



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
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Pages 4601 to 4747

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25

1	TABLE OF CONTENTS	
2		Page No.
3	List of Undertakings	4604
4		
5	IEC POTOMAC ECONOMICS PANEL CONTINUED:	
6	ROBERT SINCLAIR, Affirmed (Qual.)	
7	Continued Cross-examination by Ms. Patti Ramage	4607
8	Cross-examination by Mr. Bob Peters	4625
9	DAVID PATTON, Sworn (Qual.)	
10	Continued Cross-examination by Mr. Bob Peters	4713
11	Re-cross-examination by Ms. Patti Ramage	4723
12		
13	Certificate of Transcript	4747
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

1	LIST OF UNDERTAKINGS		
2	NO.	DESCRIPTION	PAGE NO.
3	81	Potomac to indicate the resources	
4		and the time frame that would be	
5		required to perform that back	
6		testing	4635
7	82	Potomac to provide a calculation	
8		that will demonstrate both the	
9		off-peak and the peak price impacts	4652
10	83	Potomac to provide their view as to	
11		what carbon price would be required	
12		to make hydro more economic than	
13		coal	4654
14	84	Potomac to convert the capacity	
15		prices of twenty-two dollars (\$22)	
16		per kilowatt year as well as sixty-	
17		eight dollars (\$68) per kilowatt	
18		year into dollars per megawatt	
19		hour, 5x16x52	4675
20	85	Potomac to locate the annual	
21		capacity revenue that it sees	
22		Manitoba Hydro achieving under	
23		its current contracts, and to	
24		provide as CSI	4679
25			

1	LIST OF UNDERTAKINGS (Con't)	
2	NO.	PAGE NO.
3	86	Potomac to recalculate the
4		percentage of dependable capacity
5		that is sold forward on a firm
6		basis under the assumption that US
7		diversity sales do not earn the
8		long-term firm price 4686
9	87	Potomac to re-plot slide 27 from
10		Potomac's Exhibit 4 to include a
11		high growth scenario without
12		carbon 4696
13	88	Potomac to advise as to what, if
14		any, changes would be made in the
15		probability weightings assigned to
16		the various cases, including the
17		high growth without carbon case 4700
18	89	Potomac to indicate view as to
19		whether the Preferred Development
20		Plan assumptions are conservative
21		or otherwise 4715
22		
23		
24		
25		

1	LIST OF UNDERTAKINGS (Con't)		
2	NO.	DESCRIPTION	PAGE NO.
3	90	Manitoba Hydro to determine and	
4		identify the question posed by Mr.	
5		Hacault, which Manitoba Hydro	
6		indicated may be CSI; and then to	
7		determine whether the response by	
8		Potomac is CSI; and if it is not	
9		CSI, Potomac to provide the answer	
10		by way of undertaking	4746

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 --- Upon commencing at 9:03 a.m.

2

3 THE CHAIRPERSON: Good morning. I
4 hope everybody had a good evening last night. I
5 believe we're ready to commence today's proceedings.
6 And unless there are matters to attend to I will turn
7 the microphone over to Ms. Ramage. Thank you, Ms.
8 Ramage.

9

10 IEC POTOMAC ECONOMICS PANEL RESUMED:

11 ROBERT SINCLAIR, Previously Affirmed (Qual.)

12

13 CONTINUED CROSS-EXAMINATION BY MS. PATTI RAMAGE:

14 MS. PATTI RAMAGE: Thank you. And I
15 just have a -- just three (3) topics that hopefully we
16 can burn through fairly quickly. One (1) -- the first
17 deals with expanding market access, and I think there
18 was a discussion, I believe with the chairman, about
19 whether building a line would expand Manitoba Hydro's
20 market.

21 And to follow up on there -- on that
22 topic, are you aware that it's part of the Preferred
23 Development Plan which includes the 750 megawatt line,
24 that Maniti -- Manitoba Hydro also has 700 megawatts
25 of firm MISO point-to-point transmission service

1 request sinking into Wisconsin?

2 DR. ROBERT SINCLAIR: Yes.

3 MS. PATTI RAMAGE: And, so we're all
4 working from the same page, can you clarify for the
5 panel exactly what transmission service request is?

6 DR. ROBERT SINCLAIR: Transmission
7 service request is sort of self-explanatory. It's a
8 request for transmission on -- on the MISO network.

9 MS. PATTI RAMAGE: And would I be
10 correct that a transmission service request is -- is
11 something Manitoba Hydro would have this -- at this
12 stage in the Development Plan, but that would be
13 converted to a transmission service reservation once
14 we actually have a line built?

15 DR. ROBERT SINCLAIR: Yes. Provided
16 that line provides the adequate capacity associated
17 with the request, yes.

18 MS. PATTI RAMAGE: And with the
19 transmission service reservation, it's essentially
20 yours to your -- yours to use, and at that point you
21 would have the associated financial transmission
22 rights and option revenue rights?

23 DR. ROBERT SINCLAIR: Correct.

24 MS. PATTI RAMAGE: Would you agree
25 then that these firm MISO TSRs, they're referred to --

1 the firm MISO TSRs serve to increase Manitoba Hydro's
2 market access for bilateral transactions for capacity
3 and dependable energy?

4 DR. ROBERT SINCLAIR: Yes.

5 MS. PATTI RAMAGE: Effectively it
6 increases the number of customers we have access to,
7 and thus a larger market.

8 DR. ROBERT SINCLAIR: Yeah, it can get
9 more megawatts into the market.

10 MS. PATTI RAMAGE: Yeah. And that
11 should tend to provide Manitoba Hydro with higher
12 prices because at that point we're now getting the
13 Wisconsin price, not the Manitoba node?

14

15 (BRIEF PAUSE)

16

17 DR. ROBERT SINCLAIR: So if you go
18 straight to -- yes, if you go straight to Wisconsin
19 then you bypass the congestion between Manitoba and
20 the Minnesota Hub.

21 MS. PATTI RAMAGE: Yeah, I think we're
22 in agreement there?

23 DR. ROBERT SINCLAIR: Yes.

24 MS. PATTI RAMAGE: Put that one aside.

25 THE CHAIRPERSON: I do have some

1 questions of clarification, though. In terms of the
2 passage from a transmission service request to a
3 transmission service reservation, is it automatic? In
4 other words, if you -- assuming a line is built, is it
5 necessary automatic that the -- one (1) follows the
6 other?

7 DR. ROBERT SINCLAIR: Pretty much. As
8 long as -- as long as the line provides the capacity
9 that's in the request, MISO would do a study. But I
10 think in this case it's rather straightforward; the
11 line is -- has lots of capacity on it, so I think
12 pretty much it goes from the request to the
13 reservation.

14 THE CHAIRPERSON: So here's no
15 queueing mechanism where some other transmission
16 provider wants to build a line, a similar line?
17 There's no -- there's no competition? There's no...

18 DR. ROBERT SINCLAIR: Correct. Just -
19 - if you're building a line you get the -- you get the
20 access rights to it.

21

22 CONTINUED BY MS. PATTI RAMAGE:

23 MS. PATTI RAMAGE: Next, if I could
24 have you turn to slide 31 of your presentation. And I
25 just want to clean up a little bit on the -- on the

1 discussion we had regarding the advanced CT. You
2 noted in that -- in your first sub-bullet that you
3 used the capital cost of an advanced CT from the EIA
4 to determine the value of capacity, and I want to
5 follow-up on -- on what an advanced CT is.

6 And would you agree it reflects
7 improvement in fuel efficiency?

8 DR. ROBERT SINCLAIR: Yes.

9 MS. PATTI RAMAGE: In technical terms,
10 it uses the lower heat rate?

11 DR. ROBERT SINCLAIR: Yes. And a
12 lower capital cost I think was the most -- the most
13 impressive factor.

14 MS. PATTI RAMAGE: Perfect. That was
15 my next question. And does the number -- in terms of
16 capital cost, the EIA suggests -- I think the
17 overnight capital cost is nine hundred and seventy-
18 three (\$973) per kilowatt for a conventional CT versus
19 six hundred and seventy-six (676) per kilowatt for an
20 advanced CT.

21 Does that sound correct?

22 DR. ROBERT SINCLAIR: Correct. Yes.

23 MS. PATTI RAMAGE: So it's a 30
24 percent difference. Similarly, it's a 30 percent
25 difference on the operating costs of the advanced --

1 the advanced does 30 percent better than the
2 conventional.

3 Would that be correct?

4 DR. ROBERT SINCLAIR: I -- I can't
5 recall. Subject to check, though, I'll agree.

6 MS. PATTI RAMAGE: Now, when the EIE -
7 - EIA publishes these results, you're familiar that
8 they classify the various technologies as
9 revolutionary, evolutionary, and mature?

10 DR. ROBERT SINCLAIR: I think I
11 remember seeing something like that.

12 MS. PATTI RAMAGE: And then would you
13 accept, subject to check, that the advanced CT is
14 classified as an evolutionary technology?

15 DR. ROBERT SINCLAIR: Subject to
16 check.

17 MS. PATTI RAMAGE: Whereas the
18 conventional CT is classified as a mature technology?

19 DR. ROBERT SINCLAIR: I think that's
20 right.

21 MS. PATTI RAMAGE: So your slide at
22 page 31, it -- it seeks to capture three (3) market
23 risks you identified on realizing the expected
24 capacity value in your forecast.

25 Oh, I'm sorry, I'm on just slide 33.

1 If we could turn to slide 33. And there it capture --
2 you identify the -- the market risks on realizing
3 expected capacity value.

4 And num -- point number 2 in particular
5 addresses technology improvement that could reduce the
6 cost of new generation, correct?

7 DR. ROBERT SINCLAIR: Yes.

8 MS. PATTI RAMAGE: So as your model is
9 already using an advanced CT that uses 30 percent
10 lower capital and 30 percent variable O& -- O&M costs,
11 the -- that 30 percent less than a conventional CT and
12 it's classified as still evolutionary, would you say
13 your approach inherently captures some of that
14 technology development risk?

15 DR. ROBERT SINCLAIR: I think some of
16 it, yes.

17 MS. PATTI RAMAGE: And -- and lastly,
18 just for clarification, in your evidence you suggested
19 the panel reject the forecast of Manitoba Hydro's six
20 (6) independent forecasters, and instead adopt your
21 forecast for the purposes of evaluating the Preferred
22 Development Plan. And I want to make sure I
23 understand your basis for saying this.

24 So if I understand correctly, what I
25 interpreted you as saying is that, based on your re --

1 your review of the price consultant information that
2 had been provided to Manitoba Hydro and thereafter
3 provided to do -- to you, you don't feel you're in a
4 position to say there is something -- you're not in a
5 position to say there's something fundamentally wrong
6 with that -- with those forecasts. Rather, you're of
7 the view you're not in a position to endorse them.

8 Would that be a fair summary of the
9 problem?

10 DR. ROBERT SINCLAIR: I think it's a
11 combination. On -- on the one (1) hand we see -- we
12 see some of the outputs of the model that do not --
13 are not consistent with what we see in the
14 marketplace. We weren't able to get into the data in
15 the models enough to understand why those results come
16 about.

17 So on the one (1) hand we -- we suspect
18 there's -- there's some distortion, or inaccuracies,
19 but we can't get into the models to verify.

20

21 (BRIEF PAUSE)

22

23 MS. PATTI RAMAGE: I think, Mr. Chair
24 -- thank you, Dr. Sinclair. I think that is all of
25 Manitoba Hydro's questions.

1 THE CHAIRPERSON: Dr. Sinclair, I
2 guess a question I have is in relation to the
3 methodology used in determining future prices. And
4 it's -- it's somewhat related to the question that has
5 just been asked by Manitoba Hydro. Specifically, I'm
6 wondering about whether you have done any retro --
7 retrospective testing of the method -- your
8 methodology relative to its predictability based on
9 the data that is already available?

10 In other words, have you gone back and
11 checked your methodology against what actually
12 occurred during the -- the following period?

13 DR. ROBERT SINCLAIR: So, for example,
14 whether we had taken our model and tried to predict
15 what we've seen in -- for instance, 2013 -- actually,
16 we did -- we have not. Although, we would expect that
17 because 2013 is very close to 2012 that predictions
18 wouldn't be very good. But we -- we didn't -- we
19 didn't take the data.

20 THE CHAIRPERSON: No, I meant so much
21 -- not so much that, but using the meth -- the same
22 methodology, for example, to look at, for example,
23 2011 prices; it's ability to -- you know, after the
24 fact go back and check the -- the methodology against
25 the actual data from the marketplace --

1 DR. ROBERT SINCLAIR: M-hm.

2 THE CHAIRPERSON: -- to verify if it
3 was pre -- it would have pre -- you know, a high
4 predictive value?

5 DR. ROBERT SINCLAIR: That's a
6 definitely interesting proposition, but we did not do
7 it. It is possible to go back to say 2008, or a year
8 earlier, or some years earlier to set up the -- the
9 various actual market characteristics and then try to
10 make the prediction. It's possible.

11 THE CHAIRPERSON: It -- it is
12 possible, but I -- I guess you haven't had the
13 opportunity to do that. Is that -- I mean, it would,
14 sort of, in my mind, it would confirm to some extent
15 the adequacy of the model when examining prices going
16 forward, wouldn't it, to some extent?

17 DR. ROBERT SINCLAIR: I do agree with
18 you, but we didn't do it. Yeah.

19 We could consider doing it. It may be
20 something that may not require lots of resources.

21 THE CHAIRPERSON: Now, I guess I'm
22 looking at your report, page 37, and the conversation
23 we had around the -- the fact that the CT -- I'm
24 looking at -- at the paragraph just before the cost of
25 new entry. And specifically there that you -- you

1 indicated that your analysis indicates that for --
2 forward prices all result in the CT being the most
3 economical addition for capacity having the lowest --
4 and I'm wondering, given that statement, why would
5 anybody ever build the CCCT turbine if -- if it is
6 more expensive than a -- than a -- you know, at some
7 point I'm trying to understand the tactical thinking
8 of a company that would build a CCCT given what you've
9 just said in this statement.

10 DR. ROBERT SINCLAIR: Okay. I'm glad
11 you asked that, because I was thinking about that last
12 night and I thought there may have been a
13 misunderstanding about some of the -- some of the
14 statements we make.

15 And so when we say that the most
16 economical way to add capacity is a CT, we don't mean
17 that, Oh, additional capacity should be a CT. What we
18 mean is the price for the capacity portion of any new
19 project that is going to satisfy capacity need should
20 be based on the cost of a CT. So it's -- I think it's
21 perfectly fine that companies buy hydro capacity for
22 long-term capacity needs.

23 What we're saying is that if Manitoba,
24 for instance -- Manitoba Hydro, for instance, goes
25 into the market to sell capacity that they may be able

1 to -- that the capacity component of that sale would
2 be set by the cost of a CT.

3 And there may be other reasons why a
4 utility may be buying new capacity. They may want a
5 different mix of capacity. They may want to lower
6 their overall energy costs. So they may contract with
7 a hydro supplier to add capacity to their system.

8 But what we mean by CT is that the
9 capacity payment that that resource should receive
10 should be based on the cost of a CT. It very well may
11 be that the -- the capacity itself is much more
12 expensive than a CT, but there may be reasons a
13 utility may want to buy the more capital-intensive
14 resource, for instance, to lower their overall energy
15 costs. But just to serve capacity, if a utility was
16 just interested in serving capacity they would buy a
17 CT, and that's the capacity compo -- price component
18 that the market would be willing to pay.

19 THE CHAIRPERSON: One (1) of -- one
20 (1) of the -- the base plan for Manitoba Hydro
21 involves the construction of a successive series of CT
22 generators, and the question that the panel has been
23 asking itself is: Why wouldn't you -- instead of
24 building a succession of CTs, why wouldn't you build a
25 -- a lower cost over time CCCT generator?

1 DR. ROBERT SINCLAIR: M-hm.

2 THE CHAIRPERSON: And your -- your
3 analysis suggests that that the -- the behaviour or
4 the decision to build successful -- a successive
5 series of CTs is the right decision, but -- but there
6 were some context where building the more -- the more
7 capital-intensive turbine would make sense, wouldn't
8 it?

9 DR. ROBERT SINCLAIR: For sure. And
10 the -- they hydro -- Manitoba Hydro plan involves
11 meeting incremental capacity needs and some -- also
12 some energy needs. And so -- and there's also -- part
13 of the plan, as I explained yesterday, was to support
14 some export sales. So Manitoba Hydro is not just
15 focussed on adding, you know, 10 megawatts or a
16 thousand megawatts of capacity; they're also
17 interested in meeting some long-term energy needs, and
18 also they have some plans to make export sales.

19 So it mak -- could -- could make sense
20 and it's -- that's the evaluation we're doing here, to
21 invest in highly capital-intensive investments that
22 will not just meet your capacity needs, which could be
23 met by a CT, but also longer-term needs for energy and
24 also plans to make export sales.

25 So when we said -- when we talk about

1 the CT, we're really meaning what's the least cost way
2 of meeting 10 megawatts of extra capacity on a system,
3 if that's all your consideration was. And really, if
4 a -- if a utility just wants to buy capacity, they're
5 short on capacity, and they're -- they're happy with
6 the rest of the mix, they're happy with their
7 marketing situation, then they would just buy a CT.

8 But certainly you see CCCTs and coal
9 plants being everywhere, so it's not just the only
10 decision that a utility would make.

11 MS. MARILYN KAPITANY: So, Dr.
12 Sinclair, this is on a -- a completely different
13 subject and something that puzzled me yesterday. In
14 the transcript Ms. Ramage asked you:

15 "Does it surprise you that parties
16 might see you as a competitor in the
17 business would not provide you
18 unfettered access to their
19 proprietary models and underlying
20 methodologies?"

21 And you said:

22 "It's right they should protect
23 themselves. I think there could have
24 been ways to provide the necessary
25 data and underlying processes to help

1 us better understand and perhaps
2 develop sensitivities that we
3 needed."

4 Could you give some concrete examples
5 of that. And could you maybe elaborate a bit on how
6 you've seen CSI handled in other processes in which
7 you've been involved.

8 DR. ROBERT SINCLAIR: Okay. I -- I've
9 actually thought about that question too overnight.

10 So I think what would have been an
11 approach that could have been taken in this case could
12 have been that there could have been some discussions
13 with each of the individual companies' consultants.
14 Perhaps, set up some kind of technical conference, and
15 perhaps make those consultants available for not just
16 explaining how everything in their model works but
17 also providing us maybe some sensitivities if we were
18 to ask them to run some alternative cases. And -- so
19 actually just more information. Perhaps, talking
20 directly to the consultants themselves.

21 In past -- in past cases, the -- the
22 discovery would -- would have enabled us to do just
23 that; get enough information from the consultants.
24 And also this information would have been available to
25 the panel staff as -- and that would have been

1 protected sort of CSI agreements; that we would not be
2 able to use the information; we would not be able to
3 use the underlying intellectual property. And we
4 protect it like we do the CSI in this case.

5 Now, I can remember a case we had with
6 another client where some of the -- actually one (1)
7 of the experts that's used by Manitoba, we actually
8 ran into another case where they were providing some
9 services to a utility, and we were monitoring. And we
10 worked very closely with them. They provided -- they
11 were very forthcoming as far as what their model does,
12 how their model works. They -- the would provide us
13 with various calculations, various sensitivities.

14 So we do have experience working with
15 these companies and opening up their intellectual
16 property for us to understand what's going on.

17

18 (BRIEF PAUSE)

19

20 DR. ROBERT SINCLAIR: Now, probably in
21 -- in defence of Manitoba Hydro, we did have a short
22 time frame, so it may have -- if we hadn't gone down
23 the road of setting up technical conferences to -- to
24 really dig into these, we -- we may have run out of
25 time. So in part we sort of cut -- we sort of cut

1 that path short and said, you know, We -- if we go
2 down that path we may not get what we want, and it may
3 take too long. So we just went ahead and -- and said,
4 Okay, let's -- let's do our own forecast at this
5 point.

6 THE CHAIRPERSON: In your experience,
7 Dr. Sinclair, is the approach used by Manitoba Hydro
8 to forecast prices, namely securing price estimates
9 from various forecasters and generating a value, is
10 that consistent with what the -- approaches that are
11 being used by other generators in North America?

12 DR. ROBERT SINCLAIR: We -- yes, we
13 have seen other generators using forecasters like this
14 to support their expansion plans.

15 THE CHAIRPERSON: Can you give us an
16 idea of what others are using if they're not using the
17 approach that's used by Manitoba Hydro?

18 DR. ROBERT SINCLAIR: What I said was
19 that, yeah, we do see the other -- the other clients
20 we've worked with, we do see them using consultants to
21 provide price forecasts.

22 THE CHAIRPERSON: But -- I'm sorry,
23 I'm wondering in some cases where clients are not
24 using this approach, what are they using? What are
25 they --

1 DR. ROBERT SINCLAIR: Oh, okay. Let's
2 see. So I'm trying to think of some examples. You
3 can -- sometimes there are some -- yeah, I -- I can't
4 really think of -- I'm thinking of the client we had
5 when they were doing power supply procurement which is
6 the closest to what Manitoba Hydro is doing right now,
7 and they used a price forecaster.

8 But I can't think of any -- I'd have to
9 think some more about what some other people have
10 done. I -- I can't answer that right now.

11 THE CHAIRPERSON: Coming back to the
12 methodology you used to project prices into the
13 future, are you actually using that technology right
14 now in your market monitoring, in terms of the
15 operation of MISO?

16 DR. ROBERT SINCLAIR: Yeah, we -- we
17 sort of use components of it to do our market
18 monitoring. For instance, the -- we oftentimes will
19 take the supply curves, and adjust them for fuel
20 prices, because we sometimes use those offer curves as
21 -- for reference prices. If you remember yesterday, I
22 discussed sometimes we have these processes where we
23 have to compare the offers made by a participant to
24 their marginal costs, and that changes with the fuel
25 prices. So sometimes we'll have to make some

1 projections on the supply curves in future periods
2 when fuel prices change.

3 So that's one (1) component that we
4 use.

5 THE CHAIRPERSON: And how far -- how
6 far ahead do you go with those projections?

7 DR. ROBERT SINCLAIR: Typically for
8 those we'll just go a year ahead or so. But we will
9 do all -- we also have components of the capacity
10 price estimates that we use on an ongoing basis, and
11 those are typically a year ahead. But they -- but a
12 long-run equilibrium in the capacity market doesn't
13 have to go that far ahead. As you saw with -- our
14 discussion yesterday, what -- what you need to know is
15 the cost of entry and the net revenues, and you can
16 project that into the future fairly consistently.

17

18 CROSS-EXAMINATION BY MR. BOB PETERS:

19 MR. BOB PETERS: Good morning, Dr.
20 Sinclair.

21 DR. ROBERT SINCLAIR: Good morning.

22 MR. BOB PETERS: I guess asking
23 questions at the end of the list allows me to try to
24 clean up some areas, so I'm not intending to duplicate
25 what parties have done before me. And I'm also -- my

1 questions are not designed to elicit commercially
2 sensitive information to be put onto the public
3 record.

4 You understand that, sir?

5 DR. ROBERT SINCLAIR: Yes.

6 MR. BOB PETERS: And if -- if, to give
7 the panel a complete answer to your question, you
8 believe you have to use CSI information, then I would
9 just ask you to undertake to provide it through your
10 counsel. And that could be provided in a way that
11 still protects the CSI of the company.

12 DR. ROBERT SINCLAIR: Okay.

13 MR. BOB PETERS: In discussions you've
14 even had this morning with the Chairman and others,
15 and you also mention on slide 4 of your slide deck,
16 that Potomac is the market monitor for the mid-
17 continent ISO, amongst other ones, correct?

18 DR. ROBERT SINCLAIR: Yes.

19 MR. BOB PETERS: How long have -- has
20 Potomac been the -- the independent market monitor for
21 MISO?

22 DR. ROBERT SINCLAIR: Since 2003.

23 MR. BOB PETERS: And for the other
24 wholesale electricity markets in New York, New
25 England, and Texas?

1 DR. ROBERT SINCLAIR: New York and ISO
2 New England, in about 2001. For Texas, I believe
3 around 2006.

4 MR. BOB PETERS: You did touch on some
5 of the areas in which the independent market monitor
6 functions, but I -- I didn't get a good handle on the
7 thrust of the independent market monitor's work.

8 Can you explain that further to the
9 panel, please?

10 DR. ROBERT SINCLAIR: Okay. The --
11 when the RTOs form and like MISO, when MISO formed,
12 the Federal Energy Regulatory Commission required them
13 to have a market monitor; partly just because some of
14 the market failures that occurred in California, if
15 you recall, in 2000, 2001. And the idea was that if
16 you -- if the RTO wants to operate a market then there
17 should be some way to make sure that the market is
18 working, mitigating market power.

19 And so all the RTOs were required to
20 have some kind of market monitoring unit. And some of
21 them decided to get a market monitor independently
22 contracted like MISO. MISO did that.

23 So our -- our job is really we are
24 hired by the MISO, and also the other RTOs we work
25 for, but we're independent, and there are certain

1 guidelines that the Commission sets up for our
2 independence. And we're not allowed to be removed by
3 the MISO. So there's not allowed to be pressure by
4 the MISO or any RTO to have us removed without the
5 Commission approving. So that establishes some degree
6 of independence.

7
8 And so, really, the main responsibility
9 of the market monitor is to make sure the markets
10 work. And to do that we monitor participants, making
11 sure that -- that their behaviour in the market is not
12 causing inefficiencies or exercising market power. We
13 also monitor the RTO itself, so to make sure that the
14 operations of the RTO are not interfering with the
15 market, such as -- by committing too much resources or
16 putting lines out of service at the wrong time. And
17 we also assist the RTO in developing market rules to
18 make the market more efficient.

19 Now, in all these responsibilities
20 we're required to, of course, look closely at the
21 underlying data in the market to see what participants
22 are doing, to see what the impact of the market is,
23 and to work closely with the RTO in implementing
24 changes to the market. And we also then report on a
25 periodic basis about the state of the market.

1 MR. BOB PETERS: That report is an
2 annual report on the state of the market?

3 DR. ROBERT SINCLAIR: We do annual
4 reports on -- in each of the markets, but in some
5 markets we do quarterly and also monthly reports. And
6 also it could be special reports as issues -- special
7 issues arise that may be inte -- to the interest of
8 market participants.

9 MR. BOB PETERS: And when you talked
10 to the Commission in your second last answer, Dr.
11 Sinclair, you were referring to the FERC, or the
12 Federal Energy Regulating Commission?

13 DR. ROBERT SINCLAIR: Yes.

14 MR. BOB PETERS: And how often do you
15 detect market manipulation in your independent
16 monitoring?

17 DR. ROBERT SINCLAIR: Well, we have
18 some automated mitigation measures that can detect
19 market manipulation and correct it right away. We
20 oftentimes have referrals to FERC, the Commission,
21 when we see a certain behaviour taking place. I don't
22 have on -- at -- in my mind right now exactly how
23 often that happens, but Dr. Patton later on may be
24 able to give you more information on it. He tracks
25 that more closely.

1 MR. BOB PETERS: Can you tell the
2 panel what is Potomac's understanding as to why
3 Potomac was chosen to be the independent market
4 monitor for MISO?

5 DR. ROBERT SINCLAIR: I understood
6 that the panel was interested in an expert that would
7 understand the workings of the MISO market and what
8 the potential -- the expectations of -- for prices and
9 quantities in that market, and the potential for
10 Manitoba Hydro to sell into that market.

11 MR. BOB PETERS: But I meant in terms
12 of why Potomac was chosen by MISO to be the
13 independent market monitor.

14 DR. ROBERT SINCLAIR: Oh, I thought
15 you meant why the panel chose us. That's why the
16 panel chose us, I think.

17 It -- we -- we had orig -- initially
18 had some experience as monitors in New York and New
19 England, so we alre -- already had some expertise in
20 that area. And we had expertise in engineering and
21 economics, and also some expertise in electricity
22 markets.

23 MR. BOB PETERS: Was it a competitive
24 process?

25 DR. ROBERT SINCLAIR: I believe they

1 interviewed more than just us, yes.

2 MR. BOB PETERS: In your assignment
3 for this panel, did you review Hydro's forecasts of
4 export revenues?

5 DR. ROBERT SINCLAIR: Yes.

6 MR. BOB PETERS: And -- and that was
7 in addition to the forecast unit export prices?

8 DR. ROBERT SINCLAIR: Yes.

9 MR. BOB PETERS: And to -- to look at
10 those forecasts of export revenues, I -- I wasn't
11 clear in your answer to Mr. Williams yesterday whether
12 you went back to 2009 in the integrated financial
13 forecast and followed through on -- on that particular
14 forecast as well as other ones?

15 DR. ROBERT SINCLAIR: We did review
16 the forecast from 2009, but we did not evaluate it
17 quantitatively. We don't have any results to say
18 whether the forecast was in line with actual results
19 or not.

20 MR. BOB PETERS: And I want to also
21 clarify for the benefit of the panel, there's been
22 evidence in this proceeding that Manitoba Hydro had a
23 2012 export price forecast.

24 And you're aware of that, are you?

25 DR. ROBERT SINCLAIR: Yes.

1 MR. BOB PETERS: And in the course of
2 preparing for this NFAT application Hydro realized
3 that the 2012 forecast may not be accurate, and they
4 adjusted the 2012 export market price forecast.

5 You're aware of that?

6 DR. ROBERT SINCLAIR: That's correct.
7 Yeah.

8 MR. BOB PETERS: And -- and
9 subsequently, Hydro obtained a 2013 market price
10 forecast, which was then different from the 2012
11 forecast and also different from the adjusted 2012
12 forecast that they had used.

13 You're aware of that as well?

14 DR. ROBERT SINCLAIR: Yes.

15 MR. BOB PETERS: And I -- I do think
16 Mr. Rainkie put on the record the -- the percentages,
17 but I don't know that that's germane at this point.

18 But in terms of the forecast, would the
19 panel be correct in understanding that Potomac's
20 review was primarily of the 2013 price forecast and
21 that's the basis for your report?

22 DR. ROBERT SINCLAIR: That's correct.

23 MR. BOB PETERS: Now, you had talked
24 to the Chairman this morning about retrospectively
25 testing your methodology. And in terms of testing it

1 in the near term going forward you'd expect that your
2 methodology would track relatively closely, because of
3 the -- the proximity in time in which it was done,
4 correct?

5 DR. ROBERT SINCLAIR: That's correct.

6 MR. BOB PETERS: I didn't understand
7 how you could use your methodology and test it in --
8 in years past, maybe the '08 or '09 or '10 years. Can
9 you explain what -- what your understanding is as to
10 how that would have to happen?

11 DR. ROBERT SINCLAIR: Yes. Well, we
12 simply do backwards what I explained we did forward in
13 the market; that is we'd have to remove capacity from
14 the market. We'd have to use the -- probably lower
15 gas prices. We'd have to use lower demand. So we
16 simply would be adjusting the supply curve backwards
17 instead of forward.

18 MR. BOB PETERS: Would it be adjusted
19 based on knowns, or based on -- on what would be
20 forecasts?

21 DR. ROBERT SINCLAIR: You know, we
22 would put what -- what actually happened.

23 MR. BOB PETERS: So if you did what
24 exactly happened, wouldn't it follow that it would be
25 -- because it was based on -- on '12 and '13

1 materials, if you did go backwards it -- with what you
2 know it would -- it would line up again? I'm not
3 understanding the --

4 DR. ROBERT SINCLAIR: Yeah, I think it
5 would line up pretty well, because we would just be
6 using -- we would still be using 2011/2012 base supply
7 curves, because that's the idea, we're using those
8 base supply curves, but we would be adjusting it to
9 see how it performed against the -- like a back cast,
10 seeing how it performed.

11 MR. BOB PETERS: All right. So you'd
12 be -- you'd be testing the 2011/'12 supply curves for
13 what actually happened to see if it -- it would line
14 up with the numbers that would be generated.

15 DR. ROBERT SINCLAIR: That's right,
16 yeah.

17 MR. BOB PETERS: Okay. And you said
18 that that may not take an inordinate amount of
19 resources, is what under -- interpreted your answer?

20 DR. ROBERT SINCLAIR: Yeah, I think
21 so. I'd have to check, but it's possible that we
22 could run that without spilling a lot of blood, so to
23 speak.

24 MR. BOB PETERS: Well, I wonder if --
25 I'll just ask you to -- to check into that, and

1 undertake through your counsel to advise Mr. Monnin
2 what resources and time frame would -- would be
3 required to perform that back testing, and then we'll
4 leave it to the panel to decide whether that's
5 something that they want to pursue further. Would
6 that be acceptable, sir?

7 DR. ROBERT SINCLAIR: Yes.

8 MR. BOB PETERS: All right. Thank
9 you.

10

11 --- UNDERTAKING NO. 81: Potomac to indicate the
12 resources and the time
13 frame that would be
14 required to perform that
15 back testing

16

17 CONTINUED BY MR. BOB PETERS:

18 MR. BOB PETERS: We heard in your
19 answers to, I believe almost all counsel, Mr.
20 Williams, Mr. Hacault, and Ms. Ramage included, that
21 your base forecasts had assumptions made by the Energy
22 Information Agency, correct?

23 DR. ROBERT SINCLAIR: Correct.

24 MR. BOB PETERS: Can you explain to
25 this panel specifically what is the Energy Information

1 Agency?

2 DR. ROBERT SINCLAIR: Yes. The Energy
3 Information Agency is an agency of the Department of
4 Energy, and they -- I believe they were created
5 sometime in the 1990s when energy was a high prof --
6 high profile subject in the US; around the world
7 really.

8 And what the Energy Information Agency
9 does is track all forms of energy used in the US:
10 electricity, oil, natural gas markets. And they also
11 produce a model that is intended to replicate the
12 energy consumption in the United States. And they
13 also make forecasts of energy consumption supply in
14 the United States. And this includes electricity,
15 natural gas, oil, transportation fuels, production of
16 fuels; all -- all manner of energy market and supply
17 issues.

18 And, so we were focussed, of course,
19 just on the electricity sector, and just in the region
20 of the MISO. So they do it all across the US, and in
21 all sectors. And they -- they work to produce these
22 long-term forecasts which are also integrated with
23 each -- with one another. For instance, the gas
24 markets are integrated with the electricity markets,
25 the transportation fuels are integrated with the

1 industrial sector, and the industrial sector is
2 integrated with the gas and electricity sector. So
3 they have an integrated model. So they're able to
4 produce these forecasts of natural gas prices,
5 retirements, changes in demand, and also to conduct
6 sensitivities of those forecasts.

7 MR. BOB PETERS: How often do they do
8 those forecasts, Dr. Sinclair?

9 DR. ROBERT SINCLAIR: They do major --
10 they do their annual energy outlook every year, and I
11 do believe they update that outlook once a year.

12 MR. BOB PETERS: So in addition to the
13 annual report there's a mid -- a mid-term update?

14 DR. ROBERT SINCLAIR: Yes. And, you
15 know, I think the update varies other components of it
16 from time to time --

17 MR. BOB PETERS: All right. And --

18 DR. ROBERT SINCLAIR: -- through other
19 studies.

20 MR. BOB PETERS: -- can you explain to
21 the Panel what you meant by integrating the forecasts.
22 And I wasn't sure if you were trying to cover that in
23 your answer.

24 But what is integrated into the
25 electricity forecast?

1 DR. ROBERT SINCLAIR: So there --
2 there will be -- be some interest in forecasting
3 electricity demand which will depend in part on the
4 price of natural gas, because that determines not just
5 how much electricity is -- costs to produce but also
6 whether there is some shifting of demand between
7 electricity, natural gas, as a result of prices.
8 Also, transportation fuels will -- will affect overall
9 cost of industrial production which then will impact
10 demand for electricity. So it's integrated in that
11 sense.

12 MR. BOB PETERS: From Potomac's
13 experience, does the EIA have a forecast for the
14 commencement date for CO2 prices?

15 DR. ROBERT SINCLAIR: EIA in the
16 reference case assumes that CO2 prices will not be --
17 will not occur, but they do have some sensitivities
18 where CO2 prices do come into play. And, in fact,
19 when they do -- when they do a sensitivity on the CO2
20 price it comes into play I think in 2015.

21 MR. BOB PETERS: You say the reference
22 case of EIA doesn't contain a CO2 component; and is
23 that because there is currently no existing US
24 legislation requiring CO2 tax or costs?

25 DR. ROBERT SINCLAIR: That's correct.

1 MR. BOB PETERS: But in terms of the
2 sensitivities, those are the what-ifs if there was a -
3 - a carbon cost. They've done it -- they have a --
4 GHG-10 sensitivity that -- that you're familiar with?

5 DR. ROBERT SINCLAIR: Yes, they have a
6 greenhouse gas cost of ten dollars (\$10) per tonne.
7 And I believe that sensitivity starts in 2015. They
8 also have one at twenty-five dollars (\$25) and -- and
9 higher, I think -- at twenty dollars (\$20), I can't
10 remember. But they have a couple of --

11 MR. BOB PETERS: A number of
12 sensitivities? DR. ROBERT SINCLAIR: Yes.

13 MR. BOB PETERS: And can you explain
14 to this panel what triggers the -- the commencement
15 date of 2015 in the sensitivities?

16 DR. ROBERT SINCLAIR: I think -- you
17 know, we didn't look into that why they start in 2015,
18 but I think they did not want to speculate on when it
19 would actually happen.

20 MR. BOB PETERS: On a -- a different
21 topic, Dr. Sinclair, would the panel correctly
22 understand Potomac's assumption that the historical
23 net impacts into MISO continue at a relatively static
24 level into the future for at least the twenty (20)
25 year forecast period that you used?

1 DR. ROBERT SINCLAIR: Yeah. The net
2 imports are -- are based on the 2011/2012 volumes,
3 except that the -- we incorporate the Manitoba Hydro
4 new imports from their Development Plan.

5 MR. BOB PETERS: So with the exception
6 -- the -- sorry, let me rephrase that. The net
7 imports into MISO are -- are continuing at a
8 relatively static level with the exception of
9 increases for Hydro's planned increased exports
10 resulting from its Preferred Development Plan?

11 DR. ROBERT SINCLAIR: That's correct.

12 MR. BOB PETERS: And why is it
13 reasonable for Potomac to assume that net exports,
14 excluding the Manitoba Hydro exports, do not change?

15 DR. ROBERT SINCLAIR: We thought that
16 was reasonable, because we had no basis for -- we did
17 not see developments in neighbouring markets which
18 would suggest that imports would increase one -- in
19 one direction or the other, except that we knew that
20 there may be some new hydro coming in from -- from
21 Canada.

22 MR. BOB PETERS: I realized when I was
23 asking that question that what we on this side of the
24 border consider exports you refer to them as imports,
25 so I -- I --

1 DR. ROBERT SINCLAIR: Yeah, I
2 understood. Yeah.

3 MR. BOB PETERS: I'd like to turn, if
4 I could, to page 49 of Potomac's public report which
5 is marked as Exhibit Potomac 2.1.

6 And on page 49, that's on the screen in
7 front of you, Dr. Sinclair, this is Potomac showing
8 the panel what the capacity changes are over the --
9 forecast over the next twenty (20) years, correct?

10 DR. ROBERT SINCLAIR: That's correct.

11 MR. BOB PETERS: And if we look at the
12 left-hand side of the chart, this represents the
13 reference case that Potomac has developed, correct?

14 DR. ROBERT SINCLAIR: That's correct.

15 MR. BOB PETERS: Is that with or
16 without carbon?

17 DR. ROBERT SINCLAIR: The reference
18 case is -- it's the same with and without carbon.

19 MR. BOB PETERS: And the retirements
20 are shown here as a cumulative retirement total?

21 DR. ROBERT SINCLAIR: Those are
22 cumulative.

23 MR. BOB PETERS: And so if I look at
24 this chart -- before I ask that, explain to the panel
25 what the steam reference is.

1 Is that natural gas file -- fired
2 boilers?

3 DR. ROBERT SINCLAIR: Yes, it'll be
4 boilers. Natural gas fired boilers.

5 MR. BOB PETERS: Not coal fired?

6 DR. ROBERT SINCLAIR: Not coal. Coal
7 would be separate.

8 MR. BOB PETERS: All right. And in
9 discussions that we've heard about in terms of coal
10 retirements, this view of the capacity changes in MISO
11 from Potomac shows coal retirements somewhere between
12 4 and 5 gigawatts?

13 DR. ROBERT SINCLAIR: Yeah, I think it
14 turns out to be closer to six (6). You see there's
15 some additions there.

16 MR. BOB PETERS: I see. So when we
17 take the lowest point we're -- when -- when we add in
18 the -- the steam as well as the coal and -- and it
19 looks like the CTs that are going to be retired, it --
20 it gets closest to -- closer to six (6), correct?

21 DR. ROBERT SINCLAIR: Yeah, that's
22 correct.

23 MR. BOB PETERS: And -- and then if we
24 look in the middle of the chart we see the low gas
25 price case that Potomac has developed, correct?

1 DR. ROBERT SINCLAIR: That's correct.

2 MR. BOB PETERS: And in this
3 particular case, can you explain to the panel why the
4 retirements of coal cumulatively are -- are greater?

5 DR. ROBERT SINCLAIR: Yes, because it
6 -- when you have lower gas prices the -- the least --
7 the -- the less efficient coal plants become less
8 profitable and they would go into retirement, because
9 the gas is cheaper to run for base load.

10 MR. BOB PETERS: And so what you're
11 showing here is, there's more coal retirements, but
12 then there's also likewise more combustion turbines
13 added on?

14 DR. ROBERT SINCLAIR: That's correct,
15 yeah. And by the way that -- the black line that goes
16 through all of this it would be the net of all
17 capacity. So you'll see it first in the -- in the
18 reference case, the black line; it shows lots of
19 retirements in the first couple of years on -- on a
20 cumulative basis, and then they'll start adding over
21 time again. And, actually, the capacity in the end
22 increases by about 2,000 megawatts, at the end of the
23 period, that black line.

24 MR. BOB PETERS: Right. And you're
25 referring in that answer to the reference case?

1 DR. ROBERT SINCLAIR: The reference
2 case, yeah.

3 MR. BOB PETERS: And is the -- in that
4 -- while we're still on the reference case then, Dr.
5 Sinclair, that -- that black wavy line that runs
6 through the -- through the bar chart, you show the
7 accelerated cumulative retirements of coal in the
8 early years, correct?

9 DR. ROBERT SINCLAIR: That's correct.
10 They retire early.

11 MR. BOB PETERS: And does that help
12 establish the capacity price going forward in terms of
13 tightening up the capacity that would be available in
14 MISO?

15 DR. ROBERT SINCLAIR: Exactly. That's
16 why in our capacity price we see it increase over the
17 first couple of years and it reaches equilibrium about
18 2018 when the -- when the coal is finally bal -- the
19 coal retirements cause the system to be balanced.

20 MR. BOB PETERS: And, lastly, let's
21 just turn over to the high growth portion of the
22 chart.

23 And that high growth scenario includes
24 a carbon cost, does it not?

25 DR. ROBERT SINCLAIR: Yes.

1 MR. BOB PETERS: And would it be
2 correct for this panel to understand that that -- that
3 high growth would be higher without carbon costs?

4 DR. ROBERT SINCLAIR: The -- the
5 growth rate and demand would be higher without carbon
6 cost.

7 Is that what you mean?

8 MR. BOB PETERS: That -- yes, that was
9 my question.

10 DR. ROBERT SINCLAIR: Yes.

11 MR. BOB PETERS: But in terms of the -
12 - we'll -- I'll come to that later on a -- on another
13 slide, I think.

14 DR. HUGH GRANT: Before you leave this
15 slide, I was just wondering what the overall capacity
16 in the market is? And this is in percentage terms.
17 Is it -- is it a lot, or...?

18 DR. ROBERT SINCLAIR: Yeah, the MISO
19 capacity is about 105,000 megawatts. May -- maybe a
20 hundred and ten thousand (110,000).

21 DR. HUGH GRANT: So in the -- if you
22 change the axis it would be sort of plus or minus 10
23 percent, sort of.

24 Is that about right?

25 DR. ROBERT SINCLAIR: Let's see. Each

1 -- each line would be 5 percent -- 5 percentage
2 points. So minus -- is that what you mean?

3 DR. HUGH GRANT: No, I thought at the
4 top it would be -- is it -- it's ten thousand (10,000)
5 --

6 DR. ROBERT SINCLAIR: Ten (10) percent
7 would be the top, yeah. Yeah, that's right. Yes.

8 DR. HUGH GRANT: Okay.

9 DR. ROBERT SINCLAIR: So, yeah, you
10 can convert the ten thousand (10,000) to 10 percent,
11 that's right.

12

13 CONTINUED BY MR. BOB PETERS:

14 MR. BOB PETERS: Maybe I'll ask Ms.
15 Villegas to turn to slide 40 from Potomac Exhibit 4,
16 and -- and just deal with that point that we were
17 talking about, Dr. Sinclair. Or at least one (1) of
18 the points is that, as I read Manitoba Hydro's
19 rebuttal, that the more efficient coal plants will
20 have lower carbon emissions and thus pay lower carbon
21 prices.

22 Is that how you understood their point
23 to be?

24 DR. ROBERT SINCLAIR: The point was
25 that the -- the less efficient ones will have higher -

1 - will have higher carbon output.

2 MR. BOB PETERS: And with that answer,
3 when I turn to slide 40 I don't see that demonstrated,
4 Dr. Sinclair, particularly in the middle row where I
5 think Ms. Ramage has it that the -- the CT-New is the
6 single cycle combustion turbine new, correct?

7 DR. ROBERT SINCLAIR: Correct.

8 MR. BOB PETERS: And if we follow that
9 line item across, the general understanding is that
10 because it's a single cycle combustion turbine it will
11 require more fuel than the combined cycle gas turbine,
12 correct?

13 DR. ROBERT SINCLAIR: Correct.

14 MR. BOB PETERS: And, so under the
15 fuel cost column we see that the fuel cost for the --
16 for the CT-new is -- is higher than that for the CCGT-
17 New, correct?

18 DR. ROBERT SINCLAIR: Correct.

19 MR. BOB PETERS: And then if we follow
20 that further, assuming the carbon cost is -- you have
21 it as approximately twenty dollars (\$20) a ton, right?

22 DR. ROBERT SINCLAIR: Correct.

23 MR. BOB PETERS: And that ton --

24 DR. ROBERT SINCLAIR: That's a long --

25 MR. BOB PETERS: -- on your side of

1 the border is the 2,000 pounds?

2 DR. ROBERT SINCLAIR: Yeah, this is a
3 long ton. It's twenty (20) --

4 MR. BOB PETERS: Twenty-two hundred
5 (2,200) pounds --

6 DR. ROBERT SINCLAIR: -- kilograms,
7 yeah.

8 MR. BOB PETERS: Sorry, it's 2,000
9 kilo --

10 DR. ROBERT SINCLAIR: One thousand
11 (1,000) kilograms. Twenty (20) -- 200 pounds.

12 MR. BOB PETERS: Okay.

13 DR. ROBERT SINCLAIR: Yeah.

14 MR. BOB PETERS: Or call that the US
15 long ton. Would that be --

16 DR. ROBERT SINCLAIR: Long ton. Yeah,
17 we call it the long ton.

18 MR. BOB PETERS: And I thought metric
19 was confusing, but let's continue on.

20 Well, just the significance of that.
21 If it's the long ton, it's approximately 10 percent
22 more than -- than what I guess is considered the US
23 short ton, correct?

24 DR. ROBERT SINCLAIR: Correct.

25 MR. BOB PETERS: And the US short ton

1 is equivalent to approximately 2,000 pounds?

2 DR. ROBERT SINCLAIR: That's correct.

3 This is all done in metrics here. Okay.

4 MR. BOB PETERS: And your last answer
5 meaning it was done --

6 DR. ROBERT SINCLAIR: In the long --
7 in long --

8 MR. BOB PETERS: -- in met -- the long
9 ton --

10 DR. ROBERT SINCLAIR: Yeah.

11 MR. BOB PETERS: -- or the -- the
12 metric tonne?

13 DR. ROBERT SINCLAIR: Yeah, the metric
14 tonne.

15 MR. BOB PETERS: All right. Sorry to
16 digress on that, but let's stay with that CT-New row.
17 And we see under the fuel cost of fifty-eight dollars
18 and thirty-three cents (\$58.33) per megawatt hour,
19 correct?

20 DR. ROBERT SINCLAIR: Correct.

21 MR. BOB PETERS: And we use a common
22 carbon cost, but it appears the carbon cost is
23 identical for the CT-New as it is for the CCGT-New.

24 Do you see that on the chart?

25 DR. ROBERT SINCLAIR: That's correct,

1 yes.

2 MR. BOB PETERS: Is that an error on
3 the chart?

4 DR. ROBERT SINCLAIR: No, this -- this
5 is the way we did it in our -- in our analysis. And
6 this is where Manitoba Hydro came back and said, Well,
7 if you have a less efficient plant like the CT, which
8 is less efficient, the higher heat rates means it
9 requires more fuel to produce a kilowatt hour, that
10 you really should be producing more carbon, and that
11 the carbon cost should vary with the heat rate.

12 And we agree with that logic. But what
13 we want to show here is that, and this table will
14 illustrate it, what would happen here if we were to
15 make that adjustment, to make the -- a heat rate -- to
16 make the carbon cost a function of the heat rate. You
17 would have a lower carbon cost for the CCGT. And
18 actually, that fifty dollars (\$50) would be reduced.
19 We didn't do the calculation.

20 The CT-New would have a higher carbon
21 cost, because this is an average sale. We need to --
22 to bite out the two (2) types to get a lower for one
23 and a higher for the other. CT-New would have a
24 higher carbon cost. And also the coal plant, because
25 it's one of the less efficient ones, if we were to

1 take Manitoba Hydro's suggestion and break out the
2 carbon costs by heat rate, we would -- that coal plant
3 would have -- also have a higher carbon cost.

4 So you would end up -- if we were to
5 take the suggestion the CCGT-New would have a higher
6 marg -- a lower marginal cost than fifty dollars
7 (\$50), and the old coal plant would have a higher
8 marginal cost. So you would actually have CCGTs
9 overtaking coal plants in the production cost stack,
10 which means that they will be running in base load, at
11 least with respect to the older coal plants. So you'd
12 be -- coal plants would be -- the carb -- the --
13 sorry, the CCGTs would be setting a price in the
14 offbeat periods as a result of that. So if we were to
15 adjust the way Manitoba Hydro is suggesting we'd likely
16 have a lower off-peak price.

17 MR. BOB PETERS: Are you able to do
18 that calculation as an undertaking and provide it to
19 this panel?

20 DR. ROBERT SINCLAIR: We did do a
21 sensitivity. We haven't quality controlled it. We
22 haven't made sure everything's in order. But we did
23 find that the off-peak price declines several
24 percentage points; 4 percent, perhaps.

25 MR. BOB PETERS: And CCGT-New prices

1 are overstated here by 4 percent then?

2 DR. ROBERT SINCLAIR: No, the -- if we
3 were to allow the CCGT to have a lower carbon cost,
4 and when you go through the whole year of off-peak
5 prices, the total effect on the off-peak price is
6 about 4 percent.

7 MR. BOB PETERS: Oh, I see --

8 DR. ROBERT SINCLAIR: At some hours
9 the coal pri -- coal is still setting the price.

10 Of course, on the peak times you have
11 the opposite effect. You'll have -- you'll have CTs
12 with higher marginal cost, setting the price in more
13 hours, and you'll have a higher peak price. We
14 calculate that to be about 2 percent higher.

15 MR. BOB PETERS: Can you provide
16 through your counsel a calculation that will
17 demonstrate both the off-peak and the peak price
18 impacts?

19 DR. ROBERT SINCLAIR: Okay.

20 MR. BOB PETERS: All right. Thank
21 you.

22

23 --- UNDERTAKING NO. 82: Potomac to provide a
24 calculation that will
25 demonstrate both the off-

1 peak and the peak price
2 impacts
3

4 CONTINUED BY MR. BOB PETERS:

5 MR. BOB PETERS: What carbon price
6 would be required to make Hydro more economic than
7 coal?

8 DR. ROBERT SINCLAIR: So --
9 interesting.

10 MR. BOB PETERS: That may be another
11 one to take away unless you're able to do some quick
12 math on the microphone.

13 DR. ROBERT SINCLAIR: I can't do quick
14 math, but I can tell you what the influences would be.
15 So the Hydro is typically bid in at -- we -- we -- in
16 our model we bid the man -- the Hydro in at the CCGT
17 rates, because they have an opportunity cost of --
18 they just don't want to dump their water all the time.
19 They want to sort of optimize the water and we assume
20 that they optimize that with respect to the -- sort of
21 the mid-range part of the curve with just the CCGT.

22

23 (BRIEF PAUSE)

24

25 DR. ROBERT SINCLAIR: But I could --

1 I'll take that back, too.

2 MR. BOB PETERS: All right. Mr.
3 Monnin, we would then appreciate an undertaking for
4 Dr. Sinclair and Potomac to provide their view to this
5 panel as to what carbon price would be required to
6 make hydro more economic than -- than coal, taking
7 into account the information that Dr. Sinclair has
8 already indicated in terms of directionally dealing
9 with the CCGTs.

10 DR. ROBERT SINCLAIR: I mean, in
11 short-term hydro is already less expensive to provide
12 than coal. The question is how they would bid it into
13 the market.

14 MR. CHRISTIAN MONNIN: We undertake to
15 do that and --

16 DR. ROBERT SINCLAIR: Which I could
17 get a better explanation than that for you.

18 MR. BOB PETERS: All right. Thank you
19 for that, sir.

20

21 --- UNDERTAKING NO. 83: Potomac to provide their
22 view as to what carbon
23 price would be required to
24 make hydro more economic
25 than coal

1 CONTINUED BY MR. BOB PETERS:

2 MR. BOB PETERS: While we're on slide
3 40, the marginal cost with carbon price, that was set
4 out for 2030.

5 Have I got that right?

6 DR. ROBERT SINCLAIR: Yeah, those
7 values, like the -- the gas price for instance, is
8 from 2030.

9 MR. BOB PETERS: And -- and the
10 purpose of this chart, though, if we -- if we just
11 rewind that -- that movie, was to demonstrate to this
12 panel that the assumptions used by Potomac, when
13 considered through our -- make it relatively the same
14 for the CCGT and the -- and the coal plant.

15 That was your -- your point of
16 demonstrating this to the panel?

17 DR. ROBERT SINCLAIR: Yeah, there was
18 some discussion made about the coal -- coal plant
19 retirements and that we were -- we were -- it was
20 suggested that our -- we didn't retire enough coal
21 plants. And this table was to demonstrate that the
22 effect of retiring coal plants is not going to be that
23 significant, because the CCGTs will come -- come in to
24 replace them and the marginal costs are comparable.
25 And so --

1 MR. BOB PETERS: Would -- yeah, sorry.

2 DR. ROBERT SINCLAIR: So all the hours
3 when the coal plants were setting the price, you now
4 have a -- a -- you would now have that replaced by
5 CCGT and the price is comparable. So you don't have a
6 big price effect from more retirements.

7 MR. BOB PETERS: Did Potomac in its
8 work consider what the first year in-service cost
9 would be for the energy coming out of Keeyask
10 generating station?

11 DR. ROBERT SINCLAIR: The fully
12 allocated cost, or --

13 MR. BOB PETERS: Yes, sir.

14 DR. ROBERT SINCLAIR: With --
15 including capital cost?

16 MR. BOB PETERS: Yes, sir.

17 DR. ROBERT SINCLAIR: No, we didn't do
18 that.

19

20 (BRIEF PAUSE)

21

22 MR. BOB PETERS: When we talk of
23 carbon emission rates, there was prior evidence before
24 this panel that at least some of the MISO state
25 regulators require utilities to make assumptions as to

1 carbon in their resource planning.

2 Are you aware of that?

3 DR. ROBERT SINCLAIR: Yes.

4 MR. BOB PETERS: Can you explain to
5 this panel why that occurs; why that's -- why that
6 procedure is done?

7 DR. ROBERT SINCLAIR: Yes. Across the
8 US in some of the MISO states there -- the regulators
9 are requiring that utilities have a mix of renewables
10 in their -- in their generate -- generator fleet, and
11 part of that is to reduce the amount of carbon
12 emissions from the generators in their states. And so
13 there's -- that provides an incentive for them to
14 procure wind and -- and hydro units.

15 So that may be one (1) of the other
16 factors I think I discussed earlier; why a utility
17 adding capacity may not be restricted just to the CT,
18 because the CT, although it's the cheapest, may not
19 advance other types of goals that the regulators may
20 set for the utility.

21 MR. BOB PETERS: Can we turn please,
22 Ms. Villegas, back to figure 1 on page 6. I guess
23 it's in the executive summary.

24 And, Dr. Sinclair, if you would prefer
25 to use any of the slides from Potomac Exhibit 4 in

1 lieu of this, certainly -- certainly let us know.

2 DR. ROBERT SINCLAIR: Okay.

3 MR. BOB PETERS: But Figure 1 shows
4 your two (2) forecasts of the potential opportunity
5 export energy prices, correct?

6 DR. ROBERT SINCLAIR: Yes.

7 MR. BOB PETERS: The peak prices are
8 on the left, and the off-peak are shown on the right?

9 DR. ROBERT SINCLAIR: Yes.

10 MR. BOB PETERS: and the lower line in
11 each of the figures reflects the reference case
12 without CO2 or carbon tax, correct?

13 DR. ROBERT SINCLAIR: Yes.

14 MR. BOB PETERS: And these price
15 forecasts are in real 2013 dollars?

16 DR. ROBERT SINCLAIR: Correct.

17 MR. BOB PETERS: US dollars?

18 DR. ROBERT SINCLAIR: US dollars, yes.

19 MR. BOB PETERS: And these are prices
20 at the -- what we -- the -- the delivery point into
21 MISO market which we've called the Manitoba Hydro
22 Electric Board pricing node, or MHEB node?

23 DR. ROBERT SINCLAIR: Yes, that's the
24 locational marginal price at the Manitoba border.

25 MR. BOB PETERS: Is it -- is --

1 MS. PATTI RAMAGE: Mr. Peters, could
2 we just have a quick break for a second while we
3 confirm something here?

4 MR. BOB PETERS: Certainly.

5 MS. PATTI RAMAGE: Just if we could
6 pause for a moment.

7

8 (BRIEF PAUSE)

9

10 MS. PATTI RAMAGE: Okay, Mr. Peters.
11 Sorry, false alarm. We just had to look.

12

13 (BRIEF PAUSE)

14

15 CONTINUED BY MR. BOB PETERS:

16 MR. BOB PETERS: Dr. Sinclair, while
17 you didn't do a fully -- I think you told me you
18 didn't do the fully allocated cost on in-service of
19 Keeyask, have you a perception of -- of what that
20 might be?

21 DR. ROBERT SINCLAIR: I guess it would
22 depend how long you amortize it. So we -- we really
23 haven't thought it through.

24 MR. BOB PETERS: And when you say
25 "amortize it," you're talking about the depreciation

1 on the --

2 DR. ROBERT SINCLAIR: Yeah, how long
3 you -- you would want to have the underlying capital
4 cost reflected in the production costs. For instance,
5 do you want to do it for thirty (30) years or eighty
6 (80) years. Then you would have a different allocated
7 cost.

8 MR. BOB PETERS: And the life of these
9 hydro assets, though, is long term?

10 DR. ROBERT SINCLAIR: Long term, yes.

11 MR. BOB PETERS: So wouldn't eighty
12 (80) years be a more appropriate time frame?

13 DR. ROBERT SINCLAIR: I -- I think a
14 longer term would be appropriate.

15 MR. BOB PETERS: And even in light of
16 that longer term are you then able to assist the panel
17 in understanding the Potomac perception of the annual
18 in-service costs of -- of the energy?

19 DR. ROBERT SINCLAIR: No, we -- we
20 didn't do a -- we didn't do a -- even a -- we didn't
21 even do a rough one.

22 MR. BOB PETERS: All right. And when
23 we talked to, before we just broke, briefly, the
24 prices in delivery on Figure 1 were at the -- the LMP,
25 the locational marginal price for Manitoba Hydro?

1 DR. ROBERT SINCLAIR: Yes.

2 MR. BOB PETERS: That -- that LMP, is
3 that the physical location or shall we take that as a
4 -- as a notional or virtual location?

5 DR. ROBERT SINCLAIR: I believe
6 actually it's a physical bus, yeah. That's where the
7 transactions are settled.

8 MR. BOB PETERS: And is that likewise
9 -- is there a physical bus for the -- for the MISO
10 SMP?

11 DR. ROBERT SINCLAIR: Not -- not
12 really. It's -- it's more of a calculation.

13 MR. BOB PETERS: So it's a notational
14 location?

15 DR. ROBERT SINCLAIR: Yes. It's more
16 of a -- it's kind of a -- an artifact of their
17 optimization model where they -- they start to --
18 they've taken all the information on the -- the load
19 and the resources that are available, and they tried
20 to minimize the production costs across the whole
21 footprint. And the model will provide them with sort
22 of the marginal cost of -- of meeting load before
23 considering all the congestion and losses on the
24 system. So it's sort of an uber-marginal cost.

25 MR. BOB PETERS: All right. Back to

1 Figure 1 still. And would it be correct that the
2 prices that are shown here do not include a capacity
3 component?

4 DR. ROBERT SINCLAIR: That's correct;
5 just the energy price.

6 MR. BOB PETERS: And these prices are
7 the day-ahead market prices?

8 DR. ROBERT SINCLAIR: The day-ahead
9 market prices.

10 MR. BOB PETERS: They're not the firm
11 contract prices, or expected?

12 DR. ROBERT SINCLAIR: They're --
13 they're day-ahead energy prices, right.

14 MR. BOB PETERS: And in terms of a --
15 an overall view, Potomac is forecasting that absent
16 the imposition of CO2 pricing, the export prices that
17 Hydro can achieve both on-peak and off-peak will
18 increase by about 50 percent from 2015 through to
19 2033?

20 DR. ROBERT SINCLAIR: I think with
21 carbon they will increase about 50 percent. The green
22 -- the green line.

23 MR. BOB PETERS: Well, with carbon --
24 sorry, I may have -- I may have been looking at the
25 wrong chart here. I'm looking at it on the -- on the

1 peak side increasing from thirty dollars (\$30) to
2 about sixty dollars (\$60) with carbon, correct?

3 DR. ROBERT SINCLAIR: That's correct,
4 yes.

5 MR. BOB PETERS: So it would go up a
6 hundred percent?

7 DR. ROBERT SINCLAIR: Yes.

8 MR. BOB PETERS: And then looking at
9 the -- the line without carbon, the one without the
10 hockey stick that Ms. Ramage likes, the energy price
11 goes from about thirty dollars (\$30) to forty-five
12 dollars (\$45).

13 So it goes up 50 percent?

14 DR. ROBERT SINCLAIR: Yes, that's
15 right.

16 MR. BOB PETERS: All right.

17

18 (BRIEF PAUSE)

19

20 DR. ROBERT SINCLAIR: With that system
21 marginal price, I just thought again that one way to
22 think about it is that MISO is sort of a -- produces
23 all their electricities. You can think of it as a
24 commodity, and it's produced all in one spot, but then
25 it has to be delivered to different places. And

1 imagine if instead of electricity it was some kind of
2 commodity like apples or something, and when you go to
3 different locations you may run into different
4 delivery constraints, and it costs more to get to
5 different locations.

6 So that's sort of what you can think of
7 the system marginal price in relation to congestion
8 and losses to be. Sort of the dif -- how difficult is
9 it to get it from the system out to the different
10 buses.

11 MR. BOB PETERS: Thank you for that --
12 for that analogy, as well. When we look at these
13 export prices on Figure 1, Dr. Sinclair, does Potomac
14 believe that Manitoba Hydro's importing into the
15 United States impacts the off-peak price?

16 DR. ROBERT SINCLAIR: We've found that
17 the only impact that would really have is with respect
18 to some losses, and it was rather -- it was rather
19 small.

20 MR. BOB PETERS: When you say,
21 "losses", you're meaning transmission losses?

22 DR. ROBERT SINCLAIR: Transmission
23 losses. So when we estimate the transmission losses,
24 we consider that additional imports into Manitou --
25 from Manitoba Hydro to the US will increase losses,

1 but it was by a very small amount. And there's no --
2 there's no conceivable way that the -- the amount of
3 power that Manitoba Hydro plans to sell would have an
4 impact on the MISO price.

5 MR. BOB PETERS: And that's probably
6 why it said that Manitoba Hydro is the -- is a price
7 taker as opposed to a price setter.

8 DR. ROBERT SINCLAIR: Price taker,
9 right.

10 MR. BOB PETERS: And -- and I suppose
11 as the market monitor you want to make sure that
12 there's -- you're telling the panel three's really no
13 ability of Manitoba Hydro to manipulate the market
14 based on its imports into the MISO?

15 DR. ROBERT SINCLAIR: Yeah, not just
16 from withholding -- not -- not by pricing alone.
17 There could be ways to manipulate congestion, but we
18 monitor for that; we wouldn't expect that to happen
19 either.

20 MR. BOB PETERS: Does the PJM
21 importing into MISO impact the off-peak price of
22 energy?

23 DR. ROBERT SINCLAIR: There -- there
24 are some -- there -- there tends to be a flow of power
25 from MISO to PJM, 'cause there's a -- currently a

1 surplus in MISO. So the supply coming from PJM will -
2 - tends to be minimal, so that will not have a big
3 impact on the price. But in theory it's possible.

4 MR. BOB PETERS: If we turn to slide
5 26 from the Potomac Exhibit 4, we see maybe a little
6 bit better graphically shown what we've been just
7 talking about, Dr. Sinclair. But you've demonstrated
8 before that when you start with the MISO system
9 marginal price you subtract the congestion, and you
10 subtract the losses, and you get the locational
11 marginal price at the Manitoba border, correct?

12 DR. ROBERT SINCLAIR: Correct.

13 MR. BOB PETERS: And why is this
14 congestion entirely allocated to Manitoba Hydro as
15 shown here? Aren't there other parties partly
16 responsible for that congestion, as well?

17 DR. ROBERT SINCLAIR: Well, the
18 congestion we measured at each location. So there are
19 other locations in MISO that will also have congestion
20 components associated with it.

21 So this isn't the total MISO
22 congestion. It's just the congestion associated with
23 getting power from the MISO system to the Manitoba --
24 to the Manitoba system -- to the Manitoba node at the
25 border. So it's not that all the congestion is

1 allocated to the Manitoba location, it's just the --
2 the congestion associated with that location is
3 allocated to that node.

4 MR. BOB PETERS: All right. I -- I --
5 maybe it's the lack of engineering understanding, but
6 if Manitoba Hydro is taking this energy to the US
7 border, and that's where their node is located -- and
8 that's basically your understanding, correct?

9 DR. ROBERT SINCLAIR: Yes.

10 MR. BOB PETERS: What's the
11 opportunity for congestion to occur at that location
12 when there's nobody else putting energy there?

13 DR. ROBERT SINCLAIR: Okay. So the
14 loc -- the -- the congestion isn't so much getting it
15 to the node, the congestion is how much would it cost
16 MISO to back down generators in that vicinity to allow
17 that power to come into the node. So at any given
18 time the system's in balance. So whenever you try to
19 move -- increase an injection, for instance, at the --
20 the Manitoba border, you'd have to make room for it.

21 And if it's exp -- if it's an area like
22 we have in the west of MISO, where there's lots of low
23 cost power, you have to back down some of the low cost
24 generators there to allow the Manitoba power to come
25 in. So when -- when you're backing down low cost

1 power, you're reducing -- you're re -- you're
2 increasing the cost to the system, because you still
3 have to keep it balanced.

4 MR. BOB PETERS: Okay. I -- I think I
5 have your point. And so the -- the congestion you're
6 measuring, you've called it 'marginal congestion' here
7 on slide 26.

8 That's Manitoba Hydro's responsibility
9 is what you're trying to demonstrate on your chart?

10 DR. ROBERT SINCLAIR: Yes. In order
11 to allow imports you -- there is congestion that has
12 to be managed.

13 MR. BOB PETERS: And that's at
14 Manitoba Hydro's expense?

15 DR. ROBERT SINCLAIR: It's the price
16 that would be earned -- this is the price that would
17 be earned by Manitoba Hydro and it's a -- it's a -- it
18 depends on the total cost in -- in MISO, but also what
19 MISO would have to do to allow additional power to be
20 produced there.

21 MR. BOB PETERS: But Manitoba Hydro's
22 prices decreased from the system marginal price based
23 on this congestion --

24 DR. ROBERT SINCLAIR: Yes.

25 MR. BOB PETERS: -- so it -- it is at

1 Manitoba Hydro's expense.

2 DR. ROBERT SINCLAIR: So it's at their
3 expense because they got a lower price.

4 MR. BOB PETERS: And -- and on these
5 tra -- on the marginal losses that you show we're
6 talking -- I think you told Board member Kapitany that
7 that was mostly related to transmission losses?

8 DR. ROBERT SINCLAIR: Yes.

9 MR. BOB PETERS: What else is it other
10 than transmission?

11 DR. ROBERT SINCLAIR: There could be
12 some -- there could be some distribution level issues
13 affecting the transfers, but mostly it's going to be
14 line losses. There could be some capacitor banks that
15 have to be managed. But, again, those typically --
16 they typically don't absorb a lot of the power. It's
17 going to be line losses from transformers step -- you
18 have to step down the power sometimes. You have some
19 losses there.

20 MR. BOB PETERS: I recall you had
21 given the Board a number of -- a percentage number, in
22 any event, for average losses in MISO being about 9
23 percent?

24 DR. ROBERT SINCLAIR: At -- at that
25 location it's about 9 percent.

1 MR. BOB PETERS: What is the system
2 average MISO transmission loss? Do you know?

3 DR. ROBERT SINCLAIR: Typically it's
4 about 4 percent, I believe. So it's higher in the
5 west because of all the -- because of the tendency of
6 the power to -- to be produced in the west and serving
7 load in -- in the east. So that tends to -- in other
8 words, the transmission lines are kind of hot because
9 there's lots of activity on them. Think of -- the
10 losses are associated with heat being absorbed by the
11 lines, basically. When you're using them a lot to
12 transfer over long distances, you're going to have
13 higher losses.

14 MR. BOB PETERS: Before I leave that
15 marginal congestion concept, is it the same day or
16 night?

17 DR. ROBERT SINCLAIR: No, our marginal
18 congestion changes on an hourly basis in accordance
19 with certain markets -- various market factors such as
20 the load. It will -- it will be different day and
21 night. That would be the average for the peak and off
22 peak, depending which -- which chart you're looking
23 at.

24 MR. BOB PETERS: All right. I want to
25 turn to -- to capacity prices. And maybe -- maybe we

1 can go back to figure 2 on page 7 of your Potomac
2 Exhibit-2.1. It's on the screen in front of you, sir.

3 This suggests to the panel, does it,
4 that capacity prices will increase from twenty-two
5 dollars (\$22) a kilowatt-year to about sixty-eight
6 dollars (\$68) a kilowatt- year?

7 DR. ROBERT SINCLAIR: Correct.

8

9 (BRIEF PAUSE)

10

11 MR. BOB PETERS: And when -- when you
12 use the concept kilowatt-year, can you explain that,
13 please?

14 DR. ROBERT SINCLAIR: Kilowatt-year is
15 the amount of money -- a kilowatt-year is -- is a
16 capacity measure. So it tells you how much capacity
17 you're providing for that year. So a -- a hundred
18 megawatt plant would be providing a thousand megawatts
19 -- I'm sorry, 10,000 kilowatt years -- 10,000
20 kilowatts a year if it's a capacity resource.

21 MR. BOB PETERS: You did the math in
22 your head. Are you able to convert the --

23 DR. ROBERT SINCLAIR: I could be
24 wrong. Let's see. So 1 -- 1 megawatt is 1,000
25 kilowatts, so if you had a 1 megawatt plant you're

1 providing 1,000 kilowatts a year.

2 MR. BOB PETERS: Can you convert the
3 capacity prices into an equivalent 5x16 energy price
4 per megawatt hour?

5 DR. ROBERT SINCLAIR: Say that again?

6 MR. BOB PETERS: You show here
7 capacity prices, correct?

8 DR. ROBERT SINCLAIR: Yes.

9 MR. BOB PETERS: And is it possible to
10 convert those capacity prices into an equivalent 5x16
11 energy price for megawatt hour?

12 DR. ROBERT SINCLAIR: Let's see. The
13 kilowatt -- the capacity price is typically a -- not
14 converted to an energy price. Capacity -- something
15 has to be available at all hours, so you would not
16 typically convert it to a 5x16.

17 MR. BOB PETERS: If you assumed it was
18 just on 5x16 energy though, you would do the -- do the
19 math to allocate the 5x16 hours in the year to that
20 cost?

21 DR. ROBERT SINCLAIR: See, I'd -- I'd
22 have to...

23

24 (BRIEF PAUSE)

25

1 DR. ROBERT SINCLAIR: So I'd have to
2 think that through.

3 MR. BOB PETERS: All right. The --
4 what I was just getting at, Dr. Sinclair, is that the
5 -- the purpose of the capacity cost is to -- to
6 recover fixed costs?

7 DR. ROBERT SINCLAIR: Yes.

8 MR. BOB PETERS: And --

9 DR. ROBERT SINCLAIR: Cost of -- the
10 purpose of the capacity cost is to provide enough
11 revenue so that the new entrant can -- would not make
12 losses.

13 MR. BOB PETERS: All right. And that
14 was your cost of new entrant calculation that you went
15 through yesterday?

16 DR. ROBERT SINCLAIR: Yes

17 MR. BOB PETERS: And --

18 DR. ROBERT SINCLAIR: It's meant to
19 recover some of your capital costs, right.

20 MR. BOB PETERS: Right. All right.
21 And, so if -- if that capacity price was only being
22 recovered through a 5x16 contract, I'd ask you to
23 undertake to see if you can convert that then into
24 dollars per megawatt for -- for -- let's pick your
25 twenty-two dollars (\$22) a year shown in your -- your

1 chart on Figure 2, and then also do the same
2 calculation for the, say, sixty-eight dollars (\$68) a
3 year, and --

4 DR. ROBERT SINCLAIR: Okay.

5 MR. BOB PETERS: -- calculate that in
6 terms of dollars per megawatt hour?

7 DR. ROBERT SINCLAIR: Okay. So what
8 you want to know is how much more energy revenue you
9 would need to cover your capacity costs?

10 MR. BOB PETERS: Well, if -- if you
11 were to recover -- no, I don't think that's what I'm
12 asking for. I'm asking that if you were to recover
13 your capacity costs through energy --

14 DR. ROBERT SINCLAIR: Yes.

15 MR. BOB PETERS: -- how would you --
16 how would you equate those costs into --

17 DR. ROBERT SINCLAIR: Okay.

18 MR. BOB PETERS: -- dollars per
19 megawatt hour.

20 DR. ROBERT SINCLAIR: I can certainly
21 do that, yes.

22

23 (BRIEF PAUSE)

24

25 MR. BOB PETERS: I've asked Dr.

1 Sinclair to undertake to convert the capacity prices
2 of twenty-two dollars (\$22) per kilowatt year to -- as
3 well as sixty-eight dollars (\$68) per kilowatt year
4 into dollars per megawatt hour.

5 DR. ROBERT SINCLAIR: 5x16x52, right?

6 MR. BOB PETERS: Correct.

7 DR. ROBERT SINCLAIR: Right.

8 MR. BOB PETERS: Okay. Thank you.

9 DR. ROBERT SINCLAIR: So that would be
10 five (5) days a week, sixteen (16) hours a day, every
11 week of the year?

12 MR. BOB PETERS: Yes, sir.

13

14 --- UNDERTAKING NO. 84: Potomac to convert the
15 capacity prices of twenty-
16 two dollars (\$22) per
17 kilowatt year as well as
18 sixty-eight dollars (\$68)
19 per kilowatt year into
20 dollars per megawatt hour,
21 5x16x52

22

23 CONTINUED BY MR. BOB PETERS:

24 MR. BOB PETERS: And is it likely, Dr.
25 Sinclair, that firm energy export contracts of 5x16

1 energy for any new Hydro contracts after 2035 will
2 achieve the full capacity price that you're
3 forecasting?

4 DR. ROBERT SINCLAIR: So you're saying
5 that could you design a contract that would be a 5x16
6 that could give you the same revenues after 2035?

7 MR. BOB PETERS: No, let me rephrase
8 the question. You're aware that Manitoba Hydro has
9 some 5x16 contracts now?

10 DR. ROBERT SINCLAIR: Yes.

11 MR. BOB PETERS: And those contracts
12 expire, and I'm assuming they've expired by 2034 --

13 DR. ROBERT SINCLAIR: Okay.

14 MR. BOB PETERS: -- or '35. And let's
15 assume that Manitoba Hydro then wants to enter into
16 new contracts after 2035, and they would be 5x16
17 contracts that would also not only have an energy
18 price but they'd also seek to recover a capacity cost.

19 DR. ROBERT SINCLAIR: Mmm, sure.

20 MR. BOB PETERS: Are you with me?

21 DR. ROBERT SINCLAIR: Sure.

22 MR. BOB PETERS: And I guess what I'm
23 wondering is from Potomac's perspective is it likely
24 that firm export contract sales of 5x16 energy for any
25 new contracts after 2035 will achieve the full

1 capacity price that Potomac is forecasting as seen
2 here on Figure 2?

3 DR. ROBERT SINCLAIR: Yes, that's --
4 that's what we are forecasting.

5 MR. BOB PETERS: And so it is likely
6 then that the market will -- you're saying the market
7 will provide that recovery to Manitoba Hydro's
8 exports?

9 DR. ROBERT SINCLAIR: Yes. Yeah,
10 we're projecting that's what they could earn on their
11 capacity component of their contracts.

12 MR. BOB PETERS: And you've confirmed
13 that Manitoba Hydro's long-term export contracts
14 typically include an energy price as well as a
15 capacity price?

16 DR. ROBERT SINCLAIR: That's correct.

17 MR. BOB PETERS: And in terms of
18 you're also aware that Manitoba Hydro also has what
19 they call diversity exchange contracts?

20 DR. ROBERT SINCLAIR: Yes.

21 MR. BOB PETERS: And those diversity
22 exchange agreements do not recover capacity revenues,
23 do they?

24 DR. ROBERT SINCLAIR: That's what I
25 understand.

1 MR. BOB PETERS: You understand they
2 do not recover capacity --

3 DR. ROBERT SINCLAIR: Yeah, I'd have
4 to check but that's what I understand.

5 MR. BOB PETERS: And -- but you do
6 understand that its firm price contracts recover
7 capacity revenues?

8 DR. ROBERT SINCLAIR: Correct.

9 MR. BOB PETERS: And without
10 disclosing any amounts, did you review or were you
11 able to establish the annual capacity revenue Hydro
12 achieved from the current 500 megawatt NSP long-term
13 contracts?

14 DR. ROBERT SINCLAIR: I believe I
15 looked at that one, yes.

16 MR. BOB PETERS: Did you look also at
17 Manitoba Hydro's other current firm fixed price
18 contracts?

19 DR. ROBERT SINCLAIR: I did.

20 MR. BOB PETERS: And would it be
21 correct that whatever numbers came out of your review
22 are not included in -- in your report?

23 DR. ROBERT SINCLAIR: Yeah. We did
24 not include those in our report; we used them sort of
25 as a point of reference.

1 MR. BOB PETERS: I wonder if you could
2 undertake through your counsel if you can locate that
3 information to -- to provide the panel as CSI,
4 recognizing the sensitivity of that information, the
5 annual capacity revenue that you see Manitoba Hydro
6 achieving under its current contracts?

7 DR. ROBERT SINCLAIR: The ones we
8 looked at we can do that for.

9 MR. BOB PETERS: Thank you, sir.

10 DR. ROBERT SINCLAIR: We didn't check
11 every one in the same way, but if the other ones are
12 similar then we can do it.

13

14 --- UNDERTAKING NO. 85: Potomac to locate the
15 annual capacity revenue
16 that it sees Manitoba Hydro
17 achieving under its current
18 contracts, and to provide
19 as CSI

20

21 CONTINUED BY MR. BOB PETERS:

22 MR. BOB PETERS: While -- and -- and
23 in terms of the other contracts I was talking about
24 existing contracts not -- not future contracts, Dr.
25 Sinclair.

1 DR. ROBERT SINCLAIR: Yes, I
2 understood existing.

3 MR. BOB PETERS: All right. And if we
4 can go to I think page 44 of Potomac's Report, Exhibit
5 2.1. I think everybody has taken you here, Dr.
6 Sinclair, so.

7 In your review of Hydro's historical
8 export sales, you tried to determine the percentage of
9 dependable energy sales that were through diversity
10 exchanges?

11 DR. ROBERT SINCLAIR: No, we asked to
12 verify the assumption that the -- that the future
13 dependable capacity that would be created by the new
14 projects would be sold on a long-term dependable
15 basis.

16 MR. BOB PETERS: All right. I heard
17 that answer and I provided through to your counsel a
18 copy of PUB Exhibit 63, which is taken from Manitoba
19 Hydro's -- it was actually some of the information in
20 a previous book of documents that we've had on the
21 public record. Ms. Villegas is -- is just handing it
22 out at this time and it's on the screen. And what --
23 what I -- what we're attempting to show here, Dr.
24 Sinclair, is our understanding, and see if your
25 confirm -- if you can confirm or correct it otherwise.

1 Would it sound reasonable to Potomac
2 that Hydro's dependable energy sales through diversity
3 exchanges increased from 2005 through to 2012/'13?

4 DR. ROBERT SINCLAIR: I didn't look at
5 that particular type of sale. We did look at the
6 dependable sales. Now, I -- I did see a chart here
7 before and I did not know that the dependable firm
8 sales also include the diversity sales. I did not
9 know that, yes.

10 MR. BOB PETERS: All -- all right.
11 And -- and if we're correct in that, and -- and
12 that'll be an 'if' that we'll leave on the record and
13 Manitoba Hydro may address that, those diversity
14 exchanges don't have a minimum quantity or a -- a
15 price guarantee.

16 Is that your understanding?

17 DR. ROBERT SINCLAIR: That's my
18 understanding.

19 MR. BOB PETERS: And so does that mean
20 that Hydro's diversity exchange counterparties are not
21 required to purchase any energy from Hydro?

22 DR. ROBERT SINCLAIR: That's what I
23 understand.

24 MR. BOB PETERS: And so these -- these
25 diversity exchange arrangements are not what would be

1 considered a take or pay agreement?

2 DR. ROBERT SINCLAIR: Correct.

3 MR. BOB PETERS: And that would apply
4 to both winter and to summer diversities?

5 DR. ROBERT SINCLAIR: Yes.

6 MR. BOB PETERS: And if a counterparty
7 purchases energy under the diversity exchange, it's
8 not at a firm fixed price then. Is that your
9 understanding?

10 DR. ROBERT SINCLAIR: That's my
11 understanding.

12 MR. BOB PETERS: It's -- it's at the
13 market price?

14 DR. ROBERT SINCLAIR: That's what I
15 understand, yes.

16 MR. BOB PETERS: Would it be the
17 market price at Manitoba Hydro's locational marginal
18 pricing node?

19 DR. ROBERT SINCLAIR: It would
20 probably depend on that. It may be -- there may be
21 some agreement to use that locational price as part of
22 the settlement. But actually, I'm not sure sitting
23 here.

24 MR. BOB PETERS: Okay. So even if the
25 diversity sales are made out of dependable resources,

1 they wouldn't be attracting a -- a fixed price
2 agreement, correct?

3 DR. ROBERT SINCLAIR: Right. As I --
4 what I understand is that -- that the firm dependable
5 sales -- when I -- when I think of firm -- firm sales,
6 I think of them having a -- a capacity price
7 associated with them.

8 MR. BOB PETERS: Now, back on page 44
9 you express concern in your report that Hydro assumes
10 it can sell all of its dependable capacity under long-
11 term firm contracts, correct?

12 DR. ROBERT SINCLAIR: That -- that's
13 correct. That's part -- one of the assumptions made.

14 MR. BOB PETERS: And diversity sales
15 do not provide capacity revenue, correct?

16 DR. ROBERT SINCLAIR: Correct.

17 MR. BOB PETERS: And if the diversity
18 sales are provided under -- and -- and from dependable
19 resources, you weren't aware that there was no
20 capacity cost being attributed through to that type of
21 a dependable sale?

22 DR. ROBERT SINCLAIR: That's correct.
23 I was under the impression that dependable sales, as
24 reported in that chart you had up previously, that
25 that was given that first column.

1 MR. BOB PETERS: And we'll just put up
2 PUB Exhibit 63.

3 DR. ROBERT SINCLAIR: Dependable
4 sales. Right. Right. And I was working under the
5 assumption that those dependable sales were firm sales
6 that had a capacity price associated with them.

7 MR. BOB PETERS: All right. And even
8 under that assumption you were suggesting that
9 Manitoba Hydro was being a bit aggressive in assuming
10 it was going to sell 100 percent of its dependable
11 product under a firm sale?

12 DR. ROBERT SINCLAIR: Correct.
13 Although, I think 90 -- 90 percent is still a pretty
14 good percentage.

15 MR. BOB PETERS: And -- and to be more
16 accurate, you suggested 91 percent would be more
17 realistic than the 100?

18 DR. ROBERT SINCLAIR: That was based
19 on some data that I saw provided by Manitoba Hydro
20 that showed that in recent years, at least, the
21 percent of dependable sales that were sold -- I'm
22 sorry, the percentage of dependable capacity which was
23 sold forward on a firm basis was about 91 percent;
24 which again, I think is a pretty good rate, but it's
25 not 100 percent.

1 MR. BOB PETERS: All right. So it was
2 based on -- on the data that you saw. And that data's
3 not on the public record, is it?

4 DR. ROBERT SINCLAIR: I believe it was
5 a CSI.

6 MR. BOB PETERS: It was CSI on the
7 share point arrangement that was existing, or
8 information that they provided directly to you?

9 DR. ROBERT SINCLAIR: It was posted on
10 that share point. It was an -- part of an IR.

11 MR. BOB PETERS: And so based on your
12 -- what you saw, you then suggested it would be a more
13 reasonable assumption for Hydro to assume that 9
14 percent of its dependable sales would not be sold
15 under the firm sales, but rather could be sold on the
16 peak opportunity market?

17 DR. ROBERT SINCLAIR: Yes.

18 MR. BOB PETERS: And if we're correct
19 in terms of how we interpret the US diversity sales
20 information, and that 91 percent included diversity
21 sales, does that cause you to change your opinion as
22 to what assumption should be made in terms of what
23 percentage of Manitoba Hydro's dependable energy will
24 be sold under a firm contract?

25 DR. ROBERT SINCLAIR: If the US

1 diversity sales do not have the characteristics of a
2 long-term firm contract, then they should not be
3 assumed to be earning that level of revenue. So I
4 think the answer would be yes.

5 MR. BOB PETERS: And is -- is the data
6 that's available on the screen from the snapshot that
7 it's -- provided, does that give you any opportunity
8 to provide this panel with a -- with a recommendation
9 as to what would be a reasonable percentage to assume
10 going forward would -- would be not sold under the US
11 dependable firm sales?

12 DR. ROBERT SINCLAIR: Yeah, I think
13 you would -- again, subject to check, if the US
14 diversity sales do not earn the types of prices that
15 the long-term firm sales earned then they should be
16 assumed to be sold under a different type of product.
17 And you could -- you could determine that by reducing
18 the dependable sales by the US diversity sales. For
19 instance, in 2012, you could reduce it by 1,280
20 megawatts -- gigawatt hours. And then use that
21 resulting figure as the basis for calculating the
22 percent of dependable capacity that is sold forward on
23 a firm basis.

24 MR. BOB PETERS: All right. And then
25 --

1 DR. ROBERT SINCLAIR: We could do
2 that, yeah.

3 MR. BOB PETERS: Pardon me?

4 DR. ROBERT SINCLAIR: And we could do
5 that.

6 MR. BOB PETERS: If you could
7 undertake to --

8 DR. ROBERT SINCLAIR: Calculate that.

9 MR. BOB PETERS: -- provide that
10 calculation that would be appreciated.

11 Dr. Sinclair, do you want to repeat on
12 the record your undertaking just so that you're able
13 to comply with it?

14 DR. ROBERT SINCLAIR: Under the
15 assumption that US diversity sales do not earn the
16 long-term firm price, we can recalculate the
17 percentage of dependable capacity that is sold forward
18 on a firm basis.

19 MR. BOB PETERS: All right. Thank
20 you.

21

22 --- UNDERTAKING NO. 86: Potomac to recalculate the
23 percentage of dependable
24 capacity that is sold
25 forward on a firm basis

1 under the assumption that
2 US diversity sales do not
3 earn the long-term firm
4 price

5

6 THE CHAIRPERSON: Mr. Peters, I'm
7 looking at the -- at the clock and wondering, have you
8 got many more minutes to go? Or should we use this as
9 an opportunity for a break?

10 MR. BOB PETERS: This would be an
11 opportune time. I've -- I -- I see that I've, I
12 believe, covered off some of these questions that I
13 have here, and I'll just use the break to make sure
14 that I've addressed them. And I'll -- I'll finish
15 after the break.

16 MS. PATTI RAMAGE: Mr. Chairman,
17 before we break, typically at a GRA, and I forgot to
18 mention on the record, although I did speak to Mr.
19 Peters, when -- in a GRA when Manitoba Hydro is
20 applicant we still -- if anything is raised in Board
21 counsel's cross, we're provided an opportunity to --
22 to ask some questions.

23 And I don't want to belabour this
24 portion of it, but we do have a couple of questions
25 which, frankly, I could ask in the CSI session, too.

1 However, I've developed the questions to get on the
2 public record 'cause I think it's the Board's
3 preference to do more on the public record than the
4 CSI. So I just thought I'd bring that to your
5 attention. If I could have a few minutes after Mr.
6 Peters.

7 THE CHAIRPERSON: In the interest of
8 making sure we have as full -- fulsome a -- a public
9 record as possible I would -- I would support that
10 request, so.

11 So let's take ten (10) minutes. Thank
12 you.

13

14 --- Upon recessing at 10:41 a.m.

15 --- Upon resuming at 10:54 a.m.

16

17 THE CHAIRPERSON: I believe, Mr.
18 Peters, we're ready to resume the proceedings.

19

20 MR. BOB PETERS: Yes. Thank you, Mr.
21 Chairman, panel members. M. Monnin has told me that
22 over the break his witness has thought further in
23 respect of a matter, Mr. Chairman, that you raised.
24 And I thought we would just give him the opportunity
25 to address that at this point in time if that's

1 appropriate. Dr. Sinclair...?

2 DR. ROBERT SINCLAIR: Yes, Mr.

3 Chairman, you asked a question about -- related to
4 what other -- other utilities do when they're faced
5 with the same kind of problems as far as forecasting
6 prices. And I thought about it a little bit more and
7 wanted to draw on some of our experience.

8 So what -- what you have is utilities
9 oftentimes are deciding about adding capacity to their
10 system, so they can do it by self-building their own
11 units, in which case they may not have to go out and
12 determine what the future prices are.

13 In this case, Manitoba Hydro is -- is
14 very interested in making sales. And so the sale in
15 their case are very important to their underlying
16 economics of the project, so they need to go out and
17 get the price forecast.

18 In some of our past cases we've also
19 had utilities wanting to buy capacity and also needing
20 to get price forecast, not because they want to make
21 sales with it, but because they all -- they make
22 purchases. And they need to know what their total
23 production costs are for their system, so they need to
24 use the price forecasts to determine one (1) component
25 of their own costs.

1 So some utilities may not need price
2 forecasts at all if they determine the need capacity.
3 They don't have a -- any interest in making sales out
4 of that capacity, it's just for earning, it's just for
5 satisfying a regulatory requirement. And they also
6 don't have a large amount of purchases that they need
7 to make in the market, they may not need to know what
8 the future prices are.

9 So in some cases a utility try --
10 trying to develop a project may not need consultants
11 at all, or they may have enough in-house knowledge to
12 have some idea of what -- what the prices may be in
13 the near term.

14 So I just wanted to fill out that
15 question a little bit more because I think that's what
16 you were asking.

17

18 CONTINUED BY MR. BOB PETERS:

19 MR. BOB PETERS: Thank you, Dr.
20 Sinclair. If we could turn to Figure 14 on page 36 of
21 Potomac's evidence, please. Thank you.

22 This is the high growth rate scenario
23 that Potomac forecast, correct?

24 DR. ROBERT SINCLAIR: Yes.

25 MR. BOB PETERS: And I wasn't sure if

1 I covered this very well earlier on this morning, Dr.
2 Sinclair, but when we look at this high growth case
3 this is considered under circumstances where the --
4 where the economy is -- there -- there's high economic
5 activity?

6 DR. ROBERT SINCLAIR: Correct.

7 MR. BOB PETERS: And in terms of the
8 high growth case, what you've plotted here, each one
9 of them contains a carbon cost, correct?

10 DR. ROBERT SINCLAIR: Yes.

11 MR. BOB PETERS: And would be
12 Potomac's view that the high growth case would be even
13 higher without the carbon cost?

14 DR. ROBERT SINCLAIR: Well, the carbon
15 cost affects prices in two (2) ways. The main way it
16 affects it is that jump up in 2020 where the price of
17 energy is directly affected by the need for the offers
18 in the market to reflect the additional cost.

19 So you have -- so really the -- you
20 have the energy price which really reflect the
21 marginal cost of the unit providing on the margin.
22 And so it directly affects the energy prices through
23 that bump up there in 2020. But the -- the carbon
24 cost will also affect the demand in the market,
25 because with the carbon cost economic activity is

1 slightly reduced.

2 So in this case here the -- both the
3 affect on demand is already taken into account from
4 the carbon costs. So it's sort of a -- an integrated
5 -- so the growth rate in demand is -- is slower than
6 it would be if there was no carbon cost, but it's
7 taken into account in -- in our assumptions here.

8 MR. BOB PETERS: If Potomac was re-
9 plot the high growth scenario without carbon, where
10 would that line be?

11 DR. ROBERT SINCLAIR: If we were to
12 change this case to have no carbon, we would pro -- we
13 would have to go in and change the growth rate in load
14 for -- for the years after 2020. And I would exp --
15 you would have -- two (2) things would happen. One
16 (1) you would -- that -- that bump up in 2020 you see
17 there would be smoother. But the slope of the line
18 after 2021, how -- how steeply it climbs would -- it
19 would climb more sleet -- steeply.

20 So you'd have to shift it down to where
21 it was in 2020 and get rid of that -- get rid of that
22 sharp increase, and then you'd have to increase the
23 slope of the -- the price line, because you would have
24 more economic -- slightly more economic growth.

25 MR. BOB PETERS: If we could take that

1 same and turn to slide -- on page 27 of -- of your
2 presentation, Dr. Sinclair.

3 The chart that I've just put in front
4 of you has the compilation of all four (4) of the
5 forecasts provided, correct?

6 DR. ROBERT SINCLAIR: Yes.

7 MR. BOB PETERS: And, so if we look at
8 the high growth with carbon, it's the -- it's the
9 green line?

10 DR. ROBERT SINCLAIR: High growth with
11 carbon is the -- the top line: light blue.

12 MR. BOB PETERS: Light blue. I'm
13 sorry, I was looking at -- reference case with carbon
14 is the green line?

15 DR. ROBERT SINCLAIR: Yes.

16 MR. BOB PETERS: And the reference
17 case without carbon is the -- the dark blue line?

18 DR. ROBERT SINCLAIR: Yes.

19 MR. BOB PETERS: And when we go back
20 to the high growth that we were just talking about,
21 this -- this high growth plot is -- is, in essence,
22 the same one we saw in your evidence, correct?

23 DR. ROBERT SINCLAIR: Correct.

24 MR. BOB PETERS: And, so -- just so
25 the panel has a better understanding, are you able to

1 take this chart and undertake to replot where the high
2 growth would go with no carbon?

3 DR. ROBERT SINCLAIR: We would have to
4 run the model again. The model is already set up so
5 running the model itself isn't a problem, but we would
6 also have to sort of vet the results to make sure --
7 to quality control the results. We -- we wouldn't
8 want to just change one (1) of the assumptions and it
9 just spit out the numbers. We would want to analyze
10 them first.

11 MR. BOB PETERS: Is that a day, or a
12 two (2) day --

13 DR. ROBERT SINCLAIR: This wouldn't be
14 a day.

15 MR. BOB PETERS: All right. If --

16 DR. ROBERT SINCLAIR: We can make an
17 attempt to do it, yes.

18 MR. BOB PETERS: All right. I'll ask
19 you to undertake to do that, and if I get different
20 instructions I'll be back to your counsel in -- in
21 short order on that.

22 DR. ROBERT SINCLAIR: Okay.

23 MR. BOB PETERS: Thank you, sir. Yes,
24 the undertaking is to re-plot slide 26 -- oh, I'm
25 sorry, slide 27 -- it's not numbered, but I think we

1 all know what -- we're talking slide 27 from Potomac's
2 Exhibit 4 to include a high growth scenario without
3 carbon.

4 And that's your understanding, that you
5 can accomplish that?

6 DR. ROBERT SINCLAIR: I believe so,
7 yes.

8 MR. BOB PETERS: All right. Thank you
9 for that.

10

11 --- UNDERTAKING NO. 87: Potomac to re-plot slide 27
12 from Potomac's Exhibit 4 to
13 include a high growth
14 scenario without carbon

15

16 CONTINUED BY MR. BOB PETERS:

17 MR. BOB PETERS: Just dealing with one
18 of the points you answered still in this area, if we
19 had a situation of higher economic growth without a
20 carbon cost there would be -- would the electricity
21 price be higher or lower than it is with the carbon?
22 Are you able to indicate that at this time?

23 DR. ROBERT SINCLAIR: I don't know for
24 sure, but looking at the chart I would say that high
25 growth without carbon would -- would be lower than

1 high growth with carbon. So the answer would be that
2 the price would be still lower than the high growth
3 with carbon.

4 MR. BOB PETERS: All right. And we'll
5 see when you do the undertaking as to what -- what
6 that comes back with.

7 All right. Thank you, sir. I'd like
8 to move to --

9 THE CHAIRPERSON: Mr. Peters, so --
10 just -- I just want to ask a question here in relation
11 to -- say for example that the -- the carbon market
12 was not a tax but a cap and trade system. Would that
13 influence the line to slope at all? I mean, it -- it
14 would probably -- depending on what the -- what the --
15 where the cap was set, that probably would just mean
16 that the -- the distance between the reference/CO2 and
17 no CO2 would probably be influenced by the level of
18 the -- of the cap, right? Is that --

19 DR. ROBERT SINCLAIR: That's correct,
20 yeah. I think the -- the dollar -- the dollar cap
21 that we're putting in, or -- or the tax we're putting
22 in is supposed to -- could be interpreted to reflect
23 the cap and trade, or some estimate of where the cap
24 and trade might turn up to -- to trade. And certainly
25 the -- the level would then tell you how much -- how

1 much you shift up.

2

3 CONTINUED BY MR. BOB PETERS:

4 MR. BOB PETERS: Dr. Sinclair, on page
5 48, Figure A-4 of -- of your evidence, we see the load
6 growth. And I just wanted to come back to a comment
7 that you made in your -- your answers to me, sir.

8 When the panel looks at this
9 information, we see -- we see the purple line being
10 the CO2 reference case -- that's in -- in between the
11 other two (2) lines, correct?

12 DR. ROBERT SINCLAIR: Yes, this is the
13 one that has to bend. The -- there's two (2) lines
14 with a bend in -- in them: a kink. The lower one is
15 the CO2 reference case, right.

16 MR. BOB PETERS: And the -- the lower
17 one with the CO2 reference case has a -- a dotted line
18 that is to reflect no carbon in the reference case,
19 correct?

20 DR. ROBERT SINCLAIR: That's correct.

21 MR. BOB PETERS: And if there was high
22 growth without carbon -- and we're looking at that red
23 line or that -- sorry, the red or purple line at the
24 top -- would the high growth without carbon line
25 likewise continue on with a less pronounced kink in

1 it, as you described it?

2 DR. ROBERT SINCLAIR: That's correct,
3 yeah. It'd be -- it's be steeper. It'd be of a
4 higher growth rate.

5 MR. BOB PETERS: All right. And when
6 we talked about the various scenarios that Potomac had
7 done, you assigned probabilities to them, correct?

8 DR. ROBERT SINCLAIR: Yes.

9 MR. BOB PETERS: And you'd indicated
10 that the reference with CO2 and the reference without
11 CO2 were equally weighted?

12 DR. ROBERT SINCLAIR: Correct.

13 MR. BOB PETERS: And then a lower
14 weighting was given to the high growth, and also a --
15 the high growth was also weighted the same as the low
16 energy prices?

17 DR. ROBERT SINCLAIR: Correct.

18 MR. BOB PETERS: And so back on slide
19 27, we see in that -- in the box that you have, the
20 reference/CO2, the weighting was 30 percent?

21 DR. ROBERT SINCLAIR: Correct.

22 MR. BOB PETERS: And then the
23 reference/no CO2 was also 30 percent?

24 DR. ROBERT SINCLAIR: Correct.

25 MR. BOB PETERS: And then high growth

1 was twenty (20) and low energy was also twenty (20)?

2 DR. ROBERT SINCLAIR: Correct.

3 MR. BOB PETERS: That made up your
4 hundred percent?

5 DR. ROBERT SINCLAIR: Correct.

6 MR. BOB PETERS: And in light of the
7 questions, if we had the high growth but without
8 carbon, would that impact the probabilities that you
9 would assign to these different forecasts?

10 DR. ROBERT SINCLAIR: Yeah, I think we
11 would have to rethink our probabilities.

12 MR. BOB PETERS: Maybe I'll ask you
13 then to undertake that in conjunction with the last
14 undertaking is to -- to also then advise this panel as
15 to what, if any, changes would be made in the
16 probability weightings that Potomac would assign to --
17 to the various cases, including the high growth
18 without carbon case?

19 DR. ROBERT SINCLAIR: Yes.

20

21 --- UNDERTAKING NO. 88: Potomac to advise as to
22 what, if any, changes would
23 be made in the probability
24 weightings assigned to the
25 various cases, including

1 the high growth without
2 carbon case
3

4 CONTINUED BY MR. BOB PETERS:

5 MR. BOB PETERS: And on Figures 13 and
6 14 in your evidence that we've looked at before, back
7 on pages, I think, 35 and 36, we have in Figure 13 the
8 high resource case and then on the next page we have
9 the figure for the high growth, correct?

10 DR. ROBERT SINCLAIR: Yes.

11 MR. BOB PETERS: I want to panel to be
12 clear in understanding your evidence, Dr. Sinclair.
13 Is Potomac indicating that these forecasts are not
14 indicative of future price boundaries for the
15 opportunity export sales, but they should be
16 considered likely boundaries of the range in which
17 future prices will come in?

18 DR. ROBERT SINCLAIR: This -- number -
19 - Figure 14?

20 MR. BOB PETERS: I was thinking Figure
21 13 and 14; one setting the high, one setting the low.

22 DR. ROBERT SINCLAIR: Okay. So
23 probably the --

24 MR. BOB PETERS: Maybe we should go
25 back to slide 27 if you --

1 DR. ROBERT SINCLAIR: Yeah, I wonder
2 if there's a better chart to look at that.

3 MR. BOB PETERS: Slide 27 of your
4 presentation.

5 DR. ROBERT SINCLAIR: Yeah.

6 MR. BOB PETERS: And we'll go back.
7 It's on the screen.

8 DR. ROBERT SINCLAIR: Yeah, I think
9 that's a better one, yeah.

10 MR. BOB PETERS: All right. If you
11 see it in the screen in front of you and you have it
12 in your slide deck?

13 DR. ROBERT SINCLAIR: Yes. So these
14 are our -- the alternative forecasts we made. And we
15 wouldn't look at these as the -- as the limits of
16 potential high prices or low prices. We would look at
17 these as the boundaries of what we think to be the
18 great -- the preponderance of the outcomes that we
19 expect. So the high case isn't necessarily what we --
20 what's the most high -- high case possible, but what
21 we call plausible.

22 So we think that between the high case
23 and the low case we would observe almost -- a -- a
24 very high percentage of the likely outcomes, as
25 opposed to an absolute lower or -- or upper bound. It

1 could be higher or lower cases that could possibly
2 arise, but we think that sort of in -- sort of a --
3 maybe normal kind of expectation you would expect
4 almost all of your observations -- future observations
5 to fall within these boundaries.

6 MR. BOB PETERS: Okay. I think I have
7 your -- your position on that then, sir.

8 Does Potomac have access to energy
9 price forecasts that extend beyond 2033?

10 DR. ROBERT SINCLAIR: When you say
11 "access", do you mean have them -- like we've procured
12 them and we have them in our office?

13 MR. BOB PETERS: I'm just wondering if
14 -- if that is the case, do -- do you know if they --
15 you know, do they exist as shelf products, or they
16 have to be developed?

17 DR. ROBERT SINCLAIR: Not that I'm
18 particularly aware of, no.

19 MR. BOB PETERS: Okay. Well, what's
20 the usual industry practice with respect to forecasts
21 that go out beyond twenty (20) years?

22 DR. ROBERT SINCLAIR: I think
23 consultants are very hesitant to go beyond twenty (20)
24 years.

25 MR. BOB PETERS: Again, for all the

1 uncertainty reasons you've mentioned?

2 DR. ROBERT SINCLAIR: Yes, I think EIA
3 goes out thirty-five (35) years. Or, I'm sorry,
4 twenty-five (25) years. But I have not -- I have not
5 seen that many that go beyond twenty (20) years, just
6 because of the uncertainty.

7 MR. BOB PETERS: Are you aware as to
8 whether there are long-term contracts in MISO that
9 extend out after 2035?

10 DR. ROBERT SINCLAIR: I'm not aware of
11 any particular, but I wouldn't be surprised if there
12 are some.

13 MR. BOB PETERS: And why -- why do you
14 say you wouldn't be surprised if there were some?

15 DR. ROBERT SINCLAIR: There are some -
16 - there are some contracts that might be associated
17 with a particular plant, and you may have rights to
18 purchase capacity from that plant for the life of the
19 plant which could extend beyond thirty (30) years.

20 MR. BOB PETERS: Are those likely coal
21 or nuclear plants?

22 DR. ROBERT SINCLAIR: Probably some of
23 the bigger plants, yeah. More capital intensive ones.

24 MR. BOB PETERS: Meaning nuclear?

25 DR. ROBERT SINCLAIR: Could be nuclear

1 and coal. CCGTs tend to be a little shorter in their
2 contract durations. But they probably would be
3 nuclear or coal plants.

4 MR. BOB PETERS: Is it safe to say
5 that, you know, since 2002 to 2012, just to pick ten
6 (10) years, there's been a progression of plant
7 efficiencies related to these combustion turbines?

8 DR. ROBERT SINCLAIR: Yes.

9 MR. BOB PETERS: And is -- is there a
10 law of diminishing returns at some point where you --
11 you can't squeeze any more efficiency out of them?

12 DR. ROBERT SINCLAIR: Probably. I
13 haven't looked into, you know, the rate at which these
14 are improving. But technology always surprises us, so
15 I would hate to say what's going to happen next.

16 MR. BOB PETERS: But I think I heard
17 you tell one (1) of my colleagues that technology
18 change is inevitable in Potomac's view?

19 DR. ROBERT SINCLAIR: Yeah, we think
20 the technology would keep advancing.

21 MR. BOB PETERS: Do you have any --
22 any feel or any opinion as to how efficient CTs or
23 CCGTs are going to be in the next, you know, by 2035?

24 DR. ROBERT SINCLAIR: No, we don't
25 really -- we don't have a view on that.

1 MR. BOB PETERS: Likewise, further out
2 you have no view?

3 DR. ROBERT SINCLAIR: Correct.

4 MR. BOB PETERS: And I just want to
5 talk about those future -- the future value of
6 contracts for Manitoba Hydro beyond 2034, and -- and
7 how Potomac recommends those contracts be calculated
8 in terms of their value. Let's start with my
9 understanding of what Manitoba Hydro does and see if
10 it's the same as yours.

11 And going out past 2034, Manitoba Hydro
12 takes the -- the last four (4) years of that time
13 period and calculates what's the compounded annual
14 growth rate?

15 DR. ROBERT SINCLAIR: Correct.

16 MR. BOB PETERS: And that's for the
17 last four (4) years out to 2034, so it would be 2030
18 to 2034, approximately?

19 DR. ROBERT SINCLAIR: Yes.

20 MR. BOB PETERS: And then they take
21 that compounded annual growth rate and they extend the
22 forecast that they've been provided from 2034 out to
23 2049, based on that compound annual growth rate
24 declining to zero?

25 DR. ROBERT SINCLAIR: Correct.

1 MR. BOB PETERS: All right. And then
2 after 2049, Hydro assumes zero growth?

3 DR. ROBERT SINCLAIR: Correct.

4 MR. BOB PETERS: And from Potomac's
5 perspective, is that an appropriate way to calculate
6 the opportunity sales beyond 2034?

7 DR. ROBERT SINCLAIR: If you look at
8 those, those growth rates are pretty small once you
9 get past 2035 and you're progressively making them
10 smaller. So in our testimony we thought there should
11 be some analysis of what happens to the revenues at --
12 at growth rate zero.

13 But we don't have a -- we don't -- we
14 don't see that growth rate as being a particular
15 problem as far as the impact on the overall analysis.
16 We didn't -- we didn't really take a shot at our own
17 estimate of that, because we thought it very difficult
18 to do. But given that it does go to zero, we just
19 thought a sensitivity on what would happen if it was
20 zero after 2035 would be sufficient to inform the
21 panel.

22 MR. BOB PETERS: And you didn't see
23 that sensitivity?

24 DR. ROBERT SINCLAIR: Not yet.

25 MR. BOB PETERS: Is it feasible for

1 Manitoba Hydro to count on imports from MISO going
2 forward?

3 DR. ROBERT SINCLAIR: When you say
4 "imports" you mean bringing power from MISO into
5 Manitoba?

6 MR. BOB PETERS: Correct --

7 DR. ROBERT SINCLAIR: Okay.

8 MR. BOB PETERS: -- which would be an
9 export from your side of the border --

10 DR. ROBERT SINCLAIR: Yeah.

11 MR. BOB PETERS: -- but to import it
12 from the United States into Canada?

13 DR. ROBERT SINCLAIR: Yeah, I think
14 they have a model that indicates that it's profitable
15 sometimes to do that. It's reasonable.

16 MR. BOB PETERS: And going forward, is
17 it likely that Hydro could enter into bilateral
18 contracts for the supply of energy?

19 DR. ROBERT SINCLAIR: Yes.

20 MR. BOB PETERS: And what prices would
21 Manitoba have to pay relative to the Potomac reference
22 case prices for such energy?

23 DR. ROBERT SINCLAIR: So the purchases
24 that Manitoba Hydro would make are typically going to
25 be off-peak, because I think they want to fill their

1 reservoirs overnight and on weekends. So they would
2 typically pay MISO market the off-peak price.

3 MR. BOB PETERS: And what if those
4 purchases were on-peak?

5 DR. ROBERT SINCLAIR: Then they would
6 pay the on-peak price.

7 MR. BOB PETERS: All right. So simply
8 the -- the MISO market price?

9 DR. ROBERT SINCLAIR: Yeah, energy
10 price, right.

11 MR. BOB PETERS: And if Manitoba Hydro
12 was able to enter into a bilateral contract for the
13 supply of firm energy, have you any handle on what --
14 or any opinion on what the -- the price would be?

15 DR. ROBERT SINCLAIR: Yeah, firm
16 contract would include a capacity component. So you
17 would want to have the energy price and then you would
18 add to that an annual capacity price. If you want you
19 could, as you suggested before, spread that annual
20 capacity price over the -- the sixteen (16) hours of
21 the -- the day. But basically a firm contract would
22 be sold or purchased at the energy price plus the
23 capacity price.

24 MR. BOB PETERS: All right.

25 THE CHAIRPERSON: Would you expect

1 that to be the same for a diversity agreement?

2 DR. ROBERT SINCLAIR: Diversity
3 agreement, as I understand it, would not include the
4 capacity price. It would include an exchange of
5 energy.

6 THE CHAIRPERSON: So while you didn't
7 examine the diversity agreements, looking at it from
8 simple arbitraging standpoint, so I think what
9 Manitoba Hydro is doing is attempting to arbitrage the
10 difference in prices between peak versus non-peak,
11 both on a day-to-day basis but also on a -- a seasonal
12 basis.

13 Now, can -- can you comment on -- on
14 that -- that spread that exists between day -- I
15 realize it probably varies all the time, but is there
16 an average spread between peak versus non-peak and --
17 and season to season?

18 DR. ROBERT SINCLAIR: I don't know
19 what it is off the top of my head, but there are
20 certainly ways to calculate that spread. And it makes
21 sense for Manitoba Hydro to, you know, buy power
22 during the off-peak when it's, I don't know, twenty
23 dollars (\$20), so that their reservoirs can fill up
24 and have more available on -- on the on-peak where it
25 may be fifty dollars (\$50). So that does make sense.

1 We could probably get you some
2 statistics on what that is in recent times. Manitoba
3 would have statistics that would explain that probably
4 better.

5 THE CHAIRPERSON: So -- so there --
6 there is no published data that allows one to
7 calculate that difference with some certainty? You
8 would have to go Manitoba Hydro to be able to
9 establish that, is that...

10 DR. ROBERT SINCLAIR: Oh no, you can
11 look at the MISO market to see what the historical
12 prices are in -- in any hour. And so you could -- you
13 could calculate the spread between the off-peak hours
14 and the on-peak hours.

15 But as far as how it makes sense for
16 their own system to save that water that would be
17 something they -- they would have dev -- developed
18 over time and optimized for their own marketing.

19

20 (BRIEF PAUSE)

21

22 MR. CHRISTIAN MONNIN: Sorry, Mr.
23 Chair, I'm not sure if you wanted Dr. Sinclair to
24 undertake to provide that information?

25 DR. ROBERT SINCLAIR: If you look at

1 the chart that's actually on the screen now, if you
2 looked at the 2015 prices those are pretty close to
3 current prices. And so you see that the off-peak is
4 roughly eighteen dollars (\$18), maybe little higher
5 today than -- than that, and the on-peak is around
6 thirty (30). These are average.

7 So the average difference just looking
8 at that data would be about twelve dollars (\$12). So
9 they could buy twelve dollars (\$12) -- or they can buy
10 at eighteen dollars (\$18) at nighttime, and then sell
11 at thirty dollars (\$30) during -- during the day. And
12 again it changes during the year, so the would have to
13 decide themselves what the best -- best time to make
14 those purchases are and -- to save their water.

15 THE CHAIRPERSON: But having a
16 diversity agreement would let you lock in -- lock in
17 the ability to deliver peak versus non-peak, right? I
18 mean, if -- if you have a counterparty in the US that
19 is willing to sign a diversity agreement that allows
20 you to get the transmission to lock in the difference
21 in day-to-day prices and -- and so on, am I correct?

22 DR. ROBERT SINCLAIR: Sitting here, I
23 don't know exactly the terms of diversity agreement,
24 so I can't say exactly how those operate.

25

1 DAVID PATTON, Previously Sworn

2

3 DR. DAVID PATTON: Yeah, I think -- I
4 think it depends a lot on the nature of the -- the
5 limitation. If -- if you're already going to be fully
6 utilizing the -- the transmission capability to import
7 power in the peak, then exporting power in the off-
8 peak doesn't help you very much. The -- but -- so
9 you'd have to look at -- at how much excess you have,
10 what the nature of the -- the limitation is, and how
11 to optimize it, and whether there's any -- whether
12 there's enough transmission capability to effectively
13 shift off-peak power to -- to on-peak.

14 DR. ROBERT SINCLAIR: Sorry. A lot of
15 hours of the year they'll -- they'll be constrained in
16 how much they can export on the peak hours, so there
17 would be no sense saving it overnight.

18

19 CONTINUED CROSS-EXAMINATION BY MR. BOB PETERS:

20 MR. BOB PETERS: Welcome back, Dr.
21 Patton. My last question actually for -- for this
22 panel and the public record, Dr. Sinclair, is: Did
23 the panel -- would they be correct in understanding
24 your evidence to be that no domestic load growth after
25 2047 is a conservative assumption?

1 DR. ROBERT SINCLAIR: I think that --
2 again, it's hard to say that far out, because we don't
3 -- we would expect the population to continue to grow,
4 of course, but we don't know whether population growth
5 will also result in a growth in demand, as we don't
6 know how the population will be using electricity at
7 that point in time. Whether it's conservative, I
8 would say that -- that it's conservative.

9 MR. BOB PETERS: All right. And then
10 out to -- let's go out past 2047 in terms of the
11 increase in the average export price beyond 2047.

12 How should that be considered on a
13 conservative basis?

14 DR. ROBERT SINCLAIR: I think zero
15 percent growth would probably be conservative. Zero
16 percent real growth.

17 MR. BOB PETERS: Did you have an
18 opportunity to review Manitoba Hydro's Appendix 11.3
19 in terms of their forecasts for exports and export
20 prices?

21 DR. ROBERT SINCLAIR: Yes.

22 MR. BOB PETERS: And my understanding
23 of that information is that Manitoba Hydro continued
24 to forecast an increase in the average export price
25 beyond 2047.

1 Is that your understanding?

2 DR. ROBERT SINCLAIR: My understanding
3 was that export prices would go to zero after 2047.

4 MR. BOB PETERS: All right. I'll --
5 I'll double check that. And if they didn't, your
6 suggestion is that as a conservative estimate they
7 should?

8 DR. ROBERT SINCLAIR: Yeah. My
9 understanding was zero, and we thought that was
10 conservative and -- and be useful for evaluating the -
11 - the economics.

12 MR. BOB PETERS: All right. If you
13 could also just undertake to double check that -- I
14 think it was Appendix 11.3 -- and opine from Potomac's
15 view as to whether the Preferred Development Plan
16 assumptions are conservative or otherwise.

17 DR. ROBERT SINCLAIR: With -- with
18 respect to prices?

19 MR. BOB PETERS: Yes, sir.

20 DR. ROBERT SINCLAIR: Yeah. All
21 right.

22

23 --- UNDERTAKING NO. 89: Potomac to indicate view as
24 to whether the Preferred
25 Development Plan

1 assumptions are
2 conservative or otherwise
3

4 MR. BOB PETERS: Thank you. Mr.
5 Chairman, with that I do want to thank Dr. Sinclair as
6 well as Dr. Patton, although -- those -- those will be
7 my questions from this morning. Thank you.

8 THE CHAIRPERSON: I have a few
9 additional questions and I'm assuming that the -- the
10 other panel members may have some as well. But any
11 case let's -- I want to address the -- your report on
12 page 44 and page 45. And it's specifically addressing
13 the fact that Manitoba is -- Manitoba Hydro is able to
14 obtain a premium in relation to on-peak opportunity
15 sales relative to what normally -- the price is --
16 normally be available in the marketplace.

17 And so I just wanted to ensure that the
18 -- the data that allowed you to determine that was
19 that data that published data, or is that data that
20 was provided to you by Manitoba Hydro?

21 DR. ROBERT SINCLAIR: That -- that was
22 data provided by Manitoba Hydro.

23 THE CHAIRPERSON: And so you only
24 examined 2011 and 2012? You didn't examine any other
25 years than that?

1 DR. ROBERT SINCLAIR: That's correct.

2 They were the recent years that was available from
3 Manitoba.

4 THE CHAIRPERSON: Now, you referred to
5 the val -- the -- the -- you referred to a hedge
6 obtained by the buyers of on-peak. You're not talking
7 about a hedge available in a futures market, you're
8 talking about a physical hedge here, are you?

9 DR. DAVID PATTON: Yes, that you've --
10 you've locked in your -- your energy price in the form
11 of the -- the procurement so that you're not subject
12 to the volatility in the day-ahead market.

13 THE CHAIRPERSON: So what I'd like to
14 know is are you in a position to -- to -- you make a
15 recommendation to the effect that Manitoba Hydro
16 should be attending to model these values, in other
17 words to -- well, I'm -- I'm assuming to allow it to
18 make sure it captures the most -- the most premium
19 possible. How would you do that? I mean, how would
20 you -- you would have to make some -- some assumptions
21 about the causes for the premium and then try to mod -
22 - model that from the data.

23 Is that how you do it -- you would do
24 that?

25 DR. DAVID PATTON: Yeah, so basically

1 it would be -- if -- if you assume the buyers are
2 risk-neutral the premium would be zero, so you -- so
3 you have to model some -- some preference for reducing
4 risk. Now, we didn't -- we didn't undertake that but
5 -- but if you were -- if you were banking on earning a
6 premium over and above the day-ahead market then --
7 then I think what we're suggesting is it would be
8 useful to develop a model of what that -- what the
9 value of that hedge is to a buyer whose -- whose risk
10 adverse and -- and wants to protect itself against
11 that -- that sort of volatility, so that you come up a
12 -- a fundamental estimate of how large you could
13 expect that premium to be over time. Because I -- I
14 don't know that over time Manitoba really has the
15 ability to increase that premium. That premium is
16 going to be driven by the -- the preferences of the
17 buyers.

18 THE CHAIRPERSON: Can you comment on
19 the explanation why in 2011 it was only two (2) -- it
20 was 2 percent and -- and the following year was 10
21 percent?

22 What -- what would account for that
23 sizeable difference between the two (2) years based on
24 your intuition, or your knowledge of the market?

25 MS. PATTI RAMAGE: I think that's a

1 question we ought to be dealing with this afternoon.

2

3 (BRIEF PAUSE)

4

5 DR. HUGH GRANT: Can I come back to
6 this page 49, this table, again, about capacity
7 change, because I'm just -- I'm new at this. So if
8 the -- if the axis was percentage changes, I think the
9 thing I find quite striking is just how slow capacity
10 comes offline, right. Because this is really --
11 almost twenty (20) years on the bottom, and it would
12 be over this twenty (20) year period even in the low -
13 - with low gas prices it's maybe at most 10 percent of
14 total existing capacity comes offline?

15 DR. DAVID PATTON: That's correct,
16 yes.

17 DR. HUGH GRANT: Is there something
18 specific about the nature of these coal-fired stations
19 that -- like what's -- what is their typical shelf
20 life?

21 DR. DAVID PATTON: A coal plant?

22 DR. HUGH GRANT: Yeah.

23 DR. DAVID PATTON: Well -- yeah, a lot
24 of these coal plants, I think people would normally
25 assume something like forty (40) years, but a lot of

1 the coal plants that we're talking about here actually
2 are -- are about fifty (50) years. So they're --
3 they're beyond their assumed useful life.

4 DR. HUGH GRANT: But they simply get
5 retrofitted and keep chugging on?

6 DR. DAVID PATTON: Yeah, it turns out
7 that the -- you -- you know, the cost of patching it
8 together and keeping them in operation tends to be
9 lower than -- than building replacement capacity, so.

10 DR. HUGH GRANT: And this is not true,
11 I take it -- if you look at the reference case, this
12 is not true of CT plants, where you notice in some of
13 the early years you actually get CT capacity coming
14 off line where the coal plant just persist and...

15 DR. DAVID PATTON: Well, now the --
16 the -- just make sure you're interpreting this
17 correctly. When -- when you say how slowly the coal
18 plants come offline, to me this chart looks like the
19 coal plants are dropping off extremely quickly. In
20 other words, the retirements of coal plants -- you
21 know, we're assuming in the next two (2) years that
22 we're going to lose most of our coal plant capacity.

23 DR. HUGH GRANT: I thought this was a
24 cumulative chart, so that...

25 DR. DAVID PATTON: Oh, no, no. This

1 is a -- this is absolute.

2 DR. HUGH GRANT: Annual...

3 DR. DAVID PATTON: Well, in other --

4 in other words, the -- the fact that in the coal plant

5 bar that you see is the same amount in 2020 as in

6 2021, means -- doesn't mean that those are two (2)

7 different slugs of capacity that are retiring, one (1)

8 in 2020 and one (1) in 2021. It -- it means a plant

9 retired in 2016 and it stayed retired for the whole

10 duration.

11 DR. HUGH GRANT: So that -- that's

12 what strikes me as rather a slow rate of removal,

13 isn't it? Because even -- like, again, take the low

14 gas price scenario. You're saying between 2016 and

15 2034, there's only 10,000 megawatts coming offline,

16 which is roughly 10 percent of capacity.

17 DR. DAVID PATTON: Oh, I see what

18 you're saying.

19 DR. HUGH GRANT: It seems -- it just

20 strikes me as an extremely slow...

21 DR. DAVID PATTON: So it's -- so we

22 didn't -- so it's fast initially that you lose a lot,

23 and then it's slow thereafter.

24 DR. HUGH GRANT: Yeah, it's just that

25 --

1 DR. DAVID PATTON: Okay.

2 DR. HUGH GRANT: I -- I mean, I guess
3 it's unique to this industry, but you're used to sort
4 of more rapid rates of retirement of capital stock, I
5 think, in most cases, but...

6 DR. DAVID PATTON: Yeah, I think what
7 happens is we're getting an accelerated retirement of
8 units that are at the end of their useful life. And
9 so you're left with -- with units that are more cost
10 effective, particularly once you've spent the money to
11 upgrade them to meet the -- the more stringent
12 environmental standards. It's more economic to -- to
13 keep them in operation.

14 DR. HUGH GRANT: And -- and most coal
15 plants would be of a particular vintage, or they're
16 spaced out over, I guess, expansion of the '60s,
17 perhaps, or...?

18 DR. DAVID PATTON: I think it varies,
19 but there -- yeah, there was a -- there was a slug
20 that -- that came in in the -- in the '60s, early '70s
21 when -- when demand growth for electricity slowed in
22 the, let's say late '70s the -- the building really
23 slowed down.

24 DR. HUGH GRANT: And -- and so the
25 variable cost of running a coal plant would still be

1 lower than a natural gas plant? So the --

2 DR. DAVID PATTON: Yes. Most of --
3 yeah, most of the time and in -- in most locations we
4 do have -- we do have, sort of, coal plants that are
5 operating on two (2) different types of coal, one (1)
6 of which is quite a bit more expensive. But the coal
7 that's on the western side of the footprint is -- is -
8 - tends to burn the -- the Powder River Basin coal,
9 and that coal is lower quality and very, very cheap --

10 DR. HUGH GRANT: And so that -- that's
11 what encourages you to try to keep your capital stock
12 going, and -- because of this low margin?

13 DR. DAVID PATTON: Yeah, you earn a
14 pretty high net revenue on -- when you run for energy.

15 DR. HUGH GRANT: Right. Okay.
16 Thanks.

17 THE CHAIRPERSON: Thank you. I -- the
18 panel has no further questions, at least in the -- Ms.
19 Ramage, please?

20

21 RE-CROSS-EXAMINATION BY MS. PATTI RAMAGE:

22 MS. PATTI RAMAGE: Thank you. And if
23 I could have -- I think it's PUB Exhibit 63, the table
24 that Mr. Peters was referring to -- that's the one,
25 thank you -- up on the screen.

1 I have a few questions for you on -- on
2 this. And to be fair, I want to begin by letting you
3 know this is not a Manitoba Hydro exhibit.

4 You -- you're aware of that?

5 DR. ROBERT SINCLAIR: Yes.

6 MS. PATTI RAMAGE: It was created by
7 the Public Utilities Board advisors. and -- and to be
8 fair in terms of my line of questioning, Mr. Cormie
9 disagreed with the presentation of this material on
10 the record --

11 DR. ROBERT SINCLAIR: Okay.

12 MS. PATTI RAMAGE: -- previously. so
13 I'm trying to get at what parts of this presentation
14 that you can speak to in terms of your knowledge.

15 DR. ROBERT SINCLAIR: Okay.

16 MS. PATTI RAMAGE: So -- and I
17 understood you to say that you're not familiar with
18 the specific terms associated with energy deliveries
19 under Manitoba Hydro's diversity sales.

20 Is that right? Is that what you said?

21 DR. ROBERT SINCLAIR: Yeah, it's not
22 something that we focussed on for purposes of our
23 report.

24 MS. PATTI RAMAGE: Okay. And --

25 DR. ROBERT SINCLAIR: But we're used

1 to these types of arrangements.

2 MS. PATTI RAMAGE: Right. Manitoba
3 Hydro has three (3) diversity sales? That's your
4 understanding?

5 DR. ROBERT SINCLAIR: I think I heard
6 that at some point, yes.

7 MS. PATTI RAMAGE: Okay. And is it --
8 would you -- is it your understanding that capacity is
9 treated the same in all of the diversity sales? We
10 don't pay for capacity that we get in the winter, and
11 our counterparties don't pay for the capacity they
12 receive in the summer?

13 Do you recall that from the agreements?

14 DR. ROBERT SINCLAIR: Okay. Subject
15 to check, that's -- I think that's what I understand.

16 MS. PATTI RAMAGE: Okay. So would you
17 agree that when there's an equal exchange of capacity
18 it doesn't mean you're getting zero value for the
19 capacity?

20 DR. DAVID PATTON: Do you mean
21 capacity or energy?

22 MS. PATTI RAMAGE: I mean capacity
23 right now.

24 DR. DAVID PATTON: Okay.

25 MS. PATTI RAMAGE: When neither charge

1 a demand charge. If you're exchanging equal amounts
2 of capacity --

3 DR. ROBERT SINCLAIR: Okay. Assuming
4 capac -- you -- it's inter-temporal, right, so you --
5 you're getting capacity at some times --

6 MS. PATTI RAMAGE: In the --

7 DR. ROBERT SINCLAIR: -- other times --

8 MS. PATTI RAMAGE: -- Manitoba Hydro
9 gets capacity in the winter.

10 DR. ROBERT SINCLAIR: Okay.

11 MS. PATTI RAMAGE: It gives capacity
12 in the summer. It doesn't get charged for what it
13 gets in the winter. It doesn't charge for what it
14 gives in the summer.

15 DR. ROBERT SINCLAIR: Okay. So you're
16 receiving some value for it, for sure.

17 MS. PATTI RAMAGE: Right. Now with
18 regard to the energy price, would it be your
19 understanding that two (2) of the diversity sales are
20 for fixed prices for fixed volumes of energy sold in
21 the summer?

22 DR. ROBERT SINCLAIR: Subject to
23 check.

24 MS. PATTI RAMAGE: And then are you
25 aware that one (1) of the diversity sales is for

1 market priced energy in the summer?

2 DR. ROBERT SINCLAIR: I think I saw
3 that, yes.

4 MS. PATTI RAMAGE: Okay. And then
5 would you be aware that the same contact allows
6 Manitoba Hydro to use the transmission secured year
7 round into the MISO market for market sales in the
8 winter when Manitoba Hydro doesn't need to purchase
9 energy and has surplus to sell?

10 DR. ROBERT SINCLAIR: Okay.

11 MS. PATTI RAMAGE: Accept that subject
12 to check?

13 DR. ROBERT SINCLAIR: Yes.

14 MS. PATTI RAMAGE: Okay. Are you
15 aware that the increased volumes of diversity energy
16 sales shown over the last few years in this chart were
17 under the market price contracts, and priced at the
18 LMP node at the Minnesota Hub rather than the Manitoba
19 Hydro node?

20 DR. ROBERT SINCLAIR: I don't remember
21 seeing that, but subject to check.

22 MS. PATTI RAMAGE: Subject -- would
23 you accept, subject to check, then that that contract
24 ends in 2014?

25 DR. ROBERT SINCLAIR: Sure.

1 MS. PATTI RAMAGE: And based on the --
2 the three (3) contracts in place, is it reasonable to
3 assume that Manitoba Hydro and its customers have
4 flexibility to negotiated diversity agreements
5 involving either firm energy or market priced energy,
6 and that the current mix is not necessarily
7 determinative of the future?

8 DR. ROBERT SINCLAIR: Sure.

9 MS. PATTI RAMAGE: All right.
10 However, would you see any -- any reason to expect a
11 change with respect to the tre -- treatment of demand
12 charges, assuming volumes -- volumes exchanged are --
13 or not volumes -- assuming the capacity exchanged is
14 equal summer and winter?

15 DR. ROBERT SINCLAIR: I would not.

16 MS. PATTI RAMAGE: Thank you.

17 DR. DAVID PATTON: I'm interested in -
18 - in what that question meant, because we did -- we
19 did -- we have transformed the capacity market from a
20 monthly market into an annual product. So were --
21 were you asking whether -- whether future -- future
22 value is likely to be similar to historic value from--

23 MS. PATTI RAMAGE: No --

24 DR. DAVID PATTON: -- trading capacity
25 between seasons?

1 MS. PATTI RAMAGE: No, I think it was
2 far more simplistic in terms of if the -- if a
3 contract says, I'll give you 150 megawatts of capacity
4 in the summer if you give me 150 megawatts of capacity
5 in the winter, and we'll just -- we're not going to
6 exchange -- I'm not going to give you a hundred and
7 fifty dollars (\$150) for that, so that you can write
8 me a cheque for a hundred and fifty dollars (\$150).
9 That's what I'm getting at.

10 DR. DAVID PATTON: Okay.

11 MS. PATTI RAMAGE: So you would see no
12 reason for that to exchange if that is the
13 arrangement?

14 DR. ROBERT SINCLAIR: No reason.

15 THE CHAIRPERSON: Ms. Ramage, could
16 you explain the -- the significance of the different
17 notes?

18 MS. PATTI RAMAGE: You know, I could,
19 but I'm not actually a witness. Mr. Cormie perhaps
20 should. But I'm very proud to say I could.

21 MR. DAVE CORMIE: As I explained, Mr.
22 Chairman, several weeks ago, this one (1) diversity
23 agreement has grandfathered transmission associated
24 with it, which means it's not subject to the MISO
25 tariff yet. And Manitoba Hydro is able to sell its

1 energy at the Minn Hub price rather at the Manitoba
2 nodal price. And that avoids the cost of congestion
3 and losses that -- that the two (2) doctors had talked
4 about.

5 And so we will use that transmission in
6 order to deliver energy into MISO in order to receive
7 the Minn Hub price rather than the Manitoba nodal
8 price. And -- and the two (2) companies who are part
9 of the diverse could share that benefit. And that's
10 one (1) of the values -- that's one (1) of the
11 additional values that in the opportunity market that
12 we gain revenue that's not associated with the MISO
13 day ahead sales and real time sales at the Manitoba
14 node. So it generates revenue for the company.

15 So it's -- it's kind of one of those
16 extra ways that Manitoba Hydro produces value that's
17 not reflected in the MISO forecast market price at the
18 -- at the Manitoba Hydro node. And -- but
19 unfortunately, that grandfather transmission expires
20 next -- this year and we will go into a new
21 arrangement. And -- and that arrangement will -- will
22 cease to be able to capture that value. But we're --
23 we're always trying to capture that value out of our
24 portfolio.

25 And it -- I'm -- all our -- all we're

1 suggesting is that the diversity arrangements that we
2 had in the past still have some of the grandfather
3 transmission benefits associated with them. And as
4 those grandfathered arrangements expire we'll enter
5 into new arrangements, generally under the tariff, and
6 -- and then we'll proceed into the future. But what's
7 happened in the past is not indicative of what you can
8 expect in the future.

9 And the companies that are -- are
10 making these arrangements are fully free to do
11 whatever makes business sense for them. Right now it
12 makes sense for us to trade under, you know, move spot
13 market energy under the diversities.

14 But as we go forward and we build
15 Conawapa and Keeyask, we will be wanting to put fixed
16 price take or pay energy under the diversity sales.
17 And just because we have those market priced non-fixed
18 quantities today doesn't imply that that will be the
19 situation in the future.

20 THE CHAIRPERSON: Thanks. I believe
21 that's all the questions, unless you have something
22 else to add?

23 MS. PATTI RAMAGE: I have one (1)
24 other question. And I have to compliment Mr. Cormie,
25 that's almost as good as I would have said it.

1 CONTINUED BY MS. PATTI RAMAGE:

2 MS. PATTI RAMAGE: Dr. Sinclair, you
3 indicated this morning that you had dealt with one (1)
4 of Manitoba Hydro's price consultants and they had
5 been very forthcoming with information in other
6 situations.

7 Is that correct?

8 DR. ROBERT SINCLAIR: Yes.

9 MS. PATTI RAMAGE: Would you accept
10 that different price forecasters have different
11 business models and they produce different products?

12 DR. ROBERT SINCLAIR: Yes.

13 MS. PATTI RAMAGE: And you're aware
14 that a number of the consultant's market products
15 that, for example, include selling a licence to use a
16 model, that the purchaser could then use itself? They
17 create their own forecast and input their data, or
18 purchase data, and they can manipulate that data.

19 That is one (1) of the -- the products
20 that can be purchased?

21 DR. ROBERT SINCLAIR: That sounds
22 reasonable.

23 MS. PATTI RAMAGE: That's not what
24 Manitoba Hydro purchased though? Of the -- the price
25 forecasts you saw, they were not models that Manitoba

1 Hydro purchased the model and then manipulated data
2 itself?

3 DR. ROBERT SINCLAIR: Are you asking
4 me what the nature of the agreement was with your
5 consultants?

6 MS. PATTI RAMAGE: No, not the nature
7 of the agreement, the -- just the general product that
8 was bought.

9 Did we purchase a forecast or did we
10 purchase a model to produce a forecast?

11 DR. ROBERT SINCLAIR: Oh, I
12 understand. You purchased a forecast.

13 MS. PATTI RAMAGE: Right. And then in
14 terms of purchased forecasts, you're aware a number of
15 forecasters market a -- their own generic forecasts
16 where they use their own models and their own data to
17 come up with a long-term forecast.

18 Is that correct?

19 DR. ROBERT SINCLAIR: Your consultants
20 did that. Are -- are you asking me that?

21 MS. PATTI RAMAGE: I'm asking in --
22 first in general terms that there are -- that's one
23 (1) of the business models that -- or products that
24 price forecast consultants will sell: the generic
25 model?

1 DR. ROBERT SINCLAIR: Oh yeah, the
2 model itself --

3 MS. PATTI RAMAGE: Or gen -- I'm
4 sorry, the generic price forecast. It's an off-the-
5 shelf product.

6 DR. ROBERT SINCLAIR: Yeah, we --
7 we've seen those. Yeah.

8 MS. PATTI RAMAGE: And you -- you can
9 confirm that at least some of Manitoba Hydro's price
10 forecasts that you saw were off-the-shelf products?

11 DR. ROBERT SINCLAIR: The ones that
12 your consultants produced were off-the-shelf products?
13 I -- I don't know if I've seen products from those
14 consultants like that before, so I don't know if
15 that's their off-the-shelf product or not.

16 MS. PATTI RAMAGE: Okay.

17 DR. ROBERT SINCLAIR: I know that what
18 they gave you is a forecast, not -- not the model.

19 MS. PATTI RAMAGE: Okay. Another
20 product that price forecasters can provide then is a -
21 - a forecast that is customized to the purchase
22 interests?

23 DR. ROBERT SINCLAIR: Correct.

24 MS. PATTI RAMAGE: Do you agree with
25 that?

1 DR. ROBERT SINCLAIR: Yes.

2 MS. PATTI RAMAGE: And at least some
3 of the forecasts, one (1) or more of the forecasts you
4 saw of Manitoba Hydro's, would have been a customized
5 product.

6 Is that correct?

7 DR. ROBERT SINCLAIR: Seems like it,
8 yes.

9 MS. PATTI RAMAGE: And if a company's
10 business model, for example, includes both the sale of
11 a generic forecast off-the-shelf, and customized
12 forecasts, can you see why they might carefully guard
13 their models?

14 DR. ROBERT SINCLAIR: Sure.

15 MS. PATTI RAMAGE: And based on your
16 review of the consultants' information that was
17 provided to Manitoba Hydro and provided to you, would
18 you agree that it was apparent that they did not rely
19 on publicly available EIA data to the same degree as
20 Potomac did?

21 DR. ROBERT SINCLAIR: I think there
22 was at some point a request that they produce
23 forecasts with the EIA data. I believe most of the
24 reference -- so-called reference case forecasts they
25 would have used a mixture of some -- I've seen EIA

1 data in some of those forecasts. I've seen some of
2 their own internal forecasts used for some of the
3 inputs.

4 MS. PATTI RAMAGE: Would you agree
5 then that the value provided by the independent price
6 forecasters is that they study the same type of
7 information as EIA, but they provide their independent
8 perspectives and insights?

9 DR. ROBERT SINCLAIR: So if you're
10 saying that because they don't use EIA data from top
11 to bottom that somehow they might find their own
12 analysis superior to the EIA? Is that what you're...

13 MS. PATTI RAMAGE: Yes.

14 DR. ROBERT SINCLAIR: It must be what
15 they -- they think, yes.

16 DR. DAVID PATTON: Well, I mean, let me
17 answer that. The -- I think it's important to
18 differentiate between the value they're providing
19 through their model, you know, how they translate
20 inputs into forecasts and outputs, and -- versus the
21 value that they're providing in coming up with better
22 forecasts of the inputs themselves.

23 I'm not sure all of the consultants
24 would say that -- well, I think generally the
25 consultants I've interacted with are really selling

1 their model, and not so much -- and this may not be
2 true for all of them, but not so much testing the
3 majority of their value and -- in being able to come
4 up with a better input assumption.

5 MS. PATTI RAMAGE: But if -- you'd
6 agree if we all just used EIA and we can buy off-the-
7 shelf products, we would come up with the same amount?
8 There has to be some value in those insights into that
9 input data?

10 DR. ROBERT SINCLAIR: I don't know
11 about off-the-shelf, but -- I don't know exactly how
12 they pitch it when they -- when they sell it to you,
13 but they could -- they -- I wouldn't be surprised that
14 they represented to you that they have value-added in
15 their inputs as well.

16 MS. PATTI RAMAGE: They certainly have
17 independent perspectives.

18 DR. ROBERT SINCLAIR: Different than
19 the EIA --

20 MS. PATTI RAMAGE: Different --

21 DR. ROBERT SINCLAIR: -- in some
22 cases, yeah.

23 MS. PATTI RAMAGE: Yes. And they have
24 to invest in developing those independent
25 perspectives? Is -- I -- sorry --

1 DR. ROBERT SINCLAIR: Yeah, they would
2 have to spend money to do that.

3 MS. PATTI RAMAGE: So a company that
4 invests its resources in developing its own data, and
5 who markets that information in the context of both
6 generic forecasts, specialized price forecasts, and
7 perhaps even off the -- providing off-the-shelf
8 models, is likely to be more protective of the models
9 they use to develop the forecasts they sell with their
10 data than a company that just uses off-the-shelf data
11 -- or, I mean, publicly available data, and -- and an
12 off-the-shelf model, or a publicly available model?

13 DR. ROBERT SINCLAIR: Well -- yeah,
14 it's logical, so I can't disagree. And that wasn't --
15 the fact that they protected it it wasn't really our
16 issue as much as -- I mean, it's natural for a company
17 to protect it. We -- we were -- our complaint really
18 is that we wanted to understand better what they were
19 doing, because it's being used in a proceeding where
20 it's important to have some transparency of the
21 underlying calculations and how they get to the
22 results.

23 So even though they -- I understand
24 they protect it, I think in a proceeding like this
25 they should have been a little more transparent in

1 helping us understand how they got to where they were.

2 And because of that we -- we needed to do our own

3 forecast.

4 MS. PATTI RAMAGE: Now, going back to
5 -- you referenced one (1) of Hydro's price consultants
6 sharing data in a different forum.

7 Do you know what product that customer
8 purchased in that case?

9 DR. ROBERT SINCLAIR: Yes.

10 MS. PATTI RAMAGE: Are you able to
11 share that with us on the public record, or...?

12 DR. ROBERT SINCLAIR: Would -- I --
13 you mean you want me to tell you who your consultant
14 was?

15 MS. PATTI RAMAGE: No. No, I don't
16 want you to tell me who the -- I want to know which
17 classification of product was it? Was it a -- an off-
18 the-shelf product? Was it a specialized product? Was
19 it --

20 DR. ROBERT SINCLAIR: In the case I
21 had in mind it was a specialized product.

22 MS. PATTI RAMAGE: And without
23 revealing the identity of the -- the actual -- the --
24 the customer in this case, was it a merchant
25 generator, or a regulated utility?

1 DR. ROBERT SINCLAIR: It was a
2 regulated utility.

3 MS. PATTI RAMAGE: Okay.

4

5 (BRIEF PAUSE)

6

7 MS. PATTI RAMAGE: And was the
8 information shared in the context of a regulatory
9 process like this?

10 DR. ROBERT SINCLAIR: I'm sorry, I
11 missed the first part. What --

12 MS. PATTI RAMAGE: Was the information
13 shared with you in the context of a regulatory process
14 like this?

15 DR. ROBERT SINCLAIR: Some of it was
16 made public. It wasn't in a regulatory process.

17 MS. PATTI RAMAGE: And would it be one
18 (1) of -- more akin to one of Potomac's short-term --
19 short-term -- well, I shouldn't say "Potomac's".

20 Was it a -- a short-term forecast?

21 DR. ROBERT SINCLAIR: The -- the model
22 that was being used was a short-term fore -- forecast.

23 MS. PATTI RAMAGE: So it was not
24 something that was used for negotiating long-term
25 sales?

1 DR. ROBERT SINCLAIR: No, they were
2 short-term sales.

3 MS. PATTI RAMAGE: Okay. Thank you.
4 That concludes my questions.

5 THE CHAIRPERSON: Mr. Williams,
6 please? Me. Hacaault...?

7 MR. ANTOINE HACAULT: Just some
8 comments, members of the panel. I note that there's
9 been approximately an additional twenty (20) minutes
10 of cross-examination not -- which was not part of the
11 agreed to sequence. The information, I guess, was
12 useful. I also note that there was out of sequence
13 testimony by Manitoba Hydro during the cross-
14 examination.

15 And I just want to note for the record
16 that we're not consenting to that unless all parties
17 are going to be given the same latitude going forward.
18 It's occurred, but there are questions and may be
19 questions that Intervenors may like to ask after the
20 cross-examination by Board counsel also, which would
21 be very relevant to their positions.

22 So I just wanted to note for the record
23 that we aren't consenting by the fact that this
24 occurred during this occasion to it reoccurring again,
25 unless all parties are given the same kind of

1 treatment.

2 MS. PATTI RAMAGE: If I could speak to
3 that. Mr. Hacault is forgetting, or perhaps is not
4 aware that the -- the practice before the Public
5 Utilities Board has always been that Manitoba -- or
6 the -- Manitoba Hydro has been given the opportunity
7 after Board counsel to re-examine, because as an
8 Applicant it gets -- it should get the last word and
9 be able to cross-examine. It's as an agreement
10 amongst the parties, because Board counsel prefers to
11 do a clean-up at the end and, so that is the practice
12 that has developed over many years. This is not new.

13 MR. BYRON WILLIAMS: Mr. Chair, if I
14 might?

15 THE CHAIRPERSON: Mr. Williams,
16 please, yeah.

17 MR. BYRON WILLIAMS: I guess I have
18 three (3) general comm -- comments. First of all, we
19 always love to hear from Mr. Cormie, but we --
20 certainly I -- I think some of the process this
21 morning was unusual, and we certainly want the Board
22 to have all the information it requires, so we -- we
23 did not raise an objection at that time.

24 But it does put us in a difficult
25 position. There may be -- in this case the questions

1 of Mr. Cormie I don't think I would have wanted to
2 cross-examine him, but there -- it -- it does put us
3 in a difficult position, and so I offer that comment
4 in terms of his.

5 In terms of the -- the cross-
6 examination of My Friend Ms. Ramage, the -- the post
7 Board counsel, I would divide it into two (2) pieces,
8 because I would concede that there was some material
9 new in terms of the comments from Potomac in terms of
10 information shared by one of Hydro's forecasters, but
11 it is arguable that My Friend also took some liberties
12 to revisit some of her cross-examination earlier. And
13 so I would distinguish -- so I would just say that to
14 the extent that we follow that process it -- it really
15 should be focussed on new issues arising through Board
16 -- Board counsels, and not kind of another kick at the
17 -- at the cat.

18 A third caution in terms of process
19 from my client is the -- their -- from our client's
20 perspective there are material differences in terms of
21 interpretation of CSI. We have heard again this
22 morning some commentary about matters that might be
23 better referred to CSI, and our client would urge
24 extreme caution in restricting the -- the CSI
25 discussions to those matters that are -- that are

1 truly CSI.

2 And so just as you move into this
3 afternoon, again, our client, for a variety of
4 reasons, feels shut-out of the CSI process, and we
5 would urge caution in restricting that to -- to truly
6 CSI matters.

7 THE CHAIRPERSON: I wonder if we can
8 stand down for a minute or two (2) so I can consult
9 with Mr. Peters, please?

10

11 (BRIEF PAUSE)

12

13 THE CHAIRPERSON: Ms. Ramage, have you
14 --

15 MS. PATTI RAMAGE: Yes. I don't think
16 we're still quite there in figuring out what the
17 question was that -- we were going to find out what
18 the answer was to find out if the answer is CSI, but
19 we're seeing a series of questions and we're not sure
20 which one it was. I think Dr. Pan -- Patton, for
21 example, thinks he may have already answered it. So I
22 think we're going to have to take a little more time
23 with that.

24 And I would suggest, in order that the
25 parties can go back to their offices, that that might

1 be something that we deal with by way of undertaking.

2 THE CHAIRPERSON: That sounds like a
3 good solution. So in respect of the issue that was
4 raised by Mr. Williams, I want to indicate that in the
5 future the Chair will be restricting questions from
6 Manitoba Hydro on new issues that are raised as part
7 of the cross-examination. So that provides some
8 guidance with respect to that particular matter.

9 Now, our -- our witnesses are having to
10 catch a flight sometime later this afternoon, so we
11 have a restricted amount of time with -- with them
12 today. And so what I propose we do, we have an
13 abbreviated lunch, half an hour, if possible, and that
14 will maximize the amount of time that we have with --
15 with them. And so after lunch it's our intention to
16 go into the CSI session, so it'll be restricted to
17 those individuals who are eligible to consider CSI.

18 So with that I think some people will
19 be leaving for the day, so I would invite them to be
20 back here at nine o'clock tomorrow morning for the
21 continuation of the public hearing. Thank you very
22 much.

23

24 (BRIEF PAUSE)

25

1 MS. PATTI RAMAGE: The undertaking is
2 to determine and identify the question posed by Mr.
3 Hacault, which Manitoba Hydro indicated may be CSI.
4 And once we identify that question, to determine
5 whether the res -- the response by Potomac is in fact
6 CSI; and if it is not CSI, Potomac to provide the
7 answer by way of undertaking.

8
9 --- UNDERTAKING NO. 90: Manitoba Hydro to determine
10 and identify the question
11 posed by Mr. Hacault, which
12 Manitoba Hydro indicated
13 may be CSI; and then to
14 determine whether the
15 response by Potomac is CSI;
16 and if it is not CSI,
17 Potomac to provide the
18 answer by way of
19 undertaking

20
21 THE CHAIRPERSON: We're -- we're
22 hoping it's a really good question.

23

24 (PANEL RETIRES)

25

1 --- Upon adjourning at 12:07 p.m.

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5 Certified correct,

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10 Cheryl Lavigne, Ms.

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\$10 4639:6	4662:1	110,000	4704:5	4692:16,23
\$12 4712:8,9	4664:13	4645:20	4719:11,12	4693:14,16
\$150	4671:24,25	12 4633:25	4741:9	,21
4729:7,8	4690:24	12:07 4747:1	200 4648:11	4721:5,8
\$18	4693:16	13 4633:25	2000 4627:15	2021 4693:18
4712:4,10	4695:8	4701:5,7,2	2001	4721:6,8
\$20 4639:9	4705:17	1	4627:2,15	2030
4647:21	4721:7,8	14 4691:20	2002 4705:5	4655:4,8
4710:23	4723:5	4701:6,19,	2003 4626:22	4706:17
\$22 4604:15	4726:25	21	2005 4681:3	2033 4662:19
4671:5	4729:22	150 4729:3,4	2006 4627:3	4703:9
4673:25	4730:10	16 4675:10	2008 4616:7	2034 4676:12
4675:2,16	4731:23	4709:20	2009	4706:6,11,
\$25 4639:8	4732:3,19	1990s 4636:5	4631:12,16	17,18,22
\$30	4733:23			4707:6
4663:1,11	4735:3			4721:15
4712:11	4739:5			2035
\$45 4663:12	4740:18	<u>2</u>	2011 4615:23	4676:1,6,1
\$50 4650:18	1,000	2 4613:4	4716:24	6,25
4651:7	4648:11	4650:22	4718:19	4704:9
4710:25	4671:24	4652:14	2011/'12	4705:23
\$58.33	4672:1	4658:4	4634:12	4707:9,20
4649:18	1,280	4671:1	2011/2012	2047 4713:25
\$60 4663:2	4686:19	4674:1	4634:6	4714:10,11
\$68 4604:17	10 4619:15	4677:2	4640:2	,25 4715:3
4671:6	4620:2	4692:15	2012 4615:17	2049 4706:23
4674:2	4633:8	4693:15	4631:23	4707:2
4675:3,18	4645:22	4695:12	4632:3,4,1	25 4704:4
\$973 4611:18	4646:6,10	4698:11,13	0,11	26 4666:5
	4648:21	4718:19,20	4686:19	4668:7
	4689:11	,23	4705:5	4695:24
	4705:6	4720:21	4716:24	27 4605:9
	4718:20	4721:6	2012/'13	4694:1
	4719:13	4723:5	4681:3	4695:25
	4721:16	4726:19	2013	4696:1,11
	10,000	4730:3,8	4615:15,17	4699:19
08 4633:8	4646:4,10	4743:7	4632:9,20	4701:25
09 4633:8	4671:19	4744:8	4658:15	4702:3
	4721:15	2,000	2014 4601:24	<u>3</u>
<u>1</u>	10:41	4643:22	4727:24	3 4607:15
1 4601:24	4689:14	4648:1,8	2015 4638:20	4612:22
4607:16	10:54	4649:1	4639:7,15,	4725:3
4610:5	4689:15	2,200 4648:5	17 4662:18	4728:2
4614:11,17	100	2.1 4641:5	4712:2	4742:18
4618:19,20	4684:10,17	4680:5	2016	30
4622:6	,25	20 4639:24	4721:9,14	4611:23,24
4625:3	105,000	4641:9	2018 4644:18	
4646:17	4645:19	4648:3,11		
4657:15,22	11.3 4714:18	4700:1		
4658:3				

4612:1	4675 4604:19	676 4611:19	A-4 4698:5	4609:2,6
4613:9,10,	4679 4604:24	<hr/>	abbreviated	4610:20
11 4660:5	4686 4605:8	<hr/> 7 <hr/>	4745:13	4620:18
4699:20,23	4696 4605:12	7 4671:1	ability	4703:8,11
4704:19	4700 4605:17	700 4607:24	4615:23	accomplish
4712:6	4713 4603:10	70s	4665:13	4696:5
31 4610:24	4715 4605:21	4722:20,22	4712:17	accordance
4612:22	4723 4603:11	750 4607:23	4718:15	4670:18
33 4612:25	4746 4606:10	<hr/>	able 4614:14	account
4613:1	4747 4601:25	<hr/> 8 <hr/>	4617:25	4654:7
330 4601:22	4603:13	80 4660:6,12	4622:2	4693:3,7
35 4676:14	48 4698:5	81 4604:3	4629:24	4718:22
4701:7	49 4641:4,6	4635:11	4637:3	accurate
4704:3	4719:6	82 4604:7	4651:17	4632:3
36 4691:20	<hr/>	4652:23	4653:11	4684:16
4701:7	<hr/> 5 <hr/>	83 4604:10	4660:16	achieve
37 4616:22	5 4642:12	4654:21	4671:22	4662:17
<hr/>	4646:1	84 4604:14	4678:11	4676:2,25
<hr/> 4 <hr/>	4675:10	4675:14	4687:12	achieved
4 4605:10	50	85 4604:20	4694:25	4678:12
4626:15	4662:18,21	4679:14	4696:22	achieving
4642:12	4663:13	86 4605:3	4709:12	4604:22
4646:15	4720:2	4687:22	4711:8	4679:6,17
4651:24	500 4678:12	87 4605:9	4716:13	across
4652:1,6	5x16	4696:11	4729:25	4636:20
4657:25	4672:3,10,	88 4605:13	4730:22	4647:9
4666:5	16,18,19	4700:21	4737:3	4657:7
4670:4	4673:22	89 4605:18	4739:10	4661:20
4694:4	4675:25	4715:23	4742:9	activity
4696:2,12	4676:5,9,1	<hr/>	absent	4670:9
4706:12,17	6,24	<hr/> 9 <hr/>	4662:15	4692:5,25
40 4646:15	5x16x52	9 4669:22,25	absolute	actual
4647:3	4604:19	4685:13	4702:25	4615:25
4655:3	4675:5,21	9:03 4607:1	4721:1	4616:9
4719:25	<hr/>	90 4606:3	absorb	4631:18
400 4601:22	<hr/> 6 <hr/>	4684:13	4669:16	4739:23
44 4680:4	6 4613:20	4746:9	absorbed	actually
4683:8	4642:14,20	91	4670:10	4608:14
4716:12	4657:22	4684:16,23	accelerated	4615:11,15
45 4716:12	60s	4685:20	4722:7	4621:9,19
4601 4601:25	4722:16,20	<hr/>	accept	4622:6,7
4604 4603:3	63 4680:18	<hr/> A <hr/>	4612:13	4624:13
4607 4603:7	4684:2	a.m 4607:1	4727:11,23	4633:22
4625 4603:8	4723:23	4689:14,15	4732:9	4634:13
4635 4604:6			acceptable	4639:19
4654 4604:13			4635:6	4643:21
			access	4650:18
			4607:17	4651:8
				4661:6

4680:19	adjust	4719:1	4668:11,19	4664:12
4682:22	4624:19	4744:3	4717:17	analysis
4712:1	adjusted	4745:10	allowed	4617:1
4713:21	4632:4,11	against	4628:2,3	4619:3
4720:1,13	4633:18	4615:11,24	4716:18	4650:5
4729:19	adjusting	4634:9	allows	4707:11,15
add 4617:16	4633:16	4718:10	4625:23	4736:12
4618:7	4634:8	agency	4711:6	analyze
4642:17	adjustment	4635:22	4712:19	4695:9
4709:18	4650:15	4636:1,3,8	4727:5	Anderson
4731:22	adopt	aggressive	alone	4602:17
added	4613:20	4684:9	4665:16	annual
4643:13	adust	ago 4729:22	alre 4630:19	4604:20
adding	4651:15	agreed	already	4629:2,3
4619:15	advance	4741:11	4613:9	4637:10,13
4643:20	4657:19	agreement	4615:9	4660:17
4657:17	advanced	4609:22	4630:19	4678:11
4690:9	4611:1,3,5	4682:1,21	4654:8,11	4679:5,15
addition	,20,25	4683:2	4693:3	4706:13,21
4617:3	4612:1,13	4710:1,3	4695:4	,23
4631:7	4613:9	4712:16,19	4713:5	4709:18,19
4637:12	advancing	,23	4744:21	4721:2
additional	4705:20	4729:23	alternative	4728:20
4617:17	adverse	4733:4,7	4621:18	answer
4664:24	4718:10	4742:9	4702:14	4606:9
4668:19	advise	agreements	ALTERNATIVES	4624:10
4692:18	4605:13	4622:1	4601:8	4626:7
4716:9	4635:1	4677:22	am 4712:21	4629:10
4730:11	4700:14,21	4710:7	America	4631:11
4741:9	advisors	4725:13	4623:11	4634:19
additions	4724:7	4728:4	amongst	4637:23
4642:15	affect	ahead 4623:3	4626:17	4643:25
address	4638:8	4625:6,8,1	4742:10	4647:2
4681:13	4692:24	1,13	amortize	4649:4
4689:25	4693:3	4730:13	4659:22,25	4680:17
4716:11	affected	akin 4740:18	amount	4686:4
addressed	4692:17	alarm	4634:18	4697:1
4688:14	affecting	4659:11	4657:11	4736:17
addresses	4669:13	allocate	4665:1,2	4744:18
4613:5	affects	4672:19	4671:15	4746:7,18
addressing	4692:15,16	allocated	4691:6	answered
4716:12	,22	4656:12	4721:5	4696:18
adequacy	Affirmed	4659:18	4737:7	4744:21
4616:15	4603:6	4660:6	4745:11,14	answers
adequate	4607:11	4666:14	amounts	4635:19
4608:16	afternoon	4667:1,3	4678:10	4698:7
adjourning		allow 4652:3	4726:1	Antoine
4747:1		4667:16,24	analogy	4602:14
				4741:7
				anybody

4617:5	4710:9	4666:20,22	4656:25	4730:2
anything	arbitraging	4667:2	4683:13	aware
4688:20	4710:8	4670:10	4693:7	4607:22
apparent	area 4630:20	4683:7	4695:8	4631:24
4735:18	4667:21	4684:6	4715:16	4632:5,13
APPEARANCES	4696:18	4704:16	4716:1	4657:2
4602:1	areas	4724:18	4717:20	4676:8
appears	4625:24	4729:23	attempt	4677:18
4649:22	4627:5	4730:12	4695:17	4683:19
Appendix	aren't	4731:3	attempting	4703:18
4714:18	4666:15	assume	4680:23	4704:7,10
4715:14	4741:23	4640:13	4710:9	4724:4
apples	arguable	4653:19	attend	4726:25
4664:2	4743:11	4676:15	4607:6	4727:5,15
applicant	arise 4629:7	4685:13	attending	4732:13
4688:20	4703:2	4686:9	4717:16	4733:14
4742:8	arising	4718:1	attention	4742:4
application	4743:15	4719:25	4689:5	away 4629:19
4632:2	arrangement	4728:3	attracting	4653:11
apply 4682:3	4685:7	assumed	4683:1	axis 4645:22
appreciate	4729:13	4720:3	attributed	4719:8
4654:3	4730:21	assumes	4683:20	<hr/> B <hr/>
appreciated	arrangements	4638:16	automated	backing
4687:10	4681:25	4683:9	4629:18	4667:25
approach	4725:1	4707:2	automatic	backwards
4613:13	4731:1,4,5	assuming	4610:3,5	4633:12,16
4621:11	,10	4610:4	available	4634:1
4623:7,17,24	artifact	4647:20	4615:9	bal 4644:18
approaches	4661:16	4676:12	4621:15,24	balance
4623:10	aside	4684:9	4644:13	4667:18
appropriate	4609:24	4716:9	4661:19	balanced
4660:12,14	assets	4717:17	4672:15	4644:19
4690:1	4660:9	4720:21	4686:6	4668:3
4707:5	assign	4726:3	4710:24	banking
approving	4700:9,16	4728:12,13	4716:16	4718:5
4628:5	assigned	assumption	4717:2,7	banks
approximatel	4605:15	4605:6	4735:19	4669:14
y 4647:21	4699:7	4639:22	4738:11,12	bar 4644:6
4648:21	4700:24	4680:12	Avenue	4721:5
4649:1	assignment	4684:5,8	4601:22	base 4618:20
4706:18	4631:2	4685:13,22	average	4634:6,8
4741:9	assist	4687:15	4650:21	4635:21
April	4628:17	4688:1	4669:22	4643:9
4601:24	4660:16	4713:25	4670:2,21	4651:10
arbitrage	associated	4737:4	4710:16	based
	4608:16,21	assumptions	4712:6,7	4613:25
		4605:20	4714:11,24	4615:8
		4635:21		
		4655:12	avoids	

4617:20	4635:19	4709:12	,24	4666:4,13
4618:10	4636:4	bit 4610:25	4635:8,17,	4667:4,10
4633:19,25	4637:11	4621:5	18,24	4668:4,13,
4640:2	4639:7	4666:6	4637:7,12,	21,25
4665:14	4661:5	4684:9	17,20	4669:4,9,2
4668:22	4664:14	4690:6	4638:12,21	0
4684:18	4670:4	4691:15	4639:1,11,	4670:1,14,
4685:2,11	4678:14	4723:6	13,20	24
4706:23	4685:4	bite 4650:22	4640:5,12,	4671:11,21
4718:23	4688:12	black	22	4672:2,6,9
4728:1	4689:17	4643:15,18	4641:3,11,	,17
4735:15	4696:6	,23 4644:5	15,19,23	4673:3,8,1
basically	4731:20	blood	4642:5,8,1	3,17,20
4667:8	4735:23	4634:22	6,23	4674:5,10,
4670:11	bend	blue	4643:2,10,	15,18,25
4709:21	4698:13,14	4694:11,12	24	4675:6,8,1
4717:25	benefit	,17	4644:3,11,	2,23,24
Basin 4723:8	4631:21	Board	20	4676:7,11,
basis 4605:6	4730:9	4601:3,14,	4645:1,8,1	14,20,22
4613:23	benefits	15,16,17,2	1	4677:5,12,
4625:10	4731:3	1 4602:2	4646:13,14	17,21
4628:25	best 4712:13	4658:22	4647:2,8,1	4678:1,5,9
4632:21	better	4669:6,21	4,19,23,25	,16,20
4640:16	4612:1	4688:20	4648:4,8,1	4679:1,9,2
4643:20	4621:1	4724:7	2,14,18,25	1,22
4670:18	4654:17	4741:20	4649:4,8,1	4680:3,16
4680:15	4666:6	4742:5,7,1	1,15,21	4681:10,19
4684:23	4694:25	0,21	4650:2	,24
4686:21,23	4702:2,9	4743:7,15,	4651:17,25	4682:3,6,1
4687:18,25	4711:4	16	4652:7,15,	2,16,24
4710:11,12	4736:21	Board's	20	4683:8,14,
4714:13	4737:4	4689:2	4653:4,5,1	17
become	4738:18	Bob 4602:2	0	4684:1,7,1
4643:7	4743:23	4603:8,10	4654:2,18	5
Bedford	beyond	4625:18,19	4655:1,2,9	4685:1,6,1
4602:7	4703:9,21,	,22	4656:1,7,1	1,18
begin 4724:2	23	4626:6,13,	3,16,22	4686:5,24
behaviour	4704:5,19	19,23	4657:4,21	4687:3,6,9
4619:3	4706:6	4627:4	4658:3,7,1	,19
4628:11	4707:6	4629:1,9,1	0,14,17,19	4688:10
4629:21	4714:11,25	4	,25	4689:20
Bel 4601:16	4720:3	4630:1,11,	4659:4,15,	4691:18,19
belabour	bid	23	16,24	,25
4688:23	4653:15,16	4631:2,6,9	4660:8,11,	4692:7,11
believe	4654:12	,20	15,22	4693:8,25
4607:5,18	bigger	4632:1,8,1	4661:2,8,1	4694:7,12,
4626:8	4704:23	5,23	3,25	16,19,24
4627:2	bilateral	4633:6,18,	4662:6,10,	4695:11,15
4630:25	4609:2	23	14,23	,18,23
	4708:17	4634:11,17	4663:5,8,1	4696:8,16,
			6	17 4697:4
			4664:11,20	4698:3,4,1
			4665:5,10,	6,21
			20	4699:5,9,1

3,18,22,25 4700:3,6,1 2 4701:4,5,1 1,20,24 4702:3,6,1 0 4703:6,13, 19,25 4704:7,13, 20,24 4705:4,9,1 6,21 4706:1,4,1 6,20 4707:1,4,2 2,25 4708:6,8,1 1,16,20 4709:3,7,1 1,24 4713:19,20 4714:9,17, 22 4715:4,12, 19 4716:4 boilers 4642:2,4 book 4680:20 border 4640:24 4648:1 4658:24 4666:11,25 4667:7,20 4708:9 bottom 4719:11 4736:11 bought 4733:8 bound 4702:25 boundaries 4701:14,16 4702:17 4703:5 box 4699:19 Boyd 4602:6	break 4651:1 4659:2 4688:9,13, 15,17 4689:22 BRIEF 4609:15 4614:21 4622:18 4653:23 4656:20 4659:8,13 4663:18 4671:9 4672:24 4674:23 4711:20 4719:3 4740:5 4744:11 4745:24 briefly 4660:23 bring 4689:4 bringing 4708:4 broke 4660:23 build 4610:16 4617:5,8 4618:24 4619:4 4731:14 building 4607:19 4610:19 4618:24 4619:6 4720:9 4722:22 built 4608:14 4610:4 bump 4692:23 4693:16 burn 4607:16 4723:8	bus 4661:6,9 buses 4664:10 business 4620:17 4731:11 4732:11 4733:23 4735:10 buy 4617:21 4618:13,16 4620:4,7 4690:19 4710:21 4712:9 4737:6 buyer 4718:9 buyers 4717:6 4718:1,17 buying 4618:4 bypass 4609:19 Byron 4602:9 4742:13,17 <hr/> C <hr/> CAC 4602:9 calculate 4652:14 4674:5 4687:8 4707:5 4710:20 4711:7,13 calculated 4706:7 calculates 4706:13 calculating 4686:21 calculation 4604:7 4650:19 4651:18 4652:16,24	4661:12 4673:14 4674:2 4687:10 calculations 4622:13 4738:21 California 4627:14 Canada 4640:21 4708:12 cap 4697:12,15 ,18,20,23 capability 4713:6,12 capac 4726:4 capacitor 4669:14 capacity 4604:14,21 4605:4 4608:16 4609:2 4610:8,11 4611:4 4612:24 4613:3 4617:3,16, 17,18,19,2 1,22,25 4618:1,4,5 ,7,9,11,15 ,16,17 4619:11,16 ,22 4620:2,4,5 4625:9,12 4633:13 4641:8 4642:10 4643:17,21 4644:12,13 ,16 4645:15,19 4657:17 4662:2 4670:25 4671:4,16,	20 4672:3,7,1 0,13,14 4673:5,10, 21 4674:9,13 4675:1,15 4676:2,18 4677:1,11, 15,22 4678:2,7,1 1 4679:5,15 4680:13 4683:6,10, 15,20 4684:6,22 4686:22 4687:17,24 4690:9,19 4691:2,4 4704:18 4709:16,18 ,20,23 4710:4 4719:6,9,1 4 4720:9,13, 22 4721:7,16 4725:8,10, 11,17,19,2 1,22 4726:2,5,9 ,11 4728:13,19 ,24 4729:3,4 capital 4611:3,12, 16,17 4613:10 4656:15 4660:3 4673:19 4704:23 4722:4 4723:11 capital- intensive 4618:13 4619:7,21
---	---	--	--	--

capture	4622:4,5,8	caution	4745:5	4624:24
4612:22	4638:16,22	4743:18,24	chairman	4628:24
4613:1	4641:13,18	4744:5	4607:18	4637:5
4730:22,23	4642:25	CCCT	4626:14	4641:8
captures	4643:3,18,	4617:5,8	4632:24	4642:10
4613:13	25	4618:25	4688:16	4670:18
4717:18	4644:2,4	CCCTs 4620:8	4689:21,23	4700:15,22
carb 4651:12	4658:11	CCGT 4647:16	4690:3	4712:12
carbon	4690:11,13	4650:17	4716:5	4719:8
4604:11	,15	4652:3	4729:22	characteristics 4616:9
4605:12,17	4692:2,8,1	4653:16,21	Chairperson	4686:1
4639:3	2	4655:14	4601:13	charge
4641:16,18	4693:2,12	4656:5	4607:3	4725:25
4644:24	4694:13,17	CCGT-New	4609:25	4726:1,13
4645:3,5	4698:10,15	4649:23	4610:14	charged
4646:20	,17,18	4651:5,25	4615:1,20	4726:12
4647:1,20	4700:18	CCGTs	4616:2,11,	charges
4649:22	4701:2,8	4651:8,13	21 4618:19	4728:12
4650:10,11	4702:19,20	4654:9	4619:2	chart
,16,17,20,	,22,23	4655:23	4623:6,15,	4641:12,24
24	4703:14	4705:1,23	22 4624:11	4642:24
4651:2,3	4716:11	cease	4625:5	4644:6,22
4652:3	4720:11	4730:22	4688:6	4649:24
4653:5	4735:24	cents	4689:7,17	4650:3
4654:5,22	4739:8,20,	4649:18	4697:9	4655:10
4655:3	24 4742:25	certain	4709:25	4662:25
4656:23	cases	4627:25	4710:6	4668:9
4657:1,11	4605:16	4629:21	4711:5	4670:22
4658:12	4621:18,21	4670:19	4712:15	4674:1
4662:21,23	4623:23	certainly	4716:8,23	4681:6
4663:2,9	4690:18	4620:8	4717:4,13	4683:24
4692:9,13,	4691:9	4658:1	4718:18	4694:3
14,23,25	4700:17,25	4659:4	4723:17	4695:1
4693:4,6,9	4703:1	4674:20	4729:15	4696:24
,12	4722:5	4697:24	4731:20	4702:2
4694:8,11,	4737:22	4710:20	4741:5	4712:1
13,17	cast 4634:9	4737:16	4742:15	4720:18,24
4695:2	cat 4743:17	4742:20,21	4744:7,13	4727:16
4696:3,14,	catch	certainty	4745:2	cheap 4723:9
20,21,25	4745:10	4711:7	4746:21	cheaper
4697:1,3,1	cause	Certificate	change	4643:9
1	4644:19	4603:13	4625:2	cheapest
4698:18,22	4665:25	Certified	4640:14	4657:18
,24	4685:21	4747:5	4645:22	check
4700:8,18	4689:2	Chair	4685:21	4612:5,13,
4701:2	causes	4614:23	4693:12,13	16 4615:24
carefully	4717:21	4711:23	4695:8	4634:21,25
4735:12	causing	4742:13	4705:18	4678:4
case 4605:17	4628:12		4719:7	4679:10
4610:10			4728:11	
4621:11			changes	
			4605:14	

4686:13	4622:6	4654:6,12, 25	4607:1	competitive 4630:23
4715:5,13	4624:4	4655:14,18	comment	competitor 4620:16
4725:15	4743:19,23	,20,22	4698:6	compilation 4694:4
4726:23	4744:3	4656:3	4710:13	complaint 4738:17
4727:12,21 ,23	clients 4623:19,23	4704:20	4718:18	complete 4626:7
checked 4615:11	client's 4743:19	4705:1,3	4743:3	completely 4620:12
cheque 4729:8	climb 4693:19	4719:21,24	commentary 4743:22	compliment 4731:24
Cheryl 4747:10	climbs 4693:18	4720:1,14, 17,19,20,2	comments 4741:8	comply 4687:13
chose 4630:15,16	clock 4688:7	2 4721:4	4742:18	compo 4618:17
chosen 4630:3,12	close 4615:17 4712:2	4722:14,25	4743:9	component 4618:1,17
Christian 4602:22 4654:14 4711:22	closely 4622:10 4628:20,23 4629:25 4633:2	coal-fired 4719:18	commercially 4626:1	4625:3
chugging 4720:5	closer 4642:14,20	colleagues 4705:17	Commission 4627:12 4628:1,5 4629:10,12 ,20	4638:22
circumstance s 4692:3	closest 4624:6 4642:20	column 4647:15 4683:25	committing 4628:15	4662:3
clarificatio n 4610:1 4613:18	CO2 4638:14,16 ,18,19,22, 24 4658:12 4662:16 4697:17 4698:10,15 ,17 4699:10,11 ,23	combination 4614:11	commodity 4663:24 4664:2	4677:11
clarify 4608:4 4631:21	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	combustion 4643:12 4647:6,10 4705:7	common 4649:21	4690:24
classificati on 4739:17	CO2 4638:14,16 ,18,19,22, 24 4658:12 4662:16 4697:17 4698:10,15 ,17 4699:10,11 ,23	comes 4638:20 4697:6 4719:10,14	companies 4617:21 4621:13 4622:15 4730:8 4731:9	4709:16
classified 4612:14,18 4613:12	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	coming 4624:11 4640:20 4656:9 4666:1 4720:13 4721:15 4736:21	company 4617:8 4626:11 4730:14 4738:3,10, 16	components 4624:17 4625:9 4637:15 4666:20
classify 4612:8	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	comm 4742:18	company's 4735:9	compound 4706:23
clean 4610:25 4625:24	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	commence 4607:5	comparable 4655:24 4656:5	compounded 4706:13,21
clean-up 4742:11	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	commencement 4638:14 4639:14	compare 4624:23	Conawapa 4731:15
clear 4631:11 4701:12	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1	commencing	competition 4610:17	concede 4743:8
client	coal 4604:13 4620:8 4642:5,6,9 ,11,18 4643:4,7,1 1			conceivable 4665:2

concludes 4741:4	4664:24 4745:17	4606:1	4705:2 4709:12,16	4729:19,21 4731:24
concrete 4621:4	consideratio n 4620:3	contact 4727:5	,21 4727:23	4742:19 4743:1
conduct 4637:5	considered 4648:22	contain 4638:22	4729:3	correct 4608:10,23
conference 4621:14	4655:13 4682:1	contains 4692:9	contracted 4627:22	4610:18 4611:21,22
conferences 4622:23	4692:3 4701:16	CONTENTS 4603:1	contracts 4604:23	4612:3 4613:6
confirm 4616:14 4659:3 4680:25 4734:9	considering 4661:23	context 4619:6 4738:5 4740:8,13	4675:25 4676:1,9,1 1,16,17,25 4677:11,13 ,19 4678:6,13, 18 4679:6,18, 23,24 4683:11 4704:8,16 4706:6,7 4708:18 4727:17 4728:2	4626:17 4629:19 4632:6,19, 22 4633:4,5 4635:22,23 4638:25 4640:11 4641:9,10, 13,14 4642:20,22 ,25 4643:1,14 4644:8,9 4645:2
confirmed 4677:12	consistently 4625:16	continent 4626:17	control 4695:7	4647:6,7,1 2,13,17,18 ,22
confusing 4648:19	constrained 4713:15	continuation 4745:21	controlled 4651:21	4648:23,24 4649:2,19, 20,25 4658:5,12, 16 4662:1,4 4663:2,3 4666:11,12 4667:8 4671:7 4672:7 4675:6 4677:16 4678:8,21 4680:25 4681:11 4682:2 4683:2,11, 13,15,16,2 2 4684:12 4685:18 4691:23 4692:6,9 4694:5,22, 23 4697:19
congestion 4609:19 4661:23 4664:7 4665:17 4666:9,14, 16,18,19,2 2,25 4667:2,11, 14,15 4668:5,6,1 1,23 4670:15,18 4730:2	constraints 4664:4	continue 4639:23 4648:19 4698:25 4714:3	conventional 4611:18 4612:2,18 4613:11	
construction 4618:21	consult 4744:8	continued 4603:5,7,1 0 4607:13 4610:22 4635:17 4646:13 4653:4 4655:1 4659:15 4675:23 4679:21 4691:18 4696:16 4698:3 4701:4 4713:19 4714:23 4732:1	conversation 4616:22	
consult 4744:8	consultant 4614:1 4739:13	continuing 4640:7	convert 4604:14 4646:10 4671:22 4672:2,10, 16 4673:23 4675:1,14	
consultants 4621:13,15 ,20,23 4623:20 4691:10 4703:23 4732:4 4733:5,19, 24 4734:12,14 4735:16 4736:23,25 4739:5	consultant's 4732:14	contract 4618:6 4662:11 4673:22 4676:5,24 4685:24 4686:2	converted 4608:13 4672:14	
consumption 4636:12,13	Con't 4605:1		copy 4680:18	
consider 4616:19 4640:24 4656:8			Corey 4602:20	
			Cormie 4724:8	

4698:11,19 ,20 4699:2,7,1 2,17,21,24 4700:2,5 4701:9 4706:3,15, 25 4707:3 4708:6 4712:21 4713:23 4717:1 4719:15 4732:7 4733:18 4734:23 4735:6 4747:5 correctly 4613:24 4639:21 4720:17 cost 4611:3,12, 16,17 4613:6 4616:24 4617:20 4618:2,10, 25 4620:1 4625:15 4638:9 4639:3,6 4644:24 4645:6 4647:15,20 4649:17,22 4650:11,16 ,17,21,24 4651:3,6,8 ,9 4652:3,12 4653:17 4655:3 4656:8,12, 15 4659:18 4660:4,7 4661:22,24 4667:15,23 ,25 4668:2,18 4672:20 4673:5,9,1	0,14 4676:18 4683:20 4692:9,13, 15,18,21,2 4,25 4693:6 4696:20 4720:7 4722:9,25 4730:2 costs 4611:25 4613:10 4618:6,15 4624:24 4638:5,24 4645:3 4651:2 4655:24 4660:4,18 4661:20 4664:4 4673:6,19 4674:9,13, 16 4690:23,25 4693:4 counsel 4602:2 4626:10 4635:1,19 4652:16 4679:2 4680:17 4695:20 4741:20 4742:7,10 4743:7 counsels 4743:16 counsel's 4688:21 count 4708:1 counterparti es 4681:20 4725:11 counterparty 4682:6 4712:18	couple 4639:10 4643:19 4644:17 4688:24 course 4628:20 4632:1 4636:18 4652:10 4714:4 cover 4637:22 4674:9 covered 4688:12 4692:1 create 4732:17 created 4636:4 4680:13 4724:6 cross 4688:21 4741:13 4743:5 cross- examinatio n 4603:7,8,1 0 4607:13 4625:18 4713:19 4741:10,20 4743:12 4745:7 cross- examine 4742:9 4743:2 CSI 4604:24 4606:6,8,9 4621:6 4622:1,4 4626:8,11 4679:3,19 4685:5,6 4688:25 4689:4	4743:21,23 ,24 4744:1,4,6 ,18 4745:16,17 4746:3,6,1 3,15,16 CT 4611:1,3,5 ,18,20 4612:13,18 4613:9,11 4616:23 4617:2,16, 17,20 4618:2,8,1 0,12,17,21 4619:23 4620:1,7 4650:7 4657:17,18 4720:12,13 ct-new 4647:5 4649:16,23 4650:20,23 CT-new 4647:16 CTs 4618:24 4619:5 4642:19 4652:11 4705:22 cumulative 4641:20,22 4643:20 4644:7 4720:24 cumulatively 4643:4 current 4604:23 4678:12,17 4679:6,17 4712:3 4728:6 currently 4638:23 4665:25 curve	4633:16 4653:21 curves 4624:19,20 4625:1 4634:7,8,1 2 customer 4739:7,24 customers 4609:6 4728:3 customized 4734:21 4735:4,11 cut 4622:25 cycle 4647:6,10, 11 <hr/> D <hr/> dark 4694:17 data 4614:14 4615:9,19, 25 4620:25 4628:21 4684:19 4685:2 4686:5 4711:6 4712:8 4716:18,19 ,22 4717:22 4732:17,18 4733:1,16 4735:19,23 4736:1,10 4737:9 4738:4,10, 11 4739:6 data's 4685:2 date 4638:14 4639:15 DAVE 4729:21 DAVID 4603:9 4713:1,3
---	---	--	--	---

4717:9,25	decision	4666:7	4606:3,7	different
4719:15,21	4619:4,5	demonstratin	4611:4	4618:5
,23	4620:10	g 4655:16	4680:8	4620:12
4720:6,15,	deck 4626:15	Department	4686:17	4632:10,11
25	4702:12	4636:3	4690:12,24	4639:20
4721:3,17,	declines	depend	4691:2	4660:6
21	4651:23	4638:3	4716:18	4663:25
4722:1,6,1	declining	4659:22	4746:2,4,9	4664:3,5,9
8	4706:24	4682:20	,14	4670:20
4723:2,13	decreased	dependable	determines	4686:16
4725:20,24	4668:22	4605:4	4638:4	4695:19
4728:17,24	defence	4609:3	determining	4700:9
4729:10	4622:21	4680:9,13,	4615:3	4721:7
4736:16	definitely	14	dev 4711:17	4723:5
day	4616:6	4681:2,6,7	develop	4729:16
4670:15,20	degree	4682:25	4621:2	4732:10,11
4675:10	4628:5	4683:4,10,	4691:10	4737:18,20
4695:11,12	4735:19	18,21,23	4718:8	4739:6
,14	deliver	4684:3,5,1	4738:9	differentiat
4709:21	4712:17	0,21,22	developed	e 4736:18
4710:14	4730:6	4685:14,23	4641:13	difficult
4712:11	delivered	4686:11,18	4642:25	4664:8
4730:13	4663:25	,22	4689:1	4707:17
4745:19	deliveries	4687:17,23	4703:16	4742:24
day-ahead	4724:18	depending	4711:17	4743:3
4662:7,8,1	delivery	4670:22	4742:12	dig 4622:24
3 4717:12	4658:20	4697:14	developing	digress
4718:6	4660:24	depends	4628:17	4649:16
days 4675:10	4664:4	4713:4	4737:24	diminishing
day-to-day	demand	depreciation	4738:4	4705:10
4710:11	4633:15	4659:25	development	direction
4712:21	4637:5	described	4601:10	4640:19
deal 4646:16	4638:3,6,1	4699:1	4605:19	directionall
4745:1	0 4645:5	DESCRIPTION	4607:23	y 4654:8
dealing	4692:24	4604:2	4608:12	directly
4654:8	4693:3,5	4605:2	4613:14,22	4621:20
4696:17	4714:5	4606:2	4640:4,10	4685:8
4719:1	4722:21	design	4715:15,25	4692:17,22
deals	4726:1	4676:5	developments	disagree
4607:17	4728:11	designed	4640:17	4738:14
dealt 4732:3	demonstrate	4626:1	dif 4664:8	disagreed
decide	4604:8	detect	difference	4724:9
4635:4	4652:17,25	4629:15,18	4611:24,25	disclosing
4712:13	4655:11,21	determinativ	4710:10	4678:10
decided	4668:9	e 4728:7	4711:7	discovery
4627:21	demonstrated	determine	4712:7,20	4621:22
deciding	4647:3		4718:23	discussed
4690:9			differences	4624:22
			4743:20	

4657:16	4743:7	7,23	14,18,21,2	4,17,20,25
discussion	doctors	4610:7,18	5	4675:5,7,9
4607:18	4730:3	4611:8,11,	4646:3,6,8	,24
4611:1	documents	22	,9,17,24	4676:4,10,
4625:14	4680:20	4612:4,10,	4647:4,7,1	13,19,21
4655:18	dollar	15,19	3,18,22,24	4677:3,9,1
discussions	4697:20	4613:7,15	4648:2,6,1	6,20,24
4621:12	dollars	4614:10,24	0,13,16,24	4678:3,8,1
4626:13	4604:15,17	4615:1,13	4649:2,6,1	4,19,23
4642:9	,18	4616:1,5,1	0,13,20,25	4679:7,10,
4743:25	4639:6,8,9	7 4617:10	4650:4	24
distance	4647:21	4619:1,9	4651:20	4680:1,5,1
4697:16	4649:17	4620:11	4652:2,8,1	1,23
distances	4650:18	4621:8	9	4681:4,17,
4670:12	4651:6	4622:20	4653:8,13,	22
distinguish	4658:15,17	4623:7,12,	25	4682:2,5,1
4743:13	,18	18	4654:4,7,1	0,14,19
distortion	4663:1,2,1	4624:1,16	0,16	4683:3,12,
4614:18	1,12	4625:7,19,	4655:6,17	16,22
distribution	4671:5,6	21	4656:2,11,	4684:3,12,
4669:12	4673:24,25	4626:5,12,	14,17	18
diverse	4674:2,6,1	18,22	4657:3,7,2	4685:4,9,1
4730:9	8	4627:1,10	4	7,25
diversities	4675:2,3,4	4629:3,10,	4658:2,6,9	4686:12
4682:4	,16,18,20	13,17,23	,13,16,18,	4687:1,4,8
4731:13	4710:23,25	4630:5,14,	23	,11,14
diversity	4712:4,8,9	25	4659:16,21	4690:1,2
4605:7	,10,11	4631:5,8,1	4660:2,10,	4691:19,24
4677:19,21	4729:7,8	5,25	13,19	4692:1,6,1
4680:9	domestic	4632:6,14,	4661:1,5,1	0,14
4681:2,8,1	4713:24	22	1,15	4693:11
3,20,25	done 4615:6	4633:5,11,	4662:4,8,1	4694:2,6,1
4682:7,25	4624:10	21	2,20	0,15,18,23
4683:14,17	4625:25	4634:4,15,	4663:3,7,1	4695:3,13,
4685:19,20	4633:3	20	4,20	16,22
4686:1,14,	4639:3	4635:7,23	4664:13,16	4696:6,23
18 4687:15	4649:3,5	4636:2	,22	4697:19
4688:2	4657:6	4637:8,9,1	4665:8,15,	4698:4,12,
4710:1,2,7	4699:7	4,18	23	20
4712:16,19	dotted	4638:1,15,	4666:7,12,	4699:2,8,1
,23	4698:17	25	17	2,17,21,24
4724:19	double	4639:5,12,	4667:9,13	4700:2,5,1
4725:3,9	4715:5,13	16,21	4668:10,15	0,19
4726:19,25	Douglas	4640:1,11,	,24	4701:10,12
4727:15	4602:7	15	4669:2,8,1	,18,22
4728:4	Dr	4641:1,7,1	1,24	4702:1,5,8
4729:22	4608:2,6,1	0,14,17,21	4670:3,17	,13
4731:1,16	5,23	4642:3,6,1	4671:7,14,	4703:10,17
divide	4609:4,8,1	3,21	23	,22
		4643:1,5,1	4672:5,8,1	4704:2,10,
		4	2,21	15,22,25
		4644:1,4,9	4673:1,4,7	4705:8,12,
		,15,25	,9,16,18	19,24
		4645:4,10,	4674:4,7,1	4706:3,15,

19,25	4737:10,18	4691:4	,22 4704:2	encourages
4707:3,7,2	,21	4718:5	4735:19,23	4723:11
4	4738:1,13	east 4670:7	,25	endorse
4708:3,7,1	4739:9,12,	econom	4736:7,10,	4614:7
0,13,19,23	20	4693:24	12	energy
4709:5,9,1	4740:1,10,	economic	4737:6,19	4609:3
5	15,21	4604:12	EIE 4612:6	4618:6,14
4710:2,18	4741:1	4653:6	eight	4619:12,17
4711:10,23	4744:20	4654:6,24	4604:17	,23
,25	draw 4690:7	4692:4,25	eighteen	4627:12
4712:22	driven	4696:19	4712:4,10	4629:12
4713:3,14,	4718:16	4722:12	eighty	4635:21,25
20,22	dropping	economical	4660:5,11	4636:2,4,5
4714:1,14,	4720:19	4617:3,16	either	,8,9,12,13
21	dump 4653:18	economics	4665:19	,16
4715:2,8,1	duplicate	4603:5	4728:5	4637:10
7,20	4625:24	4607:10	elaborate	4656:9
4716:5,6,2	duration	4630:21	4621:5	4658:5
1	4721:10	4690:16	Electric	4660:18
4717:1,9,2	durations	4715:11	4658:22	4662:5,13
5	4705:2	economy	electricitie	4663:10
4719:5,15,	during	4692:4	s 4663:23	4665:22
17,21,22,2	4615:12	effect	electricity	4667:6,12
3	4710:22	4652:5,11	4626:24	4672:3,11,
4720:4,6,1	4712:11,12	4655:22	4630:21	14,18
0,15,23,25	4741:13,24	4656:6	4636:10,14	4674:8,13
4721:2,3,1		4717:15	,19,24	4675:25
1,17,19,21		effective	4637:2,25	4676:1,17,
,24		4722:10	4638:3,5,7	24 4677:14
4722:1,2,6		effectively	,10 4664:1	4680:9
,14,18,24		4609:5	4696:20	4681:2,21
4723:2,10,		4713:12	4714:6	4682:7
13,15		efficiencies	4722:21	4685:23
4724:5,11,	earlier	4705:7	elicit	4692:17,20
15,21,25	4616:8	efficiency	4626:1	,22
4725:5,14,	4657:16	4611:7	eligible	4699:16
20,24	4692:1	4705:11	4745:17	4700:1
4726:3,7,1	4743:12	efficient	else 4667:12	4703:8
0,15,22	early	4628:18	4669:9	4708:18,22
4727:2,10,	4644:8,10	4643:7	4731:22	4709:9,13,
13,20,25	4720:13	4646:19,25	emission	17,22
4728:8,15,	4722:20	4650:7,8,2	4656:23	4710:5
17,24	earn 4605:7	5 4705:22	emissions	4717:10
4729:10,14	4677:10	EIA	4646:20	4723:14
4732:2,8,1	4686:14	4611:3,16	4657:12	4724:18
2,21	4687:15	4612:7	enabled	4725:21
4733:3,11,	4688:3	4638:13,15	4621:22	4726:18,20
19	4723:13			4727:1,9,1
4734:1,6,1	earned			5 4728:5
1,17,23	4668:16,17			4730:1,6
4735:1,7,1	4686:15			4731:13,16
4,21	earning			engineering
4736:9,14,	4686:3			
16				

4630:20	4628:5	4737:11	exhibit	4612:23
4667:5	estimate	examination	4605:10	4613:3
England	4664:23	4741:14	4641:5	4662:11
4626:25	4697:23	4743:6	4646:15	expense
4627:2	4707:17	examine	4657:25	4668:14
4630:19	4715:6	4710:7	4666:5	4669:1,3
ensure	4718:12	4716:24	4680:4,18	expensive
4716:17	estimates	examined	4684:2	4617:6
enter	4623:8	4716:24	4696:2,12	4618:12
4676:15	4625:10	examining	4723:23	4654:11
4708:17	evaluate	4616:15	4724:3	4723:6
4709:12	4631:16	example	Exhibit-2.1	experience
4731:4	evaluating	4615:13,22	4671:2	4622:14
entirely	4613:21	4697:11	exist	4623:6
4666:14	4715:10	4732:15	4703:15	4630:18
entrant	evaluation	4735:10	existing	4638:13
4673:11,14	4619:20	4744:21	4638:23	4690:7
entry	evening	examples	4679:24	expert
4616:25	4607:4	4621:4	4680:2	4630:6
4625:15	event	4624:2	4685:7	expertise
environmenta	4669:22	except	4719:14	4630:19,20
l 4722:12	everybody	4640:3,19	exists	,21
equal	4607:4	exception	4710:14	experts
4725:17	4680:5	4640:5,8	exp 4667:21	4622:7
4726:1	everything	excess	4693:14	expire
4728:14	4621:16	4713:9	expand	4676:12
equally	everything's	exchange	4607:19	4731:4
4699:11	4651:22	4677:19,22	expanding	expired
equate	everywhere	4681:20,25	4607:17	4676:12
4674:16	4620:9	4682:7	expansion	expires
equilibrium	evidence	4710:4	4623:14	4730:19
4625:12	4613:18	4725:17	4722:16	explain
4644:17	4631:22	4729:6,12	expect	4627:8
equivalent	4656:23	exchanged	4615:16	4633:9
4649:1	4691:21	4728:12,13	4633:1	4635:24
4672:3,10	4694:22	exchanges	4665:18	4637:20
error 4650:2	4698:5	4680:10	4702:19	4639:13
essence	4701:6,12	4681:3,14	4703:3	4641:24
4694:21	4713:24	exchanging	4709:25	4643:3
essentially	evolutionary	4726:1	4714:3	4657:4
4608:19	4612:9,14	excluding	4718:13	4671:12
establish	4613:12	4640:14	4728:10	4711:3
4644:12	exactly	executive	4731:8	4729:16
4678:11	4608:5	4657:23	expectation	explained
4711:9	4629:22	exercising	4703:3	4619:13
establishes	4633:24	4628:12	expectations	4633:12
	4644:15		4630:8	4729:21
	4712:23,24		expected	explaining

4621:16	fact 4615:24	figure	4686:2,11,	3
explanation	4616:23	4657:22	15,23	4632:3,4,1
4654:17	4638:18	4658:3	4687:16,18	0,11,12,18
4718:19	4716:13	4660:24	,25 4688:3	,20
export	4721:4	4662:1	4709:13,15	4637:25
4619:14,18	4738:15	4664:13	,21 4728:5	4638:13
,24	4741:23	4671:1	first	4639:25
4631:4,7,1	4746:5	4674:1	4607:16	4641:9
0,23	factor	4677:2	4611:2	4690:17,20
4632:4	4611:13	4686:21	4643:17,19	4691:23
4658:5	factors	4691:20	4644:17	4706:22
4662:16	4657:16	4698:5	4656:8	4714:24
4664:13	4670:19	4701:7,9,1	4683:25	4730:17
4675:25	failures	9,20	4695:10	4732:17
4676:24	4627:14	figures	4733:22	4733:9,10,
4677:13	fair 4614:8	4658:11	4740:11	12,17,24
4680:8	4724:2,8	4701:5	4742:18	4734:4,18,
4701:15	fairly	figuring	five 4675:10	21 4735:11
4708:9	4607:16	4744:16	fixed 4673:6	4739:3
4713:16	4625:16	file 4642:1	4678:17	4740:20,22
4714:11,19	fall 4703:5	fill 4691:14	4682:8	forecaster
,24 4715:3	false	4708:25	4683:1	4624:7
exporting	4659:11	4710:23	4726:20	forecasters
4713:7	familiar	finally	4731:15	4613:20
exports	4612:7	4644:18	fleet	4623:9,13
4640:9,13,	4639:4	financial	4657:10	4732:10
14,24	4724:17	4608:21	flexibility	4733:15
4677:8	fast 4721:22	4631:12	4728:4	4734:20
4714:19	feasible	fine 4617:21	flight	4736:6
express	4707:25	finish	4745:10	4743:10
4683:9	Federal	4688:14	flow 4665:24	forecasting
extend	4627:12	fired	focussed	4638:2
4703:9	4629:12	4642:1,4,5	4619:15	4662:15
4704:9,19	feel 4614:3	firm	4636:18	4676:3
4706:21	4705:22	4605:5,8	4724:22	4677:1,4
extent	feels 4744:4	4607:25	4743:15	4690:5
4616:14,16	FERC	4608:25	follow-up	forecasts
4743:14	4629:11,20	4609:1	4611:5	4614:6
extra 4620:2	fifty	4662:10	footprint	4623:21
4730:16	4650:18	4675:25	4661:21	4631:3,10
extreme	4651:6	4676:24	4723:7	4633:20
4743:24	4710:25	4678:6,17	fore 4740:22	4635:21
extremely	4720:2	4681:7	forecast	4636:13,22
4720:19	4729:7,8	4682:8	4612:24	4637:4,6,8
4721:20	fifty-eight	4683:4,5,1	4613:19,21	,21
<hr/>	4649:17	1	4623:4,8	4658:4,15
faced 4690:4		4684:5,11,	4631:7,13,	4690:24
		23	14,16,18,2	4691:2
		4685:15,24		4694:5
				4700:9
				4701:13
				4702:14

4703:9,20	4743:6,11	4717:7	4667:16,24	4688:17,19
4714:19	front 4641:7		generic	grandfather
4732:25	4671:2	<u>G</u>	4733:15,24	4730:19
4733:14,15	4694:3	GAC 4602:11	4734:4	4731:2
4734:10	4702:11	gain 4730:12	4735:11	grandfathered 4729:23
4735:3,12,23,24	fuel 4611:7	Gange	4738:6	4731:4
4736:1,2,20,22	4624:19,24	4602:11	George	Grant
4738:6,9	4625:2	gas 4633:15	4602:16	4601:17
forgetting	4647:11,15	4636:10,15	germane	4645:14,21
4742:3	4649:17	,23	4632:17	4646:3,8
forgot	fuels	4637:2,4	gets 4642:20	4719:5,17,22
4688:17	4636:15,16	4638:4,7	4726:9,13	4720:4,10,23
form 4627:11	,25 4638:8	4639:6	4742:8	4721:2,11,19,24
4717:10	full	4642:1,4,2	getting	4722:2,14,24
formed	4676:2,25	4643:6,9	4609:12	4723:10,15
4627:11	4689:8	4647:11	4666:23	graphically
forms 4636:9	fully	4655:7	4667:14	4666:6
forthcoming	4656:11	4719:13	4673:4	great
4622:11	4659:17,18	4721:14	4722:7	4702:18
4732:5	4713:5	4723:1	4725:18	greater
forty	4731:10	gen 4734:3	4726:5	4643:4
4719:25	fulsome	general	4729:9	green
forty-five	4689:8	4647:9	GHG-10	4662:21,22
4663:11	function	4733:7,22	4639:4	4694:9,14
forum 4739:6	4650:16	4742:18	gigawatt	greenhouse
forward	functions	generally	4686:20	4639:6
4605:5	4627:6	4731:5	gigawatts	grow 4714:3
4616:16	fundamental	4736:24	4642:12	growth
4617:2	4718:12	generate	given	4605:11,17
4633:1,12,17 4644:12	fundamentall	4657:10	4617:4,8	4644:21,23
4684:23	y 4614:5	generated	4667:17	4645:3,5
4686:10,22	future	4634:14	4669:21	4691:22
4687:17,25	4615:3	generates	4683:25	4692:2,8,12
4708:2,16	4624:13	4730:14	4699:14	4693:5,9,13,24
4731:14	4625:1,16	generating	4707:18	4694:8,10,20,21
4741:17	4639:24	4623:9	4741:17,25	4695:2
frame 4604:4	4679:24	4656:10	4742:6	4696:2,13,19,25
4622:22	4680:12	generation	gives	4697:1,2
4635:2,13	4690:12	4613:6	4726:11,14	4698:6,22,24
4660:12	4691:8	generator	glad 4617:10	
frankly	4701:14,17	4618:25	goals	
4688:25	4703:4	4657:10	4657:19	
free 4731:10	4706:5	4739:25	gone 4615:10	
Friend	4728:7,21	generators	4622:22	
	4731:6,8,19 4745:5	4618:22	Gosselin	
	futures	4623:11,13	4601:13	
		4657:12	GRA	

4699:4,14, 15,25 4700:7,17 4701:1,9 4706:14,21 ,23 4707:2,8,1 2,14 4713:24 4714:4,5,1 5,16 4722:21 guarantee 4681:15 guard 4735:12 guess 4615:2 4616:12,21 4625:22 4648:22 4657:22 4659:21 4676:22 4722:2,16 4741:11 4742:17 guidance 4745:8 guidelines 4628:1 <hr/> H <hr/> Hacault 4602:14 4606:5 4635:20 4741:6,7 4742:3 4746:3,11 half 4745:13 hand 4614:11,17 handing 4680:21 handle 4627:6 4709:13 handled	4621:6 happen 4633:10 4639:19 4650:14 4665:18 4693:15 4705:15 4707:19 happened 4633:22,24 4634:13 4731:7 happens 4629:23 4707:11 4722:7 happy 4620:5,6 hard 4714:2 hate 4705:15 haven't 4616:12 4651:21,22 4659:23 4705:13 having 4617:3 4683:6 4712:15 4745:9 head 4671:22 4710:19 hear 4742:19 heard 4635:18 4642:9 4680:16 4705:16 4725:5 4743:21 hearing 4745:21 heat 4611:10 4650:8,11, 15,16 4651:2 4670:10	hedge 4717:5,7,8 4718:9 HELD 4601:20 help 4620:25 4644:11 4713:8 helping 4739:1 here's 4610:14 hesitant 4703:23 high 4605:11,17 4616:3 4636:5,6 4644:21,23 4645:3 4691:22 4692:2,4,8 ,12 4693:9 4694:8,10, 20,21 4695:1 4696:2,13, 24 4697:1,2 4698:21,24 4699:14,15 ,25 4700:7,17 4701:1,8,9 ,21 4702:16,19 ,20,22,24 4723:14 higher 4609:11 4639:9 4645:3,5 4646:25 4647:1,16 4650:8,20, 23,24 4651:3,5,7 4652:12,13 ,14 4670:4,13 4692:13 4696:19,21	4699:4 4703:1 4712:4 highly 4619:21 hired 4627:24 historic 4728:22 historical 4639:22 4680:7 4711:11 hockey 4663:10 Hombach 4602:3 hope 4607:4 hopefully 4607:15 hoping 4746:22 hot 4670:8 hour 4604:19 4649:18 4650:9 4672:4,11 4674:6,19 4675:4,20 4711:12 4745:13 hourly 4670:18 hours 4652:8,13 4656:2 4672:15,19 4675:10 4686:20 4709:20 4711:13,14 4713:15,16 Hub 4609:20 4727:18 4730:1,7 Hugh 4601:17 4645:14,21	4646:3,8 4719:5,17, 22 4720:4,10, 23 4721:2,11, 19,24 4722:2,14, 24 4723:10,15 hundred 4611:17,19 4645:20 4648:4 4663:6 4671:17 4700:4 4729:6,8 hydro 4601:7 4602:5 4604:12,22 4606:3,5 4607:24 4608:11 4609:11 4614:2 4615:5 4617:21,24 4618:7,20 4619:10,14 4622:21 4623:7,17 4624:6 4630:10 4631:22 4632:2,9 4640:3,14, 20 4650:6 4651:15 4653:6,15, 16 4654:6,11, 24 4657:14 4658:21 4660:9,25 4662:17 4664:25 4665:3,6,1 3 4666:14 4667:6 4668:17 4676:1,8,1 5 4677:18
---	---	---	---	---

4678:11	4724:19	4616:21,23	4731:18	4607:23
4679:5,16	4732:4	4617:4,7,1	import	4636:14
4681:13,21	4734:9	0	4708:11	4644:23
4683:9	4735:4	4623:22,23	4713:6	4735:10
4684:9,19	4739:5	4624:2,4	important	including
4685:13	4743:10	4625:24,25	4690:15	4605:16
4688:19		4634:2	4736:17	4656:15
4690:13	<hr/>	4662:25	4738:20	4700:17,25
4706:6,9,1	I	4671:19		incorporate
1 4707:2	I'd 4624:8	4674:11,12	importing	4640:3
4708:1,17,	4634:21	4676:12,22	4664:14	increase
24 4709:11	4641:3	4682:22	4665:21	4609:1
4710:9,21	4672:21	4684:21	imports	4640:18
4711:8	4673:1,22	4688:6	4640:2,4,7	4644:16
4714:23	4678:3	4694:12	,18,24	4662:18,21
4716:13,20	4689:4	4695:24	4664:24	4664:25
,22	4697:7	4703:13,17	4665:14	4667:19
4717:15	4717:13	4704:3,10	4668:11	4671:4
4724:3	idea 4623:16	4711:23	4708:1,4	4693:22
4725:3	4627:15	4716:9	imposition	4714:11,24
4726:8	4634:7	4717:17	4662:16	4718:15
4727:6,8,1	4691:12	4719:7	impression	increased
9 4728:3	identical	4724:13	4683:23	4640:9
4729:25	4649:23	4728:17	impressive	4681:3
4730:16,18	identified	4729:6,9,1	4611:13	4727:15
4732:24	4612:23	9,20	improvement	increases
4733:1	identify	4730:25	4611:7	4609:6
4735:17	4606:4	4733:21	4613:5	4640:9
4741:13	4613:2	4734:3	improving	4643:22
4742:6	4746:2,4,1	4736:23	4705:14	increasing
4745:6	0	4740:10	inaccuracies	4663:1
4746:3,9,1	identity	imagine	4614:18	4668:2
2	4739:23	4664:1	incentive	incremental
Hydro's	IEC 4602:22	impact	4657:13	4619:11
4601:9	4603:5	4628:22	include	independence
4607:19	4607:10	4638:9	4605:10	4628:2,6
4609:1	I'll 4612:5	4664:17	4662:2	independent
4613:19	4634:25	4665:4,21	4677:14	4613:20
4614:25	4645:12	4666:3	4678:24	4626:20
4631:3	4646:14	4700:8	4681:8	4627:5,7,2
4640:9	4654:1	4707:15	4696:2,13	5 4629:15
4646:18	4688:13,14	impacts	4709:16	4630:3,13
4651:1	4695:18,20	4652:18	4710:3,4	4736:5,7
4664:14	4700:12	4653:2	4732:15	4737:17,24
4668:8,14,	4715:4,5	4664:15	included	independentl
21 4669:1	4729:3	impacts4652	4635:20	y 4627:21
4677:7,13	illustrate	4604:9	4678:22	indicate
4678:17	4650:14	implementing	4685:20	4604:3
4680:7,19	I'm 4612:25	4628:23	includes	4605:18
4681:2,20	4615:5	imply		
4682:17				
4685:23				
4714:18				

4635:11	4635:22,25	4660:4	4734:22	4702:19
4696:22	4636:3,8	4667:19	interfering	4721:13
4715:23	4654:7	4686:19	4628:14	ISO 4626:17
4745:4	4661:18	instead	internal	4627:1
indicated	4679:3,4	4613:20	4736:2	issue
4606:6	4680:19	4618:23	interpret	4738:16
4617:1	4685:8,20	4633:17	4685:19	4745:3
4654:8	4698:9	4664:1	interpretati	issues
4699:9	4711:24	instructions	on 4743:21	4629:6,7
4732:3	4714:23	4695:20	interpreted	4636:17
4746:3,12	4732:5	inte 4629:7	4613:25	4669:12
indicates	4735:16	integrated	4634:19	4743:15
4617:1	4736:7	4631:12	4697:22	4745:6
4708:14	4738:5	4636:22,24	interpreting	It'd 4699:3
indicating	4740:8,12	,25	4720:16	item 4647:9
4701:13	4741:11	4637:2,3,2	inter-	it'll 4642:3
indicative	4742:22	4 4638:10	temporal	4745:16
4701:14	4743:10	4693:4	4726:4	it's 4607:22
4731:7	inherently	integrating	Intervenors	4608:7,19
individual	4613:13	4637:21	4741:19	4610:10
4621:13	in-house	intellectual	interviewed	4611:23,24
individuals	4691:11	4622:3,15	4631:1	4613:12
4745:17	initially	intended	intuition	4614:10
industrial	4630:17	4636:11	4718:24	4615:4,23
4637:1	4721:22	intending	invest	4616:10
4638:9	injection	4625:24	4619:21	4617:20
industry	4667:19	intensive	4737:24	4619:20
4703:20	inordinate	4704:23	investments	4620:9,22
4722:3	4634:18	intention	4619:21	4634:21
inefficienci	input	4745:15	invests	4638:10
es 4628:12	4732:17	interacted	4738:4	4641:18
inevitable	4737:4,9	4736:25	invite	4646:4
4705:18	inputs	interest	4745:19	4647:10
influence	4736:3,20,	4629:7	involved	4648:3,8,2
4697:13	22 4737:15	4638:2	4621:7	1 4650:25
influenced	in-service	4689:7	involves	4657:18,23
4697:17	4656:8	4691:3	4618:21	4661:6,12,
influences	4659:18	interested	4619:10	13,15,16,2
4653:14	4660:18	4618:16	involving	4 4663:24
inform	insights	4619:17	4728:5	4666:3,22,
4707:20	4736:8	4630:6	IR 4685:10	25
information	4737:8	4690:14	isn't	4667:1,5,2
4614:1	instance	4728:17	4666:21	1
4621:19,23	4615:15	interesting	4667:14	4668:15,17
,24 4622:2	4617:24	4616:6	4695:5	4669:2,13,
4626:2,8	4618:14	4653:9		16,25
4629:24	4624:18	interests		4670:3,4
	4636:23			4671:2,20
	4655:7			4673:18
				4680:22
				4682:7,12

4684:24	4669:6	4706:12,17	4649:16	4713:5,10
4686:7	Keeyask	4713:21	4671:24	limits
4689:2	4656:9	4727:16	4672:12	4702:15
4691:4	4659:19	4742:8	4673:24	line
4693:4,6	4731:15	lastly	4676:14	4607:19,23
4694:8	kick 4743:16	4613:17	4689:11	4608:14,16
4695:25	kilo 4648:9	4644:20	4706:8	4610:4,8,1
4699:3	kilograms	late 4722:22	4714:10	1,16,19
4702:7	4648:6,11	later	4716:11	4631:18
4706:10	kilowatt	4629:23	4722:22	4634:2,5,1
4708:14,15	4604:16,17	4645:12	letting	3
4710:22	4611:18,19	4745:10	4724:2	4643:15,18
4714:2,7,8	4650:9	latitude	level	,23 4644:5
4716:12	4671:6,19	4741:17	4639:24	4646:1
4719:13	4672:13	Lavigne	4640:8	4647:9
4721:21,22	4675:2,3,1	4747:10	4669:12	4658:10
,23,24	7,19	law 4705:10	4686:3	4662:22
4722:3,12	kilowatts	least 4620:1	4697:17,25	4663:9
4723:23	4671:20,25	4639:24	liberties	4669:14,17
4724:21	4672:1	4643:6	4743:11	4693:10,17
4726:4	kilowatt-	4646:17	licence	,23
4729:24	year	4651:11	4732:15	4694:9,11,
4730:15	4671:5,12,	4656:24	lieu 4658:1	14,17
4734:4	14,15	4684:20	life 4660:8	4697:13
4736:17	kink	4723:18	4704:18	4698:9,17,
4738:14,16	4698:14,25	4734:9	4719:20	23,24
,19,20	knew 4640:19	4735:2	4720:3	4720:14
4741:18	knowledge	leave 4635:4	4722:8	4724:8
4742:9	4691:11	4645:14	light	lines
4745:15	4718:24	4670:14	4660:15	4628:16
4746:22	4724:14	4681:12	4694:11,12	4670:8,11
itsel 4734:2	knowns	leaving	4700:6	4698:11,13
I've 4621:8	4633:19	4745:19	likely	list 4603:3
4674:25	lack 4667:5	left-hand	4651:15	4604:1
4688:11,14	large 4691:6	4641:12	4675:24	4605:1
4689:1	4718:12	legislation	4676:23	4606:1
4694:3	larger	4638:24	4677:5	4625:23
4734:13	4609:7	less 4613:11	4701:16	little
4735:25	Larry	4643:7	4702:24	4610:25
4736:1,25	4601:15	4646:25	4704:20	4666:5
J	last 4607:4	4650:7,8,2	4708:17	4690:6
Jessica	4617:11	5 4654:11	4728:22	4691:15
4602:19	4629:10	4698:25	4738:8	4705:1
job 4627:23	4649:4	let's 4623:4	likewise	4712:4
jump 4692:16	4700:13	4624:1	4643:12	4738:25
K		4644:20	4661:8	4744:22
Kapitany		4645:25	4698:25	LMP 4660:24
4601:14		4648:19	4706:1	4661:2
4620:11			limitation	4727:18
				load 4643:9
				4651:10

4661:18,22	long-run	4721:13	4607:24	4710:9,21
4670:7,20	4625:12	4723:12	Manitoba	4711:2,8
4693:13	long-term	lower	4601:3,7,9	4714:18,23
4698:5	4605:8	4611:10,12	,23 4602:5	4716:13,20
4713:24	4617:22	4613:10	4604:22	,22
loc 4667:14	4619:17	4618:5,14,	4606:3,5	4717:3,15
locate	4636:22	25	4607:19,24	4718:14
4604:20	4677:13	4633:14,15	4608:11	4724:3,19
4679:2,14	4678:12	4643:6	4609:1,11,	4725:2
located	4680:14	4646:20	13,19	4726:8
4667:7	4686:2,15	4650:17,22	4613:19	4727:6,8,1
location	4687:16	4651:6,16	4614:2,25	8 4728:3
4661:3,4,1	4688:3	4652:3	4615:5	4729:25
4 4666:18	4704:8	4658:10	4617:23,24	4730:1,7,1
4667:1,2,1	4733:17	4669:3	4618:20	3,16,18
1 4669:25	4740:24	4696:21,25	4619:10,14	4732:4,24,
locational	lose 4720:22	4697:2	4622:7,21	25 4734:9
4658:24	4721:22	4698:14,16	4623:7,17	4735:4,17
4660:25	loss 4670:2	4699:13	4624:6	4741:13
4666:10	losses	4702:25	4630:10	4742:5,6
4682:17,21	4661:23	4703:1	4631:22	4745:6
locations	4664:8,18,	4720:9	4640:3,14	4746:3,9,1
4664:3,5	21,23,25	4723:1,9	4646:18	2
4666:19	4666:10	lowest	4650:6	Manitou
4723:3	4669:5,7,1	4617:3	4651:1,15	4664:24
lock	4,17,19,22	4642:17	4658:21,24	manner
4712:16,20	4670:10,13	lunch	4660:25	4636:16
locked	4673:12	4745:13,15	4664:14,25	marg 4651:6
4717:10	4730:3		4665:3,6,1	margin
logic	lot 4634:22	<hr/>	3	4692:21
4650:12	4645:17	M	4666:11,14	4723:12
logical	4669:16	main 4628:8	,23,24	marginal
4738:14	4670:11	4692:15	4667:1,6,2	4624:24
long 4610:8	4670:11	major 4637:9	0,24	4651:6,8
4623:3	4713:4,14	majority	4668:8,14,	4652:12
4626:19	4719:23,25	4737:3	17,21	4655:3,24
4647:24	4721:22	mak 4619:19	4669:1	4658:24
4648:3,15,	lots 4610:11	man 4653:16	4676:8,15	4660:25
16,17,21	4616:20	managed	4677:7,13,	4661:22
4649:6,7,8	4643:18	4668:12	18 4678:17	4663:21
4659:22	4667:22	4669:15	4679:5,16	4664:7
4660:2,9,1	4670:9	manipulate	4680:18	4666:9,11
0 4670:12	love 4742:19	4665:13,17	4681:13	4668:6,22
4683:10	low 4642:24	4732:18	4682:17	4669:5
longer	,25	manipulated	4684:9,19	4670:15,17
4660:14,16	4699:15	4733:1	4685:23	4682:17
longer-term	4700:1	manipulation	4690:13	4692:21
4619:23	4701:21	4629:15,19	4706:6,9,1	Marilyn
	4702:16,23	Maniti	1	4601:14
	4719:12,13		4708:1,5,2	4620:11
			1,24	marked
			4709:11	

4641:5	4711:18	4657:15,17	4664:21	4729:3,4
market	marketplace	,18,19	4704:24	member
4607:17,20	4614:14	4662:24	means 4650:8	4601:14,15
4609:2,7,9	4615:25	4664:3	4651:10	,16,17
4612:22	4716:16	4681:13	4721:6,8	4669:6
4613:2	markets	4682:20	4729:24	members
4616:9	4626:24	4690:11	meant	4689:21
4617:25	4628:9	4691:1,7,1	4615:20	4716:10
4618:18	4629:4,5	0,11,12	4630:11,15	4741:8
4624:14,17	4630:22	4704:17	4637:21	mention
4625:12	4636:10,24	4710:25	4673:18	4626:15
4626:16,20	4640:17	4716:10	4728:18	4688:18
4627:5,7,1	4670:19	4737:1	measure	mentioned
3,14,16,17	4738:5	4741:18,19	4671:16	4704:1
,18,20,21	Marla 4602:6	4742:25	measured	merchant
4628:9,11,	material	4744:21	4666:18	4739:24
12,15,17,1	4724:9	4746:3,13	measures	met 4619:23
8,21,22,24	4743:8,20	maybe	4629:18	4649:8
,25	materials	4621:5,17	measuring	meth 4615:21
4629:2,8,1	4634:1	4633:8	4668:6	method
5,19	math	4645:19	mechanism	4615:7
4630:3,7,9	4653:12,14	4646:14	4610:15	methodologie
,10,13	4671:21	4666:5	meet 4619:22	s 4620:20
4632:4,9	4672:19	4667:5	4722:11	methodology
4633:13,14	matter	4670:25	meeting	4615:3,8,1
4636:16	4689:23	4700:12	4619:11,17	1,22,24
4645:16	4745:8	4701:24	4620:2	4624:12
4654:13	matters	4703:3	4661:22	4632:25
4658:21	4607:6	4712:4	megawatt	4633:2,7
4662:7,9	4743:22,25	4719:13	4604:18	metric
4665:11,13	4744:6	mean 4616:13	4607:23	4648:18
4670:19	mature	4617:16,18	4649:18	4649:12,13
4677:6	4612:9,18	4618:8	4671:18,24	metrics
4682:13,17	maximize	4645:7	,25	4649:3
4685:16	4745:14	4646:2	4672:4,11	MHEB 4658:22
4691:7	may 4606:6	4654:10	4673:24	M-hm 4616:1
4692:18,24	4616:19,20	4681:19	4674:6,19	4619:1
4697:11	4617:12,25	4697:13,15	4675:4,20	Michael
4709:2,8	4618:3,4,5	4703:11	4678:12	4602:17,23
4711:11	,6,10,12,1	4708:4	megawatts	microphone
4717:7,12	3	4712:18	4607:24	4607:7
4718:6,24	4622:22,24	4717:19	4609:9	4653:12
4727:1,7,1	4623:2	4721:6	4619:15,16	mid 4626:16
7	4629:7,23	4722:2	4620:2	4637:13
4728:5,19,	4632:3	4725:18,20	4643:22	middle
20	4634:18	,22	4645:19	4642:24
4730:11,17	4640:20	4736:16	4671:18	
4731:13,17	4645:19	4738:11,16	4686:20	
4732:14	4653:10	4739:13	4721:15	
4733:15		meaning		
marketing		4620:1		
4620:7		4649:5		

4647:4	4656:24	4661:17,21	monthly	4640:17
mid-range	4657:8	4695:4,5	4629:5	neither
4653:21	4658:21	4708:14	4728:20	4725:25
mid-term	4661:9	4717:16,22	morning	net 4625:15
4637:13	4663:22	4718:3,8	4607:3	4639:23
Miller	4665:4,14,	4732:16	4625:19,21	4640:1,6,1
4602:12	21,25	4733:1,10,	4626:14	3 4643:16
mind 4616:14	4666:1,8,1	25	4632:24	4723:14
4629:22	9,21,23	4734:2,18	4692:1	network
4739:21	4667:16,22	4735:10	4716:7	4608:8
minimal	4668:18,19	4736:19	4732:3	NFAT 4632:2
4666:2	4669:22	4737:1	4742:21	night 4607:4
minimize	4670:2	4738:12	4743:22	4617:12
4661:20	4704:8	4740:21	4745:20	4670:16,21
minimum	4708:1,4	models	mostly	nighttime
4681:14	4709:2,8	4614:15,19	4669:7,13	4712:10
Minn	4711:11	4620:19	move 4667:19	nine 4611:17
4730:1,7	4727:7	4732:11,25	4697:8	4745:20
Minnesota	4729:24	4733:16,23	4731:12	nobody
4609:20	4730:6,12,	4735:13	4744:2	4667:12
4727:18	17	4738:8	movie	nodal
minus	missed	moment	4655:11	4730:2,7
4645:22	4740:11	4659:6		node 4609:13
4646:2	misunderstan	money		4658:22
minute	ding	4671:15		4666:24
4744:8	4617:13	4722:10	<hr/> N <hr/>	4667:3,7,1
minutes	mitigating	4738:2	namely	5,17
4688:8	4627:18	monitor	4623:8	4682:18
4689:5,11	mitigation	4626:16,20	natural	4727:18,19
4741:9	4629:18	4627:5,13,	4636:10,15	4730:14,18
MIPUG	mix 4618:5	21	4637:4	non-fixed
4602:14	4620:6	4628:9,10,	4638:4,7	4731:17
MISO 4607:25	4657:9	13	4642:1,4	non-peak
4608:8,25	4728:6	4630:4,13	4723:1	4710:10,16
4609:1	mixture	4665:11,18	4738:16	4712:17
4610:9	4735:25	monitoring	nature	normal
4624:15	MKO 4602:16	4622:9	4713:4,10	4703:3
4626:21	MMF 4602:19	4624:14,18	4719:18	normally
4627:11,22	Mmm 4676:19	4627:20	4733:4,6	4716:15,16
,24	mod 4717:21	4629:16	necessarily	4719:24
4628:3,4	model 4613:8	monitors	4702:19	North
4630:4,7,1	4614:12	4630:18	4728:6	4623:11
2 4636:20	4615:14	monitor's	necessary	notational
4639:23	4616:15	4627:7	4610:5	4661:13
4640:7	4621:16	Monnin	4620:24	note
4642:10	4622:11,12	4602:22	negotiated	4741:8,12,
4644:14	4636:11	4635:1	4728:4	
4645:18	4637:3	4654:3,14	negotiating	
	4653:16	4689:21	4740:24	
		4711:22	neighbouring	

15,22	4624:20	4721:17	ongoing	4742:6
noted 4611:2	4743:3	4733:11	4625:10	opposed
notes	offers	4734:1	on-peak	4665:7
4729:17	4624:23	oil	4662:17	4702:25
notice	4692:17	4636:10,15	4709:4,6	opposite
4720:12	office	okay 4617:10	4710:24	4652:11
notional	4703:12	4621:8	4711:14	optimization
4661:4	offices	4623:4	4712:5	4661:17
np	4744:25	4624:1	4713:13	optimize
4602:3,7,1	offline	4626:12	4716:14	4653:19,20
1,12,16,17	4719:10,14	4627:10	4717:6	4713:11
,19,20,23	4720:18	4634:17	onto 4626:2	optimized
NSP 4678:12	4721:15	4646:8	opening	4711:18
nuclear	off-peak	4648:12	4622:15	option
4704:21,24	4604:9	4649:3	operate	4608:22
,25 4705:3	4651:16,23	4652:19	4627:16	order
num 4613:4	4652:4,5,1	4658:2	4712:24	4651:22
	7 4658:8	4659:10	operating	4668:10
	4662:17	4667:13	4611:25	4695:21
	4664:15	4668:4	4723:5	4730:6
	4665:21	4674:4,7,1	operation	4744:24
O&M 4613:10	4708:25	7 4675:8	4624:15	orig 4630:17
objection	4709:2	4676:13	4720:8	Orle 4602:16
4742:23	4710:22	4682:24	4722:13	others
observations	4711:13	4695:22	operations	4623:16
4703:4	4712:3	4701:22	4628:14	4626:14
obtain	4713:13	4703:6,19	opine	otherwise
4716:14	off-the	4708:7	4715:14	4605:21
obtained	4734:4	4722:1	opinion	4680:25
4632:9	4737:6	4723:15	4685:21	4715:16
4717:6	off-the-	4724:11,15	4705:22	4716:2
occasion	shelf	,24	4709:14	ought 4719:1
4741:24	4734:10,12	4725:7,14,	opportune	outcomes
occur	,15	16,24	4688:11	4702:18,24
4638:17	4735:11	4726:3,10,	opportunity	outlook
4667:11	4737:11	15	4616:13	4637:10,11
occurred	4738:7,10,	4727:4,10,	4653:17	output
4615:12	12	14 4729:10	4658:4	4647:1
4627:14	oftentimes	4734:16,19	4667:11	outputs
4741:18,24	4624:18	4740:3	4685:16	4614:12
occurs	4690:9	4741:3	4686:7	4736:20
4657:5	oh 4612:25	old 4651:7	4688:9,21	overall
o'clock	4617:17	older	4689:24	4618:6,14
4745:20	4624:1	4651:11	4701:15	4638:8
offbeat	4630:14	4650:25	4707:6	4645:15
4651:14	4652:7	4679:7,11	4714:18	4662:15
offer	4695:24	4704:23	4716:14	
	4711:10	4734:11	4730:11	
	4720:25			

4707:15	4641:8,24	4742:10	21	4745:24
overnight	4643:3	4744:25	4734:3,8,1	pay 4618:18
4611:17	4645:2	partly	6,19,24	4646:20
4621:9	4651:19	4627:13	4735:2,9,1	4682:1
4709:1	4654:5	4666:15	5	4708:21
4713:17	4655:12,16	passage	4736:4,13	4709:2,6
overstated	4656:24	4610:2	4737:5,16,	4725:10,11
4652:1	4657:5	past 4621:21	20,23	4731:16
overtaking	4660:16	4633:8	4738:3	payment
4651:9	4665:12	4690:18	4739:4,10,	4618:9
	4671:3	4706:11	15,22	peak 4604:9
	4679:3	4707:9	4740:3,7,1	4652:10,13
	4686:8	4714:10	2,17,23	,17 4653:1
	4689:21	4731:2,7	4741:3	4658:7
	4694:25	patching	4742:2	4663:1
	4698:8	4720:7	4744:15	4670:21,22
page 4603:2	4700:14	path	4746:1	4685:16
4604:2	4701:11	4623:1,2	Patton	4710:10,16
4605:2	4707:21	Patti 4602:5	4603:9	4712:17
4606:2	4713:22,23	4603:7,11	4629:23	4713:7,8,1
4608:4	4716:10	4607:13,14	4713:1,3,2	6
4612:22	4723:18	4608:3,9,1	1 4716:6	people
4616:22	4741:8	8,24	4717:9,25	4624:9
4641:4,6	4746:24	4609:5,10,	4719:15,21	4719:24
4657:22	paragraph	21,24	,23	4745:18
4671:1	4616:24	4610:22,23	4720:6,15,	per
4680:4	Pardon	4611:9,14,	25	4604:16,17
4683:8	4687:3	23	4721:3,17,	,18
4691:20	participant	4612:6,12,	21	4611:18,19
4694:1	4624:23	17,21	4722:1,6,1	4639:6
4698:4	participants	4613:8,17	8	4649:18
4701:8	4628:10,21	4614:23	4723:2,13	4672:4
4716:12	4629:8	4659:1,5,1	4725:20,24	4673:24
4719:6	particular	0 4688:16	4728:17,24	4674:6,18
pages	4613:4	4718:25	4729:10	4675:2,3,4
4601:25	4631:13	4723:21,22	4736:16	,16,19,20
4701:7	4643:3	4724:6,12,	4744:20	percent
Pan 4744:20	4681:5	16,24	pause	4611:24
panel 4603:5	4704:11,17	4725:2,7,1	4609:15	4612:1
4607:10	4707:14	6,22,25	4614:21	4613:9,10,
4608:5	4722:15	4726:6,8,1	4622:18	11 4645:23
4613:19	4745:8	1,17,24	4653:23	4646:1,6,1
4618:22	particularly	4727:4,11,	4656:20	0 4648:21
4621:25	4647:4	14,22	4659:6,8,1	4651:24
4626:7	4703:18	4728:1,9,1	3 4663:18	4652:1,6,1
4627:9	4722:10	6,23	4671:9	4
4630:2,6,1	parties	4729:1,11,	4672:24	4662:18,21
5,16	4620:15	18 4731:23	4674:23	4663:6,13
4631:3,21	4625:25	4732:1,2,9	4711:20	4669:23,25
4632:19	4666:15	,13,23	4719:3	4670:4
4635:4,25	4741:16,25	4733:6,13,	4740:5	4684:10,13
4637:21			4744:11	
4639:14,21				

,16,21,23, 25 4685:14,20 4686:22 4699:20,23 4700:4 4714:15,16 4718:20,21 4719:13 4721:16 percentage 4605:4 4645:16 4646:1 4651:24 4669:21 4680:8 4684:14,22 4685:23 4686:9 4687:17,23 4702:24 4719:8 percentages 4632:16 perception 4659:19 4660:17 Perfect 4611:14 perfectly 4617:21 perform 4604:5 4635:3,14 performed 4634:9,10 perhaps 4621:1,14, 15,19 4651:24 4722:17 4729:19 4738:7 4742:3 period 4615:12 4639:25 4643:23 4706:13	4719:12 periodic 4628:25 periods 4625:1 4651:14 persist 4720:14 perspective 4676:23 4707:5 4743:20 perspectives 4736:8 4737:17,25 Peter 4602:12 Peters 4602:2 4603:8,10 4625:18,19 ,22 4626:6,13, 19,23 4627:4 4629:1,9,1 4 4630:1,11, 23 4631:2,6,9 ,20 4632:1,8,1 5,23 4633:6,18, 23 4634:11,17 ,24 4635:8,17, 18,24 4637:7,12, 17,20 4638:12,21 4639:1,11, 13,20 4640:5,12, 22 4641:3,11, 15,19,23 4642:5,8,1 6,23 4643:2,10,	24 4644:3,11, 20 4645:1,8,1 1 4646:13,14 4647:2,8,1 4,19,23,25 4648:4,8,1 2,14,18,25 4649:4,8,1 1,15,21 4650:2 4651:17,25 4652:7,15, 20 4653:4,5,1 0 4654:2,18 4655:1,2,9 4656:1,7,1 3,16,22 4657:4,21 4658:3,7,1 0,14,17,19 ,25 4659:1,4,1 0,15,16,24 4660:8,11, 15,22 4661:2,8,1 3,25 4662:6,10, 14,23 4663:5,8,1 6 4664:11,20 4665:5,10, 20 4666:4,13 4667:4,10 4668:4,13, 21,25 4669:4,9,2 0 4670:1,14, 24 4671:11,21 4672:2,6,9 ,17 4673:3,8,1 3,17,20 4674:5,10, 15,18,25	4675:6,8,1 2,23,24 4676:7,11, 14,20,22 4677:5,12, 17,21 4678:1,5,9 ,16,20 4679:1,9,2 1,22 4680:3,16 4681:10,19 ,24 4682:3,6,1 2,16,24 4683:8,14, 17 4684:1,7,1 5 4685:1,6,1 1,18 4686:5,24 4687:3,6,9 ,19 4688:6,10, 19 4689:6,18, 20 4691:18,19 ,25 4692:7,11 4693:8,25 4694:7,12, 16,19,24 4695:11,15 ,18,23 4696:8,16, 17 4697:4,9 4698:3,4,1 6,21 4699:5,9,1 3,18,22,25 4700:3,6,1 2 4701:4,5,1 1,20,24 4702:3,6,1 0 4703:6,13, 19,25 4704:7,13, 20,24 4705:4,9,1	6,21 4706:1,4,1 6,20 4707:1,4,2 2,25 4708:6,8,1 1,16,20 4709:3,7,1 1,24 4713:19,20 4714:9,17, 22 4715:4,12, 19 4716:4 4723:24 4744:9 physical 4661:3,6,9 4717:8 pick 4673:24 4705:5 pieces 4743:7 pitch 4737:12 PJM 4665:20,25 4666:1 places 4663:25 plan 4601:10 4605:20 4607:23 4608:12 4613:22 4618:20 4619:10,13 4640:4,10 4715:15,25 planned 4640:9 planning 4657:1 plans 4619:18,24 4623:14 4665:3 plant 4650:7,24
--	---	--	--	---

4651:2,7	4632:17	4745:13	4743:9	predictive
4655:14,18	4642:17	possibly	4746:5,6,1	4616:4
4671:18,25	4646:16,22	4703:1	5,17	prefer
4704:17,18	,24	post 4743:6	Potomac's	4657:24
,19 4705:6	4655:15	posted	4605:10	preference
4719:21	4658:20	4685:9	4630:2	4689:3
4720:14,22	4668:5	potential	4632:19	4718:3
4721:4,8	4678:25	4630:8,9	4638:12	preferences
4722:25	4685:7,10	4658:4	4639:22	4718:16
4723:1	4689:25	4702:16	4641:4	Preferred
plants	4705:10	Potomac	4676:23	4601:10
4620:9	4714:7	4603:5	4680:4	4605:19
4643:7	4725:6	4604:3,7,1	4691:21	4607:22
4646:19	4735:22	0,14,20	4692:12	4613:21
4651:9,11,	points	4605:3,9,1	4696:1,12	4640:10
12	4646:2,18	3,18	4705:18	4715:15,24
4655:21,22	4651:24	4606:8,9	4707:4	prefers
4656:3	4696:18	4607:10	4715:14	4742:10
4704:21,23	point-to-	4626:16,20	4740:18,19	premium
4705:3	point	4630:3,12	pounds	4716:14
4719:24	4607:25	4635:11	4648:1,5,1	4717:18,21
4720:1,12,	population	4640:13	1 4649:1	4718:2,6,1
18,19,20	4714:3,4,6	4641:5,7,1	Powder	3,15
4722:15	Portage	3	4723:8	preparing
4723:4	4601:22	4642:11,25	power 4624:5	4632:2
plausible	portfolio	4646:15	4627:18	preponderanc
4702:21	4730:24	4652:23	4628:12	e 4702:18
play	portion	4654:4,21	4665:3,24	presentation
4638:18,20	4617:18	4655:12	4666:23	4610:24
please	4644:21	4656:7	4667:17,23	4694:2
4627:9	4688:24	4657:25	,24	4702:4
4657:21	posed 4606:4	4660:17	4668:1,19	4724:9,13
4671:13	4746:2,11	4662:15	4669:16,18	pressure
4691:21	position	4664:13	4670:6	4628:3
4723:19	4614:4,5,7	4666:5	4708:4	pretty
4741:6	4703:7	4671:1	4710:21	4610:7,12
4742:16	4717:14	4675:14	4713:7,13	4634:5
4744:9	4742:25	4677:1	practice	4684:13,24
plot 4693:9	4743:3	4679:14	4703:20	4707:8
4694:21	positions	4681:1	4742:4,11	4712:2
plotted	4741:21	4687:22	pre 4616:3	4723:14
4692:8	possible	4691:23	predict	previous
plus 4645:22	4616:7,10,	4693:8	4615:14	4680:20
4709:22	12 4634:21	4696:11	predictabili	previously
point	4666:3	4699:6	ty 4615:8	4607:11
4608:20	4672:9	4700:16,21	prediction	4683:24
4609:12	4689:9	4701:13	4616:10	4713:1
4613:4	4702:20	4703:8	predictions	4724:12
4617:7	4717:19	4706:7	4615:17	
4623:5		4708:21		
		4715:23		
		4735:20		

pri 4652:9	4693:23	4668:22	problem	4730:16
price	4696:21	4670:25	4614:9	producing
4604:9,11	4697:2	4671:4	4695:5	4650:10
4605:8	4701:14	4672:3,7,1	4707:15	product
4609:13	4703:9	0	problems	4684:11
4614:1	4709:2,6,8	4675:1,15	4690:5	4686:16
4617:18	,10,14,17,	4686:14	procedure	4728:20
4618:17	18,20,22,2	4690:6,12	4657:6	4733:7
4623:8,21	3 4710:4	4691:8,12	proceed	4734:5,15,
4624:7	4714:11,24	4692:15,22	4731:6	20 4735:5
4625:10	4716:15	4699:16	proceeding	4739:7,17,
4631:23	4717:10	4701:17	4631:22	18,21
4632:4,9,2	4721:14	4702:16	4738:19,24	production
0	4726:18	4708:20,22	proceedings	4636:15
4638:4,20	4727:17	4710:10	4607:5	4638:9
4642:25	4730:1,2,7	4711:12	4689:18	4651:9
4644:12,16	,8,17	4712:2,3,2	process	4660:4
4651:13,16	4731:16	1 4714:20	4630:24	4661:20
,23	4732:4,10,	4715:3,18	4740:9,13,	4690:23
4652:5,9,1	24 4733:24	4719:13	16 4742:20	products
2,13,17	4734:4,9,2	4726:20	4743:14,18	4703:15
4653:1,5	0 4736:5	pricing	4744:4	4732:11,14
4654:5,23	4738:6	4658:22	processes	,19
4655:3,7	4739:5	4662:16	4620:25	4733:23
4656:3,5,6	priced	4665:16	4621:6	4734:10,12
4658:14,24	4727:1,17	4682:18	4624:22	,13 4737:7
4660:25	4728:5	primarily	procure	prof 4636:5
4662:5	4731:17	4632:20	4657:14	profile
4663:10,21	prices	prior	procured	4636:6
4664:7,15	4604:15	4656:23	4703:11	profitable
4665:4,6,7	4609:12	pro 4693:12	procurement	4643:8
,8,21	4615:3,23	probabilitie	4624:5	4708:14
4666:3,9,1	4616:15	s 4699:7	4717:11	progression
1	4617:2	4700:8,11	produce	4705:6
4668:15,16	4623:8	probability	4636:11,21	progressivel
,22 4669:3	4624:12,20	4605:15	4637:4	y 4707:9
4672:3,11,	,21,25	4700:16,23	4638:5	project
13,14	4625:2	probably	4650:9	4617:19
4673:21	4630:8	4622:20	4732:11	4624:12
4676:2,18	4631:7	4633:14	4733:10	4625:16
4677:1,14,	4633:15	4665:5	4735:22	4690:16
15	4637:4	4682:20	produced	4691:10
4678:6,17	4638:7,14,	4697:14,15	4663:24	projecting
4681:15	16,18	,17	4668:20	4677:10
4682:8,13,	4643:6	4701:23	4670:6	projections
17,21	4646:21	4704:22	4734:12	4625:1,6
4683:1,6	4651:25	4705:2,12	produces	projects
4684:6	4652:5	4710:15	4663:22	4680:14
4687:16	4658:5,7,1	4711:1,3		
4688:4	9 4660:24	4714:15		
4690:17,20	4662:2,6,7			
,24 4691:1	,9,11,13,1			
4692:16,20	6 4664:13			

pronounced 4698:25	4622:10 4626:10 4680:17	4711:6 4716:19	4695:7 4723:9	queueing 4610:15
property 4622:3,16	4683:18 4684:19	publishes 4612:7	quantitatively 4631:17	quick 4653:11,13 4659:2
propose 4745:12	4685:8 4686:7	purchase 4681:21 4704:18 4727:8 4732:18 4733:9,10 4734:21	quantities 4630:9 4731:18	quickly 4607:16 4720:19
proposition 4616:6	4688:21 4694:5 4706:22		quantity 4681:14	quite 4719:9
proprietary 4620:19	4716:20,22 4735:17 4736:5		quarterly 4629:5	4723:6 4744:16
protect 4620:22 4622:4 4718:10 4738:17,24	provider 4610:16	purchased 4709:22 4732:20,24 4733:1,12, 14 4739:8	question 4606:4 4611:15 4615:2,4 4618:22 4621:9 4626:7 4640:23 4645:9 4654:12 4676:8 4690:3 4691:15 4697:10 4713:21 4719:1 4728:18 4731:24 4744:17 4746:2,4,1 0,22	<hr/> R <hr/> Rainkie 4632:16
protected 4622:1 4738:15	provides 4608:16 4610:8 4657:13 4745:7	purchaser 4732:16		raise 4742:23
protective 4738:8	providing 4621:17 4622:8 4671:17,18 4672:1 4692:21 4736:18,21 4738:7	purchases 4682:7 4690:22 4691:6 4708:23 4709:4 4712:14		raised 4688:20 4689:23 4745:4,6
protects 4626:11		purple 4698:9,23		Ramage 4602:5 4603:7,11 4607:7,8,1 3,14 4608:3,9,1 8,24 4609:5,10, 21,24 4610:22,23 4611:9,14, 23 4612:6,12, 17,21 4613:8,17 4614:23 4620:14 4635:20 4647:5 4659:1,5,1 0 4663:10 4688:16 4718:25 4723:19,21 ,22 4724:6,12, 16,24 4725:2,7,1 6,22,25
proud 4729:20				
provide 4604:7,10, 24 4606:9 4609:11 4620:17,24 4622:12 4623:21 4626:9 4651:18 4652:15,23 4654:4,11, 21 4661:21 4673:10 4677:7 4679:3,18 4683:15 4686:8 4687:9 4711:24 4734:20 4736:7 4746:6,17	proximity 4633:3 PUB 4680:18 4684:2 4723:23 public 4601:3,21 4626:2 4641:4 4680:21 4685:3 4689:2,3,8 4713:22 4724:7 4739:11 4740:16 4742:4 4745:21	purpose 4655:10 4673:5,10 purposes 4613:21 4724:22 pursue 4635:5 putting 4628:16 4667:12 4697:21 puzzled 4620:13	questioning 4724:8 questions 4610:1 4614:25 4625:23 4626:1 4688:12,22 ,24 4689:1 4700:7 4716:7,9 4723:18 4724:1 4731:21 4741:4,18, 19 4742:25 4744:19 4745:5	
provided 4608:15 4614:2,3	publicly 4735:19 4738:11,12 published	<hr/> Q <hr/> Qual 4603:6,9 4607:11 quality 4651:21		

4726:6,8,1 1,17,24 4727:4,11, 14,22 4728:1,9,1 6,23 4729:1,11, 15,18 4731:23 4732:1,2,9 ,13,23 4733:6,13, 21 4734:3,8,1 6,19,24 4735:2,9,1 5 4736:4,13 4737:5,16, 20,23 4738:3 4739:4,10, 15,22 4740:3,7,1 2,17,23 4741:3 4742:2 4743:6 4744:13,15 4746:1 ran 4622:8 range 4701:16 rapid 4722:4 rate 4611:10 4645:5 4650:11,15 ,16 4651:2 4684:24 4691:22 4693:5,13 4699:4 4705:13 4706:14,21 ,23 4707:12,14 4721:12 rates 4650:8 4653:17 4656:23 4707:8	4722:4 rather 4610:10 4614:6 4664:18 4685:15 4721:12 4727:18 4730:1,7 re 4601:7 4613:25 4668:1 4693:8 reaches 4644:17 ready 4607:5 4689:18 real 4658:15 4714:16 4730:13 realistic 4684:17 realize 4710:15 realized 4632:2 4640:22 realizing 4612:23 4613:2 really 4620:1,3 4622:24 4624:4 4627:23 4628:8 4636:7 4650:10 4659:22 4661:12 4664:17 4665:12 4692:19,20 4705:25 4707:16 4718:14 4719:10 4722:22 4736:25	4738:15,17 4743:14 4746:22 reason 4728:10 4729:12,14 reasonable 4640:13,16 4681:1 4685:13 4686:9 4708:15 4728:2 4732:22 reasons 4618:3,12 4704:1 4744:4 rebuttal 4646:19 recalculate 4605:3 4687:16,22 recall 4612:5 4627:15 4669:20 4725:13 receive 4618:9 4725:12 4730:6 receiving 4726:16 recent 4684:20 4711:2 4717:2 recessing 4689:14 recognizing 4679:4 recommendati on 4686:8 4717:15 recommends 4706:7 record	4626:3 4632:16 4680:21 4681:12 4685:3 4687:12 4688:18 4689:2,3,9 4713:22 4724:10 4739:11 4741:15,22 recover 4673:6,19 4674:11,12 4676:18 4677:22 4678:2,6 recovered 4673:22 recovery 4677:7 Re-cross- examinatio n 4603:11 4723:21 red 4698:22,23 reduce 4613:5 4657:11 4686:19 reduced 4650:18 4693:1 reducing 4668:1 4686:17 4718:3 re-examine 4742:7 refer 4640:24 reference 4624:21 4638:16,21 4641:13,17 ,25 4643:18,25	4644:1,4 4658:11 4678:25 4694:13,16 4698:10,15 ,17,18 4699:10 4708:21 4720:11 4735:24 reference/ CO2 4697:16 4699:20 reference/no 4699:23 referenced 4739:5 referrals 4629:20 referred 4608:25 4717:4,5 4743:23 referring 4629:11 4643:25 4723:24 reflect 4692:18,20 4697:22 4698:18 reflected 4660:4 4730:17 reflects 4611:6 4658:11 regard 4726:18 regarding 4611:1 region 4636:19 Regis 4601:13 regulated 4739:25
--	--	---	--	---

4740:2	renewables	2 4689:10	4703:20	4655:20
Regulating	4657:9	4735:22	4715:18	retired
4629:12	reoccurring	require	4728:11	4642:19
regulators	4741:24	4616:20	4745:3,8	4721:9
4656:25	repeat	4647:11	response	retirement
4657:8,19	4687:11	4656:25	4606:7	4641:20
regulatory	rephrase	required	4746:5,15	4643:8
4627:12	4640:6	4604:5,11	responsibili	4722:4,7
4691:5	4676:7	4627:12,19	ties	retirements
4740:8,13,16	replace	4628:20	4628:19	4637:5
reject	4655:24	4635:3,14	responsibili	4641:19
4613:19	replaced	4653:6	ty 4628:8	4642:10,11
related	4656:4	4654:5,23	4668:8	4643:4,11,19
4615:4	replacement	requirement	responsible	4644:7,19
4669:7	4720:9	4691:5	4666:16	4655:19
4690:3	replicate	requires	rest 4620:6	4656:6
4705:7	4636:11	4650:9	restricted	4720:20
relation	replot	4742:22	4657:17	RETIREES
4615:2	4695:1	requiring	4745:11,16	4746:24
4664:7	re-plot	4638:24	restricting	retiring
4697:10	4605:9	4657:9	4743:24	4655:22
4716:14	4695:24	res 4746:5	4744:5	4721:7
relative	4696:11	reservation	4745:5	retro 4615:6
4615:8	report	4608:13,19	result	retrofitted
4708:21	4616:22	4610:3,13	4617:2	4720:5
4716:15	4628:24	reservoirs	4638:7	retrospectiv
relatively	4629:1,2	4709:1	4651:14	e 4615:7
4633:2	4632:21	4710:23	4714:5	retrospectiv
4639:23	4637:13	resource	resulting	ely
4640:8	4641:4	4618:9,14	4640:10	4632:24
4655:13	4678:22,24	4657:1	4686:21	returns
relevant	4680:4	4671:20	results	4705:10
4741:21	4683:9	4701:8	4612:7	revealing
rely 4735:18	4716:11	resources	4614:15	4739:23
remember	4724:23	4604:3	4631:17,18	revenue
4612:11	reported	4695:6,7	4689:18	4604:21
4622:5	4683:24	4738:22	resume	4608:22
4624:21	reports	4628:15	4689:18	4673:11
4639:10	4629:4,5,6	4634:19	RESUMED	4674:8
4727:20	represented	4635:2,12	4607:10	4678:11
removal	4737:14	4661:19	resuming	4679:5,15
4721:12	represents	4682:25	4689:15	4683:15
remove	4641:12	4683:19	rethink	4686:3
4633:13	request	4738:4	4700:11	4723:14
removed	4608:1,5,7	respect	retire	4730:12,14
4628:2,4	,8,10,17	4651:11	4644:10	revenues
	4610:2,9,1	4653:20		4625:15
		4664:17		
		4689:23		

4631:4,10	4613:7,15	4650:4	16,22	0,15,22
4676:6	4614:10	4651:20	4684:3,12,	4727:2,10,
4677:22	4615:13	4652:2,8,1	18	13,20,25
4678:7	4616:1,5,1	9	4685:4,9,1	4728:8,15
4707:11	7 4617:10	4653:8,13,	7,25	4729:14
review	4619:1,9	25	4686:12	4732:8,12,
4601:9	4621:8	4654:10,16	4687:1,4,8	21
4614:1	4622:20	4655:6,17	,14 4690:2	4733:3,11,
4631:3,15	4623:12,18	4656:2,11,	4691:24	19
4632:20	4624:1,16	14,17	4692:6,10,	4734:1,6,1
4678:10,21	4625:7,21	4657:3,7	14 4693:11	1,17,23
4680:7	4626:5,12,	4658:2,6,9	4694:6,10,	4735:1,7,1
4714:18	18,22	,13,16,18,	15,18,23	4,21
4735:16	4627:1,10	23 4659:21	4695:3,13,	4736:9,14
revisit	4629:3,13,	4660:2,10,	16,22	4737:10,18
4743:12	17	13,19	4696:6,23	,21
revolutionar	4630:5,14,	4661:1,5,1	4697:19	4738:1,13
y 4612:9	25	1,15	4698:12,20	4739:9,12,
rewind	4631:5,8,1	4662:4,8,1	4699:2,8,1	20
4655:11	5,25	2,20	2,17,21,24	4740:1,10,
Richard	4632:6,14,	4663:3,7,1	4700:2,5,1	15,21
4601:16	22	4,20	0,19	4741:1
rid 4693:21	4633:5,11,	4664:16,22	4701:10,18	room 4667:20
rights	21	4665:8,15,	,22	rough
4608:22	4634:4,15,	23	4702:1,5,8	4660:21
4610:20	20	4666:12,17	,13	roughly
4704:17	4635:7,23	4667:9,13	4703:10,17	4712:4
risk 4613:14	4636:2	4668:10,15	,22	4721:16
4718:4,9	4637:9,14,	,24	4704:2,10,	round 4727:7
risk-neutral	18	4669:2,8,1	15,22,25	row 4647:4
4718:2	4638:1,15,	1,24	4705:8,12,	4649:16
risks	25	4670:3,17	19,24	RTO 4627:16
4612:23	4639:5,12,	4671:7,14,	4706:3,15,	4628:4,13,
4613:2	16	23	19,25	14,17,23
River 4723:8	4640:1,11,	4672:5,8,1	4707:3,7,2	RTOs
road 4622:23	15	2,21	4	4627:11,19
ROBERT	4641:1,10,	4673:1,7,9	4708:3,7,1	,24
4603:6	14,17,21	,16,18	0,13,19,23	rules
4607:11	4642:3,6,1	4674:4,7,1	4709:5,9,1	4628:17
4608:2,6,1	3,21	4,17,20	5	run 4621:18
5,23	4643:1,5,1	4675:5,7,9	4710:2,18	4622:24
4609:4,8,1	4	4676:4,10,	4711:10,25	4634:22
7,23	4644:1,9,1	13,19,21	4712:22	4643:9
4610:7,18	5,25	4677:3,9,1	4713:14	4664:3
4611:8,11,	4645:4,10,	6,20,24	4714:1,14,	4695:4
22	18,25	4678:3,8,1	21	4723:14
4612:4,10,	4646:6,9,2	4,19,23	4715:2,8,1	running
15,19	4	4679:7,10	7,20	4651:10
	4647:7,13,	4680:1,11	4716:21	4695:5
	18,22,24	4681:4,17,	4717:1	
	4648:2,6,1	22	4724:5,11,	
	0,13,16,24	4682:2,5,1	15,21,25	
	4649:2,6,1	0,14,19	4725:5,14	
	0,13,20,25	4683:3,12,	4726:3,7,1	

4722:25	saving	4727:21	s	settlement
runs 4644:5	4713:17	4744:19	4621:2,17	4682:22
	saw 4625:13	seek 4676:18	4622:13	seventy
<u>S</u>	4684:19	seeks	4637:6	4611:17
safe 4705:4	4685:2,12	4612:22	4638:17	seventy-six
sale 4618:1	4694:22	seems	4639:2,12,15	4611:19
4650:21	4727:2	4721:19	sensitivity	several
4681:5	4732:25	4735:7	4638:19	4651:23
4683:21	4734:10	seen 4615:15	4639:4,7	4729:22
4684:11	4735:4	4621:6	4651:21	share
4690:14	scenario	4623:13	4679:4	4685:7,10
4735:10	4605:11	4677:1	4707:19,23	4730:9
sales 4605:7	4644:23	4704:5	separate	4739:11
4619:14,18	4691:22	4734:7,13	4642:7	shared
,24	4693:9	4735:25	sequence	4740:8,13
4676:24	4696:2,14	4736:1	4741:11,12	4743:10
4680:8,9	4721:14	sees 4604:21	series	sharing
4681:2,6,8	scenarios	4679:16	4618:21	4739:6
4682:25	4699:6	self-	4619:5	sharp
4683:5,14,	screen	building	4744:19	4693:22
18,23	4641:6	4690:10	serve 4609:1	Shefman
4684:4,5,2	4671:2	self-	4618:15	4602:20
1	4680:22	explanator	service	shelf
4685:14,15	4686:6	y 4608:7	4607:25	4703:15
,19,21	4702:7,11	sell 4617:25	4608:5,7,1	4719:19
4686:1,11,	4712:1	4630:10	0,13,19	4734:5
14,15,18	4723:25	4665:3	4610:2,3	4737:7
4687:15	season	4683:10	4628:16	shift
4688:2	4710:17	4684:10	services	4693:20
4690:14,21	seasonal	4712:10	4622:9	4698:1
4691:3	4710:11	4727:9	serving	4713:13
4701:15	seasons	4729:25	4618:16	shifting
4707:6	4728:25	4733:24	4670:6	4638:6
4716:15	second	4737:12	session	short 4620:5
4724:19	4629:10	4738:9	4688:25	4622:21
4725:3,9	4659:2	selling	4745:16	4623:1
4726:19,25	sector	4732:15	sets 4628:1	4648:23,25
4727:7,16	4636:19	4736:25	setter	4695:21
4730:13	4637:1,2	sense	4665:7	shorter
4731:16	sectors	4619:7,19	setting	4705:1
4740:25	4636:21	4638:11	4622:23	short-term
4741:2	secured	4710:21,25	4651:13	4654:11
satisfy	4727:6	4711:15	4652:9,12	4740:18,19
4617:19	securing	4713:17	4656:3	,20,22
satisfying	4623:8	4731:11,12	4701:21	4741:2
4691:5	seeing	sensitive	settled	shot 4707:16
Saunders	4612:11	4626:2	4661:7	showed
4602:19	4634:10	sensitivitie		
save 4711:16				
4712:14				

4684:20	15,19	4648:2,6,1	6,20,24	5
showing	4613:7,15	0,13,16,24	4678:3,8,1	4710:2,18
4641:7	4614:10,24	4649:2,6,1	4,19,23	4711:10,23
4643:11	4615:1,13	0,13,20,25	4679:7,10,	,25
	4616:1,5,1	4650:4	25	4712:22
shown	7 4617:10	4651:20	4680:1,6,1	4713:14,22
4641:20	4619:1,9	4652:2,8,1	1,24	4714:1,14,
4658:8	4620:12	9	4681:4,17,	21
4662:2	4621:8	4653:8,13,	22	4715:2,8,1
4666:6,15	4622:20	25	4682:2,5,1	7,20
4673:25	4623:7,12,	4654:4,7,1	0,14,19	4716:5,21
4727:16	18	0,16	4683:3,12,	4717:1
	4624:1,16	4655:6,17	16,22	4724:5,11,
shows	4625:7,20,	4656:2,11,	4684:3,12,	15,21,25
4642:11	21	14,17	18	4725:5,14
4643:18	4626:5,12,	4657:3,7,2	4685:4,9,1	4726:3,7,1
4658:3	18,22	4	7,25	0,15,22
shut-out	4627:1,10	4658:2,6,9	4686:12	4727:2,10,
4744:4	4629:3,11,	,13,16,18,	4687:1,4,8	13,20,25
sign 4712:19	13,17	23	,11,14	4728:8,15
significance	4630:5,14,	4659:16,21	4690:1,2	4729:14
4648:20	25	4660:2,10,	4691:20,24	4732:2,8,1
4729:16	4631:5,8,1	13,19	4692:2,6,1	2,21
	5,25	4661:1,5,1	0,14	4733:3,11,
significant	4632:6,14,	1,15	4693:11	19
4655:23	22	4662:4,8,1	4694:2,6,1	4734:1,6,1
	4633:5,11,	2,20	0,15,18,23	1,17,23
similar	21	4663:3,7,1	4695:3,13,	4735:1,7,1
4610:16	4634:4,15,	4,20	16,22	4,21
4679:12	20	4664:13,16	4696:6,23	4736:9,14
4728:22	4635:7,23	,22	4697:19	4737:10,18
Similarly	4636:2	4665:8,15,	4698:4,12,	,21
4611:24	4637:8,9,1	23	20	4738:1,13
	4,18	4666:7,12,	4699:2,8,1	4739:9,12,
simple	4638:1,15,	17	2,17,21,24	20
4710:8	25	4667:9,13	4700:2,5,1	4740:1,10,
simplistic	4639:5,12,	4668:10,15	0,19	15,21
4729:2	16,21	,24	4701:10,12	4741:1
simply	4640:1,11,	4669:2,8,1	,18,22	single
4633:12,16	15	1,24	4702:1,5,8	4647:6,10
4709:7	4641:1,7,1	4670:3,17	,13	sinking
4720:4	0,14,17,21	4671:7,14,	4703:10,17	4608:1
	4642:3,6,1	23	,22	
Sinclair	3,21	4672:5,8,1	4704:2,10,	sir 4626:4
4603:6	4643:1,5,1	2,21	15,22,25	4635:6
4607:11	4	4673:1,4,7	4705:8,12,	4654:19
4608:2,6,1	4644:1,5,9	,9,16,18	19,24	4656:13,16
5,23	,15,25	4674:4,7,1	4706:3,15,	4671:2
4609:4,8,1	4645:4,10,	4,17,20	19,25	4675:12
7,23	18,25	4675:1,5,7	4707:3,7,2	4679:9
4610:7,18	4646:6,9,1	,9,25	4	4695:23
4611:8,11,	7,24	4676:4,10,	4708:3,7,1	4697:7
22	4647:4,7,1	13,19,21	0,13,19,23	4698:7
4612:4,10,	3,18,22,24	4677:3,9,1	4709:5,9,1	

4703:7	slope	somewhat	4688:18	4643:20
4715:19	4693:17,23	4615:4	4724:14	4661:17
sitting	4697:13	somewhere	4742:2	4666:8
4682:22	slow 4719:9	4642:11	special	4706:8
4712:22	4721:12,20	sorry	4629:6	starts
situation	,23	4612:25	specialized	4639:7
4620:7	slowed	4623:22	4738:6	state
4696:19	4722:21,23	4640:6	4739:18,21	4628:25
4731:19	slower	4648:8	specific	4629:2
situations	4693:5	4649:15	4719:18	4656:24
4732:6	slowly	4651:13	4724:18	statement
six 4611:19	4720:17	4656:1	specifically	4617:4,9
4613:19	slug 4722:19	4659:11	4615:5	statements
4642:14,20	slugs 4721:7	4662:24	4616:25	4617:14
sixteen	small	4671:19	4635:25	states
4675:10	4664:19	4684:22	4716:12	4636:12,14
4709:20	4665:1	4694:13	speculate	4657:8,12
sixty	4707:8	4695:25	4639:18	4664:15
4604:16	smaller	4698:23	spend 4738:2	4708:12
4663:2	4707:10	4704:3	spent	static
sixty-eight	smoother	4711:22	4722:10	4639:23
4671:5	4693:17	4713:14	spilling	4640:8
4674:2	SMP 4661:10	4734:4	4634:22	station
4675:3,18	snapshot	4737:25	spit 4695:9	4656:10
sizeable	4686:6	4740:10	spot 4663:24	stations
4718:23	so-called	sort 4608:7	4731:12	4719:18
slee 4693:19	4735:24	4616:14	spread	statistics
slide 4605:9	sold 4605:5	4622:1,25	4709:19	4711:2,3
4610:24	4680:14	4624:17	4710:14,16	stay 4649:16
4612:21,25	4684:21,23	4645:22,23	,20	stayed
4613:1	4685:14,15	4653:19,20	4711:13	4721:9
4626:15	,24	4661:21,24	squeeze	steam
4645:13,15	4686:10,16	4663:22	4705:11	4641:25
4646:15	,22	4664:6,8	stack 4651:9	4642:18
4647:3	4687:17,24	4678:24	staff	steeper
4655:2	4709:22	4693:4	4621:25	4699:3
4666:4	4726:20	4695:6	stage	steeply
4668:7	Soldier	4703:2	4608:12	4693:18,19
4694:1	4601:15	4718:11	stand 4744:8	step
4695:24,25	solution	4722:3	standards	4669:17,18
4696:1,11	4745:3	4723:4	4722:12	stick
4699:18	somehow	sound	standpoint	4663:10
4701:25	4736:11	4611:21	4710:8	stock 4722:4
4702:3,12	sometime	4681:1	start	4723:11
slides	4636:5	sounds	4639:17	straight
4657:25	4745:10	4732:21		
slightly		4745:2		
4693:1,24		spaced		
		4722:16		
		speak		
		4634:23		

4609:18	suggesting	4651:22		4613:5,14
straightforward	4651:15	4665:11	<hr/>	4624:13
4610:10	4684:8	4676:19,21	<hr/>	4705:14,17
strikes	4718:7	4682:22	table 4603:1	,20
4721:12,20	4731:1	4688:13	4650:13	ten 4639:6
striking	suggestion	4689:8	4655:21	4645:20
4719:9	4651:1,5	4691:25	4719:6	4646:4,6,1
stringent	4715:6	4695:6	4723:23	0 4689:11
4722:11	suggests	4696:24	tactical	4705:5
studies	4611:16	4711:23	4617:7	tend 4609:11
4637:19	4619:3	4717:18	taker	4705:1
sub-bullet	4671:3	4720:16	4665:7,8	tendency
4611:2	summary	4726:16	taking	4670:5
subject	4614:8	4727:25	4629:21	tends
4612:5,13,	4657:23	4728:8	4654:6	4665:24
15 4620:13	summer	4735:14	4667:6	4666:2
4636:6	4682:4	4736:23	talk 4619:25	4670:7
4686:13	4725:12	4744:19	4656:22	4720:8
4717:11	4726:12,14	surplus	4706:5	4723:8
4725:14	,21 4727:1	4666:1	talked	term 4633:1
4726:22	4728:14	4727:9	4629:9	4660:9,10,
4727:11,21	4729:4	surprise	4632:23	14,16
,22,23	superior	4620:15	4660:23	4683:11
4729:24	4736:12	surprised	4699:6	4691:13
subsequently	supplier	4704:11,14	4730:3	terms 4610:1
4632:9	4618:7	4737:13	talking	4611:9,15
subtract	supply	surprises	4621:19	4624:14
4666:9,10	4624:5,19	4705:14	4646:17	4630:11
successful	4625:1	suspect	4659:25	4632:18,25
4619:4	4633:16	4614:17	4666:7	4639:1
succession	4634:6,8,1	Sven 4602:3	4669:6	4642:9
4618:24	2	Sworn 4603:9	4679:23	4644:12
successive	4636:13,16	4713:1	4694:20	4645:11,16
4618:21	4666:1	system	4696:1	4654:8
4619:4	4708:18	4618:7	4717:6,8	4662:14
sufficient	4709:13	4620:2	4720:1	4674:6
4707:20	support	4644:19	tariff	4677:17
suggest	4619:13	4661:24	4729:25	4679:23
4640:18	4623:14	4663:20	4731:5	4685:19,22
4744:24	4689:9	4664:7,9	tax 4638:24	4692:7
suggested	suppose	4666:8,23,	4658:12	4706:8
4613:18	4665:10	24	4697:12,21	4712:23
4655:20	supposed	4668:2,22	technical	4714:10,19
4684:16	4697:22	4670:1	4611:9	4724:8,14,
4685:12	sure 4613:22	4690:10,23	4621:14	18 4729:2
4709:19	4619:9	4697:12	4622:23	4733:14,22
	4627:17	4711:16	technologies	4743:4,5,9
	4628:9,11,	system's	4612:8	,18,20
	13 4637:22	4667:18	technology	test 4633:7
			4612:14,18	testimony

4707:10	4633:5	4620:23	4639:3	4710:19
4741:13	4634:7,15	4621:20	4661:18	4736:10
testing	4635:4	4712:13	4676:12	topic
4604:6	4638:25	4736:22	4706:22	4607:22
4615:7	4640:11	theory	third	4639:21
4632:25	4641:6,10,	4666:3	4743:18	topics
4634:12	14 4642:21	thereafter	thirty	4607:15
4635:3,15	4643:1,14	4614:2	4660:5	total
4737:2	4644:9,15	4721:23	4663:1,11	4641:20
Texas	4646:7,11	there's	4704:19	4652:5
4626:25	4647:24	4610:17	4712:6,11	4666:21
4627:2	4649:2,25	4614:5,18	thirty-five	4668:18
thank	4657:5	4619:12	4704:3	4690:22
4607:7,14	4658:23	4628:3	thirty-three	4719:14
4614:24	4661:6	4631:21	4649:18	touch 4627:4
4635:8	4662:4	4637:13	thousand	tra 4669:5
4652:20	4663:3,14	4642:14	4619:16	track 4633:2
4654:18	4664:6	4643:11,12	4645:20	4636:9
4664:11	4665:5	4657:13	4646:4,10	tracks
4675:8	4667:7,8	4665:1,2,1	4648:10	4629:24
4679:9	4668:8,13	2,25	4671:18	trade
4687:19	4674:11	4667:12,22	three's	4697:12,23
4689:11,20	4677:3,4,1	4670:9	4665:12	,24
4691:19,21	0,16,24	4692:4	thrust	4731:12
4695:23	4678:4	4698:13	4627:7	trading
4696:8	4681:17,22	4702:2	thus 4609:7	4728:24
4697:7	4682:10,14	4705:6	4646:20	transactions
4716:4,5,7	4683:12,13	4713:11,12	tightening	4609:2
4723:17,22	,22 4686:6	4721:15	4644:13	4661:7
,25	4689:25	4725:17	today 4712:5	transcript
4728:16	4691:15	4741:8	4731:18	4603:13
4741:3	4696:4	the-shelf	4745:12	4620:14
4745:21	4697:19	4739:18	today's	transfer
Thanks	4698:10,20	they'd	4607:5	4670:12
4723:16	4699:2	4676:18	tomorrow	transfers
4731:20	4702:9	they'll	4745:20	4669:13
that'll	4706:16	4643:20	ton	transformed
4681:12	4712:1	4713:15	4647:21,23	4728:19
that's	4717:1	they're	4648:3,15,	transformers
4610:9	4718:25	4608:25	16,17,21,2	4669:17
4612:19	4719:15	4619:16	3,25	translate
4616:5	4721:11	4620:4,5,6	4649:9	4736:19
4618:17	4723:7,10,	4623:16	tonne 4639:6	transmission
4619:20	24	4637:3	4649:12,14	4607:25
4620:3	4725:3,15	4662:10,12	top 4646:4,7	4608:5,6,8
4622:7	4729:9	,13 4690:4	4694:11	,10,13,19,
4623:17	4730:9,10,	4720:2,3	4698:24	
4625:3	12,16	4722:15		
4630:15	4731:21,25	4736:18,21		
4632:6,17,	4732:23			
21,22	4733:22			
	4734:15			
	themselves	they've		

21	4668:9	4671:4	4677:25	4651:18
4610:2,3,1	4691:10	4673:25	4678:1,4,6	4652:23
5	4724:13	4675:2	4681:23	4654:3,21
4664:21,22	4730:23	type 4681:5	4682:15	4675:14
,23	TSRs 4608:25	4683:20	4683:4	4679:14
4669:7,10	4609:1	4686:16	4710:3	4687:12,22
4670:2,8	turbine	4736:6	4725:15	4695:24
4712:20	4617:5	types	4733:12	4696:11
4713:6,12	4619:7	4650:22	4738:18,23	4697:5
4727:6	4647:6,10,	4657:19	4739:1	4700:14,21
4729:23	11	4686:14	understandin	4715:23
4730:5,19	turbines	4723:5	g 4630:2	4745:1
4731:3	4643:12	4725:1	4632:19	4746:1,7,9
transparency	4705:7	typical	4633:9	,19
4738:20	turn 4607:6	4719:19	4634:3	Undertakings
transparent	4610:24	typically	4647:9	4603:3
4738:25	4613:1	4625:7,11	4660:17	4604:1
transportati	4641:3	4653:15	4667:5,8	4605:1
on	4644:21	4669:15,16	4680:24	4606:1
4636:15,25	4646:15	4670:3	4681:16,18	unfettered
4638:8	4647:3	4672:13,16	4682:9,11	4620:18
tre 4728:11	4657:21	4677:14	4694:25	unfortunatel
treated	4666:4	4688:17	4696:4	y 4730:19
4725:9	4670:25	4708:24	4701:12	unique
treatment	4691:20	4709:2	4706:9	4722:3
4728:11	4694:1		4713:23	unit 4627:20
4742:1	4697:24		4714:22	4631:7
	turns	<hr/>	4715:1,2,9	4692:21
tried	4642:14	uber-	4725:4,8	
4615:14	4720:6	marginal	4726:19	United
4661:19	twelve	4661:24	understood	4636:12,14
4680:8	4712:8,9	uncertainty	4630:5	4664:15
triggers	twenty	4704:1,6	4641:2	4708:12
4639:14	4639:9,24	underlying	4646:22	units
true	4641:9	4620:19,25	4680:2	4657:14
4720:10,12	4647:21	4622:3	4724:17	4690:11
4737:2	4648:3,11	4628:21	undertake	4722:8,9
truly	4675:15	4660:3	4626:9	unless
4744:1,5	4700:1	4690:15	4635:1	4607:6
try 4616:9	4703:21,23	4738:21	4654:14	4653:11
4625:23	4704:5	understand	4673:23	4731:21
4667:18	4710:22	4613:23,24	4675:1	4741:16,25
4691:9	4719:11,12	4614:15	4679:2	unusual
4717:21	4741:9	4617:7	4687:7	4742:21
4723:11	twenty-five	4621:1	4695:1,19	update
trying	4639:8	4622:16	4700:13	4637:11,13
4617:7	4704:4	4626:4	4711:24	,15
4624:2	twenty-two	4630:7	4715:13	upgrade
4637:22	4604:15	4633:6	4718:4	4722:11
	4648:4	4639:22	undertaking	
		4645:2	4606:10	
			4635:11	

Upon 4607:1 4689:14,15 4747:1	21 4737:3,8	4715:15,23	weighting 4699:14,20	,22 4746:21
upper 4702:25	value-added 4737:14	Villegas 4646:15 4657:22 4680:21	weightings 4605:15 4700:16,24	west 4667:22 4670:5,6
urge 4743:23 4744:5	values 4655:7 4717:16 4730:10,11	vintage 4722:15	Weinstein 4602:23	western 4723:7
useful 4715:10 4718:8 4720:3 4722:8 4741:12	variable 4613:10 4722:25	virtual 4661:4	Welcome 4713:20	we've 4615:15 4623:20 4642:9 4658:21 4664:16 4666:6 4680:20 4690:18 4701:6 4703:11 4734:7
usual 4703:20	varies 4637:15 4710:15 4722:18	volatility 4717:12 4718:11	we'll 4624:25 4625:8 4635:3 4645:12 4681:12 4684:1 4697:4 4702:6 4729:5 4731:4,6	whatever 4678:21 4731:11
utilities 4601:3,21 4656:25 4657:9 4690:4,8,1 9 4691:1 4724:7 4742:5	variety 4744:3	volumes 4640:2 4726:20 4727:15 4728:12,13	we're 4607:5 4608:3 4609:12,21 4617:23 4619:20 4620:1 4627:25 4628:2,20 4634:7 4642:17 4644:4 4655:2 4669:5 4677:10 4680:23 4681:11 4685:18 4688:21 4689:18 4696:1 4697:21 4698:22 4718:7 4720:1,21, 22 4722:7 4724:25 4729:5 4730:22,23 ,25 4741:16 4744:16,19	what-ifs 4639:2
utility 4618:4,13, 15 4620:4,10 4622:9 4657:16,20 4691:9 4739:25 4740:2	various 4605:16 4612:8 4616:9 4622:13 4623:9 4670:19 4699:6 4700:17,25	wasn't 4631:10 4637:22 4691:25 4738:14,15 4740:16	Whenever 4612:17	whenever 4667:18
utilizing 4713:6	vary 4650:11	water 4653:18,19 4711:16 4712:14	whether 4605:19 4606:7 4607:19 4615:6,14 4631:11,18 4635:4 4638:6 4704:8 4713:11 4714:4,7 4715:15,24 4728:21 4746:5,14	whole 4652:4 4661:20 4721:9
<hr/> V <hr/>	verify 4614:19 4616:2 4680:12	wavy 4644:5	whose 4718:9	William
val 4717:5	versus 4611:18 4710:10,16 4712:17 4736:20	ways 4620:24 4665:17 4692:15 4710:20 4730:16		
value 4611:4 4612:24 4613:3 4616:4 4623:9 4706:5,8 4718:9 4725:18 4726:16 4728:22 4730:16,22 ,23 4736:5,18,	vet 4695:6	we'd 4633:13,14 ,15 4651:15		
	vicinity 4667:16	week 4675:10,11		
	view 4604:10 4605:18 4614:7 4642:10 4654:4,22 4662:15 4692:12 4705:18,25 4706:2	weekends 4709:1		
		weeks 4729:22		
		weighted 4699:11,15		

4602:11	4656:8	4704:1		
Williams	worked	4717:9,10		
4602:9	4622:10	4722:10		
4631:11	4623:20			
4635:20	working	<hr/> Z <hr/>		
4741:5	4608:4	zero 4706:24		
4742:13,15	4622:14	4707:2,12,		
,17 4745:4	4627:18	18,20		
willing	4684:4	4714:14,15		
4618:18	workings	4715:3,9		
4712:19	4630:7	4718:2		
wind 4657:14	works	4725:18		
Winnipeg	4621:16			
4601:23	4622:12			
winter	world 4636:6			
4682:4	write 4729:7			
4725:10	wrong 4614:5			
4726:9,13	4628:16			
4727:8	4662:25			
4728:14	4671:24			
4729:5				
Wisconsin	<hr/> Y <hr/>			
4608:1	yesterday			
4609:13,18	4619:13			
withholding	4620:13			
4665:16	4624:21			
witness	4625:14			
4689:22	4631:11			
4729:19	4673:15			
witnesses	yet 4707:24			
4745:9	4729:25			
wonder	York 4626:24			
4634:24	4627:1			
4679:1	4630:18			
4702:1	you'll			
4744:7	4643:17			
wondering	4652:11,13			
4615:6	yours			
4617:4	4608:20			
4623:23	4706:10			
4645:15	you've			
4676:23	4617:8			
4688:7	4621:6,7			
4703:13	4626:13			
work	4666:7			
4627:7,24	4668:6			
4628:10,23	4677:12			
4636:21	4692:8			