy price forecast. We do the

23 on-peak and off-peak energy price forecast basically

24 the same. We -- we estimate the energy price in each

25 hour, and then simply separate the hours by on peak

1 and off peak. So anything I say going forward with

2 respect to estimating these prices, that applies to

3 both the on peak and off peak.

4   So our forecast is a twenty (20) year

5 forecast, the same as the Manitoba Hydro consultants.

6 We use the day-ahead market as the basis for the

7 forecast. Just about all of the energy in the Midwest

8 markets are clearer than day-ahead markets. It's the

9 important market in the Midwest, and it's also the

10 market that the consultants focussed on.

11   Our forecast are based on actual MISO

12 supply curves from the two (2) most recent years

13 available, 2011 to 2012. So what we do is we look at

14 the supply relationships that existed for every hour

15 in 2011 and 2012, and -- and every hour we make

16 adjustments to the supply curves to try to project

17 what the conditions in those hours will be like in

18 future periods. And I'll explain how that works.

19   But we use historical -- the historical

20 supply curves, adjust them based on the projected key

21 inputs, fuel prices, retirements in order to determine

22 what the price would be in some future hour. And we

23 do it for every hour of the year.

24   So for each hour what we observe is the

25 offer -- as-offered marginal cost of MISO units that

4377

1 are committed in that hour. And this is all public

2 data that you can get from the MISO site. And we also

3 have MISO demand, system-wide demand, and we can also

4 observe the actual clearing price. And I'll show you

5 an illustration of what exactly that would look like

6 if you were analyzing it.

7   Again, this is all public data. It's

8 all -- it's all available. There's no mystery on how

9 this is done. I mean, there -- well, we have a

10 computer program doing some of it, so it's -- it's

11 available, but we -- here's basically how it works.

12   So this is going to be some

13 representative hour in MISO. And what we as -- what

14 we're able to observe in each hour is this supply

15 curve. And this tells us what the marginal cost is of

16 all the MISO units that are committed during that

17 hour, I don't know, say 3:00 p.m. on July 15th.

18   And what we do is we -- we are able to,

19 of course, just simply sort the MISO units and stack

20 them from low cost to high cost, and you get this

21 supply curve. This is familiar to a lot of people in

22 the industry. So this is actually what happened on

23 this hour in -- in, say, 2011 or 2012. We're also

24 able to observe the level of demand and if you have

25 some level of demand, say 82,000 megawatts, then we're

1 also able to observe the price. And we're able to

2 construct the supply and demand relationship for that

3 hour.

4   Now, what we do is -- go ahead and put

5 that box up -- is we get this price, it's roughly

6 fifty-five dollars ($55). This is what we call the

7 system marginal price. It's the -- it's the so-called

8 MISO-wide price. It would represent what it cost MISO

9 to meet the next increment of load if you would ignore

10 congestion and losses. So it -- it's simply the --

11 the summing together of all of the MISO units that are

12 online in that hour, and determining what it would

13 cost MISO if it was to meet another incremental load.

14 It's the marginal -- marginal cost to meeting load in

15 MISO.

16   Now, as I'll explain below, in order to

17 get the appropriate price, for the purposes of this

18 case, we'll need to add the congestion and losses in.

19 But the system marginal price is the basic price that

20 MISO uses to establish the locational prices. And so

21 we calculate this system marginal price for every hour

22 of each year for the twenty (20) years, based on the

23 historic supply curve that we see in 2011/2012.

24   And I'll show you exactly how -- how we

25 go ahead and forecast the future hours. So I'm going

4379

1 to move to the next slide, where we take the supply

2 curve and look at what happens if we change some of

3 the market fundamentals. So let's see what happens to

4 the same supply curve if we -- if -- inst -- if the

5 demand changes.

6   So we use this supply curve for a

7 future hour where everything's the same except demand

8 goes up. So we have a shift out in demand and then we

9 just simply have a higher price. So if we're

10 forecasting a price for 2015, we take the 2012 supply

11 curve and we adjust it to the 2015 demand. We also do

12 it for other factors, but just to keep it simple for

13 now we just look at the one factor that might change.

14 And then we get a higher -- this will be our forecast

15 for 2015.

16   But more than that changes. More than

17 demand changes. So now let's suppose we have some

18 retirements in the meantime. So let's suppose that in

19 2015, everything's the same. Fuel costs are the same,

20 demand's the same, but we have some units retiring,

21 net retirements.

22   So we have a net retirements. What

23 happens is the supply curve moved back -- moves back

24 something like this, because basically you're removing

25 basic coal units. You're removing them from the

4380

 1 bottom of the stack, so everything else on top of the

 2 stack has to shift to the left. So you have this

 3 supply curve like that, and then the price is going to

 4 clear right here. And so you -- you remove some coal

 5 units from the market, and you get a higher price.

 6   So this is the system marginal price in

 7 the future -- in some future hour with retirements.

 8 Again, everything else is the same. You see that the

 9 demand stays the same. The shape stays the same, the

10 shape of the supply curve stays the same.

11   Now the third determinate we want to

12 look at is the -- what happens when fuel costs change.

13 When you have higher fuel cost, the supply curve will

14 shift up something like this. We can think of it -- I

15 don't know how to do this, but I'm -- I don't have a

16 pointer, but someone is -- just go into this mode here

17 -- can you still see? Can you see my pointer? This

18 is just regular mode.

19   So if you have a unit here, say 50,000

20 megawatts, and before it -- its marginal cost was

21 here, it has -- experiences higher fuel costs, this

22 marginal cost goes up here. So that's why the supply

23 curve shifts straight up when you have -- when you

24 have the higher fuel cost.

25

4381

1   (BRIEF PAUSE)

2

3   DR. ROBERT SINCLAIR: We're back to

4 slide number 16, where we shifted the supply curve up,

5 because fuel -- fuel cost increased. And then is --

6 you -- at the same level of demand, you get a higher

7 price, something like sixty-five dollars ($65). So if

8 we were forecasting some hour in 2015, and all we had

9 changing between 2015 and 2012 was fuel cost, then we

10 would simply just get a higher price, as shown in this

11 -- in this figure.

12   Now, when we move to slide 17, we're

13 going to try to put all the effects together, so you

14 can see that in some future hour, we're not just going

15 to have fuel price changes. We're going to have a

16 number of things changes -- changing.

17   So again, this is the original price

18 here where you see the arrow. Now, if we have higher

19 fuel costs, the price will go up to the second arrow,

20 something like fifty-five dollars ($55). If we, in

21 addition to that, we have retirements, we shift the

22 curve out from that point and we get a price, say

23 fifty-eight dollars ($58), and finally, if we were to

24 increase demand, then we get a price something like

25 seventy dollars ($70). It's just an example.

4382

1   So on -- on slide 17, what we're seeing

2 is the -- what we do in our model, and that is include

3 all these effects in the supply curve, and you have

4 these three (3) major determinants of the supply

5 curve. Actually, of the market, really, because

6 demand is part of the market, and all three (3) of

7 them tend to move higher over time. So you'll see

8 that the tendency is for prices to move higher over

9 time. The question is how high they move.

10   Now, there's a couple of things that I

11 don't show on these slides, and that is, although we

12 have a constant supply curve that we use from a

13 historical period, when we do have changes in

14 retirements and changes in demand, we also will sort

15 of what we call recommit for that hour. And that is,

16 we may -- MISO, if it experiences changes in demand,

17 it will -- it will not commit the system in the same

18 way that they -- that it committed it in 2012. It

19 will commit additional units or less units.

20   So we also keep the supply curve

21 adequately -- adequately committed by adding more

22 units from the existing units into the supply curve so

23 that we don't have an under-committed system or an

24 over-committed system. I don't show that on here,

25 because I think it would unnecessarily complicate it,

4383

1 but we do recommit it in future periods on a daily

2 basis so that we have enough capacity online in the

3 supply curve to clear the market.

4   Are there any questions so far from the

5 panel about how that's done? Dr. Grant...?

6   DR. HUGH GRANT: I'm on my hands and

7 knees here. Can I ask a few things? First of all,

8 how do you observe the marginal cost? Is this just

9 the offer price of different utilities?

10   DR. ROBERT SINCLAIR: It's -- it's the

11 as-offered marginal cost.

12   DR. HUGH GRANT: The second question I

13 had, you talked about net replacements or net

14 retirements. And so if you're taking a -- a coal-fire

15 unit out of service and replacing it with an up-to-

16 date natural gas unit, what would be the effect on the

17 supply curve, particularly the -- these would be lower

18 cost, more efficient users of energy, right?

19   So marginal cost should come down?

20   DR. ROBERT SINCLAIR: That's a good

21 question, I -- and later on, I have a table that --

22   DR. HUGH GRANT: Okay.

23   DR. ROBERT SINCLAIR: -- looks

24 specifically at that, but your -- your sense is right

25 that when you start to retire the least-efficient coal

4384

1 plants that were high heat, right, and you start to

2 replace them with the modern CCGTs, and you have a

3 certain gas price relationship. You can get CCGTs

4 that are lower in cost than the retiring coal unit, so

5 you could get a decline -- actually a decline in the

6 off-peak price.

7   DR. HUGH GRANT: And just one last

8 point on slide 16. This is a very minor point, I

9 think. This should be a -- would this be linear

10 transformation of the line? Is it just -- is it --

11 did you just get a little too lusty drawing that upper

12 sloping portion, because you get a very large price

13 increase from what's a fairly modest change in fuel

14 cost.

15   Is that -- or is it something about the

16 nature of these marginal units that are coming online?

17   DR. ROBERT SINCLAIR: It should be a

18 straight shift up so -- actually, where the curve

19 bends, it should be lined up horizontally, you're

20 right -- vertically.

21   DR. HUGH GRANT: So the -- the price

22 increase should be roughly proportional to the -- you

23 know, down at the vertical distance that these two (2)

24 lines are moving at the other end?

25   I'm just -- I was just curious --

4385

 1   DR. ROBERT SINCLAIR: I think that's

 2 right, yeah.

 3   DR. HUGH GRANT: -- I was just

 4 curious, is it something unique coming on with these

 5 sort of marginal units in that their fuel costs may go

 6 up. Anyway...

 7   DR. ROBERT SINCLAIR: No, I think

 8 you're right. This should be -- the vertical distance

 9 should be equal bet -- between all those points,

10 you're right. And you're right, it doesn't look like

11 it is. That's a good point.

12   DR. HUGH GRANT: Thank you.

13

14   (BRIEF PAUSE)

15

16   DR. ROBERT SINCLAIR: So I'm going to

17 move now on to slide 18. So from slide 17 you'll see

18 that we did three (3) things: we affected capacity, we

19 affected fuel costs, we affected demand. And I'm

20 going to carry those over to the next slide, because

21 these are our main determinants of -- of how we make

22 our forecast.

23   So if I circled net retirements there,

24 one of our main determinants in our future prices is

25 the capacity additions and retirements. The higher

4386

1 fuel costs are fuel costs: coal and natural gas, other

2 fossil fuels. And I'm also combining carbon in here.

3 Some people might consider carbon to be a fourth

4 determinant. I'm going to just lump it in fuel costs,

5 because it acts like a fuel cost. And for demand, we

6 also track load growth over time.

7   So these are the three (3) main

8 determinants that are going to tell use how we take

9 that historical supply curve and change it into a

10 historical -- into a forecast supply curve and,

11 therefore, a historic price.

12   We make a range of assumptions about

13 capacity additions, fuel costs, and load growth. And

14 these result in four (4) alternative forecasts that we

15 come up with. We have two (2) reference cases: one

16 (1) with and one (1) without carbon costs. We have a

17 high-growth case, which represents more robust

18 macroeconomic activity. And we have a low fuel price

19 case, which reflects lower fuel costs and also lower

20 demand for electricity.

21   Now what I want to do is take each of

22 these three (3) categories of main determinants and

23 explain a little bit about what -- how we got to

24 those. So we'll start with the capacity additions and

25 retirements. Our capacity additions and retirements

 1 over the twenty (20) year forecast period is based on

 2 the projections of the US Energy Information Agency.

 3 And we used their reference case.

 4   The EIA, I think, has about sixty (60)

 5 some cases. I can't remember exactly, but it's dozens

 6 and dozens of cases. And they have a reference case.

 7 And the other alternative cases are from the reference

 8 case, but testing different outcome -- different

 9 possible fore -- future outcomes. We start with the

10 reference case. We believe that is the case that the

11 EIA thinks is most likely to occur. And after

12 reviewing their reference case, we believe it -- it's

13 a reas -- it's reasonable projections.

14   They project 7,700 megawatts of

15 retirements over the twenty (20) year period. Six-

16 thousand (6,000) megawatts are coal retirements. They

17 forecast over 9,000 megawatts of additional capacity

18 coming online. And again, this is in MISO. I should

19 mention it's MISO north and central. It's not -- it

20 doesn't include MISO south's region -- MISO's south

21 region.

22   A lot of that, the additions are wind,

23 4,000 megawatts, but most of that is derated so that

24 when you actually have it into market, you only have a

25 few megawatts. I think something like 20 percent of

4388

1 those megawatts actually are producing -- able to

2 produce in the market when they're committed.

3   And we also balance the system in any

4 given year when there's a deficit. And we do that by

5 adding natural gas capacity. So that's not an EIA

6 assumption. That's what we do when we have a year

7 where the demand either has exceeded the existing

8 capacity because the EIA assumptions don't always add

9 up to the MISO demand, and so we commit to -- we add

10 capacity in our own process. In our reference case,

11 we added about 4,000 megawatts over the twenty (20)

12 year period.

13   Any questions about the capacity? I'll

14 move on to the fuel prices.

15   THE CHAIRPERSON: The reference to

16 derated, could you explain that for me, please?

17   DR. ROBERT SINCLAIR: Oh, yeah, so --

18 so when you look at this you'll see that there's an

19 addition of 7,000 megawatts. And I mean, retirements

20 is 7,000 megawatts and additions of 9,000. And it

21 looks like an addition of 2,000 megawatts altogether.

22 But the wind is derated in a sense that it doesn't

23 show up on the market at 4,000 megawatts. It

24 typically is derated by -- by 80 percent. So you

25 wouldn't count that as capacity, for instance. You'd

4389

1 kind of derate that for capacity.

2   So I'll move on to fuel -- our fuel

3 projections. So our fuel costs again are taken from

4 the Energy Information Agency, the reference case.

5 Natural gas cost increase, they just about double in

6 the twenty (20) year period. Coal costs increase 50

7 percent.

8   Now, our carbon prices do not come from

9 EIA. In our carbon case, they start at thirteen

10 dollars ($13) in 2021, and then increase to about

11 twenty-five dollars ($25) in 2034. This assumption

12 was based on Mr. Sabine, of MNP -- MNP. He's -- he's

13 the expert consultant on this -- on this issue. And

14 he advised us that this was his most likely case,

15 although he did say there's a 50 percent change that

16 this will not be the price and that the price will be

17 zero. So it is 50/50 that we get to thirteen (13) or

18 zero. And I'll -- I'll explain that a little bit more

19 later, but that does not come from EIA. That comes

20 from Mr. Sabine.

21   Any questions on fuel cost to the

22 panel? So we talk about load growth. You remember on

23 our -- on our schemes, on our illustrations before

24 that can affect the prices, so we want to know how --

25 how much demand grows, again based on EIA reference

4390

1 case, although we do adjust it for carbon. As I'll

2 explain, in our reference carbon case, our load growth

3 projections result in a cumulative 10 percent growth

4 over twenty (20) -- a twenty (20) year period, rather

5 slow.

6   We use the EIA reference up to 2012,

7 but after that, because of the carbon in our carbon

8 case, that is, because of carbon, we reduce the load

9 growth under the assumption that load will grow

10 slightly slower when you put a tax on the inputs.

11   So we -- after that point, we pick up

12 the load growth that EIA identified in their own

13 sensitivity. They did a ten dollar ($10) carbon price

14 sensitivity, which indicates slightly lower growth,

15 and we used that for those years after 2022 -- after

16 2021.

17   Any question about how we get the load

18 growth?

19   MS. MARILYN KAPITANY: Not on load

20 growth, but could we just go back to fuel cost for one

21 second? And -- and I'm particularly interested in the

22 natural -- the natural gas cost increase from three

23 twenty-six (326) to six thirty-one (631).

24   I'm hearing so much about the huge

25 supply of shale gas in Bakken. And I'm just wondering

4391

1 what is it that you think is going to drive the gas

2 price to that extent?

3   DR. ROBERT SINCLAIR: That's a good

4 question. I think, you know, the marginal cost of --

5 of gas is going to depend on the cost of extracting

6 it, basically. And in the long run there's -- and

7 this is the -- this is the reference case. We do have

8 a -- another case that assumes that gas production is

9 higher as a result of what you just mentioned. But in

10 the reference case, the underlying drivers of the gas

11 cost would be the labour and materials required to get

12 out to the field to extract it.

13   And we do believe there is a reasonable

14 case to be made that we will be in a low gas price

15 scenario, where the extraction costs sort of collapse

16 in a way, so to speak, because of all the -- the so-

17 called fracking. And in that case we do have

18 significantly lower prices. So we believe that's a

19 very plausible scenario, and we do estimate that case,

20 too.

21   MS. MARILYN KAPITANY: Thank you.

22   DR. ROBERT SINCLAIR: But the short

23 answer is from three (3) to six dollars ($6) is

24 basically the underlying cost of extraction.

25

4392

1   (BRIEF PAUSE)

2

3   MR. CHRISTIAN MONNIN: If -- if I may,

4 just for the benefit of the record, that particular

5 question from panel member Kapitany referred to slide

6 21. The -- the number wasn't on that slide, but...

7   DR. HUGH GRANT: Can I just get one

8 other thing in? On slide 22 I'm just curious about

9 the impact of the carbon tax on -- on load. We had a

10 fascinating discussion about price elasticities with

11 electricity.

12   A pretty marginal effect, I mean, small

13 impact over the ten (10) years?

14   DR. ROBERT SINCLAIR: It -- it was --

15 you know, it was very detectable. You can see how I

16 have a -- if you have my report, I can show you the

17 exhibit. But it's -- it's in the appendix. Very easy

18 to see on page 47.

19

20   (BRIEF PAUSE)

21

22   DR. ROBERT SINCLAIR: I'm sorry, not

23 on page 47. But I think page 48, the -- the load

24 growth.

25

4393

1   (BRIEF PAUSE)

2

3   DR. ROBERT SINCLAIR: And so if you

4 look at the -- the blue line in the middle that's

5 associated also with the dotted line. So the dotted

6 line is what happens if you do not have a carbon price

7 -- a carbon price of zero. And the solid blue line

8 indicates how the load changes under our scenario of a

9 carbon price. So if you didn't have a carbon price,

10 load will continue to grow up to one point one-two

11 (1.12). With a carbon price, it only gets up to one

12 point one (1.1). And that -- and that's derived from

13 projections -- projections from the EIA.

14

15   (BRIEF PAUSE)

16

17   DR. ROBERT SINCLAIR: So moving to

18 slide 23, we just mention again our alternative

19 forecasts. We had a -- a reference case with carbon

20 which -- and we also have an alternative reference

21 case with no carbon. And we think those cases are

22 equally likely, 50 percent each. And -- but we think

23 there's some probability that we could be in a high

24 resource production case that panel member Kapitany

25 had mentioned, where -- where the fracking is -- is --

1 continues to produce its beneficial results to the gas

2 supply.

3   And that results in a lower fuel price

4 not just for gas, but also for coal, and also results

5 in lower electricity demand, partly because of the use

6 of natural gas instead of electricity for lots of

7 processes. The -- then we have a high-growth case,

8 which is a macroeconomic thing, where it is just a

9 more robust macroeconomic scenario. And we think

10 that's a plausible -- a plausible case as well.

11   And we -- we place some probabilities

12 on these, but it is very difficult to determine what

13 the probabilities are. But we do come down that the -

14 - we think that the reference cases are equally likely

15 at around 30 percent, and the other two (2) cases

16 roughly 20 percent. I think that rounds out to 100

17 percent. It's in the report. We were hesitant to put

18 probabilities on them, but it was useful, I think, for

19 the process.

20

21   (BRIEF PAUSE)

22

23   DR. ROBERT SINCLAIR: Now, we can go

24 on to slide 24. Now, as -- as I mentioned before, the

25 process where we take the historical supply curves and

4395

1 change them to reflect these major determinants, these

2 major inputs, really produces the system marginal

3 price, which is the -- the price that MISO starts with

4 when it is -- is determining the locational marginal

5 price.

6   The system marginal prices is -- you

7 can think of it as a great big pool, and you're --

8 you're trying to pull units together to see which ones

9 are cheapest and -- to meet demand. But then you

10 realize you've got to honour these transmission

11 constraints and losses, so you have to re-dispatch in

12 a way.

13   So as I said, we're interested in the

14 locational marginal price at the Manitoba border.

15 This is the price where, when Manitoba Hydro makes an

16 export, it'll be receiving the locational marginal

17 price at the Manitoba border.

18   And to get that, we need to take the

19 system marginal price, which we estimated in that

20 process I showed you, take out losses, because to get

21 from the system marginal price to the border the

22 system incurs transmission losses, and also

23 experiences congestion. The system operator will have

24 to re-dispatch and incur costs in order to make sure

25 that the -- the power can be accepted at that

4396

1 location.

2   So really next up in our forecast, once

3 we have all these prices for every hour going out

4 twenty (20) years, we have really seventeen thousand

5 (17,000) prices per year. But they're just the system

6 marginal price, so we have to add losses and

7 congestion to those.

8   We have seventeen thousand (17,000)

9 prices because we -- our historical prices are based

10 on two (2) years, so to even out any kind of

11 anomalies. And we take the average of -- really we

12 take a forecast based on both years, and then we take

13 the average.

14   Okay. So next we want to discuss how

15 we integrate the congestion losses into our system

16 marginal price to get to the border. So for losses,

17 we simply take the average over those two (2) years,

18 2011/2012. This was about 9 percent. A simple

19 average. We didn't expect that to vary a lot, so we

20 didn't -- we thought that the average was adequate,

21 Manito -- Manitoba's consultants. Or the ultimate

22 price that Manitoba uses also has sort of an average

23 for losses. Actually, losses and congestion.

24   Now, the congestion costs, we thought,

25 needed more careful treatment because it -- it can

4397

1 fluctuate more based on system conditions. So

2 basically we took the historical congestion costs and

3 used a linear regression to estimate what it might be

4 in each future hour. We did a linear -- we did a

5 forecast model using linear regression techniques.

6   So to -- to do the linear regression

7 techniques, we look at the historical congestion for

8 each hour, and then look at the characteristics in

9 each hour and try to estimate a relationship between

10 what the congestion was in that hour and how those

11 various factors that -- that are prevailing in those

12 hours are related statistically.

13   I actually don't have the presentation

14 of the model here, the linear regression model. It's

15 rather technical, but cer -- certainly spelled out

16 pretty clearly in the report, I believe.

17   But our estimates indicate that on-peak

18 hours, congestion was about 12 percent, and then in

19 off-peak hours, about 16 percent. And the -- the

20 higher off-peak congestion was the result of basically

21 lots of wind -- having to manage a lot of wind in the

22 off-peak hours. And also in off-peak hours the demand

23 in the West is lower, so in order to get out of the

24 West you -- you will experience more congestion.

25   I'm happy to answer questions about the

1 regression model.

2   DR. HUGH GRANT: Can I just ask, how

3 do you get from congest -- how does congestion

4 translate into a price or cost effect?

5   DR. ROBERT SINCLAIR: Okay, so if you

6 go back to slide number 24. We're looking at the LMP,

7 so we -- we had the system marginal price which we

8 estimated with all those supply curves, the historical

9 supply curves, and so we simply take -- we simply take

10 the SMP and subtract that losses, which was something

11 like 9 percent, and then we subtract out the

12 congestion, which is estimated -- really is -- is

13 almost like a historical average, except it's a little

14 more complicated because we did the regression.

15   We take the historical congestion to

16 see how much it is. For instance, we estimated that

17 if you increase wind capacity by 1 percent, the

18 congestion component of the LMP increases something

19 like forty-five (45) cents, so the congestion is going

20 to be something like five dollars ($5) or something.

21

22   And we have all the observations of the

23 congestion over time, and we have all the observations

24 of load generation, other types of variables that we

25 think might impact the congestion, and we come up with

4399

1 some relationship between those variables.

2   And so every hour in the future, using

3 the regression estimates, the -- the estimated

4 coefficients, we can take the projected values of load

5 generation, SMP, for instance, is an explanatory

6 variable, and plugged them into the regression

7 coefficients, and we get what the future congestion

8 component will be in that hour.

9   DR. HUGH GRANT: I'm just not clear

10 how it translates into a monetary cost. So my

11 electron gets to the border, but there's congestion in

12 the system, so how does that end up --

13   DR. ROBERT SINCLAIR: Oh, I see.

14   DR. HUGH GRANT: -- affecting the

15 price --

16   DR. ROBERT SINCLAIR: Okay, so the

17 problem is that if Manitoba Hydro wants to send a lot

18 of power into -- into the west -- into -- at the

19 border there, you may have other generators in the

20 west already running, so in order to allow more

21 production to be absorbed at -- at the border, you may

22 have to turn down a unit in, say, Minnesota, and so

23 you calculate the cost of basically turning that unit

24 down and allowing the Manitoba unit to produce.

25   And that, essentially, is what the loss

4400

1 will be, is how -- how you have to re-dispatch the

2 system, basically, in order to facilitate additional

3 transfers between points, basically, how you have to

4 manage the system to keep it in balance in order to

5 allow a generator to produce more at some point, or a

6 -- a load to withdraw more at some point.

7   It's basically mostly re-dispatch

8 costs, so we had all the observations of that, and we

9 had all the prevailing factors for those hours, and we

10 simply estimated the relationship between congestion

11 and these historical conditions. And we knew what the

12 future conditions were based on our forecast, and we

13 were able to project the future congestion. It's

14 rather -- it's rather constant, but we thought we --

15 it was important to recognize that there's lots of

16 factors that can affect congestion.

17   So based on those estimates, basically

18 averages, the following chart shows our reference

19 forecast. This is our forecast for our reference case

20 with carbon, and on the left-hand panel, there's the

21 peak hours, one (1) price per year. And in the off-

22 peak, there are -- I'm sorry. On -- on the right-hand

23 panel, there is the off-peak prices, again, one (1)

24 price per year, so they -- it's sort of an average.

25   So the red line on top is the MISO

4401
1 SMP. That's where most of our effort went, is to try

2 to determine what the marginal price is going to be in

3 MISO based on projections of load, retirements, and

4 fuel costs.

5   And then we reduce that price by the

6 marginal congestion, which we just discussed, which is

7 what it costs to get from MISO to the border, and then

8 the marginal losses. Then the -- the lower blue line

9 -- or it's kind of greenish, is -- is the LMP -- our

10 forecast LMP for our reference case, so -- okay.

11   MS. MARILYN KAPITANY: So the -- the

12 marginal losses are only transmission losses. There's

13 nothing else in there?

14   DR. ROBERT SINCLAIR: I think that's

15 basically it, yeah. It's -- it's the total -- there

16 may be some small losses associated with some capacity

17 there, but mostly it's transmission losses, line

18 losses.

19   So you'll notice a big jump up in 2020.

20 That's the introduction of the carbon price. So you

21 see that the carbon price has a huge impact on the

22 forecast, and in the next slide I'll show you --

23 illustrate more clearly what that impact is.

24   The impact of carbon in the off peak is

25 also significant. It's also larger, because the

4402

1 carbon price went will impact off-peak prices more,

2 because it's likely to impact coal resources much more

3 significantly. So any changes in carbon price are

4 going to be -- it's -- it's going to be showed up --

5 it's going to show up more significantly in the off

6 peak, but you see it's -- it's very significant in on-

7 peak hours.

8   So then if you recall, we did four (4)

9 cases. We -- we did a reference case with and without

10 carbon, and we did a -- a high growth and low energy

11 price case. So this is a four (4) -- all four (4) of

12 our cases for the LMPs, we have again, peak and off

13 peak. We have, of course the high growth case is the

14 highest, because that includes more load growth and

15 also the carbon, whereas the two (2) lowest cases is

16 our reference case without CO_2. So you don't get that

17 jump up in 2020. As you see they track each other

18 perfectly until 2020, then they depart.

19   So the difference between the blue and

20 the green shows you the impact of carbon, which also

21 reflects changes in load. And then finally, our low

22 case is the -- is the so-called fracking case, where

23 the extraction of natural gas continues to develop

24 technologically, and prices are very low, which also

25 affects the coal prices, and we also assume no carbon

4403

 1 in that case. But you can see from the cases if you

 2 want to put carbon in any of those, you'd sort of just

 3 jump it up at 2020 and then continue it on.

 4   So those are our price forecasts for

 5 energy. Any questions about -- about that? So that

 6 means we move to a capacity price forecast.

 7   Now, the capacity price -- so the

 8 energy price is what Manitoba Hydro received for

 9 supplying energy to their customers. The capacity

10 price is an additional price above the energy price,

11 which they will receive for committing to provide

12 capacity, which is basically a firm -- a firm

13 commitment to supply energy, usually sixteen (16)

14 hours a day, but sometimes twenty-four (24), but

15 basically, it says we have enough capacity of above

16 our own requirements and above our other firm sales to

17 guarantee you that we can deliver this energy at all

18 hours during the year for the next whatever the

19 horizon of the contract is.

20   So here's our -- the overview of our

21 capacity price forecast. We use the so-called net-

22 CONE, or net cost of new entry, and basically, what

23 we're saying is that the capacity price should reflect

24 what it costs -- or should reflect a value that

25 compensates a new entrant for supplying capacity to

4404

1 the MISO market, and that will be -- depend on the

2 cost of putting a new unit in, which is, in our case,

3 a combustion turbine, because that's the lowest type

4 of -- lowest-cost capacity that you can build.

5   And -- but you don't pay them the

6 entire cost of entry, because they're going to earn

7 some money in the -- in the energy market. So you

8 estimate the energy revenues, and you subtract that

9 from the cost of new entry.

10   And that's how much money they need to

11 remain viable in the market, so that's what we

12 consider to be the capacity price. And this is the --

13 the approach that the Manitoba Hydro consultants also

14 took, the so-called net-CONE.

15   And it makes sure that you get entry,

16 and that entry does not depend tot -- totally on your

17 ability to earn money in the energy market, because

18 such a system has serious problems. So there's --

19 regulators require that capacity be bought, and it's

20 going to be related to how much it costs for a new

21 entrant to be viable. Any questions about that?

22   MS. MARILYN KAPITANY: Can you just

23 say a bit more about what the ancillary services

24 market is?

25   DR. ROBERT SINCLAIR: Okay, yeah. So

4405

1 for the ancillary services market provides basically

2 reserves to the system. So you can provide energy to

3 the system on a -- on a -- in the operating horizon.

4 Day ahead, you provide energy a day ahead, but you can

5 also provide reserves and -- and regulation.

6   And so CTs can also earn money, not

7 just producing, but also because they're on stand-by

8 very often, they can bid into the ancillary services

9 market. Even though they don't run, they may get paid

10 just to stand by on -- for reserves, because they can

11 start in thirty (30) -- thirty (30) minutes. Some

12 faster.

13   We assume they earn a dollar an hour in

14 peak hours. We -- I'm sorry, we assume they earn a

15 dollar an hour when they are not operating, which is

16 something like seventy-five hundred (7,500) hours a

17 year. They barely oper -- they hardly operate, but

18 they do operate in peak times. Other times, they're

19 standing by.

20

21   (BRIEF PAUSE)

22

23   DR. ROBERT SINCLAIR: So again, this

24 is just a few more comments on the logic of the net-

25 CONE. It recognizes that's -- recognizes that

4406

1 suppliers need a capacity price high enough to make

2 entry profitable, but it has to be set right so that

3 you don't have excess entry, excess planning reserves,

4 and you don't have insufficient planning reserves.

5   If you set it at net-CONE, then you

6 will get entry to occur at just the right level. If

7 you set it higher, then you'll get too much capacity

8 to enter. Planning reserves would be excessive. If

9 you set it too low, entrants won't enter until the

10 capacity is short and prices start to rise, and you

11 won't get sufficient planning reserves. So in a way,

12 it's administrative, because it's set to hit a certain

13 planning reserve margin.

14   THE CHAIRPERSON: Dr. Sinclair, your

15 report indicated that there was a surplus capacity in

16 the -- in the MISO market, and how -- how did the

17 market get in that position?

18   Can you -- could you...

19   DR. ROBERT SINCLAIR: Yeah. It was

20 primarily the result of the 2009 financial crisis.

21 Lost -- a loss of -- loss of demand. There was also a

22 build-up of -- of gas capacity during the -- right

23 before that, in the '90s and early 2000s, but mainly

24 it was as a drop in demand.

25   THE CHAIRPERSON: And -- and the --

4407

1 the fact that a non-functioning capacity market in --

2 in MISO is totally attributable to this excess surpl -

3 - production and capacity?

4   DR. ROBERT SINCLAIR: No. It's

5 attributable to the market design, and I'll say a

6 couple words, but I think Dr. Patton -- this is one of

7 his favourite topics. So if you don't mind asking him

8 that question tomorrow, or this afternoon.

9   The problem with the MISO capacity

10 market is that it has a -- a vertical -- what we call

11 vertical demand curve, so that basically, when you get

12 into excess -- just a couple megawatts in excess of

13 the planning reserves, the capacity price collapses to

14 zero, and also if you are -- have adequate capacity,

15 the price collapses to zero. So you're often -- very

16 often seeing prices of zero.

17   So that's -- it's -- it's not so much

18 that there's a surplus, but there is a -- a market

19 design flaw, but even with that -- that flaw, you

20 might see pretty low prices, given that there is a

21 surplus. We're seeing low prices in PJM, for

22 instance.

23

24   (BRIEF PAUSE)

25

4408

1   DR. ROBERT SINCLAIR: So just some

2 details of our calculation. We assume an -- we

3 estimate the net-CONE to be ninety (90) -- about

4 ninety dollars ($90). So I got -- I discussed this.

5 Basically, you take that eight-nine dollars ($89), and

6 you calculate the revenues per kilowatt, and those are

7 based on our own forecast that we talked about

8 earlier, our energy forecast. We know what the energy

9 forecasts are. We know how often the CT would run

10 based on its own marginal cost, so we can calculate

11 how much it would make every year.

12   There is a surplus in MISO until 2018.

13 So when you do have a surplus, you will tend to have

14 lower prices below the net-CONE because people need --

15 the demand will fall off for capacity. There's no --

16 there's no need for utilities to buy capacity, so

17 they're not buying capacity, so the price will go

18 down.

19   So here's our price forecast.

20   THE CHAIRPERSON: Dr. Sinclair, the

21 previous slide indicated 2018 as the year when new

22 resources were required. And I'm trying to reconcile

23 that with the ongoing debate within MISO and OMS

24 regarding the 2015/2016 year and the surveys they are

25 doing with respect to the -- you know, determining the

4409

1 capacity.

2   What's different between that and

3 what's -- what's here in your slide?

4   DR. ROBERT SINCLAIR: Okay. So our --

5 our retirements, it -- it really boils down to

6 retirements, the assumptions on retirements. And we -

7 - we see that -- based on our retirements, that in

8 2017 we'll see that the retirements will have

9 eliminated the surplus. But there are some capacity

10 contracts in MISO that go outside the market, PJM, for

11 instance. Those will probably be drawn back into the

12 market in 2017. So really it won't be until 2018 that

13 we see the -- the surplus -- that -- that we see that

14 the capacity of market will reach its equilibrium.

15   So we're -- our -- our data shows that

16 by 2017 we'll have -- the surplus will have dissipated

17 based -- really based on retirements because we're --

18 we're seeing 6,000 megawatts of coal come in, in 2017.

19   I think MISO might look at that and say

20 that they expect slightly more retirements. Well,

21 they expect -- I think they're assuming 12 megawatts

22 by 2016, so one (1) year sooner and slightly more

23 megawatts; not slightly more, twice as much.

24   And so MISO -- MISO did -- did a survey

25 to determine what the level of retirements were --

4410

1 were expected to be. And I think that they did one

2 that's rather conservative in the sense of -- in a

3 planning sense, because they're more of a planning

4 organization, we need to plan for 12 gigawatts of

5 retirements.

6   But I think if you look at some of the

7 presentations in that regard, you'll see that between

8 6 and 12 megawatts, they're in categories what they're

9 not quite sure of. So we weren't quite sure that you

10 would get above 6 gigawatts as fast as MISO is

11 planning. They need to plan conservatively, so we

12 don't blame them.

13   But I think in forecasting prices you

14 should look at what you really expect to happen, not

15 what you need to plan for. And we thought the -- we

16 thought the EIA assumptions looking at 6 gigawatts was

17 something that we -- we feel more comfortable with in

18 -- in our forecast.

19   So here's our capacity price forecast.

20 Again, until 2018, we're really picking up capacity

21 prices from PJM, because the MISO capacity market is

22 really establishing zero prices, which we don't think

23 -- we think that's because of the market design flaw.

24   So we just pick up the PJM prices until

25 2018, when -- at which point we see -- we project the

4411

1 system to be an equilibrium. And after that point,

2 the capacity price is basically set at net count on a

3 real term going forward that is a few -- few points.

4 I put the points inside the chart because there was

5 that big white space.

6   But once we get an equilibrium, you see

7 that the capacity price stays rather constant, just

8 under seventy dollars ($70). That's because the cost

9 of entry -- cost of new entry is based on the most

10 efficient CT. And there's no reason to believe that

11 that cost will go up or down significantly over time,

12 so -- and this is in real dollars, so, basically, the

13 cost of entry stays constant over all those years, and

14 also the net revenue.

15   So the -- the capacity price is the

16 cost of entry minus what you earn -- what a CT would

17 earn in the market. And that also stays constant

18 because the factors that change over time really cause

19 the margin that a CT earns to stay relatively

20 constant. For instance, fuel prices, if the fuel

21 price goes up because a CT is on the margin and if it

22 be this marginal cost, then the marginal cost and the

23 price will go up at the -- at -- by the same

24 increment. Likewise, with -- if load changes or

25 retirements change, it doesn't affect the CT on the

4412

 1 margin.

 2   So we project, in our equilibrium

 3 analysis here, that what a CT will earn over time is

 4 going to stay constant, what it costs to enter over

 5 time stays constant; so that's why you have a flat

 6 capacity supply curve -- capacity price curve, sorry.

 7 Tomorrow in the -- the CSI session, we'll show you

 8 this compared to the other consultants. So I think

 9 you'll find that interesting, too.

10   Any questions about the capacity price

11 forecast?

12   Oh, so we -- in our report we talk

13 about three (3) caveats. And the one is we recognize

14 that Manitoba Hydro will have to rely on bilateral

15 contracts, bilateral capacity contracts, because the

16 MISO capacity market needs to be reformed and it's not

17 clear when that will be reformed. And there's a

18 possibility that utilities may prefer to build

19 themselves, rather than buying long-term capacity from

20 others. It's -- it's -- we haven't quantified that,

21 but we think it's something to keep in mind.

22   Over the long time -- time frame of the

23 forecast, generation technology may become cheaper.

24 We've seen it over the last twenty (20) years or so

25 that adding capacity has become cheaper. We think the

4413

1 risk is that -- we're not projecting it will get

2 cheaper, but we think the risk is that it will get

3 cheaper before it gets more expensive. Again, it's

4 just sort of a qualitative statement here.

5   Also the net revenues that we use to

6 estimate the capacity price, it was based on the MISO

7 system marginal price. But if you have a -- an area

8 that's highly congested, those -- those generators may

9 earn more revenues and -- which will cause the

10 capacity price to go down in the whole footprint. So

11 there's some chance that the -- the net-CONE will

12 overstate the capacity price.

13   Again, we didn't quantify these. We

14 just think these are risks that you should keep in

15 mind when interpreting capacity price.

16   THE CHAIRPERSON: Could we dissect a

17 lot of those statements? At -- at least two (2) of

18 those statements. I am -- I am interested

19 particularly in -- in number 1, specifically, Manitoba

20 Hydro relying on bilateral contracts and face possible

21 preference for self-building. Okay.

22   I understand that point, but I'm guess

23 -- I guess what I'm wondering is, given that

24 statement, why would somebody sign a long-term

25 contract with Manitoba Hydro?

4414

1   You know, if -- if you are dealing with

2   the self-interest embodied in this from the -- from

3   the buyer's perspective in the US, why would you be

4   interested in -- in buying from Manitoba Hydro over

5   such an extended period of time in some cases?

6   DR. ROBERT SINCLAIR: Yeah. I -- I

7   don't think the -- the preference for self-building is

8   all encompassing. But it's just I think there's a

9   tendency for a utility, when they go out to procure

10   capacity. And we've done some procurement monitoring,

11   and you -- you can just see that there is some

12   preference for keeping the capa -- capital

13   accumulation within the company as opposed to buying a

14   -- a PPA.

15   There's just a -- a long-term -- the

16   return on investment is slightly higher because you

17   have your own steel in the ground and you earn a

18   return on that. And actually a PPA can actually

19   result in higher taxes since -- in some ways. But for

20   the most part, we -- we think this is just a

21   preference.

22   We don't think the regulators will

23   necessarily allow just a utility to build anything

24   they want. They have to go out and sort of market

25   test it. So there's very good reason to think that

4415

1 Manitoba Hydro can come in with a capacity contract

2 that's better than a self-build option. And the

3 regulators will require that the PPA be taken instead.

4   THE CHAIRPERSON: 'PPA' meaning a

5 power purchase agreement?

6   DR. ROBERT SINCLAIR: Power purchase

7 from -- from Manitoba -- Manitoba Hydro.

8   THE CHAIRPERSON: So -- so you said

9 taxes. You associated taxes with a PPA.

10   What -- what do you mean by that?

11   DR. ROBERT SINCLAIR: Yeah, there's a

12 -- so let's see. So when you -- when you buy a PPA --

13 I'm -- not taxes, credit -- a credit rating. So when

14 you buy a PPA, the credit agencies treat it as a --

15 like a debt. So not -- not fully as a debt, and it

16 changes sometimes. But part of it is treated as a

17 debt because you have this long-term obligation on

18 your balance sheet.

19   And so, you know, to keep your credit

20 quality up, you may have to issue some more stock or

21 something like that. So it's -- it's something that

22 utilities look at and say: Well, okay, PPA or a self-

23 build. Build our own unit here in our backyard. We

24 get our jobs in -- in our service territory. And we

25 also earn a return on the investment.

4416

 1   So there's some thinking that --

 2 there's a preference for that kind of transaction.

 3 Like I said, it's not overwhelming that in every case

 4 that you get that, but I think the incentives were

 5 there for trying to get a self-build as opposed to a

 6 PPA. Of course, many utilities have PPA. So it,

 7 obviously, doesn't -- isn't the case everywhere. It's

 8 sort of on the margin, perhaps.

 9   THE CHAIRPERSON: "On the margin,

10 perhaps," could you explain that please?

11   DR. ROBERT SINCLAIR: So if you have a

12 -- a self-build that's very economic and you have a

13 PPA that's comparable, you may go with the self-build;

14 as opposed to if you have a PPA that comes in that

15 looks very good compared to self-build, you may not be

16 able to push that through the regulatory process.

17   THE CHAIRPERSON: Now, it -- item

18 number 2 talks about generation technology. So you

19 know, wind is ob -- an obvious example of something

20 that might become cheaper. But what about other

21 technologies, solar and so on? You know, you didn't

22 encompass that as part of your work.

23   Is there a reason for that, that you

24 didn't attribute more importance to technological

25 development in your assessment?

4417

 1   DR. ROBERT SINCLAIR: Yeah, the reason

 2 is it's very hard to foresee. But we do think, based

 3 on recent experience, that the technological advances

 4 are significant. The efficiency of gas plants, for

 5 instance, are significant and may continue; we don't

 6 know.

 7   So we thought the best was to use the

 8 CT, which we know is -- is the most efficient form of

 9 capacity to add to a system. And then just mention

10 that, that may not be -- there may be something

11 cheaper in the future. So it's -- there's a risk.

12 And, you know, Man -- in Manitoba Hydro capacity sale

13 would have to compete not just -- not always with the

14 CT, but also the most efficient new capacity.

15   But we -- we really had no way to

16 incorporate something like that into the analysis.

17

18   (BRIEF PAUSE)

19

20   DR. HUGH GRANT: I was going to save

21 this for later, but I was just curious about this

22 preference for self-building. And is there any

23 genuine preference in this sense, or is it a relative

24 price issue where, if in the past there's been large

25 transaction cost to transmitting energy over long

 1 distances.

 2   Is that, perhaps, why energy isn't --

 3 electricity isn't as traded an item? And -- and if

 4 that's the case, would it decline over time? I mean,

 5 presumably, now the cost of transmission have fallen

 6 and makes it more desirable to trade?

 7   DR. ROBERT SINCLAIR: I think over

 8 time we have seen the markets open up. So the open-

 9 access transmission has, I think, made it more -- made

10 -- has made it easier for utilities to engage in long-

11 term PPA contracts, and not less.

12   But the self-building is more of a

13 corporate, sort of, incentive within a company to

14 prefer to have more of a -- a rate base. But again,

15 if you have a good PPA and you have, you know, looking

16 at a development plan of a -- of a new fossil unit or

17 something, sometimes they just don't compete, so you

18 will have the PPA being selected.

19   THE CHAIRPERSON: Bullet number 3

20 talks about lower net-CONE values. If your variable

21 profits are decreasing, would your net-CONE value

22 increase?

23   DR. ROBERT SINCLAIR: If you have a --

24 if you -- if you're a generator -- a developer located

25 in an area where the energy prices are high because of

4419

1 congestion, so if you were to locate your generator

2 there, you would earn these high -- high prices

3 because it -- because of the locational price is high.

4 Y

5   So the net-CONE would go down, because

6 the net-CONE -- additional revenues reduce the

7 capacity price, because net-CONE is the cost of the

8 unit, which basically should be comparable everywhere.

9 Although, you could argue in congested areas might be

10 a slightly more expensive, but when you earn more

11 revenues, your net-CONE will go down.

12   THE CHAIRPERSON: But if your costs

13 increase because of congestion, wouldn't your net

14 revenue go up?

15   DR. ROBERT SINCLAIR: Well --

16   THE CHAIRPERSON: Net-CONE go up,

17 rather?

18   DR. ROBERT SINCLAIR: Yeah, so but

19 you're a generator, so if cost -- if costs are going

20 up, you're earning the extra cost. They're not costs;

21 they're congestion costs. So if you're located in

22 area where there's congestion costs, as a generator

23 you actually earn the extra money because you're

24 relieving congestion. Think of it as -- instead of

25 congestion costs, think of it as a place where there's

4420

1 high -- high locational prices. So you set yourself

2 down there, and you're -- you're earning high --

3 higher prices than everywhere else.

4   Okay. So we can move on to -- okay.

5 So next is -- are the export market issues. So if

6 there's any questions about the energy prices or -- we

7 can certainly go back to them anytime, but I'm happy

8 to take questions about the capacity prices or energy

9 prices.

10

11   (BRIEF PAUSE)

12

13   DR. ROBERT SINCLAIR: So I think I

14 really only have two (2) export market issues. I -- I

15 did state earlier that we thought, given the scale of

16 the exports projected, that we think MISO could easily

17 absorb those kind of quantities. So I don't think we

18 have any problem with the projections of the

19 quantities.

20   There were some -- we had some

21 qualifications with some issues, but I think -- I -- I

22 think I can't talk about it till tomorrow, so. But

23 basically it -- it depends on various pricing, so I

24 think we'll save it for tomorrow.

25   So that just takes us to some of the

4421

1 issues that Manitoba Hydro raised in their rebuttal

2 that would --that we thought we needed to address.

3 Keep going.

4

5   (BRIEF PAUSE)

6

7   DR. ROBERT SINCLAIR: So let's see,

8 I'm on slide 37 now. And I think I have about forty-

9 one (41) slides or so, so we -- I think we can get --

10 keep going. So I'm referring to Manitoba Hydro

11 rebuttal, I think it's...

12

13   (BRIEF PAUSE)

14

15   DR. ROBERT SINCLAIR: I think it's

16 Exhibit 85, Manitoba Hydro-85. And these pages that I

17 reference are the ones that were listed on the top of

18 the original document, so like let's say something

19 like ninety-five (95) out of a hundred and forty-five

20 (145). I understand there might be another page

21 number put in there. But anyway.

22   Let's see. So one of the points that's

23 raised in the rebuttal is that our forecast is within

24 the general range of the experts. We'll see tomorrow

25 when we look at these all together, and you can

4422

1 certainly judge for yourself.

2   But it's really a point that we don't

3 care that much about because really we weren't really

4 aiming to get higher or lower. We just wanted to --

5 to get -- have a forecast that was transparent, that

6 everybody could understand, that could be evaluated

7 rather easily but still have the sophistication

8 necessary to capture all the important changes and the

9 inputs.

10   And -- but anyway, our forecast is

11 lower than -- okay.

12   MR. CHRISTIAN MONNIN: Mr. Chair,

13 we're in -- possibly into a grey area here, so we're

14 just coming to a landing on that with regards to CSI.

15

16   (BRIEF PAUSE)

17

18   MR. CHRISTIAN MONNIN: Mr. Chair, with

19 respect to slide 37, the first bullet referring to

20 Manitoba Hydro rebuttal 95-97, there may be some

21 assertions in the two (2) checklists -- or the

22 checkmark bullets beneath that that stray into the

23 area of CSI. I'm not going to advise which -- which

24 of the two (2) that is, but it's something that we

25 will be addressing during the break.

4423

1   My friends from Hydro advise me that

2   the balance of slide 37, the bullet with regards to

3   rebuttal at page 98, is -- is fine for Dr. Sinclair to

4   -- to proceed. So he will -- he will do so.

5

6   (BRIEF PAUSE)

7

8   THE CHAIRPERSON: Mr. Williams, did

9   you -- I see you've got your finger on the button.

10   MR. BYRON WILLIAMS: If there are

11   going to be objections, it would be helpful to have

12   them put on the record. And clearly, one just has to

13   look at page 5 of the Potomac evidence to -- to see

14   that the -- this checkmark is consistent with --

15   certainly in our -- our client's evidence. So it

16   would be helpful for our client to understand the

17   basis of the allegation. Maybe that can be put on the

18   record afterwards.

19   MS. PATTI RAMAGE: Mr. Williams, we're

20   working in real time, and we don't have a basis for an

21   allegation. We're being careful right now, so we're

22   trying to look it up as we are proceeding.

23   MR. BYRON WILLIAMS: Isn't the

24   statement on page 5, under 'B', second paragraph:

25   "Our results generally forecast lower

4424

1   prices than Manitoba Hydro's

2   consultants due to assumptions on key

3   inputs."

4   Isn't that the key statement?

5

6   (BRIEF PAUSE)

7

8   MS. PATTI RAMAGE: Where are you

9 reading from, Mr. Williams?

10   MR. BYRON WILLIAMS: If you look at

11 the first two (2) paragraphs under 'B', "Summary of

12 Results," and in particular the second line -- excuse

13 me, the first sentence of the second paragraph.

14

15   (BRIEF PAUSE)

16

17   MS. PATTI RAMAGE: Mr. Williams,

18 that's helpful. I think we're okay on this, but

19 you'll -- you have to understand, we're -- we're

20 seeing the deck for the first time, so we're -- we're

21 trying to make sure that nothing gets out. And so we

22 have to stop and then look, not -- not have

23 information go out and then think about it after.

24   MR. CHRISTIAN MONNIN: So just so I

25 understand clearly then, Dr. Sinclair can proceed with

4425

1 that slide?

2   MS. PATTI RAMAGE: Well, he can -- Dr.

3 Sinclair can proceed with the slide. The CSI would be

4 in the explanation of why that is the case. So the

5 expectation would be the -- the statement is already

6 out there, but the actual details behind it are the

7 CSI.

8   MR. CHRISTIAN MONNIN: That's

9 acceptable. Thank you.

10   DR. ROBERT SINCLAIR: Okay. So we

11 were at page 98, the rebuttal. Potomac Economics has

12 improperly dismissed Manitoba Hydro forecast. And the

13 -- one of the reasons that we develop our own forecast

14 was that we were not able to get access to a lot of

15 the details of the underlying data. Now, there were

16 some PowerPoint presentations associated with each

17 consultant, and we were able to get some idea of the -

18 - the main inputs.

19   But we really felt that in order to

20 assess -- make an assessment of the reasonableness of

21 the forecast, we needed to see more -- more of the

22 inner workings of the models. And -- and so I don't

23 know if we'd say we dismissed them, but we said -- we

24 recommended that a more transparent model be the basis

25 of your decision.

4426

1   And we tried to develop a transparent

2 model where you can see everything that we did, and

3 everything's available. And so, really, our -- our

4 point here is that we -- we could only work with those

5 models so far and then we needed to get some more

6 information and provide you with some more details.

7 And so we developed our own model.

8

9 CONTINUED BY MR. CHRISTIAN MONNIN:

10   MR. CHRISTIAN MONNIN: If I may just,

11 again, for the benefit of the record, I -- I believe

12 it's on the record. However, the debate on -- on --

13 with respect to CSI content pertained to slide 37 of

14 the presentation.

15   DR. ROBERT SINCLAIR: So on to slide

16 38, where a similar comment was made in the rebuttal

17 at page 98 of the rebuttal:

18   "Potomac Economics improperly

19   interpreted consultants' capacity

20   analysis."

21   Again, we had difficulty fully

22 comprehending what was going on in the analyses. So

23 we weren't really able to make conclusive statements.

24 And we had to infer a lot from what we saw in the

25 data. So if it was improperly interpreted, it was a

 1 result of not having enough data.

 2   The Manitoba Hydro rebuttal at page

 3 101:

 4   "Potomac Economics misunderstood the

 5   Brattle capacity analysis inputs."

 6   So we read the Brattle report to be

 7 using a twelve hundred dollar ($1,200) a kilowatt

 8 combustion turbine price. So it wasn't that we

 9 misunderstood, but we -- it was actually reported to

10 us that was the price. And the rebuttal notes that

11 Brattle corrected that value in some form. I -- I

12 suppose it was maybe a confirmation to the Company.

13 But, anyway, it wasn't that we misunderstood. It was

14 just we were not informed properly of the -- of the

15 prices used.

16   All right. Just a couple -- a couple

17 more slides. So at page 105 -- and I talked about

18 this earlier. The panel Chairman asked a question

19 about it, and we'll talk about it a little bit more

20 now:

21   "Potomac Economic's coal retirements

22   assumption is outside the

23   mainstream."

24   As I said before we -- our assumption

25 is based on EIA projections, which we do not believe

4428

1 are outside the mainstream. EIA does very careful

2 work. Their evaluation involves many experts, many --

3 a great amount of effort. and has been ongoing for

4 many years. The -- their model has been vetted over

5 many years. I -- I think they do very careful work,

6 important work.

7   And as I discussed before, I think part

8 of this assertion that our coal retirement assumption

9 is outside the mainstream is because it doesn't match

10 up with MISO's 12 gigawatts. And I explained that

11 part of that is because MISO is a planning

12 organization. They plan more conservatively. And

13 they are counting capacity that looks -- that was in a

14 category of indeterminate whether it would retire or

15 not.

16   And so the difference between what we

17 say at 6 gigawatts and what MISO says at 12 gigawatts

18 is really a category where MISO is assuming these

19 retirements, even though these units have not

20 indicated that they're retiring. And besides that, we

21 do think that the EIA has good estimates.

22   And finally, it's made out to indicate

23 -- it's made out that this will have a big impact on

24 prices, whereas, actually, when carbon costs are

25 included, the marginal retiring coal plant is actually

4429

1 comparable to a new CCGT. So if you were to retire

2 more coal units in our model, or really any model, and

3 you have a carbon price, you really are going to get

4 the coal plants that are retiring to be comparable to

5 the new CCGTs.

6   And if you look at the following slide,

7 on slide 40, we wanted to illustrate this. And I've

8 brought it up before in response to a question. We

9 have three (3) types of units here -- a CCGT, a CT,

10 and an old coal plant -- because what -- what do you

11 have on the margin is that you have coal retiring

12 inefficient coal plants, and you have these new CCGTs

13 coming in. And the important numbers are on the far

14 right.

15   So this is the marginal cost of an old

16 coal unit when you have a carbon price; carbon price

17 being twenty dollars ($20) there. You see the carbon

18 price. And so if that's on the margin, you have a

19 fifty dollar ($50) price. Now, the marginal cost of a

20 new CCGT in that time frame is -- is slightly higher,

21 but it's basically comparable.

22   So all -- all the issues that are

23 raised about coal retirements giving the impression

24 that this may have a drastic impact on prices, I think

25 it's not true in that our model could sustain more

4430

1 coal retirements and the prices would be very stable.

2 It's at stable levels. And I believe that would be

3 the case with most models, and it is driven by these

4 converging costs.

5   Okay, so Manitoba -- in slide 41,

6 Manitoba also takes exception with our use of emission

7 rates. So we use a cons -- we use a constant rate for

8 all gas plants, and we use a constant rate for all

9 coal plants. And Manitoba Hydro's suggesting that

10 perhaps this should change. This should be -- it

11 should change with the efficiency of the plant.

12   And that's logical that if -- if a

13 plant's less efficient, it's going to emit more CO_2;

14 and I agree with that point. However, this is

15 something that will have very little impact on -- on

16 the -- really, what the marginal price in any hour,

17 because you're really moving between heat rates and

18 you're -- and you are -- the carbon price moves

19 through the cost of the plant and the -- the variance

20 in the carbon. And the heat rate will not have a big

21 impact on the -- on the marginal costs of the plant if

22 you were to make that adjustment.

23   In fact, you may get lower -- actually,

24 lower off-peak prices because you'd be pushing coal

25 units off the margin and bring a cheaper gas onto the

4431

1 margin, and you may actually lower the off-peak price.

2 But we -- we think that the -- the effect is -- is

3 minimal.

4   In a similar way, Potomac Eco --

5 Manitoba Hydro -- this is on slide -- my slide 42.

6 Manitoba Hydro says that our capacity expansion is too

7 simplistic. If you remember, we used the EIA capacity

8 expansion. But we have to supplement that to a degree

9 because in some years there's not enough capacity to

10 meet the demand. So we add natural gas plants, half

11 of it combustion -- combined-cycle gas turbines, and

12 half of it combustion turbines.

13   And again, there's a suggestion that

14 this will have a big impact on -- on the prices, but

15 we're really adding very little in this -- in this

16 system because most of the additions are from the EIA

17 capacity expansion. And, for instance, in a reference

18 case, we add about 4,000 megawatts of natural gas over

19 the twenty (20) year period, which is about 11 percent

20 of the CCGT and CT capacity in the region by 2034.

21 So, again, this -- this impact is likely to be very

22 small if we were to make it more flexible like that.

23   So that's -- that's it for my public

24 presentation, and the CSI will be presented, I

25 believe, tomorrow. So thank you. Certainly if you

4432

1 have questions, I'd be happy to answer them now.

2   THE CHAIRPERSON: Dr. Sinclair, the

3 consultants that were used by Manitoba Hydro to

4 forecast prices would have access -- have had access

5 to the same historical data that you had access to?

6   DR. ROBERT SINCLAIR: Yeah -- yes.

7   THE CHAIRPERSON: So the difference

8 would be assumptions that they used and perhaps the

9 formulas they used to generate the price forecast.

10   I mean, that would -- in essence is

11 that the difference between -- without knowing the

12 details, would -- would -- is that what you assume

13 would be the difference between your results versus

14 their results?

15   DR. ROBERT SINCLAIR: It -- it's hard

16 to say. They -- they certain had the same access to

17 the key inputs, such as gas prices. They provided

18 some of that, actually. But what was different

19 between our model and their model was that their model

20 tends to be -- it's a commitment model, commitment of

21 dispatch model basically.

22   So it -- it goes through each hour

23 trying to find -- re-dispatches the system --

24 recommits the system, re-dispatches the system, where

25 we actually take what actually happened in MISO and

4433

1 adjust it from there. So they -- conceivably they

2 could have taken a -- taken the MISO curves like we

3 did, and adjusted them.

4   But what they do, I think they -- they

5 produce -- and again it's a little sketchy, because

6 the transparency wasn't that great. But I believe

7 what they do is they have more of a linear programming

8 model that will take the -- the units that are

9 available, sort of select them out of certain groups,

10 and create their own supply curves for each hour, not

11 related to the historical necessarily.

12   They may use the historical, but I -- I

13 don't know, to sort of gauge their own estimates. But

14 they -- they tend to build up from worth -- up from

15 scratch a little bit more, from what I understand.

16   THE CHAIRPERSON: Mr. Williams, are

17 you in a position to -- to ask some questions of this

18 witness?

19   MR. BYRON WILLIAMS: I am ready when

20 the --the panel is ready.

21   THE CHAIRPERSON: I just want to

22 confirm that I -- I heard Me. Monnin say that, you

23 know, his client is arriving at one o'clock. He'd

24 like some time with the. I wonder if we couldn't

25 combine both things, and have lunch around that time

4434

1 so that he's able to consult at the same time as -- as

2 we're having lunch.

3   And for the sake of efficiency, I'm

4 assuming we can go till, say, quarter to 1, and then

5 break and then resume after -- after lunch. Is that

6 workable for all of the Intervenors? If it is, I'm

7 just going to look around to see if any -- anybody

8 needs a break. It doesn't look -- yeah, we do need to

9 -- let's take five (5), and then we'll come back and -

10 - and work till about quarter to 1:00.

11

12 --- Upon recessing at 12:02 p.m.

13 --- Upon resuming at 12:11 p.m.

14

15   THE CHAIRPERSON: I believe that we're

16 in a position to resume the questioning of the

17 witness. So, Mr. Williams, please.

18

19 CROSS-EXAMINATION BY MR. BYRON WILLIAMS:

20   MR. BYRON WILLIAMS: Thank you. And

21 good afternoon, members of the panel. And Mr. -- Dr.

22 Sinclair, good afternoon to you, as well.

23   I wonder if we could pull up the terms

24 of reference of the Public Utilities Board in this

25 proceeding, so the ones issued to the Public Utilities

4435

1 Board. Thank you. And perhaps if we could scroll

2 down to the -- page 2, 1(d). That's perfect there,

3 thank you.

4   Dr. -- Dr. Sinclair, your team, in

5 preparing for your work on this assignment, I take it

6 you would have reviewed the terms of reference of the

7 Public Utilities Board?

8   DR. ROBERT SINCLAIR: Yes.

9   MR. BYRON WILLIAMS: And you're aware

10 that one of the issues for the Public Utilities Board

11 to advise the province on is the reasonableness,

12 thoroughness, and soundness of all critical inputs,

13 including export expectations and commitments?

14   DR. ROBERT SINCLAIR: Yes.

15   MR. BYRON WILLIAMS: And if we could

16 scroll down to 2(d), which I believe is on page 3 of 8

17 of the terms of reference. Thank you.

18   And as well, Dr. Sinclair, you're aware

19 that the Public Utilities Board is called upon to

20 advise the province, in terms of the reasonableness of

21 forecasted critical inputs, including electricity

22 market price forecasts?

23   DR. ROBERT SINCLAIR: Yes.

24   MR. BYRON WILLIAMS: And scrolling

25 down to sub (e), and again, Dr. Sinclair, you're aware

4436

 1 that the Public Utilities Board is called upon to

 2 advise the province, in terms of the reasonableness of

 3 the scope and/or evaluation of risks and benefits

 4 related to the reliability of Hydro's interpretation

 5 of the most likely future -- future outcomes,

 6 including export market prices and carbon pricing?

 7   DR. ROBERT SINCLAIR: Yes.

 8   MR. BYRON WILLIAMS: And just down to

 9 sub (g). Thank you. You also are aware, Dr.

10 Sinclair, that the Public Utilities Board is called

11 upon to advise the province, in terms of the financial

12 and economic risks of the plan as compared to

13 alternative development strategies with regard to

14 export, carbon contracts, and opportunity revenues?

15   Would that be fair, sir?

16   DR. ROBERT SINCLAIR: Yes.

17   MR. BYRON WILLIAMS: If we could pull

18 up Potomac Exhibit 3, which is the scope of work for

19 Potomac Economics. And in terms of -- if we could go

20 to item number 11 on that list.

21

22   (BRIEF PAUSE)

23

24   MR. BYRON WILLIAMS: Dr. Sinclair, one

25 of the tasks assigned to Potomac was a review of

4437

1 Manitoba Hydro's export revenue forecasting, including

2 the ICF forecasts.

3   Am I correct, sir?

4   DR. ROBERT SINCLAIR: Yes.

5   MR. BYRON WILLIAMS: And is it fair to

6 say that in undertaking that work, Potomac exhibited -

7 - or experienced some challenges in terms of some of

8 the underlying data relating to the ICF forecasts?

9   MS. PATTI RAMAGE: Kelly. Sorry,

10 objection. The question presumes which of the

11 forecasters are included in Manitoba Hydro's forecast.

12   MR. BYRON WILLIAMS: Let me -- let me

13 ask that question a little -- a different way, and I

14 apologize for the...

15   In terms of assessing the -- Manitoba

16 Hydro's export revenue forecasting process, did

17 Potomac experience challenges in assessing the

18 underlying forecast provided by any of the six (6)

19 external -- external consultants to Manitoba Hydro?

20   DR. ROBERT SINCLAIR: Yeah. I think I

21 explained before that one of the reasons we conducted

22 our own detailed analysis was that there was a lack of

23 transparency in -- in most of the forecasts, that we

24 were not able to determine the underlying mechanisms

25 which produced them.

4438

1   MR. BYRON WILLIAMS: Under task 1 of

2 the -- of the terms of reference for Potomac -- or

3 scope of work, excuse me, you were called upon to

4 review the factors considered to arrive at Manitoba

5 Hydro's export market expectations and to comment on

6 whether they are complete, reasonable, and accurate.

7   Would that be fair, sir?

8   DR. ROBERT SINCLAIR: Yes.

9   MR. BYRON WILLIAMS: And again, you

10 would -- it would be fair to suggest that you experien

11 -- in -- in performing this ins -- assignment, you

12 experienced some transparency constraints, sir?

13   DR. ROBERT SINCLAIR: Yes.

14   MR. BYRON WILLIAMS: If we can scoll -

15 - scroll down to number 6 on this page, Dr. Sinclair,

16 you were asked to review Hydro's IFF dating back to

17 IFF09, and assess the reasonableness of Hydro's

18 derived average export prices projected at that time?

19   DR. ROBERT SINCLAIR: Yes.

20   MR. BYRON WILLIAMS: And -- and, sir,

21 I have certainly, I -- I think, exhaustively read your

22 -- your evidence as -- as presented in Potomac Exhibit

23 2-1, and would I be -- would it be fair to say that I

24 -- I don't see much commentary in terms of the IFF09

25 projections in that document, sir?

4439

1   DR. ROBERT SINCLAIR: Yeah, we

2 reviewed those forecasts, and we did not include them

3 in the report. You're right. It's just that our

4 review of those did not seem to contribute much to our

5 effort at producing a forecast, so we did -- we didn't

6 spend a lot of time developing any points in that

7 regard.

8   MR. BYRON WILLIAMS: And -- and I

9 accept that. Sir, do -- do you have any observations

10 in terms of the reasonableness of IFF09 as compared to

11 actual export market data for the year -- you know,

12 years 2010 through 2013?

13   DR. ROBERT SINCLAIR: No, we did not

14 do a quan -- quantitative analysis of that.

15

16   (BRIEF PAUSE)

17

18   MR. BYRON WILLIAMS: Sir, in terms of

19 Potomac's efforts as presented in Exhibit 2-1 of

20 Potomac, the redacted evidence of March 2014, it would

21 be fair to say that the intent of Potomac was to

22 present a forecast that was highly transparent and

23 easily understood?

24   DR. ROBERT SINCLAIR: That's correct.

25   MR. BYRON WILLIAMS: And to assist the

4440

1 Public Utilities Board, you provided a forecast over

2 the next twenty (20) years of energy and capacity

3 prices in the MISO marketplace?

4   DR. ROBERT SINCLAIR: That's correct.

5   MR. BYRON WILLIAMS: And would it be

6 fair to characterize your report -- we can turn the --

7 if -- if you'd wish to, Diana, to Exhibit 2-1 of

8 Potomac?

9   Would it be fair to characterize that

10 report as presenting a relatively detailed explanation

11 of your modelling and assumptions?

12   DR. ROBERT SINCLAIR: Yes.

13   MR. BYRON WILLIAMS: For example, sir,

14 you have provided a transparent explanation of the

15 sources of your data, including the EIA annual energy

16 outlook assumptions and the EIA updated capital

17 estimates?

18   DR. ROBERT SINCLAIR: Yes.

19   MR. BYRON WILLIAMS: And to your

20 knowledge, sir, is there any other forecast of MISO

21 export prices on the public record of the NFAT

22 proceeding which transparently lays out its data

23 assumptions and methodology to the -- to the degree of

24 Potomac?

25   DR. ROBERT SINCLAIR: No, not -- not

4441

1 to the degree that we do. You should be able to

2 replicate our study based on public available data.

3 Now, I do say that the Brattle study that was done for

4 the NFAT, that -- that had a little more transparency

5 than -- than the others, so -- but it was -- we could

6 not take their study and replicate it, no, wouldn't be

7 able to.

8   MR. BYRON WILLIAMS: Okay. And I

9 asked on the public record, and I do not believe that

10 I'm seeking CSI with this question, but Ms. Ramage and

11 -- and Me. Monnin will be on the alert if I am.

12   To your knowledge, is there any other

13 forecast of MISO export prices on the CSI record of

14 the NFAT proceeding, which transparency lays out its

15 data assumptions and methodology to the degree that

16 Potomac does?

17   DR. ROBERT SINCLAIR: No.

18

19   (BRIEF PAUSE)

20

21   MR. BYRON WILLIAMS: If we could turn

22 to -- if we could turn to Potomac Exhibit 2-1, to page

23 41, please?

24

25   (BRIEF PAUSE)

4442

1   MR. BYRON WILLIAMS: And if you could

2 scroll down to the bottom of this page? Try to ignore

3 the black lining, Dr. Sinclair. Again, I'm not

4 seeking CSI in this particular question, but you see,

5 sir, the first sentence of the second paragraph, a

6 suggestion by Potomac that you were unable to obtain

7 detailed information on the models and inputs used by

8 Manitoba Hydro's consultants to forecast capacity

9 prices.

10   Do you see that, sir?

11   DR. ROBERT SINCLAIR: Yes.

12   MR. BYRON WILLIAMS: And with regard

13 to the inability of Potomac to access this detailed

14 information on models and inputs related to capacity

15 price forecasts, to your understanding, sir, was it

16 that Manitoba Hydro refused to provide the material,

17 or that Manitoba Hydro did not have the material?

18   DR. ROBERT SINCLAIR: My understanding

19 was that Manitoba Hydro agreed with their consultants

20 that they would not release the detailed material. I

21 believe they did not have it.

22   MR. BYRON WILLIAMS: Okay. Did you --

23 and I guess just on that point, did you explore with

24 Manitoba Hydro whether it had the detailed

25 information on the models and inputs of its

4443

1 consultants with regard to capacity prices?

2   DR. ROBERT SINCLAIR: Yes, we had

3 conversations about it.

4   MR. BYRON WILLIAMS: And your sense

5 was they did not have it?

6   DR. ROBERT SINCLAIR: Yeah. My sense

7 -- we were told that the data was proprietary, that

8 they had agreed not to release it. I think there was

9 some effort to go back to the consultants that was

10 unsuccessful, except in the case of Brattle. But

11 generally, yeah, the -- the message was, We don't have

12 it and we can't get it.

13   MR. BYRON WILLIAMS: Did you explore,

14 Sir, with Manitoba Hydro whether it had sought to

15 independently verify the information related to the

16 model and the inputs of its consultants with regard to

17 capacity prices?

18   DR. ROBERT SINCLAIR: No, I did not.

19 I didn't ask them that.

20

21   (BRIEF PAUSE)

22

23   MR. BYRON WILLIAMS: So -- so you're

24 not in a position to offer us any comfort that

25 Manitoba Hydro had sought to indiv -- independently

4444

1 verify the indep -- the information, models, and

2 inputs of his consultants with regard to capacity

3 prices?

4   DR. ROBERT SINCLAIR: That's correct.

5   MR. BYRON WILLIAMS: I wonder if you

6 can turn -- still staying with this document, being

7 Manitoba -- or Potomac Exhibit 2-1, to page 19 of

8 Potomac's March 2014 redacted report.

9

10   (BRIEF PAUSE)

11

12   MR. BYRON WILLIAMS: And, Sir, we were

13 talking about capacity prices previously.

14   You'll see here that in this section of

15 your report, you're referring to energy prices?

16   DR. ROBERT SINCLAIR: Correct.

17   MR. BYRON WILLIAMS: And would it be

18 fair to say as well, Sir, that when it came to

19 examining the underpinnings of Manitoba Hydro's energy

20 price forecast, that you were unable to obtain

21 detailed information regarding the consultants'

22 models, input data, and results?

23   DR. ROBERT SINCLAIR: We were not able

24 to obtain sufficient details.

25   MR. BYRON WILLIAMS: And, Sir, we --

4445

1 we went over this with capacity prices.

2   Would it be fair to summarize it --

3 your understanding that, with the exception of

4 Brattle, Manitoba Hydro was unable to -- to obtain

5 that additional information from its consultants?

6   DR. ROBERT SINCLAIR: It's the same,

7 correct.

8   MR. BYRON WILLIAMS: If we can turn to

9 page 10 of this document, which is the report of March

10 2014, redacted.

11

12   (BRIEF PAUSE)

13

14   MR. BYRON WILLIAMS: Sir, under the

15 Brattle Group heading, the third sentence, you see

16 again a reference to limited information regarding the

17 model and assumptions, agreed?

18   DR. ROBERT SINCLAIR: Yes.

19   MR. BYRON WILLIAMS: And apart from

20 what we've already discussed, with regard to the

21 capacity forecast and the energy price forecast, are

22 there any additional details in terms of the

23 limitations relating to the -- the information from

24 Brattle that you wish to -- to identify?

25   DR. ROBERT SINCLAIR: I don't think

4446

1 so, except maybe to say that it wasn't just data, but

2 also the underlying mechanisms that -- what were used

3 to -- to model the data, that were also unavailable.

4   MR. BYRON WILLIAMS: Okay. And

5 perhaps if we could turn quickly to the top of page

6 12, and maybe we can elaborate on that just a little

7 bit.

8   And, Sir, in terms of your reference to

9 the lack of insight into the -- the mech -- mechanism

10 of Brattle, would it be fair to say that, in terms of

11 energy prices and capacity prices, Potomac was unable

12 to disentangle countervailing effects, and that caused

13 you some concerns, in terms of the Brattle estimates?

14   DR. ROBERT SINCLAIR: That's correct.

15   MR. BYRON WILLIAMS: Sir, going back

16 to the -- our very early discussion of the Public

17 Utilities Board's mandate to report on the

18 reasonableness, thoroughness, and soundness of all

19 critical inputs, including export expectations, would

20 it be fair to say that -- that Potomac's efforts to --

21 to report on these inputs were, in essence, frustrated

22 by limited access to consultants' models, outputs, and

23 assumptions?

24   DR. ROBERT SINCLAIR: Yes, I think

25 that's the -- the point we make, is that because we

4447

1 couldn't get to the bottom of some of the

2 calculations, that we couldn't make further -- we

3 couldn't make definitive conclusions.

4   I don't want to give the impression,

5 there, that -- it's true there was limitations on the

6 data from the consultants, but otherwise, we had a

7 fairly high level of cooperation on other matters from

8 Manitoba Hydro, and -- we would call, and they were

9 fairly responsive, and -- and straightforward.

10   MR. BYRON WILLIAMS: And I thank you

11 for that.

12   DR. ROBERT SINCLAIR: Just -- yeah.

13   MR. BYRON WILLIAMS: Oh, sorry, I

14 didn't mean to interrupt.

15   DR. ROBERT SINCLAIR: It was really

16 just getting to the bottom of the consultants.

17   MR. BYRON WILLIAMS: Sir, if you need

18 a reference, it's page 9 of your report, but is it

19 your understa -- page 9 of this report. And by that,

20 I mean --

21   DR. ROBERT SINCLAIR: Oh, slides.

22   MR. BYRON WILLIAMS: Not the slides,

23 excuse me, Hydro Exhibit 2-1, and I apologize. In --

24   MR. CHRISTIAN MONNIN: I'm sorry,

25 that's Potomac Exhibit 2-1, just for the record.

4448

1   MR. BYRON WILLIAMS: Thank you, Me.

2 Monnin.

3

4 CONTINUED BY MR. BYRON WILLIAMS:

5   MR. BYRON WILLIAMS: Sir, and -- and

6 if I'm speaking too simplistic -- simplistically, Dr.

7 Sinclair, you'll correct me, but would it be fair to

8 say that, for purposes of the financial model, Hydro,

9 to your knowledge, essentially lumped all six (6)

10 external consultants together on an equal ways --

11 equal-weight basis to establish a single consolidated

12 forecast?

13   DR. ROBERT SINCLAIR: That -- that's

14 correct.

15   MR. BYRON WILLIAMS: And My Friend Ms.

16 Ramage and -- will want to keep her finger on -- on

17 the button just for this question. Perhaps, you as

18 well, Me. Monnin.

19   But are you in a position on the public

20 record, sir, to indicate whether all six (6)

21 forecasters for -- modelled both a no-CO2 cost

22 scenario and a CO2 cost scenario?

23   MS. PATTI RAMAGE: That material, Mr.

24 Chair, has been redacted at -- at this point, so

25 Manitoba Hydro would object to a response to that

4449

1 question.

2   MR. BYRON WILLIAMS: And CAC

3 (Manitoba) would reserve the right to re-put that

4 question if there's a -- a determination that -- that

5 that should be put on the public record.

6   MR. CHRISTIAN MONNIN: For the

7 purposes of the IECs, we will abide by whatever --

8 whatever direction the Board gives us on that.

9

10 CONTINUED BY MR. BYRON WILLIAMS:

11   MR. BYRON WILLIAMS: Dr. Sinclair,

12 again, this was a -- a thrust of your evidence this

13 morning, but in the absence of the -- an ability to

14 validi -- validate the external consultants employed

15 by Hydro, Potomac developed its own forecast, agreed?

16   DR. ROBERT SINCLAIR: That's correct.

17   MR. BYRON WILLIAMS: So I'm going to

18 play devil's advocate with you for just a moment or

19 two (2). Recognizing that we have six (6) forecasts

20 on the Hydro side that neither you or, apparently,

21 Hydro have been able to verify, isn't there somehow

22 some strength in numbers, no matter the potential

23 flaws or biasses within any one (1) of those

24 individual six (6) forecasts, that we can somehow hope

25 that the sum of that forecast will be greater than

4450

1 their individual parts?

2   DR. ROBERT SINCLAIR: I -- I don't

3 think I can really conclusively say so. No, I don't -

4 - I don't really know.

5   MR. BYRON WILLIAMS: Okay. I'll try

6 it one (1) more time, just because I'm feeling a

7 little provocative this morning, sir. In other words,

8 shouldn't we trust the cumulative wis -- wisdom of six

9 (6) forecasters, however lacking in validation and

10 transparency, as compared to one (1) transparent

11 forecast?

12   DR. ROBERT SINCLAIR: I -- yeah, I

13 think the -- the point we make with some of the

14 statements in our -- in our report about recommending

15 not relying on the consultants is -- is that a -- a

16 transparent forecast is very useful because you know

17 what's going on, the inner workings.

18   And even though the consultants may or

19 may not be -- have a good forecast, without knowing

20 how they actually -- how they actually work, it's hard

21 to make a conclusion how accurate they are. So you

22 may conclude that a transparent one, yes, is more

23 valuable than a -- a non-transparent one.

24   MR. BYRON WILLIAMS: Sir, you've

25 talked about this a bit before, and I believe it's a -

4451

1 - rather than point you to your pre-filed evidence,

2 I'll refer you to your PowerPoint of today, Potomac

3 Exhibit 4, slide 23.

4

5   (BRIEF PAUSE)

6

7   MR. BYRON WILLIAMS: Sir, at a high

8 level here, Potomac sets out the four (4) alternatives

9 that it examined, the reference case with carbon

10 costs, the reference case with no carbon costs, the

11 high resource production case, and the high growth

12 case.

13   Would that be fair?

14   DR. ROBERT SINCLAIR: Yeah. Yes.

15   MR. BYRON WILLIAMS: And the two (2)

16 most likely scenarios, sir, were the reference no

17 carbon case and the reference case.

18   Would that be fair as well?

19   DR. ROBERT SINCLAIR: That's correct.

20   MR. BYRON WILLIAMS: And you assigned

21 an equal probability based on judgment to those two

22 (2) scenarios, sir?

23   DR. ROBERT SINCLAIR: Yes.

24   MR. BYRON WILLIAMS: Just for the

25 clarification of my client, moving to the high

4452

1 reference case, which you discussed earlier with Board

2 member Kapitany, would I be correct in suggesting to

3 you that it includes both no carbon costs as well as

4 an expectation that will -- there will be limit --

5 little growth in the price of natural gas due to

6 increased supply?

7   DR. ROBERT SINCLAIR: That's correct.

8   MR. BYRON WILLIAMS: And you assigned

9 a -- a -- judgmentally, a -- a probability to that

10 scenario of 20 percent?

11   DR. ROBERT SINCLAIR: That's correct.

12   MR. BYRON WILLIAMS: Thank you, and

13 we're going to turn to slide 27. And Dr. Sinclair,

14 I'm doing this on the -- on the fly, because I had

15 actually been working off of your pre-filed evidence,

16 so you'll correct me if I -- I misstate this.

17

18   (BRIEF PAUSE)

19

20   MR. BYRON WILLIAMS: But on the left-

21 hand side, we see the presentation of the four (4)

22 Potomac scenarios at the peak time.

23   Would that be fair, sir?

24   DR. ROBERT SINCLAIR: Yes.

25   MR. BYRON WILLIAMS: And I -- I want

4453

1 to start with the reference case with carbon costs,

2 which I understand to be the green line.

3   Am I correct in that understanding,

4 sir?

5   DR. ROBERT SINCLAIR: Yes, that's

6 green.

7   MR. BYRON WILLIAMS: And you might

8 have to refer, members of the panel, to the paper

9 presentation to -- to see the green line.

10   DR. ROBERT SINCLAIR: Okay. It's the

11 second one (1) from the top on -- in the left panel.

12   MR. BYRON WILLIAMS: And just to walk

13 through the -- that -- the reference case, sir, do I

14 see you starting on the left-hand side of this

15 presentation at about thirty dollars ($30) per

16 megawatt hour in 2015?

17   Would that be fair?

18   DR. ROBERT SINCLAIR: Yes.

19   MR. BYRON WILLIAMS: And on or about

20 2021, we -- we see the -- as the forecast for the

21 green line passing the -- the forty dollars ($40) per

22 megawatt line.

23   Would that be fair?

24   DR. ROBERT SINCLAIR: Correct.

25   MR. BYRON WILLIAMS: And it tops out

4454

1 at -- at or around 2033/'34, at fifty-eight (58) or

2 fifty-nine dollars ($59) per megawatt hour.

3   Would that be fair?

4   DR. ROBERT SINCLAIR: Correct.

5   MR. BYRON WILLIAMS: And just above

6 it, which, on the paper cop -- copy is the light blue

7 line, or the top line, we see the reference hydro

8 figure.

9   Would that be fair, sir?

10   DR. ROBERT SINCLAIR: Yes.

11   MR. BYRON WILLIAMS: And would it be

12 fair to -- to characterize the -- that pattern as

13 fairly similar to the reference CO2 cost line, with

14 the exception that the price is somewhat higher,

15 ending at above sixty dollars ($60) per megawatt hour

16 towards the end of the twenty (20) year forecast?

17   DR. ROBERT SINCLAIR: Yes. It's --

18 basically has the same shape, if that's what you mean.

19   MR. BYRON WILLIAMS: The same shape,

20 sir, and -- and I'm -- I'm going to suggest to you

21 that as compared to the no CO2 cost scenario, or the

22 low energy price scenario, it's also relatively closer

23 in terms of its price experience to the reference CO2

24 model.

25   Would that be fair?

4455

1   DR. ROBERT SINCLAIR: Yes.

2   MR. BYRON WILLIAMS: Now, on the paper

3 copy, we see the reference case no carbon as being on

4 the dark blue, the third line from the top.

5   Is that fair, sir?

6   DR. ROBERT SINCLAIR: Yes.

7   MR. BYRON WILLIAMS: And again, that

8 starts around thirty dollars ($30) per megawatt hour

9 in 2015, sir?

10   DR. ROBERT SINCLAIR: Yes.

11   MR. BYRON WILLIAMS: And in this case,

12 it does not get to the forty dollars ($40) per

13 megawatt hour till on or about 2029 in your forecast?

14   DR. ROBERT SINCLAIR: Yes.

15   MR. BYRON WILLIAMS: So about eight

16 (8) years later than the other reference case?

17   DR. ROBERT SINCLAIR: Yes.

18   MR. BYRON WILLIAMS: And it finishes

19 out towards the end of the forecast in the low- to

20 mid-forties (40s) on or about 2033/2034, sir?

21   DR. ROBERT SINCLAIR: Yes.

22   MR. BYRON WILLIAMS: Would it be fair

23 to say roughly fifteen dollars ($15) per megawatt less

24 than the reference case at 2033?

25   DR. ROBERT SINCLAIR: Yes.

4456

1   MR. BYRON WILLIAMS: Now, in -- in

2   your discussion with Board member Kapitany, you

3   indicated with regard to the low energy price scenario

4   that you believed a reasonable case could be -- could

5   be made for that scenario, sir?

6   DR. ROBERT SINCLAIR: Plausible, yes.

7   MR. BYRON WILLIAMS: I believe the

8   word you used in the -- the discussion with her was

9   'very plausible'.

10   Would you accept that, subject to

11 check?

12   DR. ROBERT SINCLAIR: Sure. Twenty

13 (20) -- 20 percent chance.

14   MR. BYRON WILLIAMS: And again, on the

15 paper copy, this appears with the red line?

16   DR. ROBERT SINCLAIR: Yes.

17   MR. BYRON WILLIAMS: And it starts at

18 a bit less than thirty dollars ($30) per megawatt in

19 2015, sir, agreed?

20   DR. ROBERT SINCLAIR: Yes.

21   MR. BYRON WILLIAMS: And it finishes

22 at around thirty-five dollars ($35) per megawatt hour

23 towards the end of your forecast, correct?

24   DR. ROBERT SINCLAIR: Yes.

25   MR. BYRON WILLIAMS: So it never gets

4457

1 to that forty dollars ($40) per megawatt figure that -

2 - that we eventually cross in the other three (3)

3 scenarios?

4   DR. ROBERT SINCLAIR: That's correct.

5   MR. BYRON WILLIAMS: Subject to check,

6 would you agree that towards the end of the forecast,

7 it is roughly twenty-three dollars ($23) per megawatt

8 hour less than the reference at 2033?

9   DR. ROBERT SINCLAIR: Yes.

10   MR. BYRON WILLIAMS: And roughly eight

11 dollars ($8) per megawatt less than the no carbon at

12 2033?

13   DR. ROBERT SINCLAIR: Yes.

14   MR. BYRON WILLIAMS: Sir, looking at

15 these four (4) scenarios, would I be correct in

16 suggesting to you that in terms of downside risk for

17 these scenarios, that the greatest risk in terms of

18 magnitude flows from a low-CO2 scenario?

19   DR. ROBERT SINCLAIR: Yes. I -- I'm

20 sorry, magnitude?

21   MR. BYRON WILLIAMS: Sorry, let me try

22 this again. Sir, in terms of the -- as compared to

23 the reference CO2 case, the biggest -- let me try it

24 again. If one were to rank the downside risk to the

25 reference with CO2 cost case, would it be fair to say

4458

1 that the -- the biggest risk is no-CO2 prices,

2 followed by an -- an accumulative additional risk

3 related to low natural gas prices?

4   DR. ROBERT SINCLAIR: Okay. So the --

5 the prices will be impacted more if carbon does not

6 materialize -- carbon prices are zero, than if low

7 energy prices were to materialize, right.

8   MR. BYRON WILLIAMS: And a -- a much

9 better answered question than asked, and I thank you -

10 - thank you for that.

11   Mr. Chair, just in terms of the time, I

12 -- that's a -- a nice breaking point. I can keep

13 going if you wish. I can just indicate that My Friend

14 Mr. Gange, I believe, has no cross-examination, and

15 nor does My Friend Mr. Orle.

16   THE CHAIRPERSON: You know, I think

17 that -- Me. Monnin, I'm looking at the clock here. Do

18 -- do you know if your witness will -- will be

19 arriving shortly, or...?

20   MR. CHRISTIAN MONNIN: Mr. President,

21 I -- I believe that his -- his plane is arriving at

22 one o'clock --

23   THE CHAIRPERSON: Okay.

24   MR. CHRISTIAN MONNIN: -- and then

25 he'll make his way directly from the airport, here.

4459

 1 So subject to check, as we say, I suspect he'll be

 2 here in about half an hour, forty-five (45) minutes

 3 after that time.

 4   THE CHAIRPERSON: Okay. So we could

 5 then potentially go for another few minutes then.

 6

 7   (BRIEF PAUSE)

 8

 9 CONTINUED BY MR. BYRON WILLIAMS:

10   MR. BYRON WILLIAMS: Sir, if I

11 understood your -- again, your better answer than my

12 poor question, the biggest risk in terms of price is

13 the no -- no carbon cost scenario?

14   DR. ROBERT SINCLAIR: Yes.

15   MR. BYRON WILLIAMS: And am -- am I

16 correct in suggesting to you that when your -- your

17 fellow independent consultant, a Mr. Sabine from MNP

18 or Meyers -- well, I'll just say MNP. We'll use that

19 acronym.

20   When he looked at the no carbon cost

21 scenario versus the carbon cost scenario, he concerted

22 -- concluded that it was roughly 50/50 in terms of

23 those two (2) potential futures?

24   DR. ROBERT SINCLAIR: Yes.

25   MR. BYRON WILLIAMS: And sir, would

4460

1 that be consistent with the analysis of Potomac in

2 terms of the -- those two (2) potential futures being

3 roughly 50/50 in terms of a carbon cost future or a no

4 carbon cost future?

5   DR. ROBERT SINCLAIR: Yes.

6   MR. BYRON WILLIAMS: And it would be

7 fair to conclude that there is a significant

8 uncertainty relating to the introduction of CO2 costs?

9   DR. ROBERT SINCLAIR: Yes.

10   MR. BYRON WILLIAMS: I wonder, sir, if

11 you can outline at a national and regional level the

12 factors that led Potomac to conclude that there was

13 significant uncertainty regarding the introduction of

14 carbon costs?

15   DR. ROBERT SINCLAIR: Yeah, I -- I

16 don't think we were really -- I -- I think it was

17 mostly our assessment of the political timing that

18 there was a push for car -- more carbon action by the

19 federal government, say five (5) years ago, and the

20 momentum for that probably won't materialize soon. So

21 that was basically how we saw it.

22   And, of course, you know, we -- we work

23 with participants in the energy markets every day, and

24 our -- our opinion is formed by opinions that we pick

25 up also from other participants.

4461

 1   MR. BYRON WILLIAMS: Thank you for

 2 that. And -- and just, if we were to go back in time,

 3 perhaps five (5) -- five (5) years, it would be fair

 4 to say that at that point in time, observers were more

 5 optimistic about the likelihood of carbon cost being

 6 implemented in the relatively near future?

 7   DR. ROBERT SINCLAIR: Yes.

 8   MR. BYRON WILLIAMS: And it would also

 9 be fair to say, again, looking back in time to about

10 five (5) years ago, they would be more confident in

11 terms of the magnitude, a -- a higher magnitude of

12 carbon costs being, you know -- at that point in time.

13

14   Would that be fair?

15   DR. ROBERT SINCLAIR: That -- that's

16 logical, but I can't remember.

17   MR. BYRON WILLIAMS: Fair enough. I

18 want to just stay on the path of uncertainty for a --

19 a few more moments, and I wonder if we could turn to

20 page 45 of Exhibit Potomac-2-1, your redacted evidence

21 from March of 2014?

22

23   (BRIEF PAUSE)

24

25   MR. BYRON WILLIAMS: Now, I have to

4462

1 say that the Chair scooped -- the Chairperson of the

2 panel scooped a few of my good questions on this, so

3 I'll see if I can -- can, with no bitterness, try and

4 work out a couple. But, sir, in terms of the longer

5 term price forecasts, we -- we have both the six (6)

6 expert consultants of Hydro and the Potomac forecast

7 going out to 2034.

8   Would that be fair, sir?

9   DR. ROBERT SINCLAIR: Yes.

10   MR. BYRON WILLIAMS: And then we have

11 really, in terms of forecasts, a big black hole for

12 the period between 2034 and -- and 2080, would that be

13 fair, sir, in that there are no forecasts going out

14 that long?

15   DR. ROBERT SINCLAIR: That's right.

16 There is no forecast by ourselves or the consultants.

17   MR. BYRON WILLIAMS: And what -- what

18 Hydro essentially does is, for the period, at least,

19 between 2035 and through 2049, is literally

20 interpolate a value equal to the compound annual

21 growth rate, or CAGR, for 2030 through '34, and zero

22 value for 2049. Is that what it does?

23   DR. ROBERT SINCLAIR: That's correct.

24 After 2049, it's zero.

25   MR. BYRON WILLIAMS: Okay. And as

4463

1 Potomac looks to the future in terms of capacity

2 prices, it would be fair to say that you find no basis

3 for assuming that real prices will increase after

4 2034.

5   Would that be fair?

6

7   (BRIEF PAUSE)

8

9   DR. ROBERT SINCLAIR: I think we -- we

10 found it difficult -- I guess we've -- we would find

11 it difficult to find a basis for that, although I have

12 to say that -- that it's not a -- a very large rate

13 between -- and it declines very quickly, and it's zero

14 after that.

15   I think what we recommend is that the

16 Company's provided sensitivity, what would happen if

17 there were zero instead of that -- that other

18 alternative growth rate.

19   MR. BYRON WILLIAMS: And that's

20 helpful, and -- and to your knowledge, has that

21 sensitivity been done?

22   DR. ROBERT SINCLAIR: Not -- not to my

23 knowledge.

24   MR. BYRON WILLIAMS: Okay.

25   DR. ROBERT SINCLAIR: But we really

4464

1 haven't been in the business of following up on that.

2 We -- we put a recommendation in.

3   MR. BYRON WILLIAMS: Now, sir,

4 referring you to page 43 of your evidence, near the

5 top.

6

7   (BRIEF PAUSE)

8

9   MR. BYRON WILLIAMS: Actually, I

10 misspoke, page 45 of your evidence, near the top, and

11 Ms. Ramage and Me. Monnin may want to -- I don't think

12 I'm going to sneak into CSI, but they'll want to keep

13 their fingers near their pen -- or near their buttons.

14   We see you recommending that the

15 Company provide additional analysis supporting its

16 assumptions relating to its ability to make on-peak

17 opportunity sales at a premium as compared to the MISO

18 day-ahead price.

19   Would that be fair?

20   DR. ROBERT SINCLAIR: Correct.

21   MR. BYRON WILLIAMS: And you're

22 recommending additional analysis be undertaken in

23 support of that premium. Is that correct, sir?

24   DR. ROBERT SINCLAIR: Correct.

25   MR. BYRON WILLIAMS: And one (1) of

4465

1 the reasons you recommend that, is when you looked at

2 the 2011 material, that informa -- information in

3 terms of a premium was not supported.

4   Would that be fair?

5   DR. ROBERT SINCLAIR: That -- that's

6 correct. The -- the two (2) years I looked at would

7 not support that. That's why I recommend perhaps

8 going back -- either going back some more years, or

9 developing a -- a model that might illustrate it

10 better.

11   MR. BYRON WILLIAMS: Yeah. And -- and

12 in fairness, in 2011, the -- the on-peak price was

13 higher than the average on-peak sales of Hydro, but in

14 2012, Hydro did earn a premium.

15   Would that be fair?

16   DR. ROBERT SINCLAIR: Correct.

17   MR. BYRON WILLIAMS: And to your

18 knowledge, sir, has that analysis been undertaken,

19 that additional sensitivity analysis?

20   DR. ROBERT SINCLAIR: No. Again, we

21 hadn't really followed up.

22   MR. BYRON WILLIAMS: Turning, sir, to

23 page 42 of your report, scrolling down, and again, I

24 see my pagination is slightly off. I want to turn you

25 to page 44, and I apologize for that, and if anyone's

4466

1 suffering carpal tunnel from extra flipping, I

2 apologize as -- as well.

3   Sir, directing your attention to the

4 second last paragraph, you -- you note that Hydro

5 assumes in its forecast that all dependable capacity

6 is sold under long-term firm contracts.

7   Would that be fair?

8   DR. ROBERT SINCLAIR: Yes.

9   MR. BYRON WILLIAMS: And a minor

10 concern that you articulate in this reference, sir, is

11 that that assumption would -- would appear

12 inconsistent with the historical record?

13   DR. ROBERT SINCLAIR: Yes.

14   MR. BYRON WILLIAMS: And so, sir, you

15 recommend that 9 percent of Hydro's projected long-

16 term dependable energy be repriced at peak opportunity

17 sales levels.

18   Would that be fair?

19   DR. ROBERT SINCLAIR: Correct.

20   MR. BYRON WILLIAMS: I note your

21 comment about La Capra, but to your -- to -- to your

22 knowledge, or have you seen anything from Hydro

23 working on that -- that assessment of a repricing at a

24 -- for -- for 9 percent?

25   DR. ROBERT SINCLAIR: No.

4467

 1   MR. BYRON WILLIAMS: I'm pretty

 2 confident I have this pagination correct. If we could

 3 turn to page 16 of the -- yes. And Dr. Sinclair, just

 4 in terms of the last paragraph, you reference the low

 5 and high case alternatives produced by the Hydro

 6 consultants in response to a request by Manitoba Hydro

 7 to pre -- provide plausible scenarios.

 8   Is that fair, sir?

 9   DR. ROBERT SINCLAIR: Yes.

10   MR. BYRON WILLIAMS: And, sir, and

11 maybe I'm reading too much into this paragraph, but

12 would it be fair to say that in terms of the range

13 produced by the Hydro con -- consultants, you

14 distinguish your analysis in that rather than

15 presenting plausible scenarios, you are producing

16 alternatives based upon likely alternatives, which

17 together, present a -- a large range of probable

18 outcomes?

19   DR. ROBERT SINCLAIR: That was -- our

20 intention was to select alternatives that would, we

21 think, capture the broad range of alternatives. So

22 capture just about every possibility, or 80 percent,

23 or whatever. We -- we didn't put a number on it, but

24 we sort of -- we didn't want to identify a low case

25 which only had a 1 percent chance of occurring, but we

4468

1 wanted to perhap -- present something, maybe it came

2 out a little bit higher, but had a 20 percent change

3 of occurring.

4   So we didn't want -- we weren't

5 searching for the highest and lowest, but only where

6 we thought it's plausible -- based on our knowledge,

7 what we might -- could expect, plausibly, to occur.

8 Now, I -- I don't really know whether that same

9 thought process occurred with the consultants or not.

10   MR. BYRON WILLIAMS: Okay. And -- and

11 just, sir, so I understand it, in terms of your

12 analysis, you were looking for a -- a tighter range?

13   DR. ROBERT SINCLAIR: Tighter than

14 just the upper and lower bounds, yeah.

15   MR. BYRON WILLIAMS: And if you're

16 able to offer any reflection upon what are the

17 different insights we might get from the tighter range

18 as -- as compared to the other -- the other approach?

19   DR. ROBERT SINCLAIR: The other --

20 meaning just an absolute upper or lower bound?

21   MR. BYRON WILLIAMS: Fair enough.

22   DR. ROBERT SINCLAIR: Yeah. So we

23 would be sort of in the -- the mass -- the great mass

24 of probabilities that we would expect to occur. We

25 thought of it more like a -- maybe three (3) standard

4469

1 deviations from the mean, where you pick up 75 percent

2 of all likelihoods.

3   So we were trying to stick close to the

4 -- to the likelihoods without going out to the

5 extremes. So, I don't know, we could say that we

6 tried to pick up the great mass of outcomes.

7   MR. BYRON WILLIAMS: Thank you. And

8 if we can turn to pages 12 through 14 of your redacted

9 report? And that's fine for right now. And, again,

10 My Friend Ms. Ramage and -- and Me. Monnin may be more

11 inclined to press the button when we come to this

12 discussion. We shall see.

13   Sir, in looking -- if -- if we flip

14 through the pages 12 through 14 just visually for a

15 second, am -- am I correct, sir, in guessing that you

16 were presenting some discussion of your analysis of

17 the Hydro export price consultants other than the

18 Brattle Group?

19   DR. ROBERT SINCLAIR: That's correct.

20   MR. BYRON WILLIAMS: And if we can

21 turn first of all to page 14? Sir, you reach -- you

22 see a -- a reference to a consultant report 6.

23   Do you see that, sir?

24   DR. ROBERT SINCLAIR: Yes.

25   MR. BYRON WILLIAMS: Without in any

4470

1 way seeking CSI, sir, in terms of that particular

2 report -- to back up, sir, you -- you'll agree with me

3 that there's no discussion presented in terms of this

4 report? That it's all blacked out?

5   DR. ROBERT SINCLAIR: Yes.

6   MR. BYRON WILLIAMS: Without seeking

7 CSI, sir, can you advise my client as to any advice or

8 opinion you formed in terms of the advisability of

9 relying upon this forecast, being number 6, as a basis

10 for projecting export revenues?

11   What were your conclusions?

12

13   (BRIEF PAUSE)

14

15   MR. BYRON WILLIAMS: And while you're

16 chatting with Me. Monnin, I want to be clear. I'm

17 seeking only your conclusions at this point in time.

18   MR. CHRISTIAN MONNIN: And just to

19 give you some context, Mr. Williams, I'm just speaking

20 with Dr. Sinclair to make sure that he's comfortable

21 to be able to provide an answer without disclosing

22 CSI.

23

24   (BRIEF PAUSE)

25

4471

 1   DR. ROBERT SINCLAIR: So a -- a couple

 2 of things. First, I think what we would say for that

 3 one is similar to what we'd -- we had said about the

 4 other ones that were not redacted. For instance --

 5 yeah, for number 6. For -- for instance, at the end

 6 of number 5, which is the top of the page:

 7   "We do not recommend this forecast as

 8   a basis for projecting export

 9   revenues."

10   That same statement would apply to six

11 (6), we just didn't put it in.

12   Now, the second thing is, I think in

13 retrospect, we could have dispensed with a lot of -- a

14 lot of the -- the redacted material here. I -- I

15 don't think it was necessary to put it all in it. It

16 was sort of the fact that the transparency issue was

17 really afflicting all of the consultants.

18   We could have maybe made a general

19 statement saying, Consul -- you know, applicable to

20 all five (5) consultants about this transparency

21 issue. So it wasn't really necessary to put all this

22 in. So -- but -- six (6) is sim -- would be similar

23 to five (5), as far as conclusions go.

24   MR. BYRON WILLIAMS: And I'll ask you

25 by way of undertaking, and certainly you can discuss

1 this with -- with Me. Monnin and Manitoba Hydro, but

2 would it be possible to put in a -- a narrative

3 relating to these consultants 2 through 6, which

4 highlights or summarizes, kind of, the basis for not

5 concluding that you -- for -- for recommending that it

6 not be relied upon.

7   And in doing so, I would ask you to

8 note that under number 3, you offer a -- you offer an

9 explanation relating to lack of underlying data. So

10 it would be helpful, if -- if possible, to get some

11 sort of narrative. And I -- I'd invite you to discuss

12 that with your legal counsel and -- and Manitoba

13 Hydro.

14   MR. CHRISTIAN MONNIN: I -- I have no

15 problem doing that, Mr. Williams, but in addition to

16 your invitation to me, I would invite you to maybe

17 tighten up the undertaking a little bit. And -- we --

18 we'll, certainly, consider that. And I at first

19 blush, subject to speaking with counsel for Hydro, I

20 have no problem with the undertaking, but it will be

21 part of the -- it will have to go through the process

22 of vetting for CSI.

23   MR. BYRON WILLIAMS: So what I would

24 suggest is that, with regards to cons -- Hydro

25 consultants reports 2 through 5, that Manitoba Hydro -

4473

1 - excuse that Potomac consi -- undertake to examine

2 whether it would be possible to provide a -- a

3 narrative of the reasons that these reports -- and

4 some were not recommended, including a discussion of

5 data, assumption, and modelling limitations.

6

7   (BRIEF PAUSE)

8

9   MS. PATTI RAMAGE: I think Manitoba

10 Hydro's position on that undertaking would at best --

11 that it be taken under advisement. It certainly -- we

12 would have to see the results of the CSI review that

13 is going to take place. I wouldn't want our friends

14 at Potomac to, unnecessarily, have to go through

15 preparing an undertaking, only to have it redacted.

16   MR. BYRON WILLIAMS: I think that was

17 the thrust is that you had taken under advisement, so

18 if that's satisfactory.

19   MR. CHRISTIAN MONNIN: If I can just

20 echo Ms. Ramage's comments, I will take that under

21 advisement, as well.

22   DR. ROBERT SINCLAIR: If I could maybe

23 help you out a little bit further, I could see if you

24 were looking at this without the advantage of the text

25 that you may discern -- like a sort of mystery,

4474

1 because I see now that you -- in some of these, what's

2 left in, say different things than each time.

3   So you're wondering -- I can see why

4 you might think that, but really for the most part,

5 the reason so -- for the most part, they've all sort

6 of -- the conclusion was similar that we mentioned

7 some results of the analysis. And we basically, say

8 we don't understand how they could get there. And

9 without the underlying data, we don't recommend them

10 being used. That's basically, this would be the same

11 for each of those.

12   MR. BYRON WILLIAMS: Then -- and I

13 thank you for that. I was actually, trying to short-

14 circuit things with the undertaking, but I think I'll

15 withdraw the -- the undertaking, and I'll accept your

16 representation, in terms of the narrative for that.

17   THE CHAIRPERSON: Mr. Williams, the mo

18 -- when I was going residential school, the most

19 dangerous job in the school was to stand between the

20 meal and the students. So I think it's probably an

21 appropriate time to -- to take a break, and to have

22 lunch.

23   And I would say that if Dr. Patton was

24 to arrive late, then what we would do then, Me.

25 Monnin, is we would probably, take a -- a break for

4475

1 you to be able to consult with your -- with your

2 witness -- your client, rather. So let's -- let's

3 play that by ear, but I suggest we take a half hour --

4 half hour. Is that too short? A half hour I'm doing

5 a -- that represent enough time or would you like a

6 little bit more time? Do you want -- a half hour's

7 enough or do you thing three-quarters (3/4s) an hour -

8 - half an hour?

9   MR. CHRISTIAN MONNIN: Forty-five (45)

10 minutes is -- is fine.

11   THE CHAIRPERSON: Then do forty-five

12 (45) minutes. Thank you.

13

14 --- Upon recessing at 1:09 p.m.

15 --- Upon resuming at 2:13 p.m.

16

17   THE CHAIRPERSON: Good afternoon. I

18 believe that we're ready to continue with today's

19 proceedings. Before we start, I wonder if there are

20 any administrative matters to attend to? If not, then

21 back to you Mr. Monnin.

22   MR. CHRISTIAN MONNIN: Merci, Me.

23 President. I'm pleased to announce that Dr. Patton

24 has -- has joined us. What I propose to do at this

25 point in time is have Dr. Patton sworn in and then

 1 qualified as an expert to then proceed with the cross-

 2 examinations.

 3

 4   DAVID PATTON, Sworn (Qual.)

 5

 6 QUALIFICATION OF WITNESS:

 7   MR. CHRISTIAN MONNIN: Good afternoon,

 8 Dr. Patton. I just have some preliminary questions

 9 for you.

10   Dr. Patton, you are here on behalf of

11 Potomac Economics Inc., which has been retained by the

12 Manitoba Public Utilities Board in order to assist the

13 PUB to conduct a Needs For and Alternatives To Review

14 of Manitoba Hydro's prefor -- Preferred Development

15 Plan and, according to the terms of reference and

16 Potomac Economics's scope of work dated September

17 20th, 2013, to critically review certain aspects of

18 Manitoba Hydro's Preferred Development Plan and

19 filings in support thereof.

20   Is that correct?

21   DR. DAVID PATTON: Yes.

22   MR. CHRISTIAN MONNIN: Dr. Patton,

23 Potomac Economics prepared a report in accordance with

24 the terms of reference and scope of work.

25   Is that correct?

4477

 1   DR. DAVID PATTON: Yes.

 2   MR. CHRISTIAN MONNIN: Was that report

 3 prepared by you or under your supervision and control?

 4   DR. DAVID PATTON: It was.

 5   MR. CHRISTIAN MONNIN: And in

 6 addition, there was a presentation which was relied

 7 upon by Dr. Sinclair this morning.

 8   Was that also prepared by you or under

 9 your supervision and control?

10   DR. DAVID PATTON: Yes.

11   MR. CHRISTIAN MONNIN: Dr. Patton, can

12 you please describe for the Board the primary areas of

13 focus in your work for the PUB for these proceedings?

14   DR. DAVID PATTON: Yes. Primarily, we

15 -- we were engaged to review the -- the energy and

16 capacity price forecasts, and in -- in doing that, we

17 prepared our own forecast of energy and capacity

18 prices to -- to serve as a benchmark for comparison.

19   MR. CHRISTIAN MONNIN: Thank you. Dr.

20 Patton, your curriculum vitae has been filed with the

21 PUB as part of Exhibit Hill Co. Number 8, specifically

22 at Tab 1(b).

23   Can you please describe your

24 qualifications and experience related to the work

25 undertaken by Potomac for these proceedings?

4478

1   DR. DAVID PATTON: Yes. I'm a PhD

2 economist. I've been working on wholesale electricity

3 issues for around twenty (20) years. I'm president of

4 Potomac Economics, and in that -- that role, we

5 oversee and evaluate wholesale electricity markets,

6 primarily RTO -- RTO electricity markets in -- in the

7 United States.

8   MR. CHRISTIAN MONNIN: Can you

9 generally describe the type of clientele that you work

10 for, Dr. Patton?

11   DR. DAVID PATTON: Yeah, most of our -

12 - our work is in the area of independent market

13 monitoring of -- of RTO markets. We also do some work

14 providing independent monitoring services of

15 individual utilities who have undertaken a -- a

16 variety of -- of obligations, including market power

17 mitigation obligations associated with -- with

18 mergers.

19   MR. CHRISTIAN MONNIN: Thank you, Dr.

20 Patton. Mr. Chair, with that, I would ask that Dr.

21 Patton be accepted by the Board as an expert for

22 giving evidence with respect to the presentation given

23 by Dr. Sinclair today, and as well as the report.

24   THE CHAIRPERSON: Before we do that,

25 I'd like to hear from the Intervenors, please, to see.

4479

1 Me. Williams, s'il vous plait.

2   MR. BYRON WILLIAMS: Thank you, Mr.

3 Chair. We take no issue with the qualifications of

4 the witness as presented.

5   THE CHAIRPERSON: Merci, Me. Williams.

6 Me. Hacault, s'il vous plait.

7   MR. ANTOINE HACAULT: On behalf of

8 MIPUG, we also take no objections to the

9 qualifications of this witness as presented.

10   THE CHAIRPERSON: Mr. Orle, please?

11   MR. GEORGE ORLE: I take no objection

12 to them being qualified as an expert witness.

13   THE CHAIRPERSON: Thank you, Mr. Orle.

14 And Ms. Saunders, please?

15   MS. JESSICA SAUNDERS: We have no

16 objection to the qualifications as presented.

17   THE CHAIRPERSON: Thank you, Ms.

18 Saunders. Me. Ramage, s'il vous plait.

19   MS. PATTI RAMAGE: No objections from

20 Manitoba Hydro.

21   THE CHAIRPERSON: Yes. The panel is

22 prepared to accept Dr. Patton as an expert witness.

23 So, back to you, Me. Monnin.

24   MR. CHRISTIAN MONNIN: Merci, Mr.

25 President. With that, Potomac is prepared to pre --

4480

1 continue with the cross-examination.

2   THE CHAIRPERSON: Mr. Williams,

3 please.

4

5 CONTINUED CROSS-EXAMINATION BY MR. BYRON WILLIAMS:

6   MR. BYRON WILLIAMS: Thank you, and

7 good afternoon again, members of the panel. I think I

8 only have eight (8) or nine (9) questions. I somewhat

9 anticipate four (4) of the last five (5) may be

10 objected to, so they may take a little longer than --

11 than four (4) or five (5) minutes, but we'll see.

12   And, Dr. Patton, welcome. I think

13 these are probably to your colleague, Dr. Sinclair,

14 but feel free to chip in.

15   Dr. Sinclair, you went through this

16 with your direct evidence this morning, but at a high

17 level, when we look at the overall forecast of energy

18 prices, one (1) step would include a -- a forecast of

19 the energy prices, including both on peak and off

20 peak.

21   Would that be fair, sir?

22   DR. ROBERT SINCLAIR: Yes.

23   MR. BYRON WILLIAMS: And another step

24 that you undertake is a look at a -- a forecast of

25 capacity prices, agreed?

4481

 1   DR. ROBERT SINCLAIR: Yes.

 2   MR. BYRON WILLIAMS: And when we put

 3 these together at an aggregate or composite level, we

 4 have the overall forecast for energy prices.

 5   Would that be accurate, sir?

 6   DR. ROBERT SINCLAIR: Yes.

 7   MR. BYRON WILLIAMS: So -- and -- and

 8 we can turn to Potomac Exhibit 2-1, page 5.

 9   DR. ROBERT SINCLAIR: Just one (1)

10 more point. You might say that the ener -- off-peak

11 and on-peak energy prices and the capacity prices

12 represent electricity prices, not just energy prices.

13   MR. BYRON WILLIAMS: Yes, and if I

14 misspoke, I'm -- I apologize for that. And so, sir, I

15 -- I want to stay at that aggregate or composite level

16 of electricity prices for a moment.

17   It would be fair to say that at that

18 aggregate level, your results generally forecast lower

19 prices than those of the Hydro consultants?

20   DR. ROBERT SINCLAIR: Yes.

21   MR. BYRON WILLIAMS: And again at that

22 aggregate level, your models tended or generally

23 relied on lower natural gas prices, lower growth rates

24 of demand, and lower quantities of coal plant

25 retirements.

4482

1   Would that be fair?

2   DR. ROBERT SINCLAIR: Yes.

3   MR. BYRON WILLIAMS: Directionally,

4 sir, would it be fair to assume that with regard to

5 CO2 prices, your assumptions tended to be lower than

6 the assumptions employed by the Hydro consultants?

7

8   (BRIEF PAUSE)

9

10   MR. CHRISTIAN MONNIN: We may be

11 venturing into CSI, so we need to come to a landing on

12 that, Mr. Williams.

13   MR. BYRON WILLIAMS: So -- go ahead,

14 sir.

15   MS. PATTI RAMAGE: Mr. Williams, the

16 concern here is you're asking for relative comparisons

17 with Manitoba Hydro's consultants, higher and lower,

18 and that would be CSI information. It allows a party

19 to eventually get to what the number is, if you keep -

20 - if you -- if it's on the record, what is higher,

21 what is lower, and you carry on with that line of

22 cross, or if someone else picks up on it.

23   MR. BYRON WILLIAMS: Okay. And -- and

24 just so I'm clear, I'm seeking not the individual

25 estimates, but the estimates in aggregate, and if

4483

1 Hydro's...

2

3   (BRIEF PAUSE)

4

5   MR. BYRON WILLIAMS: And certainly for

6 the panel, we'll await deliberations tomorrow, and --

7 and see if we have room to proceed on that ground of

8 inquiry.

9   THE CHAIRPERSON: There are no other

10 references to carbon prices that -- as part of the

11 unredacted version of your report, as far as you know,

12 addressing this particular issue?

13   MR. BYRON WILLIAMS: Sir, to -- to my

14 knowledge, I -- I can't say that categorically. But

15 in terms of trying to get at the information that we

16 require, I -- I was not able to.

17

18 CONTINUED BY MR. BYRON WILLIAMS:

19   MR. BYRON WILLIAMS: And similarly,

20 and you'll -- you'll be, again -- I'm sorry. Dr.

21 Sinclair, I am again venturing from the aggregated

22 level to the modestly disaggregated level, and moving

23 from electricity prices to energy prices.

24   In terms of your energy price forecasts

25 versus the energy price forecasts of Manitoba Hydro,

4484

1 would it be fair to assume that with regard to off-

2 peak energy prices, your forecasts tend to be lower

3 than the forecasts of Manitoba Hydro?

4   MS. PATTI RAMAGE: Mr. Chair, that

5 would be the same objection.

6   MR. BYRON WILLIAMS: And we -- we

7 raised the question for the purposes of pursuing it if

8 -- if -- depending on what happens tomorrow, and get

9 ready again, Ms. -- Ms. Ramage.

10

11 CONTINUED BY MR. BYRON WILLIAMS:

12   MR. BYRON WILLIAMS: With regard to,

13 again, Dr. Sinclair, on-peak energy prices, would it

14 be fair to assume that your forecasts tend to be

15 somewhat lower than those of Manitoba Hydro?

16   MS. PATTI RAMAGE: And -- and again,

17 that -- the relative comparison puts Manitoba Hydro at

18 a -- a disadvantage in the marketplace if our

19 competitors learn that information, so Manitoba Hydro

20 would object to that question also.

21

22 CONTINUED BY MR. BYRON WILLIAMS:

23   MR. BYRON WILLIAMS: And finally, Dr.

24 Sinclair, with regard to capacity prices, would it be

25 a -- fair to assume that your forecasts tend to be

4485

1 somewhat lower than those of Manitoba Hydro?

2   MS. PATTI RAMAGE: I will jump in one

3 (1) last time. I think this is the last one for Mr.

4 Williams, at least on this run, and again, Manitoba

5 Hydro objects to the -- the -- to -- to responding to

6 that question.

7   MR. BYRON WILLIAMS: And certainly,

8 Mr. Chair, without belabouring the point, our clients

9 believe that those questions are important, relevant,

10 and necessary for the formation of their ultimate

11 position, and would also suggest that at that highly

12 aggregated level, there would not be a material

13 prejudice to the position of Hydro, so that's our

14 position, just so it's stated.

15   THE CHAIRPERSON: Thank you, Mr.

16 Williams. Your comments are noted.

17

18 CONTINUED BY MR. BYRON WILLIAMS:

19   MR. BYRON WILLIAMS: Just finally, Dr.

20 Sinclair, I think you can answer this one. In terms

21 of the Information Requests of CAC (Manitoba) posed to

22 Potomac, our records seem to show that response to

23 CAC-19 is still outstanding.

24   Is -- is that your understanding, as

25 well?

4486

 1

 2   (BRIEF PAUSE)

 3

 4   DR. ROBERT SINCLAIR: I -- I would

 5 have to check. I thought there was a request that

 6 came in for it and we submitted, but I'd have to

 7 double check.

 8   MR. BYRON WILLIAMS: Okay. So I don't

 9 think this needs to be an undertaking, but perhaps it

10 could be, Mr. Monnin -- Me. Monnin, you could take it

11 upon yourself to let us know the status of that IR.

12   MR. CHRISTIAN MONNIN: Certainly.

13 That's CAC-19?

14   MR. BYRON WILLIAMS: Yeah.

15   MR. CHRISTIAN MONNIN: I'll follow up

16 after today's proceedings.

17   MR. BYRON WILLIAMS: And, Mr. Chair, I

18 -- I think I estimated around an hour. I came in

19 fairly close, so thank you for those -- this

20 opportunity on behalf of our clients.

21   THE CHAIRPERSON: Thank you, Mr.

22 Williams. I'm sorry, Dr. Patton, I didn't welcome you

23 to Winnipeg. Welcome back. Thank you.

24   DR. DAVID PATTON: Thank you.

25   THE CHAIRPERSON: Yeah. I'm glad

4487

1 you're here. Me. Hacault, s'il vous plait.

2

3 CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

4   MR. ANTOINE HACAULT: Good afternoon,

5 Dr. Sinclair and Dr. Patton. As I indicated briefly

6 when I didn't object to your qualification, Dr.

7 Patton, I represent some industrials, Manitoba Power

8 Industrial Users Group.

9   And the -- you may or may not have been

10 following the record, but by way of preface, the basic

11 filing for the Needs For and Alternatives To had some

12 2012 assumptions, and those were updated with new

13 energy price forecasts in 2014.

14   Were the 2014 update in Manitoba

15 assumptions on expert prices provided to your firm?

16   DR. ROBERT SINCLAIR: I -- I was aware

17 -- we aware of a 2013 update.

18   MR. ANTOINE HACAULT: Or sorry, 2013.

19   DR. ROBERT SINCLAIR: Yeah. We -- we

20 got that.

21   MR. ANTOINE HACAULT: And -- and those

22 are the prices that you've considered in your report,

23 are they?

24   DR. ROBERT SINCLAIR: Yes.

25   MR. ANTOINE HACAULT: Now, the next

4488

1 thing that has evolved somewhat in this hearing as a

2 result of some DSM analysis is whether the Preferred

3 Development Plan with Conawapa being in service in

4 2026 can be deferred to a later date because you're

5 lowering Manitoba load, which might defer this next

6 major generation Conawapa, perhaps to 2030 and 2031

7 instead of being put in 2026.

8   Was that information that you had

9 available when you were preparing your report?

10   DR. ROBERT SINCLAIR: No.

11   MR. ANTOINE HACAULT: Okay. So I have

12 a couple questions with respect to that. I'm not

13 trying to prejudge what this Board will or won't

14 decide are relevant questions, but this last facility,

15 Conawapa, as I understand it, and Hydro will correct

16 me if I'm wrong, but is like a -- a nine (9) year

17 decision window. So if we count back, the 2026 date,

18 we were looking at a magic date of 2018 to decide

19 whether we'd proceed with this second generating

20 station. Are you following me so far?

21   If we push that generating station

22 another five (5) years, it may or may not push that

23 decision date. There's differing views on that, but I

24 give that as a preface to ask -- there's been a lot of

25 discussion about uncertainty in pricing, and the

4489

 1 discussion that I'm going to have with you and the

 2 following questions relates to pursuing this

 3 opportunity today as opposed to perhaps postponing the

 4 decision to pur -- pursue that opportunity to 2018 or

 5 later. So that's the background.

 6   With respect to deferring the decision

 7 for Conawapa, in other words, not making a decision in

 8 its report that's supposed to come out in June, what

 9 elements might there be that would increase the

10 certainty between now and 2018 related to a decision

11 to pursue the -- I'm going to call it 'Conawapa

12 opportunity'?

13   Can you address that question, please?

14   DR DAVID PATTON: Go ahead.

15   DR. ROBERT SINCLAIR: Well, I think

16 the first thing would be you'd have -- you'd have more

17 clarity on energy prices and capacity prices, so you

18 would know better -- you'd still have -- you would

19 still have the -- the time frame to deal with, but you

20 would certainly know how the -- the capacity of

21 surplus in MISO would shake out, for instance.

22   MR. ANTOINE HACAULT: So that you had

23 a discussion with respect to the MISO market model

24 being -- I don't know if I'm paraphrasing correctly --

25 but somewhat imperfect.

4490

 1   Would that be something that we'd have

 2 a better idea of as to whether or not that's been

 3 corrected by 2018?

 4   DR. DAVID PATTON: You certainly would

 5 know more, I think. There's been a fair amount of

 6 resistance to fixing the -- the capacity market in

 7 MISO, but I think the more -- the more relevant

 8 point, and we talked about this in -- in the report,

 9 is that our capacity price forecasts are essentially

10 bilateral capacity prices. We assume that as the

11 surplus dissipates, load serving entities in -- in

12 MISO will -- will either be building capacity to meet

13 their own needs, or -- or be available to contract

14 with Manitoba Hydro to import capacity.

15   So that's why when you look at our

16 capacity price forecast, it -- it rises rapidly over

17 the next two (2) or three (3) years because the

18 surplus is -- is dissipating. So you'd have a --

19 you'd have a better sense of whether you've hit the

20 point where we no longer have a surplus, and -- and

21 the bilateral market is -- is more robust.

22   MR. ANTOINE HACAULT: Okay. Would I

23 be correct in suggesting that if Manitoba Hydro's

24 negotiation efforts in long-term contracts securing

25 capacity price, or firm exports, that that would be

4491
 1 another avenue that might remove some uncertainty as

 2 to whether or not the Conawapa opportunity should be

 3 pursued?

 4   DR. ROBERT SINCLAIR: I -- I think the

 5 contracts that could be supported by the Keeyask

 6 alone, then you'd have a better idea of how those

 7 turned out also because you would expect the same

 8 types of contracts would have to be -- you would want

 9 to see the same types of contracts be successful with

10 the second generator -- the second dam.

11   MR. ANTOINE HACAULT: Now, let me

12 transition to some of the scenarios that we've been

13 discussing in this hearing where it may be possible

14 with increased DSM initiatives that the need to build

15 this next generating station Conawapa is actually

16 deferred from 2026 to 2030 or 2031.

17   With respect to the ability to have

18 certainty in your area of expertise does the

19 uncertainty continue, or are there items after 2018,

20 if we go another five (5) years, that change and need

21 to be taken into account?

22   DR. DAVID PATTON: Well, I -- I think

23 there's always going to be a significant amount of

24 uncertainty when you look out that far, so, I think

25 there are certain uncertainties that perhaps will be

4492

1 clarified. Perhaps we'll have a better idea of

2 whether the -- the United States is going to implement

3 a carbon tax, for example. Perhaps we'll have a

4 better understanding of the surplus situation in MISO

5 over the longer term.

6   But I -- but I think that the time

7 frame that you're talking about, you're -- you're

8 never going to get to a point where there's not

9 significant uncertainty.

10   MR. ANTOINE HACAULT: Thank you. That

11 brings me to another related subject in other areas of

12 this proceeding. For example, Manitoba Hydro had

13 certain targets on certainty with respect to its own

14 load forecast within the province, and in a five (5)

15 year time frame had a tighter -- tighter bandwidth,

16 and then when it went out ten (10) year metric it had

17 a wider metric as to what it might expect on

18 certainty.

19   With respect to the load forecasting,

20 do you have any sense, or could you explain to me, are

21 there kind of key time frames in which you achieve

22 certain certainty levels? For example, in the first

23 two (2) years out, do we have a sense of how that

24 compares to ten (10) years out, and then twenty (20)

25 years out, and finally we saw thirty-five (35) years

1 out being the analysis.

2   Could you address that question,

3 please?

4   DR. DAVID PATTON: Well, it's -- I

5 think it's really outside of the -- the -- our scope.

6 Yeah, I would say that -- to the -- when -- when you

7 get out past two (2), three (3) years the uncertainty

8 grows because the economic -- the impacts of economic

9 cycles on -- on load growth, you -- you introduce that

10 economic uncertainty and -- and uncertainty associated

11 with -- with underlying fuel prices.

12   MR. ANTOINE HACAULT: As I understand,

13 your model is essentially based on two (2) historical

14 years, correct?

15   DR. ROBERT SINCLAIR: That's correct.

16   MR. ANTOINE HACAULT: And then there's

17 certain assumptions and analysis that you've made

18 based on industry information with respect to the

19 future, and you combined both the two (2) historical

20 years with these future projections.

21   Is that a fair assumption, or a fair

22 way to state your work?

23   DR. ROBERT SINCLAIR: Yes.

24   MR. ANTOINE HACAULT: Sorry. If I

25 were to suggest to you then, even with the 2013 data

PUB re NFAT 03-31-2014

4494
1 being used, that it might change your conclusions

2 somewhat, as opposed to just relying on 2011 and 2012,

3 how do you think, if anything, the year of 2013 might

4 affect your views?

5   DR. DAVID PATTON: Well, I don't think

6 it would significantly change our -- our forecast,

7 because we -- the -- the primary things that change

8 year-to-year are fuel prices, and our analysis

9 attempts to adjust for changes in -- in fuel prices,

10 so the under -- the underlying supply-demand

11 relationship that underlies our -- our supply curve

12 analysis of -- of the energy market when it -- when it

13 changed significantly year-to-year.

14   MR. ANTOINE HACAULT: Thank you. Now,

15 before I leave the long forecast period subject,

16 you've, as I understand it, basically provided a

17 twenty (20) year outlook for this Board, correct?

18   DR. ROBERT SINCLAIR: Correct.

19   MR. ANTOINE HACAULT: And you've

20 provided some recommendations with respect to the time

21 period between the twenty (20) year metric and the

22 thirty-five (35) year metric by Manitoba Hydro, that

23 being a low sensitivity at zero growth, correct?

24   DR. ROBERT SINCLAIR: That's correct.

25   MR. ANTOINE HACAULT: Do you have any

1 other recommendations that you might be able to make

2 to this Board with respect to long lived Hydro assets

3 and the, I'm going to call it, huge challenge that

4 people have to decide economic and financial metrics,

5 as it relates only to your work though, for thirty-

6 five (35) and up to sixty-seven (67) year time

7 periods?

8   DR. DAVID PATTON: Well, I -- I think,

9 in -- in general, that's -- that's why we -- we tried

10 to produce a set of cases that -- that bounded an

11 expected level of growth in -- in prices: capacity

12 prices and -- and energy prices. You know, I think

13 what you're talking about is -- is basically risk and

14 the importance of not just relying on a reference

15 case, but also trying to do some estimate of -- of how

16 much lower the expected revenues would be under a --

17 under a reasonably probably low price case.

18   MR. ANTOINE HACAULT: And there's been

19 much talk about the low price case, but in economics

20 we should be considering both the opportunity of

21 higher prices and the significant benefit that that

22 might bring to Manitobans also, correct?

23   DR. DAVID PATTON: Yes.

24   MR. ANTOINE HACAULT: So you've

25 provided the lower and higher scenarios that you think

4496

1 are probable for the first twenty (20) years, but my

2 question, as you may -- if I go back to it, is do you

3 have any recommendations on how to deal with Manitoba

4 Hydro's need to look at this past a twenty (20) year

5 time period, because of the long life of these

6 hydraulic assets?

7   DR. ROBERT SINCLAIR: Well --

8   MR. CHRISTIAN MONNIN: And again, just

9 to state the obvious, that's within the scope of their

10 responsibilities?

11

12 CONTINUED BY MR. ANTOINE HACAULT:

13   MR. ANTOINE HACAULT: Yes, within the

14 scope of their responsibilities as set out in the

15 scope.

16   DR. ROBERT SINCLAIR: Yeah, I think

17 what -- after 2035 we -- we indicated that it becomes

18 very difficult to -- to make a projection, and that

19 Manitoba had -- had some marginally positive growth

20 rates until 2050 than when it goes to zero. So I

21 think -- I think -- to provide guidance, I think we

22 would support a sensitivity where we used the margin -

23 - marginally positive rates that Manitoba uses along

24 with the sensitivity we recommended: zero. And then

25 after 2050 nobody knows what's going to happen.

4497

 1   So, again, if you just use the real

 2 rates at zero that could probably provide a basis to -

 3 - to do some comparisons of the economics.

 4   MR. ANTOINE HACAULT: Thank you. Now,

 5 in the context of that -- and I'd ask you to pause

 6 every time if -- if you think I'm getting into CSI; I

 7 don't want to get into that -- is the new low, as

 8 revised in the fall of 2013, an appropriate low with

 9 respect to Manitoba Hydro?

10   So Manitoba Hydro has used a

11 low/reference, assigned a certain probability. It's

12 used a ref/ref and a high with respect to your area.

13 And my question to you is if we're going to look at

14 the bands, in your opinion is the low/reference with

15 respect to export the appropriate number?

16   Is it too low or too high as a low?

17   DR. ROBERT SINCLAIR: You're referring

18 to Manitoba's low?

19   MR. ANTOINE HACAULT: Yes, Manitoba

20 Hydro's low.

21   MS. PATTI RAMAGE: I think we've asked

22 a directional question at that point, Mr. Hacault.

23   MR. ANTOINE HACAULT: Well --

24   MS. PATTI RAMAGE: The -- the

25 inevitable answer is if it's -- if the answer was it's

4498

 1 too low, it suggests that I -- I can tell you that

 2 it's lower than the low. If it's too high it's higher

 3 than my low.

 4   MR. ANTOINE HACAULT: Well, I've asked

 5 the question, and I think the way it was asked, I

 6 understand Ms. Ramage's ob -- objection is that if

 7 this witness comments on whether or not the new low in

 8 2013 as chosen by Manitoba Hydro, is in fact not low

 9 enough or a bit too high, it may give some direction.

10 But I don't think that that general answer is specific

11 enough to give any competitors any kind of idea as to

12 wheth -- what the actual number is, 'cause I don't

13 even have Potomac's low on everything.

14   MS. PATTI RAMAGE: Well, Mr. Hacault,

15 the good news on that is you do have Potomac's low;

16 it's in their report. And if our competitors read

17 what Potomac's low is, and are then told that our low

18 is lower or higher than that low, that's giving them

19 market information on -- on where Manitoba Hydro sees

20 the prices going, and -- and that's the concern we

21 have. And as you heard from Mr. Cormie a -- a week or

22 two (2) ago, our -- our market competitors are -- are

23 reading these transcripts and they are watching this

24 hearing very carefully to see what information is

25 there. And I say hello to them.

4499

1   MR. ANTOINE HACAULT: Well, I guess I

2 asked the question subject to what comes out of the

3 hearings on commercially sensitive information

4 tomorrow. It seems to me it's -- it's pretty hard for

5 Intervenors if we don't even have any kind of

6 directional idea as to what's happening. It's pretty

7 hard to make any kind of submissions as to whether or

8 not the CONE uncertainty is wide enough or should be

9 narrowed out.

10   But I'm cognizant of the submissions by

11 Ms. Ramage. And if there was some kind of a solution

12 that could be achieved at and that may be discussed

13 tomorrow that would certainly be achieved because --

14 appreciated. Because in the past on some of these

15 areas, as I understand it, we were given ranges and we

16 were able to at least deal with the subject matter

17 within ranges in such a way that it didn't affect the

18 competitiveness of Manitoba Hydro, which we understand

19 is very important to Manitobans, including the

20 industrials that I represent. So I'll move on.

21   THE CHAIRPERSON: Your concerns, Me.

22 Hacault, are noted.

23   MR. ANTOINE HACAULT: Yeah.

24   MR. CHRISTIAN MONNIN: Sorry, Mr.

25 Hacault. But, Mr. Chair, if I may?

4500

1   To state the obvious, the IECs take no

2 position to these objections that are going back and

3 forth. And this is a blanket comment on a going-

4 forward basis that we take no position and we are at

5 the -- waiting for the direction from the Board on

6 that, so.

7

8 CONTINUED BY MR. ANTOINE HACAULT:

9   MR. ANTOINE HACAULT: And without

10 getting into the same debate, I intended to also ask

11 whether or not the high chosen was a reasonable

12 choice, and I'll take it, subject to the same

13 objections. But, again, to know whether or not if

14 we're looking at economic benefits, and we looked at

15 the quilt, what -- what's the reasonable expectation

16 of what we might lose if we don't go ahead with some

17 of these constructions as opposed to what's the risk

18 if -- if we go ahead with them; what additional costs

19 might there be to Manitobans, just to know whether

20 that bandwidth was wide enough.

21   So, I'll make that question, again

22 subject to all the comments, and hoping to get a

23 response as to what's going to happen.

24   The -- let me try and attack it from

25 just a certainty level. With respect to the lower

4501

1 amounts, I think you said in your presentation, Dr.

2 Sinclair, that you ascribed about a 20 percent

3 certainty related to the lower threshold.

4   Did I understand that correctly?

5   DR. ROBERT SINCLAIR: Yes.

6   MR. ANTOINE HACAULT: And that's -- is

7 that a certainty that goes up to the twenty (20) year

8 time period, because we just had a discussion that

9 certainty might change over the time period?

10   So can you give me a sense as to

11 whether it's the view of Potomac that you ascribe a 20

12 percent probability as of the end of the twenty (20)

13 year time period, firstly, and whether than changes

14 during that twenty (20) year time year -- period?

15   DR. ROBERT SINCLAIR: I think that 20

16 percent probability is the probability we would assign

17 to that path, so that once you go down that pa -- one

18 (1) of those paths, you would -- you would have to

19 assign different probabilities going off different

20 directions. You can imagine that you're standing on a

21 -- a road where there's different ways to go and

22 certain things happen if you go down one (1) road, but

23 once you -- once you start going on one (1) road, you

24 close off certain probabilities.

25   So that would be the probability of

4502

1 standing here today looking forward: 20 percent.

2   MR. ANTOINE HACAULT: Thank you. Now,

3 at page 5 of your report, there is a statement in the

4 first full paragraph -- or second full paragraph on

5 that page, where it talks about the six (6)

6 consultants. And then there is a sentence:

7   "However, we believe certain

8   assumptions made by the consultants

9   tended to overstate the level of

10   future prices."

11   And my question is: Can you -- and

12 again, I don't know whether it gets into CSI -- give a

13 bit -- bit more precision to that statement in

14 relation to capacity off-peak and on-peak?

15

16   (BRIEF PAUSE)

17

18   MR. ANTOINE HACAULT: Does the

19 statement hold true for each, I'm going to call it, of

20 the three (3) products?

21   DR. ROBERT SINCLAIR: I think -- I

22 think the report provides some detail on that question

23 with respect to Brattle. But I think if we were to

24 discuss the assumptions that we find at fault in the

25 other consultants' forecast, we might -- it might be

4503

1 considered a CSI.

2   So you can read a little bit about it

3 under the -- with the Brattle to see where we had

4 exceptions.

5   MR. ANTOINE HACAULT: Okay. So --

6   DR. ROBERT SINCLAIR: That's on page -

7 - that starts on page -- page 10, for instance.

8   MR. ANTOINE HACAULT: I understand

9 that there's some discussion with respect to the

10 Brattle Group, but this particular sentence was

11 preferenced -- prefaced by reference to the six (6)

12 consultants, and my question was with respect to that

13 initial preface. There is a statement which I just

14 read into the record:

15   "The consultants tended to overstate

16   the level of future prices."

17   And my -- what I wanted to have, if

18 possible, on the public record is if that statement

19 was true as it relates to the six (6) consultants with

20 respect to each of firm, and off-peak and on-peak.

21   DR. DAVID PATTON: Yes. So if your

22 question is does that sentence --

23   MS. PATTI RAMAGE: Excuse me --

24   MR. CHRISTIAN MONNIN: Sorry, Dr.

25 Patton, I believe there's an objection.

4504

1   MS. PATTI RAMAGE: I -- I think we

2 have the same concern with that is, it's a directional

3 -- it's going to be asking a directional comparison in

4 terms of where future prices are going by the

5 consultants.

6

7 CONTINUED BY MR. ANTOINE HACAULT:

8   MR. ANTOINE HACAULT: So I've asked

9 the question, subject to the same determination by

10 this Board. Hopefully after the CSI, if there's

11 something that can be done to help us understand on

12 the public record with respect to the three (3)

13 categories; if it only applies to one (1) category, or

14 two (2), or three (3) of the categories of energy and

15 capacity. And I'll move on.

16   At page 9 of the report, in the --

17 under the heading 'products' there is an indication,

18 and we've heard this, that Potomac estimated the

19 twenty (20) year outlook. My question is, Has Potomac

20 done some work in the MISO market, which is the area I

21 believe you're addressing here, for prices past the

22 twenty (20) year metric?

23   DR. ROBERT SINCLAIR: You mean whether

24 we've developed a fore -- forecast; no, we -- we just

25 went to 2034.

4505

 1   MR. ANTOINE HACAULT: Okay. That --

 2 but have you done a forecast past twenty (20) years

 3 for anybody else in this market?

 4   DR. ROBERT SINCLAIR: Oh, I see.

 5 Generally the price forecasts we do are -- are shorter

 6 term in nature. We -- although in some of our non-

 7 MISO cases we have dealt with longer-term forecasts

 8 going on more than twenty (20) years. Mainly what we

 9 do in those cases is -- is -- what we're doing here is

10 looking at the forecast and determining whether it's a

11 reasonable forecast or not. But those sometimes go

12 out past twenty (20) years.

13   MR. ANTOINE HACAULT: Okay. With

14 respect to the MISO market area, can -- would you have

15 done any kind of analysis that goes past the twenty

16 (20) years in the last two (2) or three (3) years,

17 say?

18   DR. DAVID PATTON: Not of energy

19 prices. We do -- we do take -- comment on long-term

20 capacity price trends, but -- but I can't think of

21 anything that we've done specifically that goes beyond

22 twenty (20) years in the last two (2) or three (3)

23 years.

24   MR. ANTOINE HACAULT: And that

25 includes with respect to capacity?

4506

1   DR. DAVID PATTON: Well, with respect

2 to capacity, we -- we do offer an evaluation of what

3 the long-run equilibrium is. So that's not a -- it's

4 not a specific -- a specific forecast in -- of prices

5 as much as it is a general forecast of the equilibrium

6 condition that should prevail over the long term.

7   MR. ANTOINE HACAULT: And with respect

8 to -- I'm trying to better understand your answer. To

9 the extent it goes over twenty (20) years, that work

10 that you have done on capacity prices, what happens

11 directionally after the twenty (20) years on the

12 capacity equilibrium pricing?

13   DR. DAVID PATTON: Well, I think, in -

14 - in that regard, what -- it's dependent on a couple

15 of things: One (1) is the -- the evolution of

16 shortage pricing in the energy market because that

17 will tend to -- to pull the capacity prices down to

18 the extent that they're -- you have a fuller

19 representation of the value of shortages in the energy

20 market. And then -- and then it's dependent on the --

21 the trends and the cost of new entry.

22   So what I was saying about we -- we

23 haven't produced specific forecasts. You won't find a

24 document from us that projects that in the year 2040

25 the capacity price will be 'X'.

4507

 1   MR. ANTOINE HACAULT: But my question

 2 was more directionally, because we've seen some

 3 projections and -- and how the capacity price changes

 4 over the next twenty (20) years.

 5   Once you hit the twenty (20) years

 6 directionally is your analysis showing that the prices

 7 stay at zero, or directionally do you still have them

 8 going up for some time after the twenty (20) year time

 9 period? Or is it unfair, because you really don't

10 address that as a twenty (20) year time period?

11   DR. DAVID PATTON: Well, I think you

12 can see from our forecast that -- that it's relatively

13 flat, that our forecast doesn't project that capacity

14 prices are -- are rising significantly over time. So

15 I think when -- if you're talking about what could

16 happen after twenty (20) years, I think generally I

17 would say we would expect it to be relatively flat to

18 declining, because technological improvements will --

19 will tend to -- to reduce capacity prices. But there

20 are factors that could cause it to -- to increase.

21 It's -- it's -- there's a fair amount of uncertainty

22 when you go out that far.

23   MR. ANTOINE HACAULT: Thank you. And

24 at page 42 of your report you do talk about

25 technological advances. And the one (1) thing I would

4508

1 have been interested in -- in understanding is these

2 two (2) categories that you speak of in your report:

3 Firstly, increased deficiency of the marginal CT.

4 And, secondly, that there may be alternative

5 technologies that displace the CT.

6   So can you perhaps elaborate on your

7 current industry knowledge, or is there anything in

8 the experimental stage, I'm going to say, that you

9 guys are aware of because of your expertise that can

10 give us concrete examples of what you state at page

11 42?

12   DR. DAVID PATTON: You want us to

13 explain what we're saying there or -- or talk about --

14   MR. ANTOINE HACAULT: Yes. You know -

15 - you know, are you talking about solar? Are you

16 talking about fusion -- hydrogen fusion? Are you

17 talking about -- you know, what are we talking about?

18 Is it -- is it just like lowering CO_2 emissions on

19 coal production to bring it so that you're not going

20 to have, you know --

21   DR. DAVID PATTON: Well, to be clear,

22 we're not talking about any specific technology. The

23 -- but as far as the economic theory goes for where --

24 where you're going to find the long-run equilibrium in

25 the capacity market, it's -- it's at that price level

1 that will cause the marginal entrant to break even.

2   So the reason that has to be the long-

3 run equilibrium is if the capacity price is higher

4 than that, then -- then -- and you can build something

5 that can earn a margin at that price level, then

6 you'll get continued investment in that technology,

7 which will bring the price down. And if it's below

8 that, then you won't get investment and that'll bring

9 the price up.

10   So what we're talking about here is --

11 is to the extent that over time technology develops

12 that is -- is more efficient or a lower cost than the

13 combustion turbine technology that we priced as the

14 basis for our cost of new entry, then that will tend

15 to point to a lower long-run equilibrium.

16   So we're not experts on what the

17 technology may be twenty (20) years from now. It'd be

18 great if it was solar; I'm not sure how optimistic I

19 am about that. But -- but even in some of the markets

20 in the US, what we've seen is that combined-cycle

21 generation is -- is demonstrably lower cost than

22 combustion turbines.

23   So that's just a -- sort of a short-

24 term example of -- of a technology that in some places

25 is -- is significantly lower cost and -- and would

4510

1 therefore bring down the -- the price of capacity.

2   MR. ANTOINE HACAULT: Thank you, sir,

3 for that helpful general answer. But I'm going to

4 push you a little bit with respect to concrete

5 examples. Let me suggest to you if somebody says it's

6 plausible that you might have technological advances

7 or it's plausible that alternative technology might

8 displace the CT, I'd want more than just a general

9 answer.

10   I'd like some examples of emerging

11 technologies that might even form the possibility of

12 this plausibility.

13   DR. DAVID PATTON: Well, I -- well, I

14 think what I'm saying is when -- when you are

15 producing a forecast over twenty (20) or more years,

16 it -- it's virtually guaranteed that there'll be

17 technological advancements. And what we are limited

18 by in our forecast is -- is the current state of

19 technology. So the -- the section that you're

20 pointing to here is a section that deals with

21 uncertainties around the -- the band of -- of cases

22 that we've produced.

23   I -- I frankly am not an expert in

24 emerging electricity technologies, so I -- I can't

25 point to which one it may be. But what I do know is,

4511

1 looking at -- at the history of this industry, it --

2 it's always been the case that the technology

3 continues to advance. So just to not recognize that

4 over the next twenty (20), thirty (30), forty (40)

5 years that trend will continue would be -- would, I

6 think, be an oversight.

7   MR. ANTOINE HACAULT: Thank you.   That

8 was helpful. If we could flip back to page 20 of your

9 report. There is a statement that there's a

10 substantial risk. This is at the very bottom on the

11 screen, Diana:

12   "This presents a substantial risk for

13   Manitoba Hydro that its capacity

14   revenues may be much lower than

15   expected."

16   And lawyers like to hang up on

17 adjectives. Somebody has chosen the word 'substantial

18 risk' that its capacity revenues may be much lower.

19   So the first thing I'd like either one

20 of you to expand on is: What do you consider as a sub

21 -- substantial risk?

22   DR. DAVID PATTON: Well, I can

23 describe qualitatively the -- the sort of risk that

24 we're -- we're talking about here and don't know if

25 this is what you're looking for. But -- but clearly,

4512

1 all of the capacity price forecasts are forecasting a

2 long-run equilibrium price for capacity which is the

3 price that -- that is -- will be produced when you're

4 in the long-run equilibrium state, which is a state

5 where there is not a lot of surplus.

6   If -- if, for a variety of reasons, the

7 -- a surplus emergens -- emerges either due to

8 overbuilding or -- or load dips or the -- the capacity

9 price you would expect would be far below the long-run

10 equilibrium level, which is basically the case today,

11 and I think is why all -- substan -- all of the price

12 forecasts are very, very low relative to the long-run

13 equilibrium level. And the -- the capacity market in

14 MISO currently is pricing pretty close to zero.

15   So to the extent that your -- your

16 investments are predicated on prices remaining at --

17 at that breakeven point for a new resource, any factor

18 that could cause the price to be significantly below

19 that would be a substantial risk.

20   MR. ANTOINE HACAULT: Would you be

21 able to help us -- because we've been talking in, you

22 know, probabilities of high, lows, and ref scenarios.

23   Is this more than a 50/50 percent? Can

24 I have more certainty than flipping a coin as to

25 whether there's a risk that capacity revenues may be

4513

1 much lower?

2   DR. DAVID PATTON: Well, I think

3 partly what I'd say about how -- how much risk there

4 is, is it relates to how long a -- a contract Manitoba

5 could sign, because what we -- what we said in this

6 report is that the -- the prices that we're

7 forecasting are largely bilateral market prices.

8   We don't think with -- short of

9 significant changes in the framework in MISO, that the

10 -- the MISO capacity auction market -- auction-based

11 market is going to provide prices that are close to

12 what we forecast.

13   So there, I think, we -- we'd have to -

14 - and we -- and this was out of the scope of -- of

15 what we were asked to look at, is how -- how long a

16 lock-in can -- can Manitoba Hydro achieve in the

17 bilateral contract market, because that would affect

18 the size of this risk.

19   MR. ANTOINE HACAULT: So that gets

20 back to our in -- initial discussion that there's ways

21 to manage risk. And you have Mr. Cormie sitting in

22 the back row with Manitoba Hydro that does his best to

23 manage that risk in negotiating long-term contracts.

24   But to the extent that he's not able

25 to, I was trying to get a sense from you with respect

4514

1 to the portion that's uncontracted, do I just flip a

2 coin to decide whether I'm going to be assuming this

3 substantial risk, or is there a greater likelihood

4 that if there's no contracts, I'm going to see that

5 substantial risk?

6   DR. DAVID PATTON: Well, I -- I think

7 it's slightly more complicated than that, because I

8 think there's -- there's -- it's not re -- it's not

9 really a question of just can you sign contracts of a

10 certain duration or can't you. It's how much of a

11 price concession do you have to make in order to get

12 the buyer to be willing to sign contracts that -- that

13 go out that far.

14   So if you -- if you set that aside and

15 you're talking about being -- having a significant

16 amount of time that's -- that's not contracted, yeah,

17 I think the -- the risk is high that you would not be

18 close to the long-run equilibrium price.

19   MR. ANTOINE HACAULT: So maybe I can

20 put the question in relationship to the decision that

21 does not yet need to be made with respect to Conawapa.

22   Is it the view of Potomac that if those

23 contracts are not in place and we don't know what

24 those numbers are, that making a decision today

25 represents a substantial risk for Manitoba Hydro and

4515

1 its ratepayers?

2   DR. DAVID PATTON: If the contracts

3 are not in place for Conawapa?

4   MR. ANTOINE HACAULT: Yeah.

5   DR. DAVID PATTON: Yeah, I think

6 there's -- there's a significant amount of risk. But

7 given what you were saying about a -- the -- the nine

8 (9) year lead time -- you said nine (9) year lead

9 time, right, to build Conawapa?

10   I think that's a risk that's inherent

11 in that decision. In other words, pushing it out and

12 if you're still going to have a nine (9) year window,

13 you're still going to be faced with a -- a situation

14 where you -- you may not have bilateral contracts in

15 place when you make the decision.

16   MR. ANTOINE HACAULT: But if I put the

17 -- the decision into context; if we have until 2018 to

18 make that decision and indirectly not quite four (4)

19 years, but another four (4) years to deal with this

20 risk, until we've dealt with the risk, you believe

21 it's a substantial risk?

22   DR. DAVID PATTON: I guess what I'm

23 saying is -- is the -- I'm not sure you're going to be

24 in a better position in 2018. There will be some

25 things you may know more about. You may know if the

4516

1 US has a carbon tax or not.

2   But I don't know if your bilateral

3 contract situation will be better, because now,

4 instead of having to negotiate contracts that would

5 begin in mid-2020s, you're going to now be contracting

6 for a facility that won't be operable until 2030 or

7 2031.

8   So I don't -- I don't know that you're

9 going to be able to deal with that risk.

10   MR. ANTOINE HACAULT: I didn't ask my

11 question correctly. The 2018 decision point, my

12 understanding, that's with respect to a 2026

13 construction date.

14   DR. DAVID PATTON: Okay.

15   MR. ANTOINE HACAULT: But what I was

16 trying to focus on, sir, is there's -- appears to be

17 not quite four (4) years, but a -- a window of another

18 three (3) and some years to negotiate contracts with

19 respect to the Conawapa output.

20   And it was in that context, sir, that I

21 was asking you, in the absence of contracting for

22 capacity for the successfulness of those negotiations,

23 does it continue to be the opinion of Potomac that the

24 absence of these contracts represents a substantial

25 risk for Manitoba Hydro that its capacity revenues may

4517

1 be much lower than expected?

2   DR. DAVID PATTON: Yes.

3   MR. ANTOINE HACAULT: Okay. And I

4 said I was a stickler for adjectives. I don't know

5 whether you're able to give a sense on the public

6 record -- and that's always a hint for people in the

7 back, take your -- pregnant pause before you answer my

8 question.

9   Would the -- when you say, "much

10 lower," in your view could -- could you expand at all

11 on that adjective, 'much lower than expected'?

12   MS. PATTI RAMAGE: I think we're

13 looking at CSI again. It's projecting a different

14 number, but...

15

16   (BRIEF PAUSE)

17

18   MR. ANTOINE HACAULT: My question --

19   MS. PATTI RAMAGE: Can I suggest, Mr.

20 Hacault, if we take that question under advisement,

21 because what I'm hearing from our people, if they knew

22 what the answer was, they'd know if it was CSI or not.

23 It could be or it couldn't be. So without knowing

24 that, and if maybe our people could talk to the

25 witnesses for a moment, that would -- would help us.

1 We don't want to not answer questions that can be

2 answered.

3

4 CONTINUED BY MR. ANTOINE HACAULT:

5   MR. ANTOINE HACAULT: Okay. Well,

6 perhaps it -- you know, at the break, is -- if we -- I

7 think we still have some flexibility, but certainly --

8 and I may try to ask in a different way. Again, I may

9 have asked the question in a way that it leads to CSI.

10 But let me ask it with respect to the statement, "much

11 lower than expected."

12   Can that answer be given in

13 relationship not to Manitoba Hydro, but in respect to

14 Potomac estimates? In other words, when -- there's a

15 statement here that:

16   "Its capacity revenues may be much

17   lower than expected."

18   Is that another way to say that the

19 capacity revenues may be those estimated at the lower

20 band of capacity revenues assigned by Potomac?

21   DR. DAVID PATTON: Yeah, I think our -

22 - that's -- that statement really is a statement that

23 points to there may be situations where the -- you

24 won't get the long-run equilibrium price that we

25 forecasted, so we haven't put a number on it but it --

4519

1 I think it certainly would be less than any of the

2 capacity price forecast that we -- we did provide.

3   DR. ROBERT SINCLAIR: If I -- if I may

4 add, this -- these statements about the capacity price

5 risks, this is really the introduction you're

6 referring to. We clarify it in the capacity section.

7 We -- we talk about the three (3) caveats, or the

8 three (3) risks, sort of expand on that.

9   So some of the language here may

10 suggest spec -- something specific, but really what

11 we're referring to is what's on page 42 of the

12 uncertainties.

13

14   (BRIEF PAUSE)

15

16   MR. ANTOINE HACAULT: And I think

17 later on in your report, I don't know if it's at page

18 42, you use the word 'significant' or something.

19

20   (BRIEF PAUSE)

21

22   MR. ANTOINE HACAULT: In fact, if we

23 could go to page 41, at the bottom of that page.

24   This is pretty much with respect to the

25 recommendations that are made by Potomac with respect

4520

1 to capacity prices, correct?

2   DR. ROBERT SINCLAIR: Page 41?

3   MR. ANTOINE HACAULT: Yes.

4   DR. ROBERT SINCLAIR: Yes.

5   MR. ANTOINE HACAULT:

6   "The opinion of Potomac with respect

7   to the forecast capacity price --

8   prices, [and I'm quoting] we do not

9   find them to be credible and

10   recommend that PUB evaluate the

11   business case for Manitoba Hydro

12   development plans on the basis of

13   Potomac's forecast."

14   Are you able to put on the public

15 record whether or not Potomac's forecasts as set out

16 in this report were more closely aligned to the 2012

17 assumptions in the NFAT than the 2013 update?

18

19   (BRIEF PAUSE)

20

21   MR. ANTOINE HACAULT: While people are

22 considering it let me perhaps explain some of the

23 reasoning we had...

24   MS. PATTI RAMAGE: I think given what

25 Manitoba Hydro has already put on the record about the

 1 difference between the 2012 adjusted forecast and the

 2 2013, if we start answering these kind of questions

 3 we're boxing ourselves in again because we have put on

 4 the record directionally between those two (2)

 5 forecasts. So now you know which way they go and then

 6 you add in a line in terms of where Potomac sits.

 7   So again, Manitoba Hydro objects to

 8 that line of questioning.

 9   MR. ANTOINE HACAULT: What --

10   MS. PATTI RAMAGE: If, however, Mr.

11 Hacault, you want to ask about the Brattle forecast,

12 that was the purpose of putting that forecast, is so

13 that these type of questions could be answered. And -

14 - and that option seems to have been ignored thus far,

15 but that was the purpose of having Brattle on the

16 public record.

17   MR. ANTOINE HACAULT: Oh, I -- I thank

18 very much -- thank you very much for your comments.

19 One (1) of the things that I think at least the

20 Intervenors are trying to grapple with is whether or

21 not the updated information on export prices brought

22 in as the new ref under the 2013 assumptions, if we

23 would ignore those kind of increases and go back to

24 2012, if that was the conclusion that this Board came

25 to, whether or not the 2012 assumptions, and the Board

4522

1 will have to conclude, I guess, are the ones that we

2 should put more weight on than the 2013 conclusions.

3   There's some comments by Potomac that

4 it recommends that its capacity prices are the

5 credible ones. And if its capacity prices are the

6 credible ones, then they more closely align with the

7 2012 assumptions. I would understand that that would

8 lead to the economics and financial information being

9 different and moving down as far as whether it -- it's

10 favourable to proceed with the Preferred Development

11 Plan.

12   So I'm not too sure whether there's

13 some way that that can be addressed so that the

14 Intervenors can make useful comments on what

15 assumptions might be more appropriate to use. But it

16 was in the context of trying to use existing analysis

17 and comparing existing analysis that I was asking the

18 questions.

19   So again, if that can be considered in

20 the CSI or -- portion, if there's some way to put on

21 the public record that type of information, that would

22 be appreciated.

23   THE CHAIRPERSON: Your comments are

24 noted, Me. Hacault.

25   MR. ANTOINE HACAULT: Okay.

4523

1   (BRIEF PAUSE)

2

3 CONTINUED BY MR. ANTOINE HACAULT:

4   MR. ANTOINE HACAULT: I'm jumping over

5 some of the questions I had here, but Mr. Williams

6 asked some questions of page 44 of your report. I

7 also had some questions. And it related to repricing

8 some of the capacity to a peak opportunity price.

9   And without necessarily knowing the

10 exact numbers, are you able to comment on the public

11 record as to whether if that was done the difference

12 would be material?

13   MS. PATTI RAMAGE: For the benefit of

14 the back row, could you repeat the question? In

15 particular, I wasn't sure what "that was done" was --

16 what that referred to.

17

18 CONTINUED BY MR. ANTOINE HACAULT:

19   MR. ANTOINE HACAULT: Well, at page 44

20 of the report, I believe -- I'll just pull out my

21 copy, there was at the bottom of the page some

22 criticism by Potomac, or recommendations, I shouldn't

23 say it's criticism, indicating that its view was that

24 not all the dependable capacity should be assumed to

25 be sold on a forward basis all at that price.

4524

1   That, in fact, it would be better to

2   re-price about 9 precent of this capacity to peak

3   opportunity sale metrics. And my question was: If

4   that was done would that lead to a material difference

5   that we should be worried about as people who don't

6   know the actual numbers?

7

8   (BRIEF PAUSE)

9

10   DR. ROBERT SINCLAIR: So we don't

11 really know because we -- Capra -- La Capra was more

12 geared up to address that kind of question, so we --

13 we referred this to them.

14   MR. ANTOINE HACAULT: Thank you. Now,

15 with respect to the alternatives, there has been some

16 discussion and alternatives put with respect to

17 whether or not Manitoba Hydro goes with a 750 megawatt

18 line giving it access to certain parts of the American

19 market, or another alternative which has been

20 indicated to be no longer viable is going with a

21 smaller 230 kV line.

22   Does the choice of line have any impact

23 on your analysis of capacity prices?

24   DR. ROBERT SINCLAIR: No. There was a

25 slight adjustment we made in the energy prices because

4525

1 the 230 kV line would have reduced congestion slightly

2 in Minnesota, so you may see slightly higher

3 congestion but really it wouldn't have much of an

4 impact at all.

5   MR. ANTOINE HACAULT: What about going

6 to a 500 kV because, as I understand it, we're talking

7 about increasing the transmission not only in Manitoba

8 but in the -- down -- down into the States to a 500

9 kV.

10   Does that impact your analysis, or is

11 it part of your assumptions, that that would in fact

12 be built?

13   DR. ROBERT SINCLAIR: We are basing

14 our analysis on the assumptions in the Preferred

15 Development Plan which included, I believe a 700 kV

16 line coming in -- 750 kV line coming in. I -- I'm not

17 sure what your supposition is.

18   Are you saying if we had additional

19 capacity going in, or less?

20   MR. ANTOINE HACAULT: No, I was just

21 trying to understand whether your analysis had the

22 assumption that that line was going in, or -- and how

23 it would be impacted if we backed out from that whole

24 process of a 500 kV transmission line down to a 230 kV

25 transmission line.

4526

1   DR. ROBERT SINCLAIR: Okay, so our

2 analysis is impacted by that line in two (2) ways.

3   First, the size of that line determines

4 the quantities that Manitoba Hydro can import and

5 that's something that, really, they provide to us, so

6 that really is -- would affect the total revenues

7 which, again, really flows into the scope of the La

8 Capra because they -- they're going to take those

9 revenues.

10   So, if they are going to cut back on

11 the quantities, that won't affect out prices except at

12 a -- at a secondary degree, because our prices do

13 depend, to some degree, on the level of additional

14 imports into MISO by Manitoba Hydro.

15   So if they do back out some of their

16 quantities, that would tend to slightly -- have a

17 slightly upward pressure on the -- the prices we

18 estimate.

19   But again, it would be very

20 insignificant, but it would -- it would tend to raise

21 them a little bit.

22   MR. ANTOINE HACAULT: There was some

23 discussion in this Hearing and some thought that this

24 500 kV line would be advantageous because it would rea

25 -- it would open up additional markets as compared to

4527

1 the 230 kV line.

2   Do either of you have any knowledge of

3 the market to be able to comment on whether or not

4 that belief should be given any credence?

5   DR. ROBERT SINCLAIR: Well, we

6 certainly acknowledge that the MISO market -- I think

7 -- I don't quite understand what the delta would be.

8   Are you saying that --

9   MR. ANTOINE HACAULT: Well, I put it

10 in a simplistic way that I understood. If I have a

11 pipe that can only handle 230 gallons of water and the

12 other one that can handle 750 megawatts, the water

13 analogy may be totally inappropriate, but if -- does

14 this open up more opportunities when one considers the

15 ther -- two hundred and thirty (230) versus the seven

16 hundred and fifty (750).

17   As -- as a layman, I'm kind of

18 thinking, Well, you know, do I sink my dollars in --

19 in for a pound, in for a dollar, and go for the 700 kV

20 and -- and drop the two hundred and thirty (230)?

21   As -- as a Manitoban, do I like that in

22 -- in the MISO market, or don't I like it?

23   DR. DAVID PATTON: Yeah, let -- let me

24 take a stab at this. So it's certainly a lot more

25 complicated than -- than that because you can't direct

 1 electricity the way you can water or other

 2 commodities.

 3   So really, the -- the -- the question

 4 you want to ask is -- is: How much chance for

 5 capability is it going to create and -- and what's the

 6 resulting impact on the market?

 7   So you may -- you may increase the size

 8 of the transmission investment, and if -- if along the

 9 same corridor you hit a limiting element that doesn't

10 allow you to fully utilize that -- that increased

11 line, then the amount of transfer capability you've

12 created could be significantly less than just the --

13 the electrical rating of -- of the line you've built.

14   But that requires a transmission study

15 to determine how the -- the transfer capability is

16 impacted by one project or the other and that's cer --

17 certainly outside the scope of -- of our analysis.

18   I will say there are -- there are two

19 (2) things that increasing the transmission capability

20 would do.

21   One (1) is it would -- it would make

22 Manitoba Hydro megawatts increasingly deliverable to

23 the -- the mid west ISO market. I assume that

24 whichever project is built, it would need to be large

25 enough to ensure that -- that you're able to deliver

4529

1 the -- the megawatts that -- that you imagine you want

2 to deliver in the capacity market. So there shouldn't

3 be a big difference between those two (2).

4   But, secondly, the bigger line will

5 reduce the congestion coming in from -- from the west

6 side of the MISO footprint.

7   And, so, you can see the -- the -- the

8 magnitude of the congestion we show in -- in our price

9 forecast. So -- so, basically, what you would be

10 looking at is -- is a reduction in the -- in the size

11 of that congestion.

12   And, so, were you to study that, you

13 could quantify how much that would be worth. It

14 shouldn't affect the capacity price in MISO but it --

15 it -- it can affect the energy price.

16   MR. ANTOINE HACAULT: Thank you. That

17 was a useful explanation. The Chairman may have

18 additional questions, I'm not too sure, arising out of

19 that. No? I just...

20   THE CHAIRPERSON: I do, but I'm not

21 sure that it's the appropriate time to ask them, but

22 you -- you mentioned trans -- transmission study as

23 something that would typically be done to evaluate the

24 merits of a transmission line.

25   Is that, in fact, the case? Is that

4530

1 typically how companies proceed to determine whether

2 or not to -- to proceed with a particular line in --

3 in the MISO region?

4   DR. DAVID PATTON: Yes, in the MISO

5 region there are reliability investments. And so --

6 so there the analysis is -- is what's needed for

7 reliability. But -- but then they also do evaluations

8 of the economic impacts of transmission projects. So

9 projects that are not -- not, perhaps, justified for

10 relia -- on reliability grounds or not needed for

11 reliability may still be undertaken as part of the

12 planning process because their economic benefits are -

13 - are significant.

14   And so there, generally, the -- the

15 criteria is how much would you be reducing the -- the

16 production cost of the system by putting in a

17 transmission line. And you'd reduce the production

18 cost because it allows you to -- to increase the

19 dispatch of low cost resources and decrease the

20 dispatch of high cost resources. And so the net of

21 those two (2) would -- would tell you what this new

22 transmission capability you've created is -- is worth.

23   THE CHAIRPERSON: And -- and on top of

24 that you would layer the actual transmission revenues

25 in addition to the capacity benefits?

4531

1   DR. DAVID PATTON: Well, generally,

2 yeah. I think the -- as an economist we would argue

3 that the -- the production cost savings are really the

4 only thing you should look at. And if you -- if you

5 don't overbuild your transmission, then the savings

6 you get from building should be large enough to pay

7 for the line. So there should be -- there should be

8 no increase in -- in transmission rates necessary to -

9 - to recover the cost of the line. But I think, you

10 know, we don't always succeed in not overbuilding

11 transmission.

12

13 CONTINUED BY MR. ANTOINE HACAULT:

14   MR. ANTOINE HACAULT: Thank you. I'm

15 hoping these questions can be answered again on the

16 public record.

17   Is Potomac able to put on the public

18 record whether in its opinion Manitoba Hydro's 2013

19 low price scenario is a credible scenario?

20

21   (BRIEF PAUSE)

22

23   DR. ROBERT SINCLAIR: I -- I think --

24 I think the answer we had given earlier for some --

25 some of these similar questions, and that is because -

4532

1 - because we -- it wasn't totally transparent to us

2 how those forecasts were developed, that we could not

3 rely on them and we did not find them to be something

4 that the Board should rely on.

5   MR. ANTOINE HACAULT: Now, let me try

6 to rephrase it a bit. I want to focus less on the

7 methodology and all the data used to arrive at the

8 methodology and more on the number.

9   I don't need to know what the number

10 is, but I'd like to know whether Potam -- Potomac's

11 view -- because trying to determine whether or not

12 we've got credible lows and credible highs and

13 credible reference values in the context of, is the

14 low number that's been chosen something that can be

15 used in a credible way as a lower limit or not.

16   DR. DAVID PATTON: Well, I think -- I

17 think what we've said is -- is we would advise you to

18 use our low rather than the Manitoba low. So -- and I

19 -- and I don't think I can tell you whether their low

20 is higher or lower than ours.

21   MR. ANTOINE HACAULT: Understood.

22 Okay. And with respect to the reference value, is the

23 answer the same, that the recommendation is to use the

24 recommended value as the ref? Because we've got --

25 without knowing the numbers, Hydro has given us three

4533

1 (3) price points, a high price point, a reference

2 price point, and a low price point. I have the answer

3 with respect to the low price point.

4   With respect to the reference price

5 point, what's --

6   DR. DAVID PATTON: Well --

7   MR. ANTOINE HACAULT: -- Potomac's

8 view?

9   DR. DAVID PATTON: Well, we gave you

10 two (2) references, right. We gave you a with and

11 without carbon. And those two (2) references look a

12 lot different than each other. So I think it's hard

13 for us to even tell you which of our two (2)

14 references to use because, ultimately, it's going to

15 go back to your expectations about the likelihood of -

16 - of a carbon tax in the US.

17   We think the probability is no greater

18 than 50/50, so. But, you know, you may have a more

19 pessimistic or optimistic view. But I -- I certainly

20 think that the -- those -- those two (2) reference

21 cases, even though they're intended to be sort of the

22 middle, they -- they create a pretty significant bound

23 -- or pretty significant band of uncertainty just in

24 and of themselves.

25   MR. ANTOINE HACAULT: So I don't know

4534

1 if I can push you this far. Would it be fair in that

2 circumstance that if we chose somewhere in the middle

3 of those two (2) given that they've got a 50/50

4 chance, that would be a fair number to use as a

5 reference case between the CO_2 and non-CO_2 given

6 that's 50/50, we just pick somewhere in the middle?

7   DR. DAVID PATTON: Well, I think that

8 would be reasonable, but I -- I don't think it would

9 be unreasonable to be risk adverse either given --

10 given the -- the consequences of being wrong. So, you

11 know, if you were risk neutral, you'd -- and you --

12 and 50/50 was a reasonable expectation, then -- then

13 I'd choose the number right in the middle.

14   MR. ANTOINE HACAULT: So if I had a

15 $10 billion decision to make, I might want to be risk

16 adverse and I might not but that would be a decision

17 that somebody has to make?

18   DR. DAVID PATTON: Correct.

19   MR. ANTOINE HACAULT: My last question

20 with respect to the high, what's Potomac's

21 recommendation with respect to the high? Is it the

22 highest number we see for energy and capacity, as

23 shown on your graphs? Is that the higher -- higher

24 outbound?

25   Is that what Potomac is recommending?

4535

 1   DR. ROBERT SINCLAIR: I think that the

 2 high and the low was meant to put bounds on not

 3 necessarily what we could expect as possible, but the

 4 -- the range of plausible outcomes. So I think the

 5 answer is the same as for the low, that we would

 6 recommend using the -- our high, given its developed

 7 in a transparent way as opposed to the Manitoba high -

 8 - Manitoba Hydro high.

 9   MR. ANTOINE HACAULT: Now, the last

10 thing we've seen in this hearing, which I confess, I

11 still don't understand exactly how it's been

12 calculated, I have some idea, is we've talked about

13 low reference and high, and finally an expected value,

14 which is not only related to your subject matter, but

15 I understand it also assigns kind of a different

16 expectation in your area, also export forecasts, of

17 what's expected as opposed to a ref case.

18   Do you have any other comments with

19 respect to that that you can put on the public record?

20 Do you understand, firstly, anything about the

21 expected value of Manitoba Hydro, how it considers

22 that to be and whether there's something on the public

23 record that you can put as to what your recommendation

24 is on the expected value notion as it relates to your

25 area of expertise?

4536

1

2   (BRIEF PAUSE)

3

4   DR. DAVID PATTON: I'm -- I'm not sure

5 I know what you're asking, but I would say our -- I

6 think what we said is our -- our cases are relatively

7 symmetric. In other words, the -- the two (2)

8 reference cases are equally likely, the -- the high

9 and low are pretty equally likely, so an expected

10 value of our cases would be -- would be pretty much

11 the middle of the band.

12   The -- but I don't know whether you

13 were asking, really, about the methodology that

14 Manitoba Hydro used to come up with an expected value,

15 and we don't have a comment on -- on that.

16   MR. ANTOINE HACAULT: No, I wasn't

17 asking on the methodology, but given that I have a

18 little bit of a math background, and probabilities can

19 be a fun area to play with when we choose and assign

20 certain probabilities, and try to relate that to

21 practical experience, and expected values may be a

22 different question, and it was in the context not so

23 much of what Manitoba Hydro has done with that, more

24 so than with respect to what's expected.

25   And if I understand, what's expected

4537

1 would be somewhere between your ref/CO2 and ref/no

2 CO2, is that fair?

3   DR. DAVID PATTON: Yes.

4   MR. ANTOINE HACAULT: Thank you very

5 much for your helpful explanations. Those are all the

6 questions I have.

7   THE CHAIRPERSON: Probably would be an

8 appropriate time to take a break. The panel intends

9 to continue sitting until 5:15, so I just wanted to

10 put the parties on notice that it's our intention to

11 work longer today to take advantage of the presence of

12 -- of Dr. Patton and Sinclair. So 5:15 today we will

13 expect to adjourn, so take -- let's take ten (10)

14 minutes.

15

16 --- Upon recessing at 3:44 p.m.

17 --- Upon resuming at 4:02 p.m.

18

19   THE CHAIRPERSON: I believe we're

20 ready to resume the proceedings. I had a few

21 questions that I wanted to ask Drs. Patton and

22 Sinclair.

23   In your position as independent market

24 monitors, are you very aware of -- of the power

25 purchase agreements that are assigned by MISO

4538

1 participants?

2   DR. DAVID PATTON: I would say we --

3 we don't routinely review power purchase agreements or

4 bilateral contracts. We -- because generally, the

5 scope of our monitoring is -- relates to the

6 performance of the -- the day ahead and real time

7 energy markets and the capacity market, so to the

8 extent that bilateral contracts affect how somebody

9 behaves in our markets, then we'll review the

10 contracts in that context.

11   But we're not -- our scope -- the scope

12 of our market monitoring doesn't extend to the

13 bilateral contract market, so we don't routinely

14 review those contracts.

15   THE CHAIRPERSON: But you do review

16 them fairly regularly -- fairly regularly?

17   DR. DAVID PATTON: Yeah, I would say

18 fairly regularly we're -- we're reviewing contracts

19 and evaluating them.

20   THE CHAIRPERSON: So is the trend in

21 MISO towards more power purchase agreements, or less

22 power purchase agreements? I mean, are you in a

23 position to comment on that?

24   DR. DAVID PATTON: That's a good

25 question. I don't -- I don't know that I could say

4539

1 whether it's more or less. I think the -- it's really

2 sort of a state-by-state determination of how they

3 want to encourage their LSEs to satisfy their

4 obligation.

5   So I think some states would have a

6 preference for self-build projects, and, you know,

7 other states might -- might not. I don't -- I don't

8 know that I could say whether -- whether the overall

9 trend is upward or downward.

10   THE CHAIRPERSON: How about the

11 duration of those agreements? Are you in a position

12 to comment whether they're getting longer, shorter,

13 they're...

14

15   (BRIEF PAUSE)

16

17   DR. DAVID PATTON: Yeah, I think --

18 yeah, I don't know that I could say whether they're

19 getting longer or shorter.

20   We're -- we're in a -- we've been in a

21 -- in a -- a period for some time now where -- where

22 there's a substantial excess or a surplus of capacity.

23 So -- so LSEs generally have not had to go out and --

24 and sigh contracts or -- or build a significant amount

25 of -- of generation, at least over the last few years.

4540

1

2   I think the -- the big thing that we're

3 going to see over the next few years is -- is as

4 certain environmental regulations come into effect,

5 that it's going to cause coal units to retire. I

6 think you're going to have a lot of load-serving

7 entities that are in a position of -- of needing some

8 capacity.

9   And, so, I don't -- I don't -- I would

10 have a hard time predicting, at this point, what the

11 preferences of the States would be when once they're

12 in a position where their load-serving entities need

13 to do something to increase their capacity.

14   THE CHAIRPERSON: We've kind of

15 already addressed this, but I -- you know, in your

16 experience, what are the factors that are considered

17 by those load-serving entities when they make a

18 decision about whether or not to self-build or to --

19 to buy from a third party?

20   DR. DAVID PATTON: Well, I think

21 generally there would be -- well, first let me say, if

22 you're in an area with -- with excess capacity, then -

23 - then there's going to be a preference for -- for

24 buying just because you -- you likely can -- can buy

25 at a lower cost than building your own capacity.

4541

1   But -- but even having said that, I

2   think in a -- in a largely vertically integrated

3   regulatory -- or regulated framework or -- or regime

4   which covers most of the mid-west ISO footprint,

5   there's -- I think there's naturally going to be an

6   incentive to build -- self-build because -- because of

7   the return you can make on -- on those investments for

8   the regulated companies versus if they -- if they

9   procure and buy lateral contracts, those are costs

10   that are generally just going to be passed through.

11   THE CHAIRPERSON: So why bother at

12   all? Like, why -- why not just self-build as an

13   option if you're a load-serving entity? I mean, if

14   you're going to get the return -- guaranteed return to

15   the regulatory rates, why even bother with a -- with a

16   power purchase agreement in that context?

17   DR. DAVID PATTON: Well, I think if it

18   was up to the load-serving entities, a lot of them

19   would build. I think the -- the -- the regulators

20   have an objective of minimizing costs to the retail

21   customer, so if there are lower cost options than --

22   than building, then it would be -- the regulators,

23   generally, are going to -- to have a mandate to ensure

24   that the load-serving entities explore those options

25   rather than just assuming that they're going to build.

4542

1   I mean, even in a -- even in a case

2 where -- where there isn't a lot of surplus capacity,

3 it may very well be that building elsewhere within the

4 MISO footprint or outside the MISO footprint is -- is

5 lower cost than building in the control area of the

6 utility.

7   So even in that case, you -- you may be

8 contracting for essentially a -- a new-build resource.

9 But I do think, all other things equal, there --

10 assuming the costs are equal, there would be a

11 preference for self-build over contract.

12   THE CHAIRPERSON: In the report

13 there's some reference to the ability of Manitoba

14 Hydro to get premium prices for -- for non-contracted

15 electricity.

16   Why is Manitoba Hydro -- I would have -

17 - I would have thought that Manitoba Hydro is purely a

18 price taker. Why is Manitoba Hydro able to get a

19 premium relative to general prices available in a MISO

20 marketplace?

21   DR. ROBERT SINCLAIR: I -- I think

22 that part of the testimony -- our report talks about

23 some of the supply issues, and, so, there's a premium

24 that is assumed to be earned on -- on peak opportunity

25 sales.

4543

1   So when you're selling on-peak, in a

2 way you're -- you're allowing a utility to satisfy

3 some of its capacity requirement, so it's sort of like

4 buying a week ahead so that if you -- if you can buy a

5 week ahead on -- on-peak, then you can avoid going

6 short in -- in the day ahead or in the real time. And

7 so you're willing to pay a -- a premium to have the

8 on-peak, even if it's not te -- technically a firm

9 product.

10   THE CHAIRPERSON: But I thought they

11 were getting a -- they were getting a premium on day-

12 ahead markets as well.

13   Did I misread that?

14   DR. ROBERT SINCLAIR: I think they

15 sell -- I mean, it -- it's a day ahead, but I think

16 they sell some of it -- there's a premium, because

17 they sell it at different lengths -- different lengths

18 of time forward.

19   MS. PATTI RAMAGE: If I could

20 interject, this might be a discussion we'd want to

21 have in the CSI session.

22   THE CHAIRPERSON: Now, I was a bit

23 surprised by your comment regarding capacity. I'm

24 looking on page 41. You know, given that you were --

25 you were given access to -- to the Brattle

4544

1 information, I was a bit surprised that you would come

2 out with a statement that would include Brattle in --

3 in that statement; in other words, find -- not --

4 don't find them to be credible, and to recommend that

5 -- that PUB use the Potomac forecast, and specifically

6 in relation to capacity price.

7   Now, is it because the different -- the

8 methodology you didn't agree with, or is it some other

9 issue?

10   DR. ROBERT SINCLAIR: I -- I think

11 Brattle was in with the other consultants to the

12 extent that we -- we're not able to identify or work

13 with the mechanisms that -- that supported their

14 models. Although we saw some of the input data, and

15 we saw more with Brattle, but we still -- it was not

16 possible to get the model itself and understand how

17 some of these outputs were developed. So again, it's

18 still -- even with Brattle, there was a transparency

19 issue, and so that's why we recommend using our

20 forecast instead.

21   THE CHAIRPERSON: Now, the propit --

22 propitire -- pardon me, the -- the veil that's in

23 place because of the agreement that's with the

24 forecasters is not unusual.

25   I mean, that -- that's quite common,

4545

1 isn't it, in the marketplace for a price forecast from

2 -- to be covered by a -- a veil of confidentiality,

3 isn't it?

4   DR. ROBERT SINCLAIR: I think if

5 you're buying the price forecast for your internal

6 use, I think that's right. Yeah.

7   THE CHAIRPERSON: But in terms of --

8 of the regulator, I mean, do regulators typically have

9 access to -- to this kind of information if they -- if

10 they seek access to it?

11   DR. ROBERT SINCLAIR: I think if

12 you're in a regulatory proceeding and you're putting

13 forth a -- a price forecast to support a capacity

14 purchase or a development plan, I think there is more

15 transparency than we're seeing here.

16   THE CHAIRPERSON: Now, in respect of

17 the -- of the price load forecasters, without --

18 without any reference to whom -- whom they might be,

19 my expectation would be that they're using name-brand

20 kind of forecasters in their price forecasts.

21   And I guess the question is: Wouldn't

22 the counterparty be using the same forecasters, in

23 terms of establishing what future prices will be like?

24 Or am I wrong there?

25   I mean, are -- aren't they all using

4546

1 the same people, in terms of establishing price

2 forecasts?

3   DR. DAVID PATTON: They very well

4 might be, but without talking about the specifics of

5 the -- the actual forecasts, I think we're -- and then

6 the -- well, tell me if I'm straying into CSI. But I

7 think our criticism that you pointed to on 41 applies

8 with far less force to Brattle than -- than most of

9 the other forecasts.

10   THE CHAIRPERSON: Okay. Thank you. I

11 would now pass the microphone over to Ms. Saunders.

12

13 CROSS-EXAMINATION BY MS. JESSICA SAUNDERS:

14   MS. JESSICA SAUNDERS: Good afternoon,

15 Drs. Sinclair and Patton. My name is Jessica

16 Saunders. I represent the Manitoba Metis Federation.

17 The MMF's IRs, I believe, are still awaiting some

18 responses, so I will endeavour to ask some

19 foundational questions, leaving specifics to the

20 questions we asked in the IR process. And, of course,

21 some of the questions I did have have been addressed

22 by the other Intervenors, so I just have a few short

23 questions in about three (3) areas.

24   Wind was considered as a capacity

25 addition in your analysis, correct?

4547

1   DR. ROBERT SINCLAIR: Yes.

2   MS. JESSICA SAUNDERS: And this is

3 just for clarification. So you indicated that most of

4 it is de-rated.

5   And I just wanted to be sure, Dr.

6 Sinclair, was that 80 percent you said if it ha -- 80

7 percent was de-rated?

8   DR. ROBERT SINCLAIR: 80 percent,

9 right.

10   MS. JESSICA SAUNDERS: Okay. So then

11 that means then 20 percent is included -- 20 percent

12 of the four hundred (400) -- or, sorry, 4,000

13 megawatts of wind is counted in the capacity

14 additions.

15   Is that correct?

16   DR. ROBERT SINCLAIR: When we de-rate

17 wind, what we mean is that whenever there's a capacity

18 accounting we have to do --

19   MS. JESSICA SAUNDERS: M-hm.

20   DR. ROBERT SINCLAIR: -- such as --

21 such as whether we're in surplus or not, we only use

22 80 -- 20 percent of the wind capacity to account for

23 that.

24   MS. JESSICA SAUNDERS: Thank you for

25 clarifying that. And I just have one (1) more

4548

1 question on capacity addition.

2   I'm just wondering if you're aware if

3 there is any US Energy Information Agency cases that

4 include solar as a capacity addition?

5   DR. ROBERT SINCLAIR: I'm not aware of

6 any, no. I mean, not for the marginal capacity.

7 There may be some that -- certainly some of the

8 capacity profiles of some regions will -- will include

9 additional solar, if that's what you mean, just for --

10 yes, there would be some cases like that, some

11 regions, yes.

12   MS. JESSICA SAUNDERS: Okay. Would --

13 would you happen to know which regions?

14   DR. ROBERT SINCLAIR: They were --

15 they weren't in the Midwest, but I would expect that

16 in the Southwest.

17   MS. JESSICA SAUNDERS: Thank you. And

18 still on wind but moving to another area, did your

19 energy price forecast include a declining cost of

20 wind?

21   DR. ROBERT SINCLAIR: It wasn't

22 necessary to have the cost of wind --

23   MS. JESSICA SAUNDERS: Okay. Sorry.

24   DR. ROBERT SINCLAIR: -- in the

25 forecast.

4549

1   MS. JESSICA SAUNDERS: My apologies.

2 And then I believe the only other question we had from

3 our -- our IR dealt with the -- the reference case

4 with no carbon. We were going to ask if the energy

5 prices you used were less than Manitoba Hydro's low

6 energy price case established in the 2012/2013

7 electricity export price forecast.

8   Of course, I am aware of the comments

9 from Ms. Ramage and Mr. Hacault, so those are all my

10 questions. Thank you.

11

12   (BRIEF PAUSE)

13

14   MS. PATTI RAMAGE: Thank you. And if

15 it's now over to Manitoba Hydro, we have a little bit

16 of housekeeping before we get started. We're going to

17 be -- our people have been hard at work over the

18 weekend, so we have a number of undertakings to file.

19   Also, we'll be filing Manitoba Hydro's

20 book of documents. It's almost useless at this point,

21 but we'll get it out there. When I say, "useless,"

22 because as we tore pieces out as other -- as questions

23 were responded to and dealt with, it's primarily just

24 excerpts of the report. But we'll get it out on the

25 record and -- and, if necessary, refer to it.

4550

 1   THE CHAIRPERSON: I don't mind doing

 2 that, but I just want to make sure that of -- I

 3 should, for the PUB -- for the record, ensure that --

 4 Mr. Orle, I just want to confirm that you have no

 5 questions to ask of these witnesses.

 6   MR. GEORGE ORLE: No, I didn't. Thank

 7 you, Mr. Chair.

 8   THE CHAIRPERSON: Thank you for that.

 9   MS. PATTI RAMAGE: Okay. And while

10 they're being distributed, I'll just read into the

11 record what is being filed. And I'll begin by noting

12 that on last Friday, Manitoba Hydro electronically

13 filed Exhibits 138, 139, and 140. There we go.

14   Exhibit 138 was -- was not a formal

15 undertaking. It dealt with a response to a PUB

16 request for Manitoba Hydro to recreate a table

17 plotting the Manitoba Hydro firm energy based on DSM

18 Level 2. And that -- I -- I believe Mr. Simonsen has

19 already confirmed that's Exhibit 138, but we thought

20 just so the transcript reflects that.

21

22 --- EXHIBIT NO. MH-138:   Table plotting Manitoba

23   Hydro firm energy based on

24   DSM Level 2

25

4551

1   MS. PATTI RAMAGE: One thirty-nine is

2 Undertakings number 26 and 42.

3

4 --- EXHIBIT NO. MH-139:   Response to Undertakings 26

5   and 42

6

7   MS. PATTI RAMAGE: And Exhibit 140 is

8 Undertaking number 36.

9

10 --- EXHIBIT NO. MH-140:   Response to Undertaking 36

11

12   MS. PATTI RAMAGE: And in terms of

13 what is being distributed around the room right now,

14 we have Exhibit Manitoba Hydro 141, which is

15 Undertaking number 63:

16   "Manitoba Hydro is to file the

17   information on the statistics

18   associated with the HNTEI initiative

19   as a table."

20

21 --- EXHIBIT NO. MH-141:   Response to Undertaking 63

22

23   MS. PATTI RAMAGE: Then number --

24 Undertaking number 64 is filed as Hydro Exhibit 142:

25   "Manitoba Hydro is to provide a

4552

```
 1                      breakdown of the number of people

 2                      that have undergone the Tataskweyak

 3                      and War Lake training initiative."

 4

 5   --- EXHIBIT NO. MH-142:   Response to Undertaking 64

 6

 7                  MS. PATTI RAMAGE:   Exhibit 143 is

 8   Undertaking number 65.  And that is how many hires for

 9   the Keeyask project to date on Table 1 of page 105

10   were HNTEI trainees, 'HNTEI' being H-N-T-E-I.

11

12   --- EXHIBIT NO. MH-143:   Response to Undertaking 65

13

14                  MS. PATTI RAMAGE:   Exhibit 144 is

15   Manitoba Hydro Undertaking number 66, and that's:

16                      "Provide the annual capital tax,

17                      water rental, debt guarantee fee, et

18                      cetera, as shown on Table 13.3 over

19                      the planning period that led to the

20                      present value calculations."

21

22   --- EXHIBIT NO. MH-144:   Response to Undertaking 66

23

24                  MS. PATTI RAMAGE:   Exhibit 145 is

25   Manitoba Hydro Undertaking number 68:
```

4553

1   "Manitoba Hydro is to file a high-

2   level description or a matrix of each

3   of the offsetting programs as per the

4   Adverse Effects Agreement."

5

6   --- EXHIBIT NO. MH-145:   Response to Undertaking 68

7

8   MS. PATTI RAMAGE: Exhibit 146 is

9   Undertaking number -- well, Undertaking number 72:

10   "Manitoba Hydro to determine on the

11   table included in Undertaking

12   PUB/Manitoba Hydro Second Round

13   423(c) whether Manitoba Hydro can

14   reframe, in terms of person years as

15   opposed to hires."

16

17 --- EXHIBIT NO. MH-146:   Response to Undertaking 72

18

19   MS. PATTI RAMAGE: The next is Exhibit

20 147, Manitoba Hydro Undertaking number 44:

21   "Manitoba Hydro to explain why its

22   historical accuracy doesn't align

23   with the probabilistic analysis

24   presented in Exhibit 103."

25

4554

1 --- EXHIBIT NO. MH-147:   Response to Undertaking 44

2

3   MS. PATTI RAMAGE: Exhibit 148 is

4 Manitoba Hydro Undertaking number 69:

5   "Manitoba Hydro to file the

6   intensity-based GHG emissions for the

7   development plans filed in the NFAT,

8   listing per kilowatt hours or

9   gigawatt hours of electricity

10   produced."

11

12 --- EXHIBIT NO. MH-148:   Response to Undertaking 69

13

14   MS. PATTI RAMAGE: Then we have

15 Manitoba Hydro Exhibit 149, which is Undertaking

16 number 48:

17   "Manitoba Hydro to indicate the

18   impact of proceeding with the

19   Preferred Plan and then switching

20   from the Preferred Plan to Pathway 5

21   at the end of 2017."

22

23 --- EXHIBIT NO. MH-149:   Response to Undertaking 48

24

25   MS. PATTI RAMAGE: And then finally,

4555

1 Manitoba Hydro Exhibit 150, which is Undertaking

2 number 54:

3   "Manitoba Hydro to update the table

4   on page 52 of the MIPUG book of

5   documents for Manitoba Hydro's

6   projected net debt balances and the

7   new increased capital costs in

8   Keeyask and Conawapa."

9

10 --- EXHIBIT NO. MH-150:   Response to Undertaking 54

11

12   MS. PATTI RAMAGE: So -- and now I

13 need a break. Oh, and then lastly I guess we'll ask

14 that the book of documents be marked as an exhibit,

15 and that'll be 151.

16

17 --- EXHIBIT NO. MH-151:   Book of documents

18

19 CROSS-EXAMINATION BY MS. PATTI RAMAGE:

20   MS. PATTI RAMAGE: Good afternoon, Dr.

21 Patton, Dr. Sinclair. It's good to see the front of

22 your faces instead of the back of your heads. You

23 look quite different from this angle.

24   In your presentation this morning, you

25 indicated that the availability of the underlying data

4556

1 was restricted, and here I'm quoting from page 10 of

2 your presentation, and that:

3   "As a result, we developed our own

4   forecast that would enable us to

5   assess the Company's forecast."

6   Is that correct?

7   DR. ROBERT SINCLAIR: Yes.

8   MS. PATTI RAMAGE: Yes? And could I

9 ask you to turn to Potomac Exhibit 3, which is your

10 scope of work?

11   DR. ROBERT SINCLAIR: Okay.

12   MS. PATTI RAMAGE: And if I look at

13 number 4 of your scope of work, it indicates that:

14   "Potomac is to review the energy

15   revenues projected by Manitoba Hydro,

16   benchmarked against your own fore --

17   forecast MISO energy prices in the

18   short term and long term."

19   Have I read that correctly?

20   DR. ROBERT SINCLAIR: Yes.

21   MS. PATTI RAMAGE: And in number 5 it

22 indicates that:

23   "Potomac is to review the capacity

24   revenues projected by Manitoba Hydro,

25   benchmarked against your own forecast

4557

1   of MISO capacity prices in the short

2   term and long term."

3   I've --

4   DR. ROBERT SINCLAIR: Yes.

5   MS. PATTI RAMAGE: -- read that

6 correctly? So wouldn't it be true that you developed

7 your own forecast because you were directed to do so

8 by the PUB?

9   DR. ROBERT SINCLAIR: No. We didn't

10 interpret this benchmarking that you refer to as the

11 kind of forecast we ended up doing. We expected to be

12 able to use the underlying assumptions of the Manitoba

13 consultants -- Manitoba Hydro consultants and get an

14 understanding of the underlying models and then from

15 that develop a forecast.

16   We didn't expect to develop -- have to

17 develop a forecast that required as much focus and as

18 much sort of bottoms-up kind of -- of work. So we

19 were expecting to come up with some kind of forecast,

20 which you might think is sort of a -- maybe a

21 composite, if we could understand what was going on in

22 those forecasts.

23   Instead, we -- because couldn't really

24 get to the bottom of it, we had to develop from the

25 bottom up an alternative forecast.

4558

 1   MS. PATTI RAMAGE: So in a sense you

 2 would be picking different components of the various

 3 forecasts, the ones that you agreed with.

 4   Would that have been your plan?

 5   DR. ROBERT SINCLAIR: Not that we

 6 agree with, but we wanted to vet the individual ones.

 7 And we may have differences about the assumptions and

 8 wanted to be able to correct the individual models.

 9   MS. PATTI RAMAGE: This morning we

10 reviewed some of the work you do aside from in the

11 MISO market monitor. And you indicated you produce

12 forecasts for various parties that foreca -- and those

13 forecasts forecast out five (5) to twenty (20) years.

14   Is that right?

15   DR. ROBERT SINCLAIR: If I said that I

16 meant to say that we monitor such forecasts and we

17 evaluate their reasonableness.

18

19   (BRIEF PAUSE)

20

21   DR. ROBERT SINCLAIR: We have --

22 sometimes we have power supply procurement monitoring

23 assignments that rely on production cost savings and

24 future prices and we're asked to sort of vet those

25 forecasts to determine their reasonableness so that we

4559

1 -- we can make conclusions about future revenues and

2 future prices.

3   MS. PATTI RAMAGE: And when you

4 monitor those forecasts, do the parties typically turn

5 over their models to you?

6   DR. ROBERT SINCLAIR: As much as we

7 want, yes.

8   MS. PATTI RAMAGE: Sorry, I didn't

9 catch --

10   DR. ROBERT SINCLAIR: As -- as much as

11 we require to -- to accomplish our task.

12   MS. PATTI RAMAGE: Would those models

13 be third-party independent models, or are they utility

14 models that are retaining you?

15   DR. ROBERT SINCLAIR: A combination.

16 A utility model sometimes informed by an outside

17 consultant.

18   MS. PATTI RAMAGE: So is the model

19 that you used -- you used for this -- this proceeding,

20 is that something you created yourself?

21   DR. ROBERT SINCLAIR: Yeah, I guess

22 you could say that. You know, we had to develop it

23 based on public data.

24   MS. PATTI RAMAGE: As -- as referenced

25 by the Chairman this morning, does it surprise you

4560

1 that parties that might see you as a competitor in the

2 business would not provide you unfettered access to

3 their proprietary models and underlying methodologies?

4   DR. ROBERT SINCLAIR: I -- I think

5 that -- that it's right that they should protect

6 themselves. I think there could have been ways to

7 provide the necessary data and underlying processes to

8 help us better understand and perhaps develop

9 sensitivities that we needed.

10   MS. PATTI RAMAGE: At page 4 of your

11 report -- I don't know that you need to turn to it.

12 Because I'll just say you state that:

13   "The Preferred Development Plan is

14   expected to deliver the expected

15   benefits if actual conditions meet

16   critical projections. And among

17   these critical projections is the

18   revenue that can be earned from sales

19   of energy and capacity to the MISO

20   markets in the US."

21   Do you recall that statement?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: Insights into how

24 the market might perform in the future is a key

25 element to the success of those doing business in the

4561

1 MISO market.

 2   Would you agree?

 3   DR. ROBERT SINCLAIR: Yes.

 4   MS. PATTI RAMAGE: And future market

 5 prices are a critical factor in assessing investments

 6 in new generation also.

 7   DR. ROBERT SINCLAIR: Yes.

 8   MS. PATTI RAMAGE: And another

 9 critical factor would be the ability to lock in

10 pricing to reduce risk by means of bilateral

11 contracts, correct?

12   DR. ROBERT SINCLAIR: Yes.

13   MS. PATTI RAMAGE: And as with any

14 negotiation the party who has the most knowledge and

15 the insight into what the other is thinking will have

16 the edge in the negotiations.

17   DR. ROBERT SINCLAIR: Yes.

18   MS. PATTI RAMAGE: So the party with

19 the most knowledge is likely to get the best deal for

20 their ratepayers.

21   Would you agree?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: Now, in your role

24 as MISO monitor, who's your client?

25   DR. ROBERT SINCLAIR: MISO.

4562

1   MS. PATTI RAMAGE: So would -- would

2 it be fair to say your role is to be independent. You

3 answer to no one and answer to everyone at the same

4 time?

5   DR. DAVID PATTON: Yeah, I'd -- I

6 would say our -- our client is also the FERC, but

7 because -- because it's important to recognize that --

8 that a large share of our monitoring responsibility is

9 actually monitoring MISO. So -- so ultimately I think

10 we -- the -- the monitoring function is specified

11 under the tariff. So we -- we ultimately answer to

12 FERC and, to a lesser extent, to MISO.

13   MS. PATTI RAMAGE: Would it be fair to

14 say in the world you operate in, transparency is

15 critical?

16   DR. DAVID PATTON: Yes.

17   THE CHAIRPERSON: Dr. Patton, when you

18 mentioned, "the tariff," you're meaning which tariff?

19   DR. DAVID PATTON: The Midwest ISO

20 tariff; that is the -- the FERC-approved tariff that

21 governs the -- the market.

22   DR. ROBERT SINCLAIR: Transmission

23 tariff that also governs the market.

24

25 CONTINUED BY MS. PATTI RAMAGE:

4563

 1   MS. PATTI RAMAGE: Manitoba Hydro

 2 provided you with the -- both the 2012 and 2013

 3 individual consultant reports and appendices as you --

 4 as was requested.

 5   Is that correct?

 6   DR. ROBERT SINCLAIR: Correct.

 7   MS. PATTI RAMAGE: And is it your

 8 understanding that Manitoba Hydro provided you with

 9 everything it had in its possession?

10   DR. ROBERT SINCLAIR: That's my

11 understanding, yeah.

12   MS. PATTI RAMAGE: So you would have

13 received, with respect to the -- the six (6)

14 consultants' reports, gas and coal prices.

15   Is that correct?

16   DR. ROBERT SINCLAIR: I think, if I

17 recall, there was gas and coal prices in -- in the

18 data. And I can't recall now, but I do believe seeing

19 those from some of the consultants.

20   MS. PATTI RAMAGE: Carbon prices?

21   DR. ROBERT SINCLAIR: I believe so.

22   MS. PATTI RAMAGE: Supply additions

23 and retirements, including renewables?

24   DR. ROBERT SINCLAIR: We did see those

25 in some summary fashion.

4564

 1   MS. PATTI RAMAGE: Overnight capital

 2 costs?

 3   DR. ROBERT SINCLAIR: Yes.

 4   MS. PATTI RAMAGE: Load and load

 5 growth, those were included?

 6   DR. ROBERT SINCLAIR: Again, some of

 7 it I remember seeing in a summary basis. For

 8 instance, I believe that Manitoba Hydro had put

 9 together a sort of a cover -- a little cover report,

10 and in the appendices were all the consultants'

11 reports.

12   And I believe in the Man -- Manitoba

13 Hydro part of it, there was some summary statistics on

14 various assumptions.

15   I don't recall for each individual

16 consultant whether they provided a whole series of

17 values for each year for those -- all those particular

18 inputs you're talking about. I just don't recall.

19   MS. PATTI RAMAGE: How about emerging

20 environmental regulations?

21   Do you recall seeing that material in

22 those reports?

23   DR. ROBERT SINCLAIR: In some form,

24 yes.

25   MS. PATTI RAMAGE: And renewable RPS

4565

1 targets?

2   DR. ROBERT SINCLAIR: There's some of

3 that in there.

4   MS. PATTI RAMAGE: That's renewable

5 portfo -- renewable portfolio standard targets, for

6 those who aren't familiar with the -- that acronym.

7   Having seen -- you saw those materials,

8 but in your materials, you relied primarily on EAI

9 (sic) data. You relied on EAI's (sic) natural gas

10 forecast?

11   DR. ROBERT SINCLAIR: Yes.

12   MS. PATTI RAMAGE: If I didn't say it

13 right, it's EIA.

14   DR. ROBERT SINCLAIR: Okay.

15   MS. PATTI RAMAGE: I'm sure -- you

16 appeared to know what I was referring to --

17   DR. ROBERT SINCLAIR: Yes.

18   MS. PATTI RAMAGE: -- even if Ms.

19 Flynn wasn't sure. You relied on EIA's electricity

20 demand growth rates?

21   Is that correct?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: And you relied on

24 EIA's capacity additions and retirements, including

25 their coal retirement figures?

4566

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 1                    DR. ROBERT SINCLAIR:   Yes.

 2                    MS. PATTI RAMAGE:   And were there

 3  other sources or inputs that you relied on, sourced

 4  directly from EIA?

 5                    DR. ROBERT SINCLAIR:   Did you mention

 6  the capital costs?

 7                    MS. PATTI RAMAGE:   No, I did not.

 8                    DR. ROBERT SINCLAIR:   There's another

 9  one.

10                    MS. PATTI RAMAGE:   Does EIA have any

11  specific insight on these items not available or

12  evident to industry analysts that would mean EIA long-

13  term forecasts are not subject to the same underlying

14  risk that is present in a long-term forecast produced

15  by private industry?

16                    DR. ROBERT SINCLAIR:   Can you -- what

17  -- what was the first part again?  Do they have...?

18                    MS. PATTI RAMAGE:   Do they have any

19  specific insight on these items that's not available

20  or evident to industry analysts?

21                    DR. ROBERT SINCLAIR:   I don't think

22  so.  I think it's all public.

23                    MS. PATTI RAMAGE:   But EIA, they have

24  no special ability to predict the future?

25                    DR. ROBERT SINCLAIR:   Not that a
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4567

1 private firm couldn't assemble.

2   MS. PATTI RAMAGE: And then each

3 individual component forecast assumption sourced from

4 EIA would have some band of uncertainty around it,

5 depending on how the future actually unfolds?

6   DR. ROBERT SINCLAIR: Certainly.

7   MS. PATTI RAMAGE: And outside of EIA,

8 are there public sources that would provide the same

9 level of detailed information?

10   DR. ROBERT SINCLAIR: Yeah, there's a

11 number of private companies that produce a forecast of

12 these various inputs.

13   MS. PATTI RAMAGE: But are they -- are

14 they public and available, or are they for purchase?

15   DR. ROBERT SINCLAIR: Oh, oh.   I mean,

16 not that I'm immediately familiar with.   But I know

17 there's some companies that produce sort of high-level

18 forecasts and give them away free, and then sort of

19 they produce more detailed ones for -- for their

20 clients, yeah.

21   So there's -- there's public firm --

22 private firms that make their output public.

23   MS. PATTI RAMAGE: But they're high

24 level, probably loss leaders, would that be fair?

25   DR. ROBERT SINCLAIR: I don't...

4568

1   MS. PATTI RAMAGE: Now, you had other

2 sources in your forecast -- or assumptions that

3 weren't forse -- weren't sourced from EIA; for

4 example, the cost of new capacity, would you --

5 overnight capital.

6   Was that one that you did yourself?

7   DR. ROBERT SINCLAIR: I believe that's

8 based on EIA.

9   MS. PATTI RAMAGE: Okay. What about

10 the debt-to-equity ratio of developers?

11   Was that one that you would develop on

12 your own?

13   DR. DAVID PATTON: Yeah, those are

14 assumptions that we've developed over time in

15 evaluating the cost of new entry, but they're --

16 they're generally consistent with assumptions that

17 have been developed by -- by a number of RTOs who --

18 who use that as an input for their capacity markets.

19   MS. PATTI RAMAGE: You say,

20 "generally." Is there a range or is -- did you arrive

21 at -- at specific numbers, or how did you deal with

22 debt-to-equity?

23   DR. DAVID PATTON: Oh, the debt-to-

24 equity? To -- for those -- for those calculations

25 that I'm aware of, or in the various contexts that I'm

4569

1 thinking of, I think a 50:50 debt-equity ratio was --

2 was used by everybody.

3   MS. PATTI RAMAGE: What about O&M

4 costs? Is that something you dealt with on your own,

5 or where did you get those from?

6   DR. DAVID PATTON: Variable O&M or a

7 fixed O&M?

8   MS. PATTI RAMAGE: I think both.

9   DR. DAVID PATTON: The -- the -- I

10 think for purposes of this calculation, our -- our O&M

11 figures came from -- from EIA, as well.

12   MS. PATTI RAMAGE: What about your

13 assumptions on inflation, where did they come from?

14   DR. DAVID PATTON: Our assumptions on

15 inflation? Generally, they've -- I think generally

16 they are consistent with -- with the assumptions made

17 by other RTOs in this calculation. But general -- but

18 I would say primarily they -- they come from our --

19 our own judgment on, you know, a reasonable inflation

20 rate to use.

21   MS. PATTI RAMAGE: And the tax rates

22 that you applied?

23   DR. DAVID PATTON: The tax rates? I -

24 - I don't recall the -- the source of the tax rates.

25 But -- but we've used the same tax assumptions going

4570

1 back to when we first performed this calculation a few

2 years ago. But I -- I'd have to go back and determine

3 where we -- where we -- what the source was for those.

4   MR. CHRISTIAN MONNIN: If I may, just

5 to chime in on one particular point for Dr. Sinclair

6 and Dr. Patton. Certain -- certain administrative

7 boards have their own way of proceeding. In here, for

8 CPF to go back, or if you want to check something,

9 it's -- your answer would be subject to check, yeah,

10 just to -- to couch that matter.

11

12 CONTINUED BY MS. PATTI RAMAGE:

13   MS. PATTI RAMAGE: Where would you

14 have got -- drawn your assumptions for property taxes

15 and insurance costs?

16   DR. DAVID PATTON: Again, I would have

17 to check.

18   MS. PATTI RAMAGE: Would they come

19 from EIA?

20   DR. DAVID PATTON: No.

21   MS. PATTI RAMAGE: What about the rate

22 of return on equity that was applied in the -- in that

23 calculation?

24   DR. DAVID PATTON: The return on

25 equity was a value that's consistent with the -- the

4571

1 return on equity used by other RTOs for this

2 calculation.

3   MS. PATTI RAMAGE: When you say,

4 "other RTOs," plural, does that mean the same rate of

5 return was applied, or was there a band of -- of

6 values?

7   DR. DAVID PATTON: Well, primarily I'm

8 thinking of the NYISO.

9   MS. PATTI RAMAGE: And would its rate

10 of return, the New York one, be the same as the MISO,

11 or any -- any other ICO -- ISO?

12   DR. DAVID PATTON: I would have to

13 check their most -- their most recent -- I'm not --

14 I'm not sure about that.

15   MS. PATTI RAMAGE: And the specific

16 input assumptions, they'd be different whether it's a

17 regulated utility or a merchant generator constructing

18 the plant?   Would that be correct?

19   DR. DAVID PATTON: They would. These

20 -- these calculations are -- generally assume it's a

21 private investment.

22   MS. PATTI RAMAGE: And then to

23 calculate the net cost of new entry, anticipated

24 market revenues also need to be calculated for the --

25 the estimated number of hours that the marginal unit

4572

1 will run in a particular year.

2   Is that correct?

3   DR. DAVID PATTON: Yes.

4   MS. PATTI RAMAGE: And is that

5 something -- a number that you would have come up

6 with?

7   DR. DAVID PATTON: Yes, based on our -

8 - that's a number you can calculate based on the --

9 the energy model that we developed.

10   MS. PATTI RAMAGE: So you would have

11 had to pull together all these numbers in -- in order

12 to develop your forecast, correct?

13   DR. DAVID PATTON: Correct.

14   MS. PATTI RAMAGE: And are these

15 numbers all documented in your report?

16   DR. DAVID PATTON: No, certainly

17 they're --they're not all in the report.

18   MS. PATTI RAMAGE: And for carbon

19 pricing, you indicated you relied on MNP's carbon

20 forecast and that Mr. Sabine stated a 50 percent

21 probability that these would or would not -- that

22 there would or would not be a carbon price on the

23 future.

24   Can you provide the reference in the

25 MNP evidence for that probability?

4573

1   DR. ROBERT SINCLAIR: No. It was done

2 by telephone call.

3   MS. PATTI RAMAGE: And during cross-

4 examination by Mr. Williams, I understood you to say

5 that you agreed with that assessment of my -- is that

6 correct?

7   DR. ROBERT SINCLAIR: I think we had a

8 feeling for it, and then we talked to Mr. Sabine and

9 we asked him: What do you think about a 50/50

10 probability? That's what we're thinking.

11   He said, That's what we're thinking,

12 too.

13   MS. PATTI RAMAGE: Do you have

14 specific expertise in the area of carbon pricing?

15   DR. ROBERT SINCLAIR: Well, we have a

16 lot -- like I said earlier, we often deal with -- we

17 every day deal with a wide range of market

18 participants, including buyers, sellers, regulators.

19 And this is a question that's interesting to us, of

20 course. So I suppose you could say that our expertise

21 is derived from canvassing, in a way, a large number

22 of market participants in understanding what they

23 expect.

24   MS. PATTI RAMAGE: And those market

25 participants would each come with their own unique

4574

1 perspectives and potential biases, their -- their

2 level of risk adversity, and that sort of thing.

3   Would that be correct?

4   DR. ROBERT SINCLAIR: Yes.

5   MS. PATTI RAMAGE: And just to finish

6 off on this, you didn't do independent analysis of

7 carbon pricing? You've relied just on MNP's, correct?

8   DR. ROBERT SINCLAIR: Correct.

9   MS. PATTI RAMAGE: In your report you

10 also described that you made adjustments to the

11 historical supply curve. And here I'm referring to

12 page 22, where you say -- and you -- you can turn to

13 it, if you like. It's -- you -- you said:

14   "To clear the hourly market and

15   establish the forecast price for that

16   hour, we adjust each historical

17   hourly supply curve based on

18   anticipated changes in each key

19   variable [And then in brackets]

20   (fuel costs, et cetera)."

21   Did I get that correctly?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: Yeah. Can you

24 explain how you adjust the historical supply curve for

25 the addition of wind generation?

4575

 1   DR. ROBERT SINCLAIR: Yes. Wind

 2 generation goes in at basically a zero price because

 3 they often actually been -- been negative prices. So

 4 they would go at the bottom of the supply curve.

 5 Remember, the supply curve is built up from offers.

 6   MS. PATTI RAMAGE: What is the shape

 7 of that curve over the course of the day?

 8   DR. ROBERT SINCLAIR: I'm -- I'm

 9 sorry?

10   MS. PATTI RAMAGE: The shape of the

11 curve over the course of the day, what is the shape?

12   DR. ROBERT SINCLAIR: Okay. The shape

13 of the curve depends on the actual historical shape

14 for that hour. We know in each hour what units were

15 committed. We know what their as-offered costs are.

16 So we just stack them up and you get a shape. And I

17 think we did an example in the report that shows you

18 an example of July, I think. So it tends to be shaped

19 like the ones I put on the board this morning, sort of

20 hockey stick shaped.

21   MS. PATTI RAMAGE: Now, you've talked

22 in something I can relate to. So with that shape,

23 that shape is developed based on the historic -- the

24 historic information. That would be two (2) years of

25 historic information?

4576

1   DR. ROBERT SINCLAIR: For each hour,

2 we have information on what units were turned on and

3 ready to produce, and so we simply took their as-

4 offered costs and stacked them from highest to lowest,

5 and we -- we get the shape.

6   MS. PATTI RAMAGE: But each hour over

7 two (2) years. Is that right?

8   DR. ROBERT SINCLAIR: We do actually

9 each hour -- yes, each hour over two (2) years. So we

10 had, like, seventeen thousand (17,000) supply curves,

11 historical supply curves.

12   MS. PATTI RAMAGE: Okay. Can you

13 explain how you adjust the supply curve for changes in

14 imports and exports from the MISO market?

15   DR. ROBERT SINCLAIR: Yeah, those --

16 the -- the net imports are put in the supply curve

17 also. They -- they basically adjust the demand. So

18 if you have a net import, then your demand goes down.

19 If you have a net export, then your -- you have more

20 demand you have to satisfy, but that really doesn't

21 affect the supply curve. It affects demand.

22   MS. PATTI RAMAGE: And then how does

23 it change for the future?

24   DR. ROBERT SINCLAIR: We know the

25 demand in the future from our projections, and we --

 1 we keep the net imports for each hour constant over

 2 time, except the projected imports for Manitoba. We

 3 add those in over time. We don't add any -- we don't

 4 project other imports over time.

 5   MS. PATTI RAMAGE: And how do you

 6 adjust for potential -- okay -- for potential

 7 increases in future demand response?

 8   DR. ROBERT SINCLAIR: The future

 9 demand will reflect any kind of demand response that's

10 -- they -- the EIA projected demand is going to

11 reflect demand response. It -- it's sort of the --

12 what they call the net energy -- I can't remember

13 exactly what it's called in -- in the -- in the data,

14 but it will reflect the demand that needs to be served

15 by generation.

16   MS. PATTI RAMAGE: And do you also

17 adjust for degradation of gas turbine performance over

18 time?

19   DR. ROBERT SINCLAIR: You mean if we

20 have a existing CCGT?

21   MS. PATTI RAMAGE: Yes, as it ages.

22   DR. ROBERT SINCLAIR: No, the heat

23 rate stays constant as it ages.

24   MS. PATTI RAMAGE: How do you map out

25 fuel prices to each specific unit?

4578

 1   DR. ROBERT SINCLAIR: The fuel price,

 2 if it's a gas price for each unit, is the Henry Hub

 3 price plus the transportation for every unit.

 4   MS. PATTI RAMAGE: So would you agree

 5 you're exercising your professional judgment in each

 6 one (1) of these variables?

 7   DR. ROBERT SINCLAIR: Yes.

 8   MS. PATTI RAMAGE: And as there's

 9 judgment, is it possible for someone to completely and

10 identically recreate your forecast?

11   DR. ROBERT SINCLAIR: Yes. They may

12 have -- they may have questions like yours, but they

13 could do it, and we'd be open -- we'd give -- we'd be

14 transparent in that regard.

15

16   (BRIEF PAUSE)

17

18   MS. PATTI RAMAGE: And when they're --

19 when comparising -- when comparing with different

20 experts, would you agree it's likely that two (2)

21 different experts working independently would have

22 different opinions on at least some of the variables

23 we've been discussing that go into calculating the

24 electricity price forecast?

25   DR. ROBERT SINCLAIR: Yes. It could -

4579

1 - it could differ.

2   MS. PATTI RAMAGE: And these

3 differences and assumptions would result in some

4 variation in long-term prices?

5   DR. ROBERT SINCLAIR: Yes.

6   MS. PATTI RAMAGE: And none of these

7 experts have -- have any sort of ability to predict

8 the future better than another.

9   Is that correct?

10   DR. ROBERT SINCLAIR: I would think

11 that there -- of those -- you're referring to these

12 consultants or any expert?

13   MS. PATTI RAMAGE: Any expert can

14 reasonably -- can a reasonable expert reasonably

15 disagree, I guess is the question.

16   DR. ROBERT SINCLAIR: Yes. I mean,

17 there's better experts than others, but there can be

18 legitimate disagreements about how to proceed.

19   MS. PATTI RAMAGE: If I could get you

20 to turn to Tab 2 of the Manitoba Hydro book of

21 documents, which is simply an excerpt of your report.

22   This is page 37 from the Potomac

23 report, and I'm interested in what you have to say in

24 the third full paragraph on the page where you're

25 discussing adding generation for capacity and using a

4580

 1 CT versus a CCGT.

 2   Do you see that paragraph?

 3   DR. ROBERT SINCLAIR: Yes.

 4   MS. PATTI RAMAGE: And before I go on,

 5 to make sure we're -- I have my acronyms straight,

 6 'CCGT' is a combined-cycle gas turbine, and a 'CT' is

 7 a combustion turbine, correct?

 8   DR. ROBERT SINCLAIR: Yes.

 9   MS. PATTI RAMAGE: And I speak in

10 terms of combined cycle and single cycle, so when you

11 say, "CT," you're talking a single cycle.

12   Is that correct?

13   DR. ROBERT SINCLAIR: CT, yes.

14   MS. PATTI RAMAGE: Yes, okay. Now, in

15 that third paragraph it says:

16   "We estimate the net-CONE of an

17   advanced CT, given the parameters

18   published by EIA, given the typical

19   price duration curve in the MISO

20   market, a CT is generally the most

21   economical way to meet capacity

22   needs. While it is conceivable that

23   a CCGT, because it runs longer at

24   lower costs, could overcome its

25   higher capital cost relative to a CT,

4581

1   our analysis indicates that the

2   forecasted energy prices always

3   results in a CT being the most

4   economical addition for capacity,

5   i.e., having the lower net-CONE."

6   Did I read that correctly?

7   DR. ROBERT SINCLAIR: Yes.

8   MS. PATTI RAMAGE: I'm an excellent

9 reader. Can you explain why you concluded that a

10 single-cycle combustion turbine is always the most

11 economical addition for capacity?

12   What -- what did your analysis tell

13 you?

14   DR. ROBERT SINCLAIR: So in order to

15 get -- basically, the logic is in order to get a CCGT

16 to be the marginal unit, you'd have to be fairly far

17 into a capacity shortage so that the marginal capacity

18 being added at a higher cost can run long enough hours

19 to make up its capacity costs -- more than make up its

20 capacity costs relative to a CT.

21   DR. DAVID PATTON: Yeah, I'll -- I'll

22 add a little bit to that. The -- so I think what this

23 -- the -- the narrow interpretation of what we're

24 saying in this paragraph is that you can calculate the

25 net revenues of both technologies, given the price

4582

1 forecasts that we produce, the hourly prices.

2   And then for all of the cases we ran,

3 the -- the net revenue -- the larger net revenue of a

4 combined-cycle unit was not enough larger -- was not

5 enough larger to make it a more economic investment

6 than the advanced CT.

7

8   (BRIEF PAUSE)

9

10   MS. PATTI RAMAGE: In that quote I

11 read to you, you refer to a -- a new advanced CT.

12   In that context, what does 'advanced'

13 mean?

14   DR. DAVID PATTON: I believe it's an

15 air-derivative gas turbine. It's not a -- it's not a

16 industrial turbine.

17   We put 'advanced' in quotes because the

18 -- the table published by EIA refers to it as an

19 advanced CT, so we wanted the reader to -- to know

20 what technology we were referring to in the EIA

21 report.

22   MS. PATTI RAMAGE: Would it be fair to

23 say that that's the -- a lower capital cost plant?

24   DR. DAVID PATTON: Lower than what?

25   MS. PATTI RAMAGE: How about lowest

4583

1 capital cost plant. Is that what you selected?

2   DR. DAVID PATTON: I -- yeah, I

3 believe that's right on a -- a cost-per-kilowatt

4 basis.

5

6   (BRIEF PAUSE)

7

8   MS. PATTI RAMAGE: I'm going to turn

9 to page 31 of your report now. Here you discuss your

10 capacity price forecast. And if I have it correctly -

11 - page 31. I'm sorry, I said, "of your report." It's

12 page 31 of your presentation I'm on.

13

14   (BRIEF PAUSE)

15

16   MS. PATTI RAMAGE: So for the purpose

17 of your price forecast, do I have it correct that you

18 assume the value of capacity will be determined by the

19 cost of an advanced combustion turbine, eighty-nine

20 ninety-five (89.95) -- eighty-nine dollars and ninety-

21 five cents ($89.95) per kilowatt, the advance CT?

22   DR. ROBERT SINCLAIR: Yes, subject to

23 check. Now, the way you're asking this question just

24 sounds like maybe we got something mixed up, but,

25 okay.

4584

 1   MS. PATTI RAMAGE: Sometimes I like

 2 you to agree with me. We're not always in

 3 disagreement.

 4   But if a utility were to were -- were

 5 to choose another capacity resource as its new

 6 resource, would the eighty-nine dollars and ninety-

 7 five cents ($89.95) per kilowatt still be the

 8 appropriate adder if you didn't use the advanced CT;

 9 for example, if you used hydro?

10   DR. DAVID PATTON: I'm not sure

11 exactly what you're asking, but I think the -- the

12 nature of what we're doing in this capacity price

13 forecast is we're identifying the -- the marginal

14 capacity resource, which should be the most economic

15 resource to -- to build.

16   So it's irrelevant what any particular

17 utility chooses to build. If it chooses to build

18 something else, and that's a higher cost resource, the

19 -- that doesn't make the capacity worth more in the

20 market. If there is a lower cost technology that

21 would be the marginal technology, then that would

22 reduce the capacity price.

23   MS. PATTI RAMAGE: But parties

24 entering, for example, into bilateral contracts to

25 deal with capacity issues, it would be relevant in

4585

1 that sense if, for example, they weren't necessarily

2 interested in the lowest cost product; they have other

3 motivations, for example, the environmental attributes

4 associated with a product or fear of carbon or simply

5 fear of the future.

6   They -- they may look at a different

7 value for that for their purposes?

8   DR. DAVID PATTON: Well, yes. So I

9 guess what I would say is that the -- the forecast of

10 the -- the market price for capacity would still be

11 based on this. What -- what you're talking about is -

12 - is a willingness to incur a premium over and above

13 the -- the market price because there are certainly

14 positive attributes of different types of capacity

15 that are not recognized in -- in the capacity market

16 price.

17

18   (BRIEF PAUSE)

19

20   MS. PATTI RAMAGE: Now, if I could get

21 you to turn over to page 35.

22   DR. ROBERT SINCLAIR: You mean slide

23 35?

24   MS. PATTI RAMAGE: Yes, it's slide 35

25 of your presentation. I have to read my own notes.

4586

1   (BRIEF PAUSE)

2

3   MS. PATTI RAMAGE: With respect to

4 your statement regarding the use of historical data,

5 is this statement related to the pers...

6   Is this statement related to the 9

7 percent reduction you refer to in your report on page

8 44 where you recommend Manitoba Hydro re-price? I

9 apologize. I...

10   DR. ROBERT SINCLAIR: You're correct.

11   MS. PATTI RAMAGE: Did that make sense

12 to you? Because --

13   DR. ROBERT SINCLAIR: Yeah, that's --

14 that's right.

15   MS. PATTI RAMAGE: Mr. Cormie slipped

16 me a note and I'm having a little trouble with his

17 penmanship.

18   DR. ROBERT SINCLAIR: Yeah, the slide

19 35 refers to the passages on page 44 of the report.

20   MS. PATTI RAMAGE: And in the past

21 years in which Manitoba Hydro did not fill -- fully

22 sell out its dependable energy, were these years ones

23 where Manitoba Hydro's dependable hydraulic energy was

24 valued because it is zero emit -- emitting?

25   DR. ROBERT SINCLAIR: Yeah. I -- I

4587

1 don't -- we -- we don't really know why you didn't

2 sell 100 percent firm, but we recommended that you

3 provide extra support for that, which could include

4 what you're saying there.

5

6   (BRIEF PAUSE)

7

8   MS. PATTI RAMAGE: In the future, do

9 the forecasters indicate there's a significant risk

10 that carbon will have a significant price associated

11 with energy?

12   DR. ROBERT SINCLAIR: Who's -- or the

13 who that -- can you repeat that, please?

14

15   (BRIEF PAUSE)

16

17   MS. PATTI RAMAGE: No, we're not going

18 to pursue that question right now, and I'm not taking

19 Mr. Cormie's notes. It's only once I read and start

20 realizing what's he's asked me. Let's move on to

21 congestion and losses.

22   Can you confirm your work on congestion

23 and losses was to apply the effect of congestion and

24 losses on the MISO system marginal price relative to

25 the price forecast for the MHEB pricing note?

4588

 1   DR. ROBERT SINCLAIR: Yes, we

 2   estimated congestion and losses to adjust the system

 3   marginal price to arrive at the Manitoba border

 4   locational marginal price.

 5   THE CHAIRPERSON: Could you repeat the

 6   question, please, just to...?

 7

 8   CONTINUED BY MS. PATTI RAMAGE:

 9   MS. PATTI RAMAGE: Can you confirm

10   your work on congestion and losses was to apply the

11   effect of congestion and losses on the MISO system

12   marginal price relative to the price forecast for the

13   Manitoba Hydro Electric Board pricing note that

14   Manitoba Hydro bore?

15   What I'm talking about is there is the

16   MISO region price over in the -- in MISO, Minnesota,

17   Wisconsin, through there, and then there is a node at

18   the Manitoba border, and I believe we've got

19   confirmation that -- that the price was -- was dealt

20   with at the border.

21   And based on your review of the price

22   consultant reports, can you confirm that Manitoba

23   Hydro receives electricity market forecasts for the

24   Minnesota Hub region?

25   DR. ROBERT SINCLAIR: Yes.

4589

1 Consultants' prices were at the Minnesota Hub.

2   MS. PATTI RAMAGE: And those market

3 forecasts accounted for congestion and losses to the

4 Minnesota Hub?

5   DR. ROBERT SINCLAIR: We didn't check

6 that, but that's what we assumed, yes.

7   MS. PATTI RAMAGE: And that being the

8 case, Manitoba Hydro would only have to account for

9 congestion and losses between the Minnesota Hub and

10 the Manitoba border, correct?

11   DR. ROBERT SINCLAIR: That's correct.

12   MS. PATTI RAMAGE: And that would mean

13 that the factor you applied to your report to account

14 for congestion and losses would be different than the

15 factor Manitoba Hydro would be applying for congestion

16 and losses?

17   DR. ROBERT SINCLAIR: Yeah. We

18 estimated different congestion and loss than you --

19 than Manitoba did, because our -- our congestion and

20 losses come from farther away.

21   MS. PATTI RAMAGE: If I could get you

22 to turn to Tab 3 of the Manitoba Hydro book of

23 documents?

24

25   (BRIEF PAUSE)

4590

1   MS. PATTI RAMAGE: And that -- that

2 would be the same graph that you produced in your

3 presentation this morning, too, at -- it's Figure 11.

4   DR. ROBERT SINCLAIR: Yeah, I believe

5 that's right. Yes.

6   MS. PATTI RAMAGE: So I -- I believe

7 you explained this -- this morning, but the top line

8 represents the MISO SMP.

9   Is that correct?

10   DR. ROBERT SINCLAIR: Yes.

11   MS. PATTI RAMAGE: And that's in 2015,

12 around thirty-seven dollars ($37) a megawatt hour, and

13 it steadily climbs to forty-four dollars ($44) a

14 megawatt hour in about 2021. It takes a jump to about

15 -- it looks like fifty-six dollars ($56) a megawatt

16 hour when you introduce the carbon pricing, and

17 thereafter steadily climbs.

18   Would that be a fair description?

19   DR. ROBERT SINCLAIR: Yeah.

20   MS. PATTI RAMAGE: All right. And

21 then similarly, it's almost a parallel line after you

22 account for congestion and then losses. The LMP at

23 the Manitoba border also steadily climbs.

24   Is that correct?

25   DR. ROBERT SINCLAIR: Yeah, same

1 shape.

2   DR. DAVID PATTON: Yeah, just a quick

3 note. It's not really a parallel line. If -- if you

4 look at the gap in 2033, it's quite a bit larger than

5 the -- the gap in 2020, or 2017, and mainly that's

6 because the -- the increasing natural -- fuel prices

7 increase the cost of re-dispatching generation to

8 manage congestion. So that -- those two (2) wouldn't

9 -- wouldn't grow in parallel.

10   MS. PATTI RAMAGE: Okay. That's --

11 that's fair. I won't disagree with that, but you'd

12 agree that, for example, if we look at towards the end

13 of the forecast at 2029, you're projecting real price

14 growth in 2029.

15   DR. DAVID PATTON: Yes.

16   MS. PATTI RAMAGE: And then again in

17 2031, it climbs regardless of which one of the top or

18 bottom line, it -- it climbs?

19   DR. DAVID PATTON: Yes.

20   MS. PATTI RAMAGE: And in 2033,

21 there's real glo -- growth again?

22   DR. DAVID PATTON: Yes.

23   MS. PATTI RAMAGE: What would be the

24 key drivers facil -- facilitating that price growth

25 for on-peak energy?

4592

 1   DR. DAVID PATTON: Well, the -- the

 2 growth in -- in fuel prices is -- is probably the most

 3 important driver.

 4

 5   (BRIEF PAUSE)

 6

 7   MR. CHRISTIAN MONNIN: And -- and

 8 just for the benefit of the record, I just wanted to,

 9 like, clarify that. The graph which Ms. Ramage is

10 referring to is the same one on slide 23 of our

11 presentation. The slide doesn't have a -- a number --

12 a page number, but for the benefit of the record, that

13 is slide 23 of our presenta -- of Potomac's

14 presentation, rather, which is the same graph that you

15 find on page 34 of the report.

16

17 CONTINUED BY MS. PATTI RAMAGE:

18   MS. PATTI RAMAGE: Would that -- that

19 key driver or other drivers suddenly change at 2033?

20 Do you have any reason to believe that?

21   DR. DAVID PATTON: Well, I -- I think

22 it's difficult to -- to comment on, you know, a

23 portion that we -- we didn't forecast, but -- but if

24 you're asking would -- would we expect some

25 significant change in the trend for 2035, the answer

4593

 1 is probably no.

 2

 3   (BRIEF PAUSE)

 4

 5   MS. PATTI RAMAGE: Now, you've

 6 indicated in your presentation that an advantage of

 7 your modelling and the resultant price forecast over

 8 the other price forecasters is that it is well-

 9 calibrated to the past two (2) years of historic MISO

10 data.

11   Is that correct?

12   DR. ROBERT SINCLAIR: Yes.

13   MS. PATTI RAMAGE: And if we could

14 turn to page 27 of your presentation?

15

16   (BRIEF PAUSE)

17

18   MS. PATTI RAMAGE: You indicate that

19 there are four (4) price scenarios are -- are

20 possible.

21   Is that correct?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: And that the range

24 of prices for on-peak energy in 2033, so if we look at

25 that red line at the bottom? The range is from -- I

4594
 1 would think -- I would say thirty-four dollars ($34)

 2 or thirty-five dollars ($35) a megawatt hour for the

 3 low energy price scenario, up to sixty-three dollars

 4 ($63) a megawatt hour for the reference case scenario.

 5   Is that correct?

 6   DR. ROBERT SINCLAIR: Yes.

 7   MS. PATTI RAMAGE: So that range is --

 8   DR. DAVID PATTON: I'm sorry. Which

 9 case are you -- I don't see any one that starts at

10 '34, but maybe I'm --

11   MS. PATTI RAMAGE: Not starts at '34,

12 ends in 2030 --

13   DR. DAVID PATTON: Oh, ends, okay.

14 I'm with you now.

15   MS. PATTI RAMAGE: Okay. The range is

16 approximately thirty dollars ($30) a megawatt hour.

17   Is that correct?

18   DR. ROBERT SINCLAIR: Yes.

19   MS. PATTI RAMAGE: And that would be a

20 hundred percent range difference between your low and

21 your high?

22   DR. ROBERT SINCLAIR: Yes.

23   MS. PATTI RAMAGE: Can you explain how

24 the advantage you've indicated your forecast has over

25 others regarding calibration helps with resolving

4595

1 uncertainty in prices in 2033, given it results in a

2 hundred percent range of -- of difference?

3   DR. DAVID PATTON: Well, I -- I think

4 you can see that the majority of that range is -- is

5 the difference in the -- in the carbon price. What

6 we're saying about the advantage of it being

7 calibrated to the existing market is -- is that we

8 think this model accurately accounts for the -- the

9 actual supply in MISO, and -- and the -- the

10 expectation of how that supply will change over time.

11   Now, when you -- when you introduce a

12 cost factor as large as the -- the assumed carbon

13 price in 2033, then you're naturally going to get a --

14 a wide band, but I think that's -- that's not

15 measuring uncertainty with the underlying model,

16 that's measuring uncertainty with the -- the carbon

17 input.

18

19   (BRIEF PAUSE)

20

21   MS. PATTI RAMAGE: If we turn back the

22 clock, and we're in -- in 2005, and we took your same

23 model, and we used two (2) years of historical data to

24 forecast forward, would that model have been able to

25 predict today's energy price?

4596

1   And in particular, what I'm thinking,

2 would it have predicted the impact of fracking on

3 natural gas, and ultimately, on electricity prices?

4   DR. DAVID PATTON: Likely not, but

5 it's important to note that -- that it wasn't within

6 our scope to produce an independent forecast of

7 natural gas.

8   MS. PATTI RAMAGE: I -- I think the

9 point I'm getting at, would you agree the quality of

10 model calibration has little to do with any predictive

11 ability? Rather, it's the underlying drivers of the

12 future that really -- that impact the -- the model's

13 ability to assist a party or to accurately predict the

14 future?

15   DR. DAVID PATTON: I think both are

16 important, but I'm -- I certainly would not disagree

17 that the -- the uncertainty around the inputs is -- is

18 a -- is a primary issue.

19   MS. PATTI RAMAGE: And in fact, the --

20 the uncertainty regarding carbon in your model is --

21 would be a -- a driver of -- of overall uncertainty.

22 That's the biggest driver, it's not calibration.

23   DR. DAVID PATTON: Well, it certainly

24 is a -- a -- it certainly is a big driver, and is

25 likely the biggest.

4597

1   MS. PATTI RAMAGE: During your

2 testimony this morning, Dr. Sinclair, you talked about

3 MISO's projections of coal retirements at 12 gigawatts

4 versus Potomac's at 6 gigawatt hours.

5   And at that time, you explained the

6 difference, saying something to the effect that MISO

7 was focussed on planning, and you expect them to be

8 conservative, but that in price forecasting, you look

9 at what you expect to happen, not what you need to

10 plan for.

11   Do I have that roughly correct?

12   DR. ROBERT SINCLAIR: I think that was

13 one of the things I said in response to that question,

14 yes.

15   MS. PATTI RAMAGE: So 'conservative'

16 is not really a dirty word in the context of planning;

17 I take it you expect planners to be conservative?

18   DR. ROBERT SINCLAIR: Yes.

19   MS. PATTI RAMAGE: And therefore, if

20 you aren't prepared to speculate on new technologies

21 for price forecasting purposes, would you agree it

22 would be less likely that a system planner would do so

23 for planning purposes?

24   DR. ROBERT SINCLAIR: What was -- what

25 was the first part of the question? We don't want to

4598

1 speculate?

2   MS. PATTI RAMAGE: If you're not

3 prepared to speculate on new technology, so I'm -- I

4 sort of jumped over here because one (1) of your --

5 you had three (3), I think, factors of uncertainty, so

6 one (1) of them was new technologies. And your

7 evidence was about not speculating on those new

8 technologies, so I guess I jumped a question.

9   But if you aren't prepared to speculate

10 them on -- on them, would a system planner speculate

11 on those in their planning?

12   DR. ROBERT SINCLAIR: Well, first, I

13 don't think we said 'speculate.' I think we just said

14 that there's a risk that some technology may replace

15 the CT as the least-cost capacity unit. Now, I don't

16 know how that relates to a planner.

17   THE CHAIRPERSON: I think I will have

18 to put an end to these questionings, because we -- we

19 have to adjourn. We have no choice, because of -- one

20 (1) of the panel members has a commitment. So in ter

21 -- in the interests of having as transparent a public

22 record as possible, I wonder if could continue this

23 questioning tomorrow morning on the record if you

24 haven't finished your questions.

25   MS. PATTI RAMAGE: Tomorrow is the CSI

4599

1 morning, correct?

2   THE CHAIRPERSON: I'm looking to

3 guidance here, but I would say that --

4   MS. PATTI RAMAGE: Mr. Peters has

5 questions anyways. I was just going to say, if I had

6 one (1) minute, I could find out if I really need

7 these ones so people don't have to come in, but they

8 have to arrive anyways in the morning for Mr. Peters.

9   THE CHAIRPERSON: That's right. Yeah,

10 they do. Yeah, because Mr. Peters has some questions

11 that he wants to ask of these witnesses, as well. So

12 we are in a position where we need to come back

13 anyways tomorrow morning.

14   So let's -- let's adjourn for the

15 evening, unless there's some business to attend to.

16 Me. Hacault...?

17   MR. ANTOINE HACAULT: Just a reminder

18 that Hydro was going to consider whether some of the

19 questions that I had asked, there was some way to

20 provide some kind of a response once they knew what

21 the response was. So if -- if it's at all possible to

22 have that occur before the CSI session, we would

23 really appreciate that.

24   THE CHAIRPERSON: The -- Mr.

25 Peters...?

4600

1   MR. BYRON WILLIAMS: And I'll just

2   indicate that in discussions I've had with Mr. Monnin,

3   we'll continue this mor -- in the morning before

4   coffee on the public session, and I believe we will be

5   with Dr. Sinclair only, and then approximately after

6   coffee, I believe Dr. Patton's other commitment will

7   be met, and he'll be able to join us, but I suspect

8   after coffee break, we'll be getting into the CSI

9   section.

10   THE CHAIRPERSON: Thank you for that.

11   So with that, I will adjourn the proceedings for

12   today. We'll see each other again tomorrow morning at

13   nine o'clock. Thank you.

14

15   --- Upon adjourning at 5:18 p.m.

16

17   Certified correct,

18

19

20   _____

21   Cheryl Lavigne, Ms.

22

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