MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

2017/18 and 2018/19

GENERAL RATE APPLICATION

PUBLIC HEARING

Before Board Panel:

Robert Gabor	- Board Chairperson
Marilyn Kapitany	- Vice-Chairperson
Larry Ring, QC	- Board Member
Shawn McCutcheon	- Board Member
Sharon McKay	- Board Member
Hugh Grant	- Board Member

HELD AT:

Public Utilities Board

400, 330 Portage Avenue

Winnipeg, Manitoba

January 11th, 2018

Pages 4113 to 4330

APPEARANCES

Bob Peters		)Board Counsel
Dayna Steinfeld		)
Patti Ramage	(np)	)Manitoba Hydro
Odette Fernandes	(np)	)
Helga Van Iderstine	(np)	)
Doug Bedford	(np)	)
Marla Boyd		)
Byron Williams		)Consumers Coalition
Katrine Dilay		)
William Gange	(np)	)GAC
Peter Miller	(np)	)
David Cordingley		)
Antoine Hacault		)MIPUG
George Orle	(np)	)MKO
Senwung Luk	(np)	) Assembly of
Corey Shefman	(np)	) Manitoba Chiefs

LIST OF APPEARANCES (cont'd)

Kevin Williams (np)	) Business Council
Douglas Finkbeiner (np)	) of Manitoba
Daryl Ferguson (np)	) City of Winnipeg
Christian Monnin	)General Service
	)Small, General
	)Service Medium
	)Customer Classes
William Haight	)Independent Expert
William Gardner	)Witnesses
Kimberley Gilson	)

TABLE OF CONTENTS

LIST OF EXHIBITS

LIST OF UNDERTAKINGS

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

THE CHAIRPERSON: Good morning, everyone. Before I ask Board counsel to review the schedule today, I want to alert all counsel and put on the record a concern of the panel, namely, the way that the words "rate request" and "rate forecast" are being used interchangeably by the parties in examining witnesses.

The Board is considering the general rate application of Manitoba Hydro which consists of a request to confirm an interim rate increase of 3.36 percent granted August 1st, 2016, confirm a second interim rate increase of 3.36 percent granted August 1st, 2017, as well as a request to grant a rate increase of 7.9 percent effective April 1st, 2018.

In support of the General Rate Application Manitoba Hydro filed, among other documents, an integrated financial forecast which is known as MH-16 which sets out a suggested rate forecast over a ten (10) year period which consists of 7.9 percent for five (5) years and then 2 percent for the next five (5) years in the forecast.

Integrated financial forecast MH-16 was revised after the Board granted the 3.36 percent

interim rate increase effective August 1st, 2017 and now contains a suggested ten (10) year rate forecast of 3.6 percent for the current fiscal year then six (6) years of 7.9 rate increases followed by a one (1) year rate increase of 4.54 percent and then the remaining years with 2 percent rate increases.

Notwithstanding the indicative information in the IFFs, the only rate approval requests by Manitoba Hydro before this Board at this time are the confirmation of the two (2) existing interim 3.36 rate increases, as well as the request to grant a 7.9 percent rate increase effective April 1st, 2018 from Manitoba Hydro's 2018/'19 fiscal year.

Nevertheless we are hearing questions to witnesses which may imply -- which imply that the Manitoba Hydro rate increase is for 7.9 percent a year for the next six (6) years.

At the same time it has been suggested to some witnesses that a different rate adjustment, a decade or so in the future, also forms part of this General Rate Application.

The imprecise language now being used is troubling to the panel as it does not reflect the actual rate requests before this Board at this time. We require counsel to be precise with their

characterization of the rate increases that Manitoba Hydro has applied for in this General Rate Application.

It is misleading to witnesses and to any members of the public who may be following this hearing to mischaracterize Manitoba Hydro's specific rate approval and increase requests.

The rate increase request Manitoba Hydro makes next year or future years will only be known when it files a General Rate Application for the relevant year or years.

We ask that any future questions to witnesses or submissions to the panel clearly reflect the rate approval requests actually before the Board in this General Rate Application. Thank you.

Mr. Peters...?

MR. BOB PETERS: Thank you and good morning. In terms of the outline of procedures for today, you'll see on the monitor that we are joined by witnesses from Daymark Energy Advisors and they will be speaking to the Board about the export forecasts of Manitoba Hydro.

And this morning and into the afternoon the session will be open to the public but all parties are also aware that some of the information that has

been provided by Manitoba Hydro and by Daymark Energy Advisors contains information that is confidential that would be detrimental if put on the public record.

Because of that, Mr. Chair and Board members, there is an incamera session plan for this afternoon where Daymark will be presenting additional material to the panel with respect to information that has been determined to be confidential.

So with that, we will after the public session ask the hearing room to be vacated and only those with the express permission will remain. There will be the disconnection of the live feed or the live streaming both on the Internet and I believe also if it's being live streamed to Manitoba Hydro's headquarters, it will be shut down and we will proceed with just those who are authorized to hear the in-camera information.

So subject to check to questions, Mr. Chair, those are the morning procedures?

THE CHAIRPERSON: Thank you, Mr. Peters. Mr. Simonsen, would you swear in the witnesses.

INDEPENDENT EXPERT CONSULTANT WITNESS PANEL 2 - DAYMARK LOAD:

DANIEL PEACO, Sworn

DOUGLAS SMITH, Affirmed

THE CHAIRPERSON: Mr. Haight...?

CROSS-EXAMINATION BY MR. WILLIAM HAIGHT:

MR. WILLIAM HAIGHT: Thank you, Mr. Chair. I intend today to take the Daymark representatives through a brief description of their background to indicate that they are qualified to give expert opinion evidence in this proceeding.

I'll begin with Mr. Peaco. Mr. Peaco, you are a principal consultant, chairman and past president of Daymark Energy Advisors?

MR. DANIEL PEACO: That's correct.

MR. WILLIAM HAIGHT: You were president for thirteen (13) years from 2002 to 2015?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you became chairman in 2015 and retain that position today?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you began with Daymark as a managing director in 1996?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And Daymark

provides integrated policy, planning and strategic analysis and advisory services to the North American electrical and natural gas industries?

MR. DANIEL PEACO: That's correct.

MR. WILLIAM HAIGHT: By way of education, sir, you have a Masters in Engineering Sciences Resource Systems and Policy Design?

MR. DANIEL PEACO: Correct.

MR. WILLIAM HAIGHT: You obtained that from Dartmouth College?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you have a Bachelor of Science in Civil Engineering and Water Resource Systems that you received from the Massachusetts Institute of Technology?

MR. DANIEL PEACO: That's correct.

MR. WILLIAM HAIGHT: After obtaining your Masters you worked for a couple of utilities, one in California and one in Maine?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And that was for approximately fifteen (15) years.

MR. DANIEL PEACO: That's correct.

MR. WILLIAM HAIGHT: You joined Daymark in 1996?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you have thirty-five (35) years of experience in electric -- in the electric industry both as a utility planning practitioner and as a consultant for the industry?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: In your thirty-five (35) years in the electric industry, you've been involved in the preparation and analysis of hundreds of market rate forecasts?

MR. DANIEL PEACO: I have.

MR. WILLIAM HAIGHT: And you've reviewed market rate -- rate forecasts prepared by others, including other Utilities?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you've provided advice to Utilities on these market rate forecasts?

MR. DANIEL PEACO: I have.

MR. WILLIAM HAIGHT: You've published papers and made represent -- and presentations on a number of issues relative to the electric industry including market rate forecasts?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And for purposes

of the record, I see that Mr. Peaco's CV which is part of exh -- Daymark Energy Advisors Exhibit Number 8 is on the screen.

I don't tend to take you through those, Mr. Peaco, but as I count the pages, there's five (5) pages of presentations and publications that you've done.

MR. DANIEL PEACO: I believe that's correct, yes, your representation.

MR. WILLIAM HAIGHT: Okay and you've given expert testimony before a number of public Utility Boards and courts regarding issues relevant to the electrical industry, including market rate forecasts?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: In fact, you gave evidence before this Board on the NFAT proceeding?

MR. DANIEL PEACO: I did.

MR. WILLIAM HAIGHT: And you were accepted as a -- as an expert and able to give opinion evidence before this Board?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: You've co-authored a report with Mr. Smith who sits beside you on export pricing and revenues and that report has

been marked as DEA Exhibit Number 1 in this proceeding; is that correct?

MR. DANIEL PEACO: I believe that's correct.

MR. WILLIAM HAIGHT: Yes, you're not familiar with the exhibit number but you did co-author the report?

MR. DANIEL PEACO: I did.

MR. WILLIAM HAIGHT: Yes. And you've prepared a PowerPoint presentation to provide today both in relation to public information, as well as commercially sensitive information?

MR. DANIEL PEACO: Yes.

MR. WILLIAM HAIGHT: And you co-authored that with Mr. Smith?

MR. DANIEL PEACO: I did.

MR. WILLIAM HAIGHT: And for purposes of the record that PowerPoint presentation is -- have been marked as DEA Exhibit Number 7.

Those are my questions for Mr. Peaco. With your permission, Mr. Chair, I'll move on to Mr. Smith?

THE CHAIRPERSON: Yes.

CONTINUED BY MR. WILLIAM HAIGHT:

MR. WILLIAM HAIGHT: Mr. Smith, you began your professional life as an accountant and obtained an accounting degree in 1991?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: You then also moved into the world of software engineering as a developer and an instructor?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: You joined the Daymark team in 2004?

MR. DOUGLAS SMITH: I did.

MR. WILLIAM HAIGHT: And you have thirteen (13) years experience in the electric industry?

MR. DOUGLAS SMITH: Yes.

MR. WILLIAM HAIGHT: You currently are lead of Daymark's market analysis -- analytics team?

MR. DOUGLAS SMITH: Yes.

MR. WILLIAM HAIGHT: And that team is responsible for, among other things, researching energy and capacity markets throughout North America?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: A good part of what you do for a living at Daymark is to prepare market forecasts for utilities?

MR. DOUGLAS SMITH: Yes.

MR. WILLIAM HAIGHT: And -- and in addition, you review market price forecasts prepared by others?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: And you have provided expert opinion evidence to the Maine Public Utilities Commission?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: And that involved market price forecasting for a public utility?

MR. DOUGLAS SMITH: Yes, it did.

MR. WILLIAM HAIGHT: And -- and so, in fact, you gave expert evidence before that Utility Commission on the same topic that you intend to give evidence today?

MR. DOUGLAS SMITH: Correct.

MR. WILLIAM HAIGHT: And you also co-authored a report with Mr. Peaco and you've heard that that report has been marked as DEA Exhibit Number 1?

MR. DOUGLAS SMITH: Yes.

MR. WILLIAM HAIGHT: And you also helped prepare a PowerPoint presentation both on public information, as well as CSI with Mr. Peaco?

MR. DOUGLAS SMITH: Yes.

MR. WILLIAM HAIGHT: And for the purposes of the record, again, that PowerPoint presentation has been marked as Exhibit 7.

Those are the questions for -- for these witnesses.

THE CHAIRPERSON: Thank you, Mr. Haight. Please proceed with the presentation.

MR. DANIEL PEACO: Good morning, Chairman, good morning members of the Board. It's a pleasure to be here again today. I know -- know some faces are familiar and some are new and I'm pleased to be back here today with -- with Doug Smith to present our evidence.

First, Mr. Chairman, to your -- oh, I'm sorry.

(BRIEF PAUSE)

MR. DANIEL PEACO: Mr. Chairman, I -- to your opening remarks, everything that we are going to talk about today is in the domain of forecasts where -- where we have nothing to do with the rate request itself. We're -- we've been asked to look at forecasts and so to the extent that we say anything that implicates anything other than the forecast

information, I apologize in advance but our -- our -- our charge and our evidence is -- relates to some of -- the forecast information that was included in the -- in the rate application and that's will be the subject of our presentation and discussion today.

And -- and again, I also apologize in advance. Some of what we're going to go through is heavily -- has a lot of potential jargon and technical market information embedded in it and we'll try to walk you through that as best we can and we try to present this.

But, I thought it was important that we start talking about the -- sort of the two (2) things I think we -- we would like to try to accomplish with you today and explaining what we're trying to explain and the first is I think that as we went through the forecast for export revenues, it became one (1) of the challenges for us and I think one (1) of the challenges ultimately for you is to understand the sort of the design objective for what -- what is this forecast intending to -- to portray within the range of possible as any forecast, there's a broad range of uncertainty and there's -- there's a forecasting objective as to what part of that -- what piece of information within that range of uncertainty that

we're really looking at.

And so we will go through this and try to help you understand what we understood the objectives of the forecast to be and whether the forecast presented actually met those objectives. And I understand that there's been some -- some discussion about various -- various policies and objectives related to this forecast and we'll try to explain our view of -- of those matters here today.

And then the other -- the other piece of this I think that is important for you understand in looking at this forecast is the -- the source of revenues. They're -- there's a discussion about markets so we're going to talk a lot about markets and -- in the -- the midcontinent independent system operator market, the MISO market and there -- there really are segments of the market to present different opportunities for Hydro to sell different types of energy and capacity services. And so, we're going to try to make sure that we lay open and explain sort of the components of the market and where the market opportunities for various types of offerings for export sales would come in.

And so those two (2) things I think we -- we feel are -- it's -- it's important that it be

clear what those are and it's -- it's not necessarily so straightforward to make -- make that clear to the folks that aren't like us sort of involved with the markets all the time but those are the two (2) broad objectives we hope we get conveyed to you through the course of our presentation.

We also intend to, as the agenda shows here, kind of walk through the various components of our -- our report or at least the -- the public version -- the public components of that. We'll talk a little bit about what our scope of work was and -- and provide some context for how we understood our scope of work and the -- and the review that we did. We -- we want to lay down a few key concepts so that we -- we help with some of the industry vernacular as we go through our presentation.

And then we will talk a bit about -- and Mr. Smith will do this section part 4 -- basically talk about the MISO market and things that are happening in the MISO market that will affect market prices and -- and the requirements for new -- new -- new capacity in energy in that market over time and then we will turn to what we're calling factors influence the bilateral markets which we'll explain which is a sort of related but distinct from the MISO

markets -- organized MISO markets themselves and we'll explain what that is.

And then we will do a -- a review of the things that we can talk about in -- on the public record relating to our review of the actual forecast and, of course, you -- you may appreciate that a fair amount of the information that goes into the forecast is -- is confidential information and so we will describe, generally, what we've done and what we found to the extent that we can do that on the public record and we'll -- we'll hold the balance of that for our CSI session this afternoon and we'll close with a -- with a sort of a cap of our key findings.

Next slide. So, our scope of work we were asked to assess the accuracy and reasonableness of the export revenues assumptions and forecasts included in -- in the Manitoba Hydro rate -- the GRA. And -- and specific -- specific requirements in our scope of work were to look at the market price forecasts for export that Manitoba Hydro retained regarding market prices in -- in the MISO markets.

We were also asked to look at the -- Hydro's analysis of their forecast of the amount of surplus that would be available for sale, so basically, what volume, for how long is included in

forecast and is that reasonable.

We were asked to look specifically at the forecast for net extraprovincial revenue so -- or -- is the -- the actual revenue forecast a reasonable forecast. And to look at changes in their forecasting methodology over the past few years, particularly going back a few years to methodologies that were used in the NFAT and in -- in some of their -- their financial forecast in 2013 to 2015 verses today.

And -- and lastly, we were asked to basically review and -- and comment on factors that are influencing trends and market prices and -- and requirements for -- for resources in the MISO market and we'll review all of those -- summarize all of those in our presentation today.

Next slide, please. So our approach, we -- as in our position as an independent expert we -- we were asked and were able to work closely with Manitoba Hydro to obtain all the materials associated with their third-party forecasts and review those. We set up a very effective protocol for communications with Hydro and -- and a -- and a electronic secure electronic transfer so we had access to all of their information in our offices related to the -- the confidential information, the party forecasts and

other materials that we reviewed.

We reviewed publicly available materials outside of what Hydro had available, particularly, as it pertained to information that's available in the public record regarding the MISO market.

We performed -- performed some of our own analysis but most of our work was in the form of review and -- and evaluation of work that Hydro had done.

And we -- we reviewed the relevant portions of the application, the filed IRs, the MFRs and -- and we have also reviewed and considered, to the extent we can, of the oral and written testimony that we've been receiving through the course of the proceeding so far. So we will to the extent that we have been able to -- to get reasonably current with that, we will try to speak to those -- those issues as well.

The material that we've presented we -- I think we've already gone through in our -- in our -- in our introductions we have -- we have two (2) reports are redacted and a -- and a confidential version of our report. And we have provided a number of responses to Information Requests and those are

already in the record as well.

So moving to context. When we were asked to review, particularly, the question we -- we were asked to do two (2) things, asked to review the accuracy and reasonableness. And so we -- the reasonableness was something that we focused on to -- to determine what is it we really need to -- what -- what measure do we use to determine what reasonable is here. And so, we -- we went to sort of the -- the -- the language that was articulated in Manitoba Hydro's GRA to sort of take guidance from that and use that as the measure in the -- in the two -- in the -- sort of the two (2) pieces that we focused on and sort of structuring our analysis, is the statement that they indicated that their goal was to -- to do a forecast that -- that would lead them to an -- to an achievement of a minimum equity target in ten (10) years and strike an appropriate balance between customers and Hydro's financial health.

And then the -- we -- further we -- we observed in their application a specific articulation is that their -- their forecast goal was to have by the end of the ten (10) year period a 50 -- 50 percent chance that Hydro would achieve its 25 percent minimum equity ratio. So they expressed a -- a longer-term

target built on their -- building their forecasts around that that was expressed in terms of a probabilistic assessment that they had a 50-50 probability.

So we -- we took that as our -- our charge to say, if you think about the broad range of potential forecasts considering all the uncertainties in the market over ten (10) or twenty (20) years, which is the -- the range that we looked at, there's -- there's a broad range. And so we were looking to see whether in -- in -- in our understanding of this language whether the forecast they have actually met, what I would say, the 50 percent chance metrically. Is it sort of in this -- in the middle of the range of possible outcomes and not -- not toward the high end or the low end but what we were looking -- so, all of our language in our report and what we'll talk about today is through the frame of reference: Is the forecast to our eye reasonably representative of sort of the middle of the distribution of possible forecasts that they could come -- come to.

And so that's -- that's how we understood their -- what they presented in their -- in their application; that's how we understood or sort of made -- made operational the definition of what is --

what is reasonable for this purpose.

As I mentioned in the opening, this is -- this is clearly an articulation of what I would say an articulation of an objective for a forecast. You could have an objective and say, I want a forecast that's optimistic or pessimistic or some other number or some other way of thinking about it.

But we understood this to mean that they were looking for a forecast that was -- was down the middle of the fairway. And -- and so that was -- that's the -- the context within which we reviewed it and the context within which we -- we offer our -- our opinions as to whether the forecast is reasonable or are -- or not relative to that standard.

So, again, we understand that this standard may not be -- this objective may not -- ultimately but what you -- what you choose to -- to make your decisions on in this case but I wanted to make sure you understand the -- the -- the perspective from which we did our review.

So the next slide is simply a -- a piece of evidence, the -- there was a ten (10) year version of this same chart and I think you've seen this in evidence from other witnesses in the proceedings. This is a -- a portrayal that was

included in Tab 4 of the GRA application and this twenty (20) year analysis, I think, was provided in IRs and has been discussed by other witnesses in the hearing, to my understanding.

And you can see here there is a -- we've highlighted in red a set of data points that run through the middle of this graphic that is the -- the actual year-by-year revenue projection that is the -- the forecast that we were asked to review. And -- and in this particular presentation, it's -- it's a presentation, results of the uncertainty analysis that -- that the company has done. It shows what -- it -- it actually specifically characterizes the forecast that we're looking at as P50. And P50 in the -- in statistical jargon, you may have heard -- you've probably heard this already in the hearings, that's a -- a probability that the forecast would be sort of equally likely to be the -- the actual results equally likely to be higher or lower than that value. it's right in the middle of a probability distribution in terms of probabilities.

So -- so this was -- this was part of -- part of what we found in -- in their application that led us to sort of use that as the -- as the measure of the -- one of the -- one of the core

questions we have is -- is -- do we -- do we understand the numbers behind that part -- that -- the dashed redline version to actually be fairly represented -- fairly developed to be a representative of a P50 forecast.

We -- we spent some time talking about some of the uncertainty analysis but our primary focus was looking at testing the prop -- proposition of whether we agreed that -- that the -- the numbers highlighted in -- in the red -- the dashed red line actually was -- was a fair representation of a P50 forecast.

The next slide. And this is another slide that I believe you've already seen in evidence and discussed by others and this is just a depiction of the -- the trajectory of the rate paths of the -- of sort of the existing trajectory -- long-term trajectory planned and the proposed with the -- with a higher -- the higher near term rate increases over the -- over the first ten (10) years and the associated trajectories that those -- those plans provide in terms of getting to the equity targets.

And so, obviously, our export forecast is embedded in the -- the -- it is one (1) of the key inputs and how -- how these play out. And so to the

extent that -- that the export forecast is different than as used and -- and these numbers clearly would change and -- and so we -- we have not done any analysis beyond the export revenue forecast itself but, clearly, that is a key -- key input to this type of an analysis and -- and the forecast that would be higher or lower than what they produced would -- would clearly move these values and -- and may influence sort of the -- the valuation of the longer-term rate plans that the Company has proposed.

Next slide. So, in wrapping up our context, we -- we -- we structured our work to -- to answer the question: Is the -- the high -- is the Manitoba Hydro approach to export revenue forecast balanced? And then re-charact -- re -- restate the language here from the -- a -- our previous slide indicating that they were looking for an appropriate balance between interest of customers and Manitoba Hydro in long-term -- from in -- in a long-term perspective.

And as I mentioned on -- on the earlier slide: Does the -- does the forecast comport with the 50 percent chance of reaching the Manitoba Hydro equity target in ten (10) years?

And -- and then we also looked at the -

- the changes in methodology from prior years 2013 to 2015 period, in particular, versus today and -- particularly looking at the reasons for those changes in -- through the lens of: Does it change the -- I would say the objective of their forecasting? Is it -- is it -- was their earlier forecasting, you know, leading to a more -- more optimistic or pessimistic outlook then -- then the current methodology and how do those change.

And then we were specifically asked to look at both ten (10) and twenty (20) year forecasts. Those -- the twenty (20) year, the charts we just looked at went out twenty (20) years and so we were specifically asked to look at those longer-term forecasts and make an assessment about those forecasts for the long-term. And so that was -- that was part of our scope of work and that was included in -- in the work -- in the presentations that we'll make today.

So maybe I would like to just stop, and -- and take a breath, and ask whether there's any questions about sort of that context before we move -- move on.

(BRIEF PAUSE)

MR. DANIEL PEACO: Okay. Good. And I would -- I would just invite you -- I -- I probably -- this probably doesn't -- goes without saying, but I'm -- I'm happy to entertain questions at any time that you -- you care to ask questions.

So a few key terms that we'll be using as we go through this to sort of unpack the forecast. We've talked already about P50, and we'll talk -- we'll -- we'll talk about that simply because that's the framework within which the forecast was presented, and the -- the structure of our review, but we'll be looking for -- we'll be talking about the various inputs to the forecast and the result in output of the forecast to assess whether it is reasonably consistent with the philosophy of a P50 forecast.

MISO markets. We'll talk a lot about MISO markets today, and the -- there -- and -- and I will -- guess I want to men -- mention that that's plural for a reason. There is an energy market administered by MISO. That energy market is very short-term. It's minutes to hours to a day ahead. It's not long-term. It's -- it's day-to-day -- our our day-to-day, and in some cases, minutes-to-minute.

But there is a market that's liquid and

clearing in the MISO markets for energy, and that's, you know, megawatt hours, or kilowatt hours, or however you want to -- whatever units you want to use. But that's -- that's one (1) market that MISO administers, and -- and that's a liquid and -- and actively traded market.

There's also a one (1) year capacity market, which capacity is basically megawatts, as -- as the system needs to have a total amount installed megawatts to -- to operate reliably through peak load conditions with allowance for outages, and MISO does administer a one (1) year ahead capacity market, so we'll be talking about that market. And that -- that is a MISO-administered market.

There -- within the MISO's energy market, there are -- the energy prices are referred to as locational market prices, or LMPs. And so if we talk about LMPs, what we're really talking about is that smart market price for energy to have -- that occurs in the market in the MISO-administered energy markets from time to time. And the location of that means that every point that -- the -- the price can be different at the -- at the border between Manitoba and the points where it's connected to the MISO market from the Minnesota hub, or other -- other locations

within MISO. So the location does matter. The pricing at the Manitoba -- at the Manitoba border will be different than the pricing at -- in -- in -- at the Minnesota hub or -- or in -- in Entergy Arkansas, for example. So -- so we're -- so the location does matter in the -- in the pricing mechanisms that MISO uses for that.

Third-party forecasts. Manitoba Hydro retained four (4) third-party forecasts. These are -- these are consultants who do forecasting of -- among other things, MISO market prices, and MISO markets, we've just talked about. And so we will refer generally to these as the third party forecast, but when we -- when we use that, we may use the shorthand, but what we're referring to is the four (4) entities that -- that Manitoba Hydro retained and procured a forecast of these market prices from them to use in their -- in their forecast -- forecast of export revenues.

We will -- we will refer and talk a lot about the bilateral market. And this is not a market that -- this is a market that -- that happens within the MISO footprint, but is not a MISO-administered market. This is two (2) utilities getting together and agreeing to -- to enter into contracts. It --

that -- those transactions are informed by what happens in the MISO market, but it is a different market in the same way, and -- and we'll get into the details of why, but we will talk a lot about the bilateral market. And that -- that really goes to the long-term contracts that Hydro has or -- or might entertain entering into, as -- as opposed to energy it might sell today or tomorrow into the MISO markets.

IRP is another industry jargon term that we'll -- we'll refer to some as integrated resource plan, or resource plan. Most of the utilities in the MISO footprint are doing their own long-term planning and making decisions about resource choices that they make, including potentially buying power from Manitoba Hydro. And so we're going to spend some time looking at some of the integrated resource plan information for utilities within the MISO market, and -- and I wanted to make sure that -- that we up front sort of indicated when we -- when we say 'IRP', this is what we're referring to.

And we'll also talk about a reference forecast. The -- some of the -- the way that Manitoba Hydro has characterized their -- their market price forecast and their export revenue forecast that we're primarily focusing on is a reference forecast. And so

a reference forecast may or may not actually be a P50, but we'll -- we'll talk about that. But it's -- it's their -- their baseline forecast. And so when we talk about reference, that's the -- that's the primary forecast that they prepared, and then do sensitivity and -- and uncertainty analysis around, so.

THE CHAIRPERSON: Sorry, Mr. Peaco, I've got a question.

MR. DANIEL PEACO: Sure.

THE CHAIRPERSON: In relation to defined terms, in your paper, you refer to LSEs. It's not a defined term, and I -- I spent a few minutes turning to find the place it was first referenced, and gave up after a while. What does LSE stand for?

MR. DANIEL PEACO: Okay. My apologies. It's -- it refer -- it refers to load-serving entities, and so that's basically the Utility, and -- and it -- it means different things in different markets. There's some markets where utilities own generation, and transmission, and serve load, and there's other markets where load-serving entities do not own generation. And so we -- it's the general term.

I don't think we'll be using that term today in the presentation, but it was probably in

reference to the more -- it's a more generalized term in terms of saying -- I think, for example, in case Minnesota, they have -- they have utilities that own the generation, transmission, and distribution, so-called vertically-integrated utilities, and so they're the load-serving entity, and the power provider, and -- and everything, so.

But I -- I think we tend to use that general term because there are -- some markets have load-serving entities that are entirely separate from the generation function.

THE CHAIRPERSON: Thank you.

MR. DANIEL PEACO: Okay. So the next slide, we -- we talked -- there's a -- again, sort of -- this is really -- like -- and a little bit more definitional, but when you talk about the -- the transactions, and the -- and the sales of export power -- the -- the export of power to other entities, there's really, I would say, two (2) categories of products we're going to talk about. One (1) is what we'll call opportunity energy and capacity. And this is really energy and capacity that's of the moment, near-term, within -- within the day, or the -- or the current year, and up to maybe a year ahead.

These are relatively short-term

transactions. They wouldn't -- they -- they -- some of these could actually be done within the liquid markets at MISO, and not necessarily require a -- a special contract. A lot of them, because of the liquid market, you can -- by -- by virtue of being a participant in the MISO market, Manitoba Hydro can -- can basically transact to the market through the tariff directly without need of a special contract. And -- and that would also apply to -- if they were -- had opportunity to sell capacity to utilities that needed it next year, they could do that through a -- a MISO capacity market.

There's also what I would call dependable energy and capacity transactions. And there's -- there's a -- there's a range of theirs, but we'll -- we'll talk a lot about being able -- Hydro being able to sell longer-term, from their firm dependable energy, from their system contracts for longer-term to -- to utilities in the MISO footprint, and so we'll talk about those -- those two (2) things as distinct, and types of products that they can sell. There's -- there's clearly a lot of variance on those, but those -- and those are the two (2) general categories of transactions that we'll be talking about.

And the potential counterparties that they have for those transactions, as I -- as I indicated, they can sell directly into the MISO-administered energy market. They can sell directly into the MISO-administered one (1) year ahead capacity exchange. And they can also sell to utilities for any and all of the longer-term products that they would sell, so that anything outside of those two (2) MISO markets would be what I would fall into the bilateral transaction with specific utilities for -- under some provisions of us -- of a -- of a contract.

Okay? So the -- so where -- there's a lot of discussion about -- in -- in the methodology about premiums and I'm going to start by saying, when we're talking about premiums for Manitoba Hydro's power, those premiums will not come from the MISO-administered markets. Those short-term markets, those are what I would call commodity markets. There's very lit -- limited treatment for premiums for anything of the types of attributes that were defined in the premiums. And these MISO markets do not incorporate state policy. They do not incorporate anything other than the -- the minute-to-minute, hour-to-hour cost to deliver energy into the MISO market and the associated costs of the generating -- that the generators who

deliver that power incur in doing that. The premiums factor into buyer decisions when you're talking about bilateral contracts with -- with utilities.

Most -- as -- as we talked about, most utilities in MISO are vertically integrated, including the primary counterparties that Manitoba Hydro has historically sold power to. These are -- in long-term resource commitments, they are state-regulated. And so when a, say, for example, Minnesota Power wants to enter into a long-term contract to buy power from Manitoba Hydro, they will need to go before their state regulator and get approval consistent with their resource plans that entering into a contract with Hydro is consistent with state policy and their resource planning objectives. And so that's -- and -- and in tho -- in those decisions, the -- the state and the Utility can impute the premium for the power if they choose to do so.

The -- the resource planning, the IRP process really is the primary determinant of what resources are chosen, what values are -- are applied to contracts that might be entered into, or -- or other resources that may be chosen in lieu of a contract with Hydro. So that when we talk about premiums, those premiums will -- will come from

bilateral transactions with specific utilities, and won't nec -- won't really come from the MISO-administered markets.

Okay. So with that, I'll stop. Let me see if there's any questions sort of on that sort of perhaps painful review of definitions before -- but I'm happy to -- to answer questions. I'm going to turn it next over to Mr. Smith, and he's going to through some of the -- some of the fundamentals of the MISO market itself. Okay?

THE CHAIRPERSON: We're fine, thanks.

MR. DOUGLAS SMITH: Thank you, and good morning. I think Mr. Peaco stole a little of my thunder, but that may be -- might just mean we'll get through this a little faster.

So when we began this review -- and -- and as you -- you just heard from -- from Mr. Peaco, the -- the importance of the MISO market is that it is a -- a large market to the -- to the south of Manitoba. Manitoba is -- is relatively well interconnected there, and it -- it represents through -- it represents the -- the -- a significant portion of the export opportunities that Manitoba Hydro has, and -- and evaluates and -- and attempts to contract with.

So what we focused on in particular with respect to -- to MISO markets is -- is the capacity side, for a couple of reasons. As -- as Mr. Peaco indicated, the energy markets are -- are very short-term, hour-to-hour, sometimes minute-to-minute, day-to-day, and -- and don't represent the -- the longer-term opportunities that Mani -- Manitoba Hydro is -- is forecasting. Also, it -- it -- the capacity market represents one (1) significant portion on which methodology has changed over the last several years. And so -- so we wanted to make sure that it was clear what was happening in -- in the MISO markets, why Manitoba Hydro might be looking at -- at these changes and -- and drawing its conclusions, and then present information to the Board to -- to help understand the context for those.

Before we go too far into the -- the markets, though, I want to just cover a couple of quick terms, here. I think these are concepts that are probably very familiar to everyone here in the room, and -- and more. This is terminology. Every -- every market calls these -- these concepts something slightly different. And so in -- in the interest of ensuring that if I use jargon later on, perhaps it's -- it's a bit clear, I just wanted to -- to cover

these.

So -- so resource adequacy is -- is the -- the effort that MISO and other similar entities take to ensure that there is enough capacity to serve load out over time. So the planning exercises that MISO engages in is -- is intended -- one (1) of their -- their chief obligations is to ensure resource adequacy out over time. To do that, they set -- as -- as is done throughout North America, they set a reserve obligation. So for every megawatt of -- of expected capacity, there's a percent above that that all participants in MISO are required to -- to obtain, and they call that the planning reserve margin, or PRM.

They engage and administer auctions where the participants for MISO come together and can procure or sell capacity one (1) year in advance, and they call that the planning reserve auction, or PRA.

And then the last term here is -- is one that shows up in our presentation, and is actually in one (1) of the tables in our report as well. And so we wanted to -- to unpack that a little bit and make it a -- a bit plainer, or as best as possible. In -- in their forecasting of capacity out over time, and in MISO's forecasting of capacity out -- out over

time, they refer to an amount that's -- that they call low certainty resources. And -- and that -- that term is something that -- that is specific to them, but it represents something that all entities like MISO have to wrestle with, and that is that they have a -- a queue of potential resources, pot -- potential new resources out over time. And it -- it's called the interconnection queue.

If I'm a participant in MISO and I want to bring a new resource into the market, have to go to MISO, and I have to request that the studies necessary to ensure that that can be interconnected safely and -- and robustly into the transmission system, that those studies are done in time for me to bring that -- that generation online. So years in advance, I'm making a request into MISO to do those studies, and that shows up in an interconnection queue. And there -- there's a long list of potential resources that might someday come on in -- in MISO to serve future resource adequacy needs.

When MISO does its planning, though, it can't count on all of those showing up. There's -- this -- this is just somebody with an idea that wants to bring something on, and as it goes through that planning process, and as it gets through all its

studies, it becomes more and more certain that it will actually come online, or, in many cases, it falls out of the planning process, and it -- it fails at a -- one (1) of the studies, or is -- is pulled from the queue.

So when MISO does its planning, it assen -- assigns a rough probability, and it says, Some amount of the resources I can count on out of the queue, and some resources are very low -- a low probability that I can count on. And it uses that to -- to -- as -- as one (1) of the steps in forecasting future need. So you'll see that term later, but I just wanted to highlight it up front. Next slide.

The other -- the other key -- key piece to understand in -- in thinking about resource adequacy in MISO is to understand the roles of -- of the parties involved. MISO's role is to ensure resource adequacy. It sets planning reserve margins. It sets the obligations that the participants will -- will have to meet. It insures that only qualified resources are used to meet those obligations. And as -- as both -- as -- as Mr. Peaco has already indicated, it operates the short-term auction, which serves as a balancing market, or -- or what I might call a -- a last resort market in the year prior to

need to provide opportunity for -- for participants to either sell excess or to procure shortages of capacity against that -- that planning reserve target that has been set.

The -- the participant's role, then, is they are the ones actually procuring the capacity. So -- so MISO does no procuring. They own no generation. They -- they're just setting targets. The -- the participants, then, are going out and meeting those obligations. And there's a number of -- of mechanisms that they can use to -- to meet those obligations.

They can own their own generation. They put steel in the ground. They can enter into bilateral arrangements with -- with each other, with outside entities like Manitoba Hydro or others, and they -- they can ensure that they have the legal rights to that capacity, and that -- therefore meet their obligations that way. And then finally -- pardon me -- and finally, they can -- they can balance any -- any last-minute needs with an auction -- with a -- with a PRA to -- to reach their targets.

The other significant role that -- that participants play that we alluded to and that Mr. Peaco will cover in -- in more detail in the next section, is that they are obligated to meet both

federal, but also in -- in many cases, more significantly, state policies. So they -- they are beholden to the regulators. They -- they come before the regulators on a regular basis, much like we're doing here. And they -- they do long-term planning in accordance with state policies and -- and rules of laws. So those -- those two (2) are sort of -- sort of the -- the setup of -- of how -- how the MISO market views and -- and handles resource adequacy. So next slide.

And I suppose, actually, before I -- before I move on, I -- I don't know if there's any questions about -- about the -- sort of the -- the basic split between who does what.

Okay. So this -- this slide represents the actual results from the most recent PRA, the most recent balancing auction in MISO. These -- these are MISO numbers. And -- and I think the key to -- to take away from here is that 96 percent of the obligations that -- that MISO set were procured -- were identified ahead of the actual PRA auction. And if we -- if we stop and think about how -- how these resources come online, this makes sense. It takes far longer than a year to identify, analyze, permit, and -- and build, and bring online new generation. So a --

a year-ahead balancing market can't drive new capacity. It doesn't have -- there's not enough time lag for that -- that to occur.

So the -- the new generation, as it's needed, is being driven on the right-hand side of the slide. It's being driven by those other activities that occur in advance of that final year auction. And we see that in -- in the -- the numbers here. So -- so 4 percent was balancing. It was somebody with a little bit of excess selling to somebody who was just a little bit short in that final year, but it does not represent the -- the bulk of the -- the procurement of new resources. Next slide.

So taking a -- maybe a small step back, if 96 percent is -- is occurring elsewhere, then -- then why are MISO markets important? You -- you might wonder that -- that this is all occurring somewhere else. Why do we talk about MISO markets?

And I think there's a couple reasons why they are very important, and why Manitoba Hydro spend a lot of time attempting to understand them. Number 1 is, as my colleague mentioned earlier, they are liquid markets. They -- they trade and transact regularly. There is a -- a great deal of -- of information, both historical and current available to

all participants. They are -- are reasonably transparent relative to -- to the protecting of -- of commercially-sensitive information, and -- and therefore, they are forecastable. As a professional in this industry, the first thing we're -- that we're going to do if we're asked to forecast in an area is -- is locate pricing nodes, locations where we can get access to all the information we need to make a -- a informed, credible forecast of future events.

So -- so they are -- they are important and serve as a benchmark, or a -- a reference point for understanding what's happening in the region. They are also the last market that all participants engage in before everyone's lights are -- are turned on. The -- the day-ahead, the real time, the minute-to-minute markets, that's what actually ensures that all loads are actually being met in MISO, and that there is pricing signals around whether we have sufficient energy, and whether there's any congestion in the -- in the region and -- and that provides information about future needs.

Another reason why the MISO markets are so important is because some of the key counterparties, both historical as well as likely future counterparties for Manitoba Hydro, are MISO

participants. They're all being impacted by these markets. They are looking ahead, and -- and presumably doing their own forecasting of what -- what prices are going to look like in MISO. Is MISO going to be short in capacity? What are my energy prices going to do? And -- and that means that they are -- are looking for opportunities to hedge their own perception of risk.

They had -- they -- just as -- as we were discussing here, they have their own views of uncertainty. They don't know what's going to happen in the future. And for their own customers, they're looking for opportunities to -- to mitigate or hedge that risk. And so that leaves -- provides a -- a strong nexus for -- for an opportunity to explore options for a -- a mutually beneficial transactional or bilateral agreement between entities like Manitoba Hydro and the -- and these counterparties.

And then the -- the final reason that MISO markets are important sort of comes out of that, is they're used in all these resource planning exercises that entities like Minnesota Power, or -- or Northern States Power engage in. So -- so when they're planning, they're planning with their own knowledge and expectations around the MISO markets.

Next slide. So -- so I've got a few slides here just to give you some of the basics of -- of what the MISO market looks like currently. And I -- and I start with the mix of resources that are -- that are in MISO today, or in this case at the end of 2016. This is evolving and this is constantly evolving, but as you can see at -- at the end of 2016 on a capacity basis the -- the gas and the coal were roughly equal. This is continuing a trend of more -- more gas coming online in MISO and in other regions in North America and coal retiring and -- and reducing.

So I believe in our report we have a point in time in 2017 and -- and it was even further towards gas and with additional call retirements. So this is -- this is continuing to evolve over time. The -- the reason we chose to put this in is, as you can see, in MISO they -- from a energy perspective on the right-hand side the coal is still generating significant portions of MISO's energy. There is a significant amount of coal generation that is occurring minute to minute, day-to-day to keep the lights on.

So while gas is -- is coming online more and more there's still a strong amount of coal which brings with it environmental concerns, aging

plant concerns, reliability concerns that have been discussed in our report and other places on this record.

Next slide.

THE VICE-CHAIRPERSON: Sorry, Mr. Smith, before you leave one --

MR. DOUGLAS SMITH: Sure.

THE VICE-CHAIRPERSON: I apologize if I missed it. But could you just clarify what you mean by "unforced capacity share?"

MR. DOUGLAS SMITH: Certainly. So when MISO looks at its capacity it -- it starts with if -- if a generation -- if -- if a generating unit is able to bring all of its capacity to bear, it's able to -- to reach its full capacity or its full capability, how much -- how much capacity could it serve, could it provide in that environment. So if it's a hundred megawatt unit it's a hundred megawatts of capability. That's in unforced capacity number.

There is a recognition that not always can a unit bring all of its capacity online. It might be temperature based, but it might also be some -- some unit is tripped off-line, or otherwise unavailable at any given hour. When they're looking at capacity they're looking at their peak hours, their

-- their -- the hour in which the load is highest. You're not good to have 100 percent of the units available online at their full capacity at that point.

So their final planning is done recognizing -- recognizing that there's a portion of that that's not available. This is simply saying, in an idealized case, what would be on -- what would be available.

BOARD MEMBER GRANT: And can I just ask one other? Is it possi -- is it possible to identify excess capacity in the MISO region? So if there was a -- is it a hundred and thirty-five thousand (135,000) is the total capacity?

MR. DOUGLAS SMITH: A hundred and -- subject to check I believe a hundred thirty-five thousand (135,000) is the peak load, and the PRA will clear a margin above that based on what's bid. And then over time there might be excess capacity. So the -- the capacity, I think, a couple years ago was 170 or something thousand megawatt -- megawatts and declining as -- as items are retiring. So it is certainly possible to do that. I don't have exactly what the -- what those numbers are.

MR. DANIEL PEACO: We -- we do have a slide later on where we look at MISO's forecast in

that. Thanks.

MR. DOUGLAS SMITH: Any other questions before I -- okay. So sort of in -- in keeping with your question, the excess capacity declines over time through retirements. And -- and MISO spends a lot of time looking at and -- and attempting to forecast retirements because, as -- as I mentioned at the beginning, they're -- they're responsible for resource adequacy.

So they need to have a view and an understanding of what is likely to be available out into the future and send signals to the market participants if they believe that they're not going to have sufficient capacity. And one (1) of the key drivers of that are retirements.

So this -- this slide is from a presentation that MISO made on -- called "fleet changes," where they were looking at questions of -- of retirements for gas and oil and coal plants, and noting and discussing the fact that due to the age of the fleet that significant retirements were, in their mind, to be expected over the course of the next decade regardless of other influences.

So they -- they -- the bullets here are that over 80 percent of -- of their coal capacity is -

- is at least fifty (50) years old, and half of it is over sixty (60) years old. As -- as the -- as any generating unit ages it becomes more costly to keep it online. Those are the -- the going forward costs, so the investments that we would have to make to keep that plant available, and in particular to keep it available enough that it's -- that it's coming close to its unforced capacity when we need it. That it's not tripping off all the time at the very moment we need it.

As they get more expensive because -- it becomes less and less economic and at some point it will not be economic to -- to maintain anymore and presumably will retire. So age is a -- is a key driver in forecasting retirements. And -- and MISO here was just noting that they considered a large portion of their fleet, especially their -- their coal fleet, to be at high risk for retirement.

Next slide. As part of their planning they looked at a few policies. And this slide -- the -- the graphic from this was also in our report. And -- and we wanted to put -- put it back here for -- for some clarification purposes. This was their middle-of-the-road future. They looked at three (3) different futures from a -- a relatively conservative

to a relatively aggressive retirement future, and this was their middle-of-the-road.

And what they're -- what they're representing here is that there are retirements in both gas and oil and coal -- gas and oil and coal units throughout their region, that -- that some of them are due to potential policy drivers, environmental mostly, but that also a lot of them are -- are driven by age.

And, as you can see, there are significant units that MISO considers to be at risk up in the northern MISO area, which is the area of most concern when thinking about Manitoba Hydro's opportunity to make longer-term sales. That's where their counterparties reside.

MR. DANIEL PEACO: I might -- I might just note on this graphic, it's a little bit hard to read, but the colour coding here. The green is our -- MISO's assumptions about retirements due to age. And there's a few that are coloured purple that are -- that are presumed to be policy driven, presumably maybe some environmental policy driven or other -- other things. But the predominate retirements in these scenarios are really ones that they've assumed based upon age.

THE VICE-CHAIRPERSON: Mr. Smith, the -- the coal part is fairly clear.

Could you say a little bit more about the gas and oil retirements?

MR. DOUGLAS SMITH: So the -- the gas and oil is -- is not something we focused on as -- as heavily. It's -- but -- but the story is -- is fundamentally the same. These are -- without -- without trying to be too specific, because I haven't -- I haven't researched them in particular, they're likely to be the older steam units. They -- they've been around longer as well. They're -- they're probably often not quite as old, but they also -- at least throughout -- throughout North America they tend to not have quite as long a useful life as some of the -- the older coal plants. They're also subject to obviously to -- to different fuel price risks and different going forward economics that they would have to consider.

But the story that MISO is telling is -- is fundamentally the same. They looked at -- at these units and assessed that based on either age or potential impacts of policies that those units would be subject to -- that they were at risk of being retired in the -- prior to 2031.

THE VICE-CHAIRPERSON: Would any of these be the shale gas plants that they come on, I know, more recently?

MR. DOUGLAS SMITH: I don't have a specific answer to -- to when they came on.

MR. DANIEL PEACO: Well, the -- the units specifically we're talking about here are the -- are the older plants that were identified in that curve and so, those would not be those units. And we'd say the oil and gas fired units that were built forty (40) or fifty (50) years ago would typically be, you know, steam, whatever, but -- but inherently they would be much less efficient than plants -- newer plants today.

And so from an energy production standpoint they probably were used only during, you know, very high load periods. You know, as -- as peaking because they're less -- they're -- the new combined cycle units are so much more efficient than those older plants. And so those -- those would not be producing nearly as much energy in the market as the coal plants would be. So the loss of a coal plant means the loss of a whole -- a -- a large -- a much larger production of energy than a loss of one (1) of the older oil or gas fired plants.

BOARD MEMBER GRANT: Sorry. Can I -- I vaguely recollect at the NFAT, and I think it was Potomac Energy, I got the impression that these coal plants were going to be very stubborn in terms of coming off line. That, you know, depending on what the natural gas forecast price was. But that -- because coal prices would probably be tracking them downwards, and that retrofitting some of these aging plants was often going to be more viable than, you know, the construction of new natural gas.

Is that -- has that thinking changed at all or -- because this seems, I guess from Manitoba Hydro's point of view, a fairly optimistic portrayal of coal generation retirement.

MR. DANIEL PEACO: Yeah, I think that -- I guess one (1) thing to understand is this is a planning study that MISO needs to do. Because MISO's responsibility amongst -- in addition to operating the markets we've talked about, is they're responsible for planning the transmission system. And so they need to make some assumptions about retirements. And they're making various case assumptions because if these retirements occur, how does that imp -- what -- what changes in the transmission system are implicated by those changes.

And so they're doing -- they're doing this study in the context of them needing to understand where might we need to build transmission if -- if these retirements occur. And so they're -- they're postulating some scenarios based upon this. So this isn't necessarily them saying, We're going to retire these units. But they're saying, We need to make some assumptions about where these might occur so we can be -- because tran -- planning transmission is a long lead time exercise.

And so they are -- they're saying, Let's try two (2) or three (3) different scenarios here. And so we picked the -- sort of the middle of the three (3) scenarios they were using to do their own transmission planning. And so they -- they're -- they're like Hydro and us sitting here not really know exactly when all of these units would retire but they're coming up with some reasonable assumption so they can do a transmission planning study.

MR. DOUGLAS SMITH: Okay. And -- and the -- sort of the culmination of all this is that, as -- as Mr. Peaco just indicated, they -- they forecast out over -- over time the -- the potential need for -- for new generation. And because this is a transmission planning exercise, they are going to --

in -- in their modelling and their planning they're going to assume that the generation arrives. They're not going to leave themselves short.

Because as -- as Mr. Peaco just indicated, the goal of this exercise is to ensure they have the transmission that they need to actually serve the generation that presumably will show up to meet the load at that time. So -- so they will model and presume that the generation will show up through whatever means. They're not responsible for making it occur, but they're going to assume that it's there.

At the same time they're trying to send signals to the participants about the likely state of -- of the market out over time. And so they work with the participants in the region, in particular the organization of MISO States, to set the assumptions that they're going to use in their transmission planning exercise.

And so this is where we get back to the idea of this low -- low certainty resources. They model out over time, we have an existing block of generation. We have the stuff we already know about. It's online. And we have a forecast of retirement, so over time that amount of capacity, that -- that means to serve load is declining. We also have an

interconnection queue. We have a known pool of resources that say they would like to participate in our markets.

And we also have historical information that says not all of those show up. Soon -- you know, a great many of them fall out of the process along the way. They don't get a contract and so they are unable to be built or they don't pass through the -- the planning stages. They don't make it through permitting, or -- or it's gonna cost too much to interconnect, or for other reasons don't make it all the way through their -- their planning process that is used to get a new unit online.

And so they -- they effectively split their need into the resources they feel reasonably confident in. They either already have an interconnection agreement or they're far enough along in the planning process that MISO feels -- and -- and the OMS, the -- the Organization of MISO States, feels that -- that they should be signalled as -- as relatively certain, and then a portion that is this low certainty, less likely to show up.

MISO knows something will show up eventually, will meet load. But they don't know what it is and they don't necessarily know that they

haven't identified via the queue. And so in the report there was a table, and this is a visual representation of that, to help kind of illustrate this.

The -- the lightest grey at the bottom is the existing resources, net of imports and -- and some transfer limits where there's not enough transmission or whatever, and -- and reaches a -- an amount of the capacity that can be served by the -- by the units and the commitments already made. Out over time that's net of retirements.

Meanwhile, MISO has a forecast of their expected planning reserve margin requirements. So recall that the planning reserve margin is the year ahead value that the resources -- that the participants in MISO have to meet. That's only for the year ahead, but MISO forecasts what they believe it's going to be out over time. The difference between that are the new resources that show up. Some of those they -- they believe are -- are reasonably far along in the -- in the planning process, and those are the dark grey.

And then the light blue is what they call the low certainty. They put them into their planning exercise so that they can identify what

transmission needs are -- are coming. But those are less certain. We don't know where they'll show up.

And I think that this is helpful -- is a helpful way to look at this, because in -- in many ways you can think about that last piece, the light blue, as the place where entities that want to engage in future contracts for -- for long-term firm energy and capacity have opportunity. Because MISO is saying we need this. It's going to have to -- based on our current planning assumptions and the -- and the planning exercise we've done, we've identified this as a need, but we don't yet know where it's coming from.

So all the participants are going to have to meet that out over time through some means, their own or contracting with entities like Manitoba Hydro and others. So when we say that there is a indication of a shortage -- that -- that MISO's analysis indicates potential shortage in, say, '22/'23 time frame, this is what we're talking about. It's not that they actually expect that when that year's PRA occurs that they'll still be short.

It's that right now when they're doing planning and they're looking ahead, they don't see yet where all that's coming from. There's going to need to be some kind of procurement activities, a build or

buy decision by utilities in MISO to meet that need.

(BRIEF PAUSE)

MR. DANIEL PEACO: Yeah, I think it's important to make sure that we understand sort of what this chart represents. And again, it goes back to the context of the planning exercise within which MISO prepared this. They are working with the -- with the MISO -- Organization of MISO States and the participants to develop a postulated set of generation in their system over time that they can use for transmission planning studies.

And -- but the -- the dark -- dark blue and the light blue areas are really areas where they're making assumptions about where future generation is going to come from to close the gap between what they currently know to be the -- to be -- or expect to be the case, basically existing plant and existing resources that are committed and sub -- adjusted for retirements. And the balance of those, which are in some form of planning, more or less certain but still sort of speculative.

And so the -- this chart by MISO is not indicating that they have all the capacity that they

need through the entire period. They're just indicating, We're going to -- we have to make some assumptions with what -- about what is going to show up by virtue of utilities doing their planning and -- and procuring the resources so that, you know, ultimately these -- these requirements will be met.

And they -- they're working with their stakeholders to come up with a reasonable postulate for that so that they can do a transmission -- a transmission plan. But the real -- the real needs for capacity, somebody is going to have to spend money on energy capacity, on new resources to -- to actually secure the supplies to meet the dark and light blue areas.

(BRIEF PAUSE)

MR. DANIEL PEACO: And the -- and we've indicated the timing on -- on those for those two (2) pieces.

MR. DOUGLAS SMITH: Thank you. Yes, and -- and if you just -- just think back to the beginning of the MISO presentation, the "somebody" is not MISO. It's the participants. It's the utilities because they're -- they're the ones that are

responsible for the actual procurements.

MR. DANIEL PEACO: Okay. We're going to sort of move to bilateral markets. So is -- is there any -- any question on sort of the -- sort of the background on MISO, the MISO market, and where -- where things stand? Okay.

So we -- as we talked -- as I mentioned earlier on, the -- there's a -- there's a number of federal and state policies that actually govern how individual utilities will be doing their planning. On the federal -- we identify in the report several federal policies that have bearing both on MISO market itself, but also on how utilities will actually do their resource planning.

There's been a lot of talk for several years now in the US about the Clean Power Plant regulations, and now -- and there's still talk about it but it's -- but it's in the terms of if it will repeal and replace as opposed to proceeding forward with that. And there's -- there's efforts underway to -- to do that. So there is some uncertainty about what the ultimate regulation will be with respect to the requirements to regulate greenhouse gas emissions. But there's clearly a change afoot in -- in that process.

Another federal policy that's important to talk about in the context here and sort of really -- I think there's been some discussion in the record about sort of competing resources. The production tax credit policy in the US tax code currently -- and even surviving the -- the recent tax law change, is a mechanism that -- that currently provides substantial incentives of tax credits for wind and solar energy. Particularly for the -- for the wind projects that is a short-lived policy. There's -- there's a design phase out built into the tax code so that there's substantial incentives today. Within a few years those are designed to -- expire.

So -- so when we talk about production tax credits it's important to know that it's really a very important driver in the development of wind energy in the moment. It's designed to be phased out over a few years and so that within a -- within a four (4) or five (5) year time frame it will be a much less significant policy for the purposes of developing wind -- wind projects.

There's also -- on top of that there was a very recent change to the tax code at the end of 2017, which among other things changed the -- substantially reduced the corporate tax rate for

corporations. And that is expected to have some material effect on utilities in terms of the -- the value of production tax credits to them. And that's still being -- being sorted out.

But that -- that reduc -- that material reduction in the -- in the corporate tax rate will have some influence on how utilities will see the economics of the tax credits in the winds thing. So we -- and that's sort of to be determined yet. But there -- but it is a material change and that will be something that will be important to watch in the change going forward. And it will have impacts on the economics of resources in the -- within the -- within the US.

And then lastly there's a -- there's another federal policy that's -- that's gotten a fair amount of discussion in the -- in the US and I think in this docket. There's this issue of grid resiliency pricing. The Department of Energy requested last fall that the Federal Energy Regulatory Commission pursue an effort to provide subsidies to coal and nuclear plants to keep them online.

Just this week the FERC issued a ruling that indicated that they would not be pursuing that avenue, but they were -- were going to be continuing

to look at issues of resiliency and how to design those into markets. But I think the prospect of the -- the kinds of direct subsidies that -- that was contemplated by the original deal we report have been set aside in favour of an investigation of a broader review of re -- resiliency and -- and how to make sure that those are properly reflected in markets.

So those are some of the federal policies that obviously affect both of how the MISO markets would -- would look over time and also how individual utilities doing their planning would be influenced by federal policy.

The -- the utilities doing planning will also be affected very materially by state policies. They -- every state has their requirements for how resource plans will be conduc -- conducted and reviewed and approved within the state, and what kinds of criteria would be applied to those, includes economics as well as environmental and renewable portfolio content of the other matters.

So those state policies have a very important bearing on how the long-term inv -- long-term decisions are made on new additions to the system. And we just note a couple here that we'll talk a little bit more later. Minnesota's moving

forward with a fairly strong environmental policy. They just made some recent changes that we noted in the report.

And Wisconsin has some policies. They've met their short-term goals, but -- and so their -- their policies are -- are not as -- are -- are different than Minnesota. But -- but they have -- they do have some of their own policy and it would govern the way that utilities in Wisconsin would make decisions distinct from perhaps Minnesota or North Dakota.

So I'll turn to -- to Minnesota because we talked about that. And the -- there are -- there are two (2) con -- existing counterparties of Manitoba Hydro that operate in Minnesota that are -- that we -- we focused on. Minnesota Power and Northern States Power operate there, and they are dealing with certain policies that are coming.

The --the state has adopted fairly aggressive greenhouse gas reduction targets. And you can see in each of the resource plans of those utilities some discussion about how they are going to accomplish those -- those longer-term targets.

They also have renewable energy targets established that they -- they are also planning, too.

I think by and large the utilities have met those. I think the -- the greenhouse gas reduction targets are -- are somewhat more aggressive than the renewable targets themselves.

And in Minnesota's case they've just recently adopted some guidance for -- for what they call "social cost of carbon" in their planning process. So the -- so the utilities are expected, when they bring their resource plans, to actually incorporate those values in their planning so that there are choices about -- between those resources that have low carbon emissions versus higher will have -- will have some differential in the economics. So those are some of the things that are happening sort of within the Minnesota planning environment that are -- that are important to opportunities that potentially Hydro may -- may have over time.

The next slide. And -- and specifically Minnesota Power, they have -- they -- their resource plan shows a 44 percent renewable energy target by 2025. A longer-term goal of 66 percent renewable and natural gas. So they're -- they're substantially moving away from their coal to renewable and natural gas.

The -- their existing contract with

Manitoba Hydro extends over most of their -- their contract. And they're currently planning a large natural gas combined cycle unit, which is not at regulatory approval and beyond, but it's an example of the kind a resource that MISO would expect to show up but is not yet committed to, or -- or in place.

And so, as an example, where in the case of Minnesota Power where they have a investment in a -- in a substantial new generating capability in the -- in -- in the next two (2) years that they are planning but not yet committed to. And this -- and then they've just sort of -- we just note that they've indicated in that plan that the project's needed for reliability in support of wind and solar, and increase the energy hedge benefits associated with having -- having natural gas in their mix. I think they have a mix it's fairly heavily coal, so that -- that diversifies their mix to some degree.

Next slide. And shifting to Northern States Power and their plan for Minnesota. Their contracts with Hydro are expiring in 2025. And -- and it's -- it's a big part of their IRP to sort of deal with that and some -- some other retirements that are occurring in mid -- in the -- in the middle of the decade.

They -- in -- in their context they are clearly looking at a range of options, and they may or may not be looking at a specific sale, but that's -- that's clearly the loss of -- of the amount of contract for Hydro is among the -- among a number of significant resources that they are looking at replacing in their planning process. They also have a number of aging coal and nuclear facilities that they are contemplating losing by the end of the decade in their planning -- in their planning.

Next slide. And I -- and I wanted to call your attention to two (2) specific things we found in -- in both -- in their IRP and the -- the Commission's order approving the IRP that was issued just a year ago. And they're -- I think they're due to file their next IRP later this year.

The -- Northern States Power indicated that they're continuing to evaluate the potential of hydro, including the potential hydro resources from Manitoba Hydro beyond the current contract. And in the -- and in the Commission's order approving that plan they -- they basically were asked that -- that the company sort of further explore alternatives to the natural gas options in their plan, including a number of resources. And at the top of that list was

large hydro power.

So I think -- you know, from these things we take this fairly clear interest and expectation that -- that options from Hydro -- from Manitoba Hydro will be considered in their planning going forward. And so that's in -- and -- and that's in sort of mid-century time frame.

Next slide.

THE CHAIRPERSON: You know, Mr. Peaco, I'm -- I think this may be the appropriate place to take the morning break. So we're going to adjourn for fifteen (15) minutes.

MR. DANIEL PEACO: Okay.

THE CHAIRPERSON: Thank you.

--- Upon recessing at 10:31 a.m.

--- Upon resuming at 10:47 p.m.

THE CHAIRPERSON: Please continue.

CONTINUED PRESENTATION:

MR. DANIEL PEACO: Okay, we'll continue into the next section and we're going to -- here we're going to provide sort of an overview of our review of the expert revenue forecast. We'll

necessarily -- this will be somewhat cryptic because we -- there -- in order to sort of describe the full review, we would have to talk about CSI so it will be sort of the parts that we can talk about on the public record we'll go through now and describe those, but we'll reserve the balance of our discussion about what we did in our view for the -- for the CSI session this afternoon.

So, in this presentation I've -- I've included sort of a few things. I'll go over them briefly. There's a -- I'll go through sort of each of the components of the -- of the forecast that we reviewed. Go back? Yeah.

We're going to -- we talk about what we did in reviewing each piece, and I'm going to hit that very briefly, but I'd be happy to answer questions on -- questions about what we actually did in the process. We have a little summary of -- of Hydro's approach to -- to developing that element of -- of the forecast and -- and I'll just go through and touch on and mostly -- mostly focus here on this section on what are -- what our public -- what our observations and findings were that are in the public's portion of our report. And then, obviously, we'll talk about the balance of that in the CSI.

So now the next slide, please. And so what we're going to talk -- I'm going to talk about sort of basically building the forecast up and the first thing we'll talk about is their forecast of the revenues they're going to get from their existing contracts over time. And so we reviewed that particular piece. I'll talk about that first and then I'll go to their forecast of in -- over and above their existing commitments, how much additional surplus energy and capacity do they expect to have over the planning horizon.

We -- I'll then move to talking about the changes in their forecast methodology for what they assume about pricing for -- for sale of that surplus. And then I will talk a little bit about the export market price forecast themselves with third-party providers and -- and then, ultimately, we'll talk about how that all comes together in the -- in the export revenue forecast that they used. The one that we saw with the red line back in the early chart.

Okay. Our firm contract. We -- we were asked to assess the reasonableness of the forecast of revenues derived from these contracts. We reviewed a number of CSI documents, including the ones we've listed here, as well as the contracts and the

work papers that Hydro has done in -- in preparing those forecasts. And -- and so we -- we went into some specific detail both in how -- what the contracts are and -- and how -- how those were evaluated by Hydro.

Next slide. This is just a depiction in megawatts of the amount of -- of contract sales. So, you can see that they have an existing amount as an -- as an -- is an increase in 2021/'22 and that sort of coincides with the new contracts associated with Keeyask. And then the decline in 2026 which is when the -- the primary contracts with Northern States Power retire and then going on after that. So, those are -- it's the -- in -- in terms of megawatts of sales, that's the sort of the general depiction over time of -- of the existing contracts that they have.

I terms of the -- our findings, when we reviewed their forecast we found that the -- the -- the values that they had for the forecasts for the revenues from the existing contracts are reasonable.

We found that they -- that when they evaluated that they were doing it in a way that was consistent with -- with the methodology that they used in the NFAT proceedings. We also conducted a review of it at that time so we were familiar with -- with

that going in.

And the -- and -- and they have a few new contracts included and -- and we found those -- the treatment of those to be consistent with the others. And so, overall, we found that the -- their valuation -- they had a reasonable forecast of what to expect from those contracts.

Next slide. Moving on to the forecast of how much -- over and above those commitments how much surplus energy and capacity they have potentially for sale over the twenty (20) -- over the planning horizon. We were asked to specifically look at the reasonableness of forecasting those amounts and we reviewed their modelling documentation, their third-party documents pertaining to hydrology and the reviews of their hydrology modelling. The number of IR responses associated with that and the -- and their outputs from their -- their modelling of -- of those. And we spent -- and in each case, we -- we did have -- we had a -- an ongoing discussion with Hydro in each one (1) of these areas to make sure that we understood what they had to identify documents and to make sure we understood what their -- how their model -- how their models and spreadsheets worked and so forth.

So we had -- we had a very productive

ongoing dialogue with Hydro in each of these areas through the -- through the process.

Next slide. And so they used -- they have two (2) models. They have a short-term model that they use for their operation plannings for -- for current year and year ahead and they used that for their -- for their initial year, and so we look -- we took a look at that. And they also use their -- what -- their long-term planning model so-called SPLASH model and -- and they -- they -- they do, in those cases, as they had -- did in the NFAT and have been done and doing in their other planning doing a -- a simulation of a large number of different Hydro simulations based upon historical -- their historical records of different year, plotter years.

We found that the -- that they really had no change in the -- the overall methodology; how they did that from -- from -- from the NFAT or prior years but -- so this is fairly consistent in methodology than what -- from what we had seen before.

Next slide. Overall, our findings here is that their methods were consistent with past practice and their forecasts of surplus energy and capacity is -- was -- reasonably represents the average of the -- of -- considering the range of

uncertainty and the hydrology that they're facing and so we found -- we didn't found -- find any issues with their forecast -- the forecast that they're using for their revenue -- export revenue forecast to be -- we found it to be reasonable.

Moving on to the -- the change in forecast methodology. And this forecast methodology is for the forecast of the prices that they can obtain for sales into the market for the surplus that they have. And here, let me just stop and say that -- that perhaps I should back up, but, you know -- you can stay with this slide.

But there -- there's sort of two (2) elements to their forecast of -- of surplus energy available. One -- one (1) component of that is what's called surplus dependable energy and I refer to that here in this slide. The surplus dependable energy is the amount of surplus energy that Hydro will have in the driest year. So that's just something they can count every year and it's not dependent upon -- on hydrology.

And so, surplus dependable clearly is something that is -- they can be made highly firm for a long term and is -- is typically what's used to service it's own load, and to the extent it's surplus,

it can also be used to firm up a long-term contractual arrangement with -- with another counterparty. And so we'll talk about surplus dependable and then we'll talk about additional energy over and above that that's available when the water conditions occur.

And in the case of their baseline forecast, they're assuming an average water year, essentially, so their -- in an average year, you're going to have the dependable amount, plus an additional amount that -- that's -- that's going to be -- will accrue -- acquire -- it will show up in that year but won't necessarily show up every year.

And we re -- reviewed a number of the documents on their methodology, including some that were specifically identified in our scope of work and others that we identified or that we -- that we discussed with Hydro on terms of their methodology as it is today and how it's evolved since, I think basically, the 2013 to 2015 period that they were using a methodology that -- that was, among other places, showed up in the -- in the NFAT proceeding.

Okay, next slide. In 2013 to '15 this -- a synopsis of their method is that the surplus dependable energy that they had for sale in -- including the NFAT and in -- in another financial

forecast they made in that period, they would value all of the surplus dependable energy identified in their forecast to be sold with three (3) revenue components. MISO market energy prices forecast by their third-party vendors. They would include a revenue for capacity based upon a forecast prepared by their third-party vendors. And -- and then they would add a premium for -- for added values that -- that a long-term firm hydropower product would offer the market and they had seen in -- in past transactions.

The -- with the -- the balance of the energy and that, the surplus opportunity energy that -- - that energy that shows up in -- in the average year but not all years was priced out just at the market energy prices.

Moving to the -- to the current method, the surplus dependable energy and -- and the -- the balance of the opportunity energy are all priced at the MISO market. There -- there -- the addition of a -- of a capacity value and a premium value was removed from that analysis. And the reasons offered for the change, in summary, were their current view -- their current view or understanding of the long-term market outlook for the -- for the markets that they were looking at and their -- their observations on softness

in the near term capacity prices and that refers principally to the -- the MISO PRA or the year ahead market that we've -- that we've talked about previously today.

Next slide. So the changes -- our -- our findings on this, we believe -- first, we believe the method is more conservative; applying capacity and premium at zero is -- is -- is not a -- what I would call a P50 value. There -- there really would not -- and this wo -- would be -- particularly applying to the surplus dependable. We're talking about products that would be offered into the bilateral markets we're talked about and -- and to the -- to the extent that a long-term contract would only command energy prices based upon MISO market prices is -- it's a very low end of a range of -- of possible outcomes for how much capacity and -- and other premium values that Hydro could -- could obtain in a -- in a surplus dependable contract offer to a counterparty in the bilateral market.

This -- this -- these assumptions we found are used reasonable for the very near term because we would agree that in the very near term, the market is surplus and the prices are low both for energy and capacity, but it's not suitable for a

longer term product or longer-term outlook over ten (10) or twenty (20) year time horizon.

THE VICE-CHAIRPERSON: Sorry, what would you define as "the very near term"?

MR. DANIEL PEACO: Well, it's in the next couple years to at most five (5) years.

(BRIEF PAUSE)

MR. DANIEL PEACO: And we also think -- we believe it's not reasonable for use in the long-term and "reasonable" being defined as P50. It -- in that it -- and we'll have to talk about this more in the CSI section, but their -- their assumptions are not consistent with the third-party forecasts that they've received. And we -- we find it not to be consistent but we've identified and we've already talked about is -- as identified needs, both generally in MISO and, specifically, for the -- the primary counterparties they have operating in Minnesota.

And Manitoba Hydro, they do their forecast, which we'll talk more about later this afternoon, they do forecast significant surplus dependable energy for most of the twenty (20) year forecast. And so it's in terms of how much volume

they have potential to sell into this market. There's -- there's a substantial amount of that they are over most of the -- over the twenty (20) year period. So we feel like based upon -- particularly based upon the capacity and premium assumptions that this is a very conservative view relative to the expectation that this is a P50 forecast.

Next slide. Moving to our review of the export market prices that they prepared, we were asked to review the reasonableness of the -- the market price forecast; both, you know, and -- and including both -- what we call reference. We talked about reference before and a high and low and the reference, high, and low were used in that original chart that shows the probability distributions that we talked about earlier and we'll come back to that.

We reviewed their -- we review each of the third-party consultant forecast documents that they received and any documentation that they had with that and the -- and the workpapers that Manitoba Hydro have in sort of taking those forecasts and -- and preparing them for inputs to their models and into their analysis.

And then we -- we relied on some other information and we -- we obtained from talking to them

and other information we have from the market more generally.

Next slide. So their approach, they take -- they -- they procure forecasts of -- long-term forecasts for energy prices on and off peak for twenty (20) years, both energy and capacity, delivered to the -- what's called the hub in -- in Minnesota. So it's -- it's -- it's -- it's central to Minnesota as we talked earlier, prices are location specific, so this -- these forecasts was specific to that location.

And we also found that there was some documentation on these forecasts but it was fairly limited. And so we were -- we -- we'll talk more about this, but we -- we reviewed the documentation that they had but we found that we would -- it -- it was less than what I would consider full documentation for a forecast.

So our initial step -- or the -- the initial step that Hydro took was to average the four (4) forecasts. They took a simple average and prepared on-peak and off-peak energy prices over the -- over the study period and then they -- they took the capacity price forecast from the four (4) vendors and averaged that. And so they ended up with a -- a reference case energy and capacity price forecast as a

result of the -- of reviewing the third -- four (4) third-party forecasts.

They then took those energy prices -- and -- and adjusted them for location because their -- their energy deliveries are made at the border and so there is somewhat of an adjustment in price differential between the Minnesota hub and the -- and the border between Minnesota and -- and Manitoba. And so there's -- Hydro applied that adjustment to these forecasts. And we went -- so we reviewed that as well.

Next slide. The -- with -- with respect to preparing high and low case forecast, you may be aware that in -- in the NFAT and prior years, they actually pro -- had procured more -- more extensive forecast from the third-party vendors, which would include both their reference case and -- and high and low cases. And so they have previously built their high and low cases off of the third-party vendors' forecast.

In this in -- in this round, they prepare their own high and low forecast using what I would call a market heat rate method, and we can talk a little bit about what that is. But essentially, what they've done is prepare high and low cases by

basically it -- it's treating it as a natural gas price sensitivity. They calibrated a high and low gas price based upon some -- some information they got publicly from the US Energy Information Administration's annual energy outlook and they derive percentages referenced between their high, low, and -- and referenced gas prices and applied them to their forecast to come up with high and low energy market prices for their use in their planning. That's a -- effectively, it's a -- it's a natural -- natural gas price sensitivity so it will reflect a -- a range based upon changing that one (1) variable in their market prices. They did not prepare high and low cases for the capacity prices.

So our findings on their energ -- export market price forecast, at least in terms of what we can talk about here this morning, we did find that the third-party forecast did let -- lack information on the probably of the range. So we really -- when we looked to see -- I mean, in the -- in -- in the context of our original -- our initial discussions this morning, we were looking to see did -- are they representing these as -- as a P50 forecast or as in a middle of a range or how do they characterize them.

Typically they were -- they were -- they were not really cat -- categorized as -- with any particular probability range. They were basically a -- - a forecast that they offer. So it's -- it's -- and Hydro has taken those as -- as reference or as -- as -- - as approximately P50 but there really was no documentation to that effect.

And -- and in each case, we -- we -- we were looking to see whether there was consistency in the sets of assumptions and inputs that the four (4) party forecasted and -- and we weren't -- there wasn't sufficient information for us to do that so we weren't really clear as to, you know, to the extent that there were differences between them, you know, what underlying assumptions were different that would be driving them. In some cases we had some of that information, but not sufficient to -- to draw any real definitive conclusions on that.

The -- obviously as we noted before, while they did take third-party forecasts for capacity and they did prepare an average of those four (4), they ended up -- they did not use that in any of the analysis so -- so -- while they -- while they -- they get -- they received the information from the third-party forecasts because they ended up not using that

in their actual analysis. The balance of what we've observed on that we'll set the -- hold for this afternoon.

With respect to the revenue forecasts. So now that we take the fort -- the sum total of the revenues that they will receive from their existing contracts over time and what they will receive from sales of all the additional surplus energy, dependable energy that they have, how do they sort of translate that into a total -- the total forecast, which we saw on the -- on the dashed red line on the chart earlier this morning.

So the documents we -- we reviewed the documents that -- that went into their -- their forecast and then the uncertainty analysis and -- which was included in their Tab 4 of the -- of the application and we spent a fair amount of time talking with Hydro about their analysis here.

The next -- next slide. Their approach in doing this, they basically summed it up. They added the existing firm contract revenues to the -- basically, the energy price. They -- they priced out all of the surplus energy at the MISO market energy prices that they received from the third-party vendors, averaged and -- and used that as the basis

for their revenue projections.

On the uncertainty analysis, they did the same method except they -- they substituted the -- the high/low and reference energy prices that they'd derived and then they looked -- they coupled that with a look at the range of the various flow cases across the -- the -- the hundred and two historical records that they have in their model and -- and they've assigned some probabilities to the outcomes to come up with a -- the probability scatterplot that's shown on the -- one of the earlier slides we talked about.

So the overall revenue forecast here -- they've got total revenues net of some -- the transmission expenses to show the -- the dark blue bar basically is the same line, the -- the net revenues that we saw earlier on that we had on the dashed red line on the chart at the beginning of the presentation. Next slide.

As -- as we -- we've shown it here. And so -- and so what we -- what we have, then, now is that they've done their forecast, or their reference case, which we show here on this chart as the P50, the red dot -- dashed line, and then combining the Hydro uncertainty and the price uncertainty, they show this range of possible export revenue outcomes in this

probably assessment. And this is a extended version of what they included in Tab 4 of the -- the GRA. And you can see that it -- you can see that it approaches the -- the reference case approaches something in excess of $500 million for a few years, and then sort of settles down and -- and sits at just over $400 million for the balance of the forecast. Next slide.

The -- the -- our -- our public findings on the ref -- on the reference case, we -- we've concluded that the -- the reference case is not a P50 case. The energy market price forecast, we believe, is -- is a -- is a very conservative representation of -- of the value that they could extract from the market from these things.

We think that there is -- while there's -- and there really isn't any representation from the vendors that -- that what they've provided to them is P50, but if you accept that it is, then -- then perhaps for the energy component of that -- that may be P50 in it -- in that piece. But the real problem is that they've assigned zero value to capacity and energy, which essentially means that they've assumed that they're -- they're going to have no new firm energy contracts for the twenty (20) years.

A zero capacity revenue for surplus

dependable energy over twenty (20) years for -- for all of their volume, I -- I would consider as something close to a P100, which basically, it's virtually certain that it's going to be that or higher. There's -- and -- and same with the premium. I think, to the extent that -- that none of their surplus dependable could be sold for any premium over the twenty (20) years is -- is virtually the lowest number you could come up with. So those are -- those I would consider, you know, virtually certain that they could do that or better.

There's -- it would -- as another way to put it, I don't expect that they'll be selling, you know, were -- asking people take -- to take their power -- to pay them to take their power, which would have to be -- the only way to be lower is in that. So it's -- it's primarily the -- the assumption of no capacity and energy -- I mean premium values for the entirety of their volume for the entirety of the twenty (20) year period that causes us to conclude that that's -- that's at the very low end of a range of possible outcomes.

THE CHAIRPERSON: Mr. Peaco, can I just interrupt for a sec?

MR. DANIEL PEACO: Yeah.

THE CHAIRPERSON: The first bullet says "the energy market price forecast is conservative." Your comment was that it's very conservative. So we have a difference between what you said and what --

MR. DANIEL PEACO: Yeah.

THE CHAIRPERSON: -- the page says. Which -- which one is it?

MR. DANIEL PEACO: Yeah. I can take -- yeah. I -- I apologize. Let me -- it's -- thank you for asking that. It's -- clarify it.

Overall, the -- the entirety of the forecast is very conservative, primarily because of the capacity premiums. When we looked at the energy piece itself, we -- we found that to be potentially a -- a bit conservative but -- but it's -- but it's really the capacity in the premium values that are -- are the biggest concern for us as relative to the -- the, you know, comparing it to what -- what a P50 forecast for revenues would be for the -- for the surplus dependable in particular.

(BRIEF PAUSE)

MR. DANIEL PEACO: Okay. And with

respect to the uncertainty analysis, one (1) is we -- we note that in their own analysis, which included basically the -- the sensitivity to natural gas prices -- the natural gas prices values, the -- the reference cases currently are -- are quite low. The -- the low case is -- is lower than that, but -- but the high cases are much, much higher.

And so there's -- there's -- in their probability, distribution, and -- and others that we would -- we would expect to see, there clearly is much more potential for the prices to be a lot higher than to be a lot lower than their reference case. And so that means that the -- the sym -- there is a -- the -- the probability distribution around their reference case is not symmetrical, and there's -- it's sort of biased to the high, which would tend to have a -- a P50 case be somewhat higher than their reference case.

And they -- we also found that in the -- in the market prices that they receive, there's -- there's a fairly limited value for -- for carbon built into their forecast, and particularly as we get to premiums that they might get for long-term contracts, that -- that is a fairly low number, and -- and the -- and obviously, the capacity in the premium values being zero are -- are at the very low end of the range

for those parameters in the -- in the uncertainty analysis.

The risk allocation between Hydro and its customers, the -- the asymmetry in the forecast itself means that the risk based upon the forecast, which is conservative relative to P50, clearly runs toward the customers or Hydro. We'd also just note here, and we noted in the report that all the risk and that are exogenous to the customers. Hydro's marketing does have some control on being able to capture some of those values for capacity and premium, that -- in there, and it -- it -- I think that it's -- essentially, their forecast assumes that they sell only to the spot market over the twenty (20) year period for anything that's not currently committed. Okay. Next slide.

Let me stop there before we wrap up. Is there any questions on -- on that section? Okay. So, in -- in summary, we just kind of review the timeline, here. The -- the twenty (20) year time horizon. We review the milestones. We looked at the -- we see that -- the Keeyask coming online in 2021 has an impact on when the surplus depend -- dependable becomes important. It -- it also -- also in 2022 or thereabouts is when the MISO forecast shows some needs

in the -- in the MISO market showing up by 2025, NSP's and Hyd -- Manitoba Hydro's contract expires, and -- and among other things, the NSP IRP show some material needs in their system at that point, and in -- in addition to increasing needs that's shown in the MISO analysis itself.

By 2027, it's -- that's the ten (10) year target date for the equity target that Hydro has included in its -- in its application. And then we -- our forecast, obviously, we looked at the twenty (20) year forecast as well, which went on another ten (10) years after that. And I think that 2037 was somewhere close to the original -- the existing rate plan lands at the equity target at about that time. So those are some of the key -- key dates that we -- around the -- the forecast we looked at. Next slide.

The reason most of their export revenue forecasts, we believe, it's conservative low relative to the -- the objective of a 50/50 the chance of meeting their equity target in ten (10) years, and we -- and -- and also low for the longer-term analysis to be done out to twenty (20) years. The -- the energy market price is -- is a bit is -- is -- tends to be a bit low, but the assumption about no revenue received for capacity on any of the premiums is -- is

substantially below a P50 assumption, in our estimation, and the energy price risk is skewed for the high side, so there would be some -- if you -- if you actually considered that uncertainty, you probably would take a somewhat higher view of the P50 case in an -- in an analysis. Next slide.

With respect to the resource needs and outlook in the MISO market, most of the -- most of the export sales that Hydro makes is to that market. The -- some of the -- some of the documents or -- or the analysis direct -- coming directly from MISO in their resource adequacy assessment shows an expectation of a very substantial amount of coal generation declining over the next decade and large -- and in their view, it's -- it's largely age-driven and much less so sort of policy-driven.

The existing and committed resources will leave MISO short in capacity by 2022. They do need to add new resources of some type in, you know, in the near term and -- and beyond to -- to meet the resource ade -- adequacy requirements in the MISO market, and that they -- their analysis shows as much as 24 gigawatts -- 24,000 megawatts -- of need in the MISO market overall by 2031. And we also have talked a lot about the fact that because the opportunities

for selling long-term firm contracts into the bilateral markets, the state policies really have an important -- have an important role in determining the opportunities for those, and particularly for -- for the premium values that might be obtained for any sales.

We did -- and just to recap, we did find that -- several elements of their forecast to be reasonable with respect to the P50 standard, is the -- we found the overall forecast for what surplus is available, was reasonable, both dependable and surplus energy, and that the -- the revenue forecast arrived for their existing firm contracts was reasonable as well. Next slide.

Okay. That -- that completes our prepared presentation for this morning.

THE CHAIRPERSON: Mr. Peaco, I've got a couple questions before the Intervenors start.

MR. DANIEL PEACO: Sure.

THE CHAIRPERSON: Without going into CSI, Daymark -- or, I guess, Capra reviewed similar -- the same kind of data, or similar data before NFAT for the NFAT hearing?

MR. DANIEL PEACO: We -- yeah. We were -- our firm was called the La Capra Associates at

the time, but we --

THE CHAIRPERSON: Right.

MR. DANIEL PEACO: -- we -- we conducted several -- reviews sev -- several elements of -- of the NFAT proposal, including the overall economics of the project and the economics of the export contracts at that time.

THE CHAIRPERSON: So when you looked at the approaches taken by Manitoba Hydro for NFAT, and without getting into CSI, in looking at whether there are projections from that period coming forward, or the period just before NFAT, moving through NFAT, is it your evidence that the approaches they -- they used to forecast at that time were more reasonable than the forecasts they're using now?

MR. DANIEL PEACO: Well, they -- we have -- I mean, there were a -- a couple of diff -- differences. I think that at the time that we were reviewing the NFAT, I think that the -- just -- just to chara -- just to get -- summarize how they did treat -- treated some of these issues in the NFAT, a) they had a larger load forecast; they had somewhat lower surplus, and -- but they -- they assumed capa -- energy capacity and premium for all of their identified surplus dependable energy in their forecast

for the entirety of the -- of the planning period. And -- and then they -- as compared to this forecast, where they assumed no -- no premium, no capa -- capacity for any of their surplus.

And so I think that whether that -- either of those is more reasonable, I think if we're looking at a P50, I think that -- that forecast, you know, went to the high side, and this forecast clearly goes to the low side.

THE CHAIRPERSON: Secondly, in terms of what happens within the MISO market, I'm -- I'm just wondering in terms of the decision-making process and the time frame for -- determined for the -- for the difference -- different utilities to determine what sources they're looking at, and negotiate contracts, and things of that nature. Is it a different -- is it a different time frame now versus NFAT? Like, in -- based on technology, policies, and all that, do decisions have to be made faster now, or is it the same sort of pacing as was used before?

MR. DANIEL PEACO: I think that -- I don't know that it was meant -- it would be materially different. The -- the decision-making timeframe for planning really is a function of the lead time for the primary resources you're looking to add. If you're

developing a new nuclear plant, you need to have a longer-term planning horizon than if you're building a new gas plant, for example. But typically, I think resource planning is usually done, looking out.

You know, you think about building, say, a new combined cycle unit. You're going to -- from the time you start planning, to permanent design, permitting, and so forth, it's probably a four (4) or five (5) year lead time, and so your planning needs to be sufficiently advanced of that so that you can -- can have a plan on and operational in time to meet the requirements that you're trying to -- trying to get.

There may be somewhat -- each utility may have different circumstances that their lead time for planning may be a bit different, but it's roughly on that magnitude, and I think that's not much different than it would have been a few years ago.

THE CHAIRPERSON: Okay. Thank you. If there are no questions, Dr. Williams?

CROSS-EXAMINATION BY DR. BYRON WILLIAMS:

DR. BYRON WILLIAMS: Yes, and good morning, members of the panel, and good morning, Mr. Smith and Mr. Peaco.

MR. DOUGLAS SMITH: Good morning.

DR. BYRON WILLIAMS: Sir, before the clock starts running on my -- on my cross-examination, I'm wondering if I could have Kristen pull up Manitoba Hydro Exhibit 67. And Mr. Chair, to you and to the panel, I have a question of clarification just -- I don't need an answer now, but going forward -- and -- and it relates to your remarks this morning before the hearing started.

And our clients and the legal team certainly heard those and appreciated them, and the guidance from the Board in terms of the need for precision between the requested rate increases of the three point three-six (3.36) -- three point three-six (3.36) interim's been confirmed, and the seven point nine (7.9) versus the distinction with the potential for seven point nine (7.9) in future years.

And I certainly will indicate that our client has, both in our conversations with the ratepayers panel or experts, has tried to be mindful of that to the extent that if we have misstepped, we certainly apologize for that. But our client is quite consciously, in terms of the -- the potential for five (5) -- seven point nines (7.9s) in future years use the term 'the Manitoba Hydro plan'. You would have seen that in the ratepayers panel.

And our client did that quite consciously. And so I -- I am seeking some guidance from the Board on that. And we did that consciously, because really, taking our guidance from Manitoba Hydro in here, in Manitoba Hydro Exhibit 67, you'll see the -- the comments of the Chairperson of the Board. And if we can go to slide 16 for just a minute. The next slide, please, being slide -- slide 14. I apologize.

Here, you see the -- the characterization of the -- the plan is being annual 7.9 percent rate increases each year from 2019 to 2024. And so, Mr. Chairman, I don't need any guidance from the Board right now. I won't use those words. But going forward, certainly, when we're talking with our experts, or in future questions, we considered that terminology to be appropriate, consistent with what Manitoba Hydro is using, but certainly would appreciate the Board's guidance on that.

THE CHAIRPERSON: The concern the panel has is what's -- what's creeped in is six (6) year rate requests. And that's the specific concern. If there's a reference to the IFF forecasts and things of that nature so it's clear that we're not talking about six (6) year rate requests. But what's happened

is there was more caution earlier on. And what's happened over the past few days is that we now -- well, now it's being put forward of, What do you think of six (6) year -- of -- of the rate request of six (6) years, 7.9 percent for six (6) years. And that's the concern. It's -- it's the precision of the words.

The rate request is not for 7.9 percent for six (6) years. The rate request is for the 3.63, 3.6, and 7.9. And it may be a picky point, but the problem is where -- we will be spending an enormous amount of time going through the evidence, including the transcript, and we don't want to get into people thinking certain comments mean one (1) thing and other people mean the other.

As long as the parties understand the panel rec -- reviews the information based on what the actual rate request is. I just wanted to make it clear because over the past few days it's started slipping. And that's why I made the comment this morning.

DR. BYRON WILLIAMS: And we'll certainly be mindful of it and we appreciate it. Just in terms of -- before my discussion starts I have three (3) exhibits that I'd like to introduce. he one (1) -- the first being excerpts from the North

American Electric Reliability Corporation here -- going forward NERC, their 2017 long-term reliability assessment, which was presented -- made public on December 13th, 2017. And we would ask that that be marked as Exhibit 39.

--- EXHIBIT NO. COALITION-39: Excerpts of North American Electric Reliability Corporation long-term reliability assessment for 2017, dated December 13, 2017

MR. KURT SIMONSEN: Thank you.

DR. BYRON WILLIAMS: Secondly, excerpts from the assumptions to the Annual Energy Outlook of the US Energy Information Administration dated July 2017, which we'd ask be marked as Exhibit 40 -- Coalition Exhibit 40.

--- EXHIBIT NO. COALITION-40: Excerpts of Annual Energy Outlook of US Energy Information Administration dated July 2017

MR. KURT SIMONSEN: Thank you.

DR. BYRON WILLIAMS: And then finally, hot off the presses, the decision of the Federal Energy Regulatory Commission, FERC, dated January 8th, 2018, relating to grid reliability and resilience pricing, which we would ask be marked as Coalition 41.

--- EXHIBIT NO. COALITION-41: Federal Energy Regulatory Commission decision dated January 8, 2018

MR. KURT SIMONSEN: Thank you.

CONTINUED BY DR. BYRON WILLIAMS:

DR. BYRON WILLIAMS: And to the Daymark panel, I may direct my questions to a specific individual, but please free to chime in, and tag team me to the extent you feel appropriate. And just in terms of the three (3) exhibits that were presented.

It would be fair, Mr. Peaco, to suggest that these are documents that Daymark would generally be familiar with in terms of their ordinary course of practice?

MR. DANIEL PEACO: Yeah, I'm aware of them, but not -- we haven't reviewed all of them, but we -- we're generally aware of those kinds of

documents, yes.

DR. BYRON WILLIAMS: Okay. And -- and, Mr. Peaco, in your evidence this morning at slide 26 you made reference to the social cost of carbon increasing in the state of Minnesota for planning purposes.

You recall that evidence, sir?

MR. DANIEL PEACO: Yes.

DR. BYRON WILLIAMS: And I'm -- I'm not asking for you to recall the figures off the top of your head, sir, but I wonder if by way of undertaking you would consider providing the -- what -- what the calculation of the social cost of carbon for planning purposes is -- is currently in Minnesota, as compared to what -- what it was previously?

MR. DANIEL PEACO: We -- we can surely take it as an undertaking. I believe in our -- in our report we cite that with a -- with a -- I think there's a link in the -- to the website for that document as well. But we surely can provide that as an undertaking.

DR. BYRON WILLIAMS: Yeah, and I'll indicate that that perhaps it's a reflection of my age, but this particular lawyer had challenges following it through to its end product. So I would

appreciate that as an undertaking.

MR. DANIEL PEACO: We can do that.

--- UNDERTAKING NO. 48: Daymark to provide the calculation of the social cost of carbon for planning purposes in currently in Minnesota as compared previously

CONTINUED BY DR. BYRON WILLIAMS:

DR. BYRON WILLIAMS: If we can turn to Coalition Exhibit 39, being the -- the NERC report, and specifically, Mr. Peaco, when we use the term "NERC" you understand that to be referring to the North American Electic -- Electric Reliability Corporation?

MR. DANIEL PEACO: Yes, it is.

DR. BYRON WILLIAMS: I didn't hear you, sir.

MR. DANIEL PEACO: Yes, it is.

DR. BYRON WILLIAMS: And it's charged at a high level with -- with making sure that -- that the lights and the -- the power stays on, certainly in -- in the United States, but more broadly as it

extends into Canada?

MR. DANIEL PEACO: They're -- they're an organization that -- that the folks like myself are accountable to, to make sure that reliability is consistent across the country, yes.

DR. BYRON WILLIAMS: And the report, such as the long-term reliability assessment, would be ones that -- that are regularly gathered by NERC in -- pursuant of keeping its -- a handle on the reliability picture for North American, sir?

MR. DANIEL PEACO: Yes, this is a -- this -- there's regular reporting requirements from all the RTOs to report to NERC for this kind of information. This is a -- this is a periodic publication.

DR. BYRON WILLIAMS: And when you say "RPOs", sir, are you referring to the regional entities that --

MR. DANIEL PEACO: I'm sorry, I -- I probably -- RTOs --

DR. BYRON WILLIAMS: RTOs?

MR. DANIEL PEACO: -- Regional Transmission Organizations, which MISO is one (1).

DR. BYRON WILLIAMS: And, sir, if we turn to page 41 of this document you'll -- you'll see

information relating to -- to -- Kristen, perhaps we can scree -- show a bit more of this page, if you don't mind. Thank you. This is information relating to the RTO MISO.

Is that right, sir?

MR. DANIEL PEACO: Yes.

DR. BYRON WILLIAMS: And just if we could, sir, just looking to the table titled "Existing On Peak Generation (Summer)," you'll see a description of, I'll suggest to you, for natural gas in -- in terms of peak season capacity being 43.3 percent, sir?

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: And coal being 40.9 percent, sir?

MR. DANIEL PEACO: I see that as well.

DR. BYRON WILLIAMS: So generally reflective of the information you've presented in your PowerPoint, I'll suggest to you, with perhaps natural gas even a bit higher than you suggested?

MR. DANIEL PEACO: Maybe one (1) year more current than the data we had, but it's very similar, yes.

DR. BYRON WILLIAMS: And, sir, if we can just go under demand resource and reserve margins to the year 2023. So that's the column -- or the

table a bit higher up. And focus -- no, that's -- that's perfect and thanks for make it bigger, Kristen. So if we go down to reserve margins towards the bottom of that table, and -- and take anticipated all the way out to 2023, sir, you'll see a figure of fifteen-point-five-seven (15.57)?

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: And in terms of the reference margin level, you'll see it being somewhat higher at fifteen-point-eight-zero (15.80), sir?

MR. DANIEL PEACO: I see that as well.

DR. BYRON WILLIAMS: And, sir, what that suggests is that on or about 2023 there are some potential capacity issues with -- with regard to MISO.

Would that be fair, sir?

MR. DANIEL PEACO: My understanding of that is that they have -- their existing plus anticipated additions begin to fall short of targets at that point.

DR. BYRON WILLIAMS: Okay. Thank you. Thank you for that. We're going to be jumping around a little bit, sir, and I hope you'll forgive me for that. I want to direct your attention to Manitoba Hydro's rebuttal evidence to Daymark Energy Advisors,

and specifically to page 33 of 37, and lines 21 to 31. And, Mr. Peaco, if you need a couple of seconds to look at that you --

MR. DANIEL PEACO: That'd be great. Just give me a second.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: We were trying to trick you by changing the video display, sir.

(BRIEF PAUSE)

MR. DANIEL PEACO: Okay. I've read that.

DR. BYRON WILLIAMS: And, sir, generally when you look at this paragraph you -- you see a portrayal by Manitoba Hydro in its rebuttal of some uncertainty in terms of US -- starting at line 26 -- in terms of US administrative efforts to revive the coal industry.

You see that reference, sir?

MR. DANIEL PEACO: Yes.

DR. BYRON WILLIAMS: And a suggestion starting at line 28 that the US Energy Information

Administration, there was nearly 500 terawatt hours difference between a regulated and a non-regulated framework, sir?

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: Explain to -- to the Board and my clients what is meant be -- between the difference between a regulated and a non-regulated framework.

MR. DANIEL PEACO: Well, I haven't -- I haven't reviewed the underlying document to that. So I would have to sort of give you my best judgement of what I think it is.

DR. BYRON WILLIAMS: That's fair enough, sir.

MR. DANIEL PEACO: If that's what you're looking for?

DR. BYRON WILLIAMS: Yeah.

MR. DANIEL PEACO: Well, the regulated -- as a parenthetical refers to CPP which, to my understanding, is Clean Power Plant regulations. And I mentioned those a little bit in my presentation this morning. And -- and I -- I can only guess that the non-regulated framework must mean no CPP. But I -- beyond that I would -- you know, I'm clearly speculating at that level. And beyond that what the -

- no -- non-regulated scenario really is -- is something I'd have to read the document to find out.

DR. BYRON WILLIAMS: Okay. And that's fair enough. And can you advise whether or not Daymark back tested Manitoba Hydro's assertion that that -- that AEO document suggests a nearly five hundred dollar ($500) a terawatts difference? Did you -- were you --

MR. DANIEL PEACO: 500 terawatts?

DR. BYRON WILLIAMS: Yeah. Did you review --

MR. DANIEL PEACO: I -- no, we haven't -- we haven't had an opportunity to review that document.

DR. BYRON WILLIAMS: I wonder if Daymark would consider reviewing that document and -- and whether -- whether or not the -- the difference is actually 500 terawatts or whether it's perhaps more in the range of 390 terawatts. I wonder if you would consider doing that by way of undertaking.

MR. WILLIAM HAIGHT: It seems to be beyond the scope of work --

DR. BYRON WILLIAMS: Fair enough.

MR. WILLIAM HAIGHT: -- that Daymark has been asked to undertake by the Board. So I have

an initial objection to that.

DR. BYRON WILLIAMS: That's not a problem, Will.

CONTINUED BY DR. BYRON WILLIAMS:

DR. BYRON WILLIAMS: If we can go, though, to Coalition Exhibit 40, and specifically page 113 of the document, being the assumptions to the Annual Energy Outlook of the US Energy Information Administration.

Do you have that in front of you, Mr. Peaco?

MR. DANIEL PEACO: I don't have a page number on this document. At the top of the page starts, "operation existing plant generation?"

DR. BYRON WILLIAMS: That's the page, sir.

MR. DANIEL PEACO: Okay.

DR. BYRON WILLIAMS: And you understand this source document to be the assumptions that the US Energy Information Administration does in developing their estimates, sir?

MR. DANIEL PEACO: It's the -- I saw the title of that, yes.

DR. BYRON WILLIAMS: And, sir,

directing your line -- attention to the first paragraph about five (5) lines from the bottom, you'll see an indication by the US Energy Administration that in -- in their assumptions, the capital charge they use for capital plants being beyond thirty (30) years of age.

Do you see that reference, sir?

MR. DANIEL PEACO: You mean you're looking at the sentence that starts "beyond thirty (30) years of age?" Yes, I see that.

DR. BYRON WILLIAMS: Sir, would it be fair to suggest that the EIA's assumptions for age-related retirements do not differentiate between coal plants more than thirty (30) years old?

MR. DANIEL PEACO: Can you give me a minute to look at this?

(BRIEF PAUSE)

MR. DANIEL PEACO: Okay. So I've read that. Could you -- could try the question again?

DR. BYRON WILLIAMS: Would it be fair to suggest that the EIA's assumptions for age-related requirements do not differentiate between coal plants more than thirty (30) years old and say, for example,

sixty (60) or seventy (70) years old?

MR. DANIEL PEACO: Well, the only demarcation they have represented here is less than thirty (30) years and -- and thirty (30) years or more.

DR. BYRON WILLIAMS: And, sir, you would agree that it -- it costs more to keep a -- on average, a sixty (60) or seventy (70) year-old plant operational than it does a thirty (30) year-old plant?

MR. DANIEL PEACO: As a -- as a plant gets older it gets closer to the point where major equipment would need to be replaced in order for it to continue to operate.

DR. BYRON WILLIAMS: And, sir, when we think of the MISO market, and you made this point in slide 15 of your evidence -- perhaps it's not slide 15. Just give me a second. You made the point certainly in -- at figure 6 of your evidence that there's a lot of aged plant in the -- in the MISO marketplace.

MR. DANIEL PEACO: Yes, and that's basically reporting an analysis that MISO had done.

DR. BYRON WILLIAMS: Yeah. I wonder if we can turn to the FERC resiliency ruling which is marked is the Coalition Exhibit 41.

And, sir, you referenced this ruling in your discussion of your evidence this morning?

MR. DANIEL PEACO: I did.

DR. BYRON WILLIAMS: And -- and just by way of background, sir, would it be your understanding that a few months back the Department of Energy, and specifically the US Energy Secretary directed that the Federal Energy Regulatory Commission consider a rule ensuring full cost recovery for generators providing reliability services, and that store at least ninety (90) days of fuel on site?

MR. DANIEL PEACO: Yeah, was it -- I don't know if it was reliability or resiliency, but the -- but it was tied to the fuel -- the fuel supply, yes.

DR. BYRON WILLIAMS: And, in essence, those would largely be coal and nuclear?

MR. DANIEL PEACO: That's my recollection, yes.

DR. BYRON WILLIAMS: And this proposal by the Department of Energy would've supported coal-fired and nuclear plants by mandating special tar -- tariffs for them.

MR. DANIEL PEACO: That's my understanding of their -- their concept, yes.

DR. BYRON WILLIAMS: And in this January 8th, 2018, ruling the Federal Energy Regulatory Commission, or FERC, rejected the proposed rule from the Department of Energy that would have provided financial support for these coal and nuclear plants?

MR. DANIEL PEACO: Yes, I also -- that's also my understanding.

DR. BYRON WILLIAMS: Sir, would it be your understanding or would it be fair to suggest that if the proposed rule had been passed it may have prevented or delayed some coal and nuclear retirements?

MR. DANIEL PEACO: Well, I -- I believe that that was the express purpose was -- was to provide a revenue stream to plants at risk that -- at -- at risk to not being economic going forward and retiring. And so that was the pretty expressed expectation of the -- of the Energy Secretary's proposal.

DR. BYRON WILLIAMS: In essence, it was to prop up uneconomic coal units and aging nuclear plants?

MR. DANIEL PEACO: Yes.

DR. BYRON WILLIAMS: And that proposal

was rejected in a unanimous decision?

MR. DANIEL PEACO: In this -- in this order for a set-aside, the -- the specific proposal to pursue that kind of a tariff, they -- they've indicated that they're going to take a different direction in -- in reviewing the resiliency issue more broadly. But -- but they refused -- they -- they rejected the notion of the -- the -- sort of the direct support for -- for those coal and nuclear units that that were proposed in the -- in the rule that the Department of Energy offered.

DR. BYRON WILLIAMS: I'd like to direct you to some specific references in the decision. And, sir, if you are -- if you find that you're uncomfortable in commenting upon them --

MR. DANIEL PEACO: I'll surely let you know.

DR. BYRON WILLIAMS: You'll let me know.

MR. DANIEL PEACO: Yes.

DR. BYRON WILLIAMS: And your --

MR. DANIEL PEACO: If my -- if my counsel doesn't kick me first, right?

DR. BYRON WILLIAMS: No, no, it's just --

(BRIEF PAUSE)

DR. BYRON WILLIAMS: And, sir, perhaps we can start with the paragraph 10 of the decision, which appears on or about page 4. And -- and, sir, just -- just generally, when we think of where the federal or FERC has been going, would it be fair to say that more generally they've been seeking more market based decisions? And -- and certainly decisions that allow for innovation and change in the energy market?

MR. DANIEL PEACO: I mean, FERC has had a fairly consistent history of trying to make -- adapt the market construct to the changing environment. They -- they pretty consistently are looking for market-based solutions to wherever they can.

DR. BYRON WILLIAMS: And many would've interpreted the Department of Energy's efforts to protect aging coal and -- or aging nuclear and uneconomic coal as being contrary to -- to market principles.

MR. DANIEL PEACO: Well, I think in particular in the -- in the -- in this decision the FERC kind of pointed to the fact that they felt that

the proposal would be a tariff change and that there would need to be some sort of showing that they're -- the current tariffs were just -- unjust and unreasonable in order to do that. And they -- that burden had not been met.

So I think that's -- confirming here, but just to be clear in terms of how they -- how they struck that decision, that's my understanding of their finding. So the implication would be they don't have proof that it would be market-based, and there isn't -- wasn't evidence that there was a problem in the market that would -- that would warrant them to intervene at that point.

DR. BYRON WILLIAMS: Okay. Perhaps we can go to the concurring judgment of LaFleur at page 20 of this decision, which is page 2 in her concurring judgement. And just a bit more towards the bottom of the page, Kristen.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: And -- and, Mr. Peaco, generally in the -- the paragraph starting "in the 21st century," and then "with these new technologies," I'll suggest to you that at least Board

member LaFleur was talking about the dynamic change in the -- in the marketplace, and -- and speaking specifically in the second paragraph, line 3 of the fact that there have been market winners and losers and -- and resource turnovers as a natural consequence of the marketplace.

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: And, sir, just generally would that be consistent with your understanding of the US market, and -- and in particular the -- MISO market?

MR. DANIEL PEACO: I think all markets have been fairly dramatically impacted by the -- the changes in the natural gas availability and the competitiveness of natural gas generation vis-a-vis coal and other resources. And, of course, also we've talked a little bit about the -- both the tax incentives and the improvements in technology costs of wind and solar. And she -- she alludes to those here. So I'd agree with that. Those -- those are pretty dramatic changes in the market in the last two (2) years.

DR. BYRON WILLIAMS: And, sir, if we can just go to -- now to the concurring judgment of Chatterjee, C-H-A-T-T-E-R-J-E-E, page 23 -- or page 1

of his, and towards the bottom. And yeah, keep -- that's lovely right there, Kristen. Sir, here you see Board member Chatterjee highlighting more numerically, I'll suggest to you, that dramatic change, both in the new sources coming on power, including natural gas, solar, voltaic, as well as what's leaving the marketplace, and in particular, coal and nuclear.

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: And that, sir, is -- is emblematic of the dramatic change that -- that we were discussing?

MR. DANIEL PEACO: That would -- yes, that would -- would be consistent.

DR. BYRON WILLIAMS: And just finally, if we can go to the concurring judgement of Glick, G-L-I-C-K, page 2, page 28 in this document.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: And, sir, I guess right near the start of our conversation we discussed how this -- this -- the expressed intent of Department of Energy was a support for uneconomic coal and -- and nuclear -- aging nuclear. And -- and here you see some -- especially in the second paragraph, some

rather colourful language with Commissioner Glick in terms of what he describes as a multibillion dollar bailout targeted at coal and -- and nuclear.

MR. DANIEL PEACO: I see that.

DR. BYRON WILLIAMS: And again, sir, perhaps not to use the words bailout but that's certainly how the -- the failed effort of the Department of Energy was -- was seen in terms of trying to hold back the passage of -- of time and of economics.

MR. DANIEL PEACO: That's how Commissioner Glick viewed it co- correct.

DR. BYRON WILLIAMS: Mr. Chair, I exceeded my budget yesterday. I'm trying to stay within my time budget today, and I think I've achieved that. So we appreciate the opportunity to discuss this new information with the Daymark panel, and we thank the Daymark panel for their time.

THE CHAIRPERSON: Thank you, Dr. Williams. We'll adjourn for lunch and return at one o'clock. Thank you.

--- Upon recessing at 11:51 a.m.

--- Upon resuming at 1:04 p.m.

THE CHAIRPERSON: Okay, if we could resume. Mr. Cordingley, I understand GAC has no questions?

MR. DAVID CORDINGLEY: That's correct, Mr. Chair. Thank you.

THE CHAIRPERSON: Mr. Hacault...?

CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

MR. ANTOINE HACAULT: Yes, Mr. Chair, and thank you for your comments this morning to all -- it caused me check the transcript. I don't think there's a problem but I -- I'll try to make sure you're clear.

I'd like to start with this panel on slide 49 and then go to the reference IR that caused this slide to be built. The first thing I just want to clarify by looking at the very end of the graph in the year 2036.

And am I right in interpreting this graph that when we consider the probabilities in relation to P50 there's greater upside than downside?

MR. DANIEL PEACO: Are you asking as Hydro has evaluated it or --

MR. ANTOINE HACAULT: As Hydro has evaluated. This is their evaluation with all the

assumptions that you've mentioned.

MR. DANIEL PEACO: Well, as we've described this morning, the -- the market price forecast scenarios they have have -- have a -- the highest is much higher than the reference and the low is -- is -- is not as low. So it is skewed to the high side, yes, for that -- for that reason.

MR. ANTOINE HACAULT: So if -- to understand that in terms of numbers, the P50 dot on the 2036 year is a little bit below $400 million; is that correct? I'm reading that correct?

MR. DANIEL PEACO: In 2036, yes.

MR. ANTOINE HACAULT: And the extreme they show takes it somewhere a little bit less than 200 -- negative 200 million?

MR. DANIEL PEACO: I see that.

MR. ANTOINE HACAULT: So there's a swing there of -- I'm going to say some $600 million on the downside?

MR. DANIEL PEACO: I see that, yes.

MR. ANTOINE HACAULT: But the swing on the upside, if we add $600 million to the P50 would take us just about to the billion dollar mark?

MR. DANIEL PEACO: Yes, thereabouts.

MR. ANTOINE HACAULT: But we can see

that the upside does higher than the billion dollar mark?

MR. DANIEL PEACO: Yes.

MR. ANTOINE HACAULT: And that's a more concrete way of showing that the upside is greater than the downside; correct?

MR. DANIEL PEACO: In my -- in my understanding that that's what I call skewness so that -- that's due to the fact that they -- if you look at the -- the distribution of their -- the range of their market price forecast uncertainty, it would have the same characteristic.

MR. ANTOINE HACAULT: And just to further get into a little bit of details as to what the top and bottom whiskers end that, am I correct in understanding that those would be the P5 and P95 values?

MR. DANIEL PEACO: That's how they've labelled them, yes.

MR. ANTOINE HACAULT: So we're looking at either 5 percent -- all the results would be over -- at P5 or -- between the P5 and the P95, that's what the whiskers show us?

MR. DANIEL PEACO: Again, as -- that's exac -- that's how they've represented it, yes.

MR. ANTOINE HACAULT: Is it your understanding, and I'm going to the bottom where it says "102 flow records" that this chart doesn't only reflect price variability in the export market, but also the variability in flow records?

MR. DANIEL PEACO: Correct.

MR. ANTOINE HACAULT: So it would show us the worst flow year and the best flow year in combination with the pricing?

MR. DANIEL PEACO: That's correct.

MR. ANTOINE HACAULT: Okay. Now, with respect to financial forecasting for rate making purposes, is it Daymark's view that using P50 as a starting point is an appropriate measure?

(BRIEF PAUSE)

MR. DANIEL PEACO: Yeah, that -- that's something we weren't -- we didn't specifically get there. I mean, that -- that clearly is -- is one (1) objective. I -- you know, we -- we -- as we lead -- opened our presentation, we -- we understood that that was the representation that was made in the GRA. I mean, I think I left it open is that the Board and Hydro and -- and the parties can agree on what they

want to have for that. I mean, it's -- that's -- that is a choice as to what you want to use for rate-making purposes, but we did our assessment based upon what we understood in the GRA as a represent -- Hydro was -- was seeking that as their -- as their design principle.

MR. ANTOINE HACAULT: And that's something that you showed specifically on your slide number 7, as I recall?

MR. DANIEL PEACO: Correct. So that was our interpretation of this language in terms of what they were striving to do with -- with their analysis.

MR. ANTOINE HACAULT: Okay. And if we go back to slide 49, we see the P50. So -- being indicated in the red line. So that would be consistent with what you've set out as the goal in slide 7?

MR. DANIEL PEACO: Yes. So we looked at this -- these numbers and the -- and particularly the -- the set of numbers that are labelled P50 and -- and read those together as -- this -- so we -- we took it as our primary charge to see if -- if that, in fact, tied together.

MR. ANTOINE HACAULT: Okay. Now what

I'm going to do is take you back to the figure source. Kristen, if you could go to PUB/Manitoba Hydro, round 241(a).

And specifically now if we all focus on a year -- the first year to have this discussion. If we go on the numbers below this visual chart, there should be a chart with numbers on it?

As I understand the figure above those numbers plots the numbers shown in the table below the visual chart. Is my understanding correct?

MR. DANIEL PEACO: I -- I would have the same understanding as you, but --

MR. ANTOINE HACAULT: Okay.

MR. DANIEL PEACO: -- we didn't -- we didn't actually look specifically to verify that.

MR. ANTOINE HACAULT: So we focus on 2020 because it's easy. It's the first line. And the P50 number, we see the response by Manitoba Hydro indicating that in the year 2020 the probability 50 percent would be that you would have $192 million of net export revenue.

Is that the same reading you would have of that table?

MR. DANIEL PEACO: Yeah, I see that. Yes.

MR. ANTOINE HACAULT: And is my understanding correct that to arrive at the next net export revenue, we would have to take the export revenue, then subtract water rentals and then further subtract purchased power and fuel?

MR. DANIEL PEACO: Well, I'm not sure how this particular calculation was done.

MR. ANTOINE HACAULT: Maybe to better understand that I could go to appendix 3.8 at page 1. And if we continue to focus on the year 2020. If we go down the fourth line in that year.

Do you see the number 420 million, and if we go across that's the extra provincial revenue? Are you following me so far? Extra provincial revenue under the year 2020.

MR. DANIEL PEACO: Yep, we've got it.

MR. ANTOINE HACAULT: Okay. So the number's 420 million. My understanding is that to determine what we would have as net export revenue, we would have to deduct the water rental costs and there is a line under expenses that shows water rentals and assessments. And if we go across to the year 2020, we would see that that number is 110 million.

Do you see that, sir?

MR. DANIEL PEACO: Yes.

MR. ANTOINE HACAULT: So if I'm making personal notes I've got 420 million. I subtract 110 million. My lawyer's math brings me to 310 million.

Are we -- are you with me so far?

MR. DANIEL PEACO: Okay, I am.

MR. ANTOINE HACAULT: And then immediately under that line that we had looked at, there is a heading "fuel and power purchased."

Do you see that line?

MR. DANIEL PEACO: I do.

MR. ANTOINE HACAULT: And if we go across to the year 2020, we see a number of $158 million. Do you see that?

MR. DANIEL PEACO: I see that.

MR. ANTOINE HACAULT: If I then subtract that $158 million from the $310 million, my lawyer's math brings me to $152 million.

Are you following me so far?

MR. DANIEL PEACO: Okay, yep.

MR. ANTOINE HACAULT: So if we go back to the previous number for that particular year 2020, we saw a number of $192 million instead of $152 million under the year 2020 for P50.

This brings me to another concept, would Daymark have looked at whether Manitoba Hydro

for integrated financial forecasting purposes whether it uses a P50 number or a mean of water flows to get to its number?

Did Daymark consider that?

MR. DOUGLAS SMITH: As part of our -- our valuation, we reviewed their methodology for using the hundred and two waterflow years if that's -- if that's what you're asking.

MR. ANTOINE HACAULT: There's -- sometimes mathematics become confusing if you use a median that would be a P50 number, correct? Am I right so far?

MR. DOUGLAS SMITH: If you used a median of a set of numbers you would be -- and if each of those numbers had equal probability of occurring, then you would have a P50 of those particular numbers.

MR. ANTOINE HACAULT: Yep. And that is different than using a mean of those hundred and two flows, is it not, sir?

MR. DOUGLAS SMITH: Potentially different, yes.

MR. ANTOINE HACAULT: And if you aren't aware that's okay, but are you aware whether Manitoba Hydro for IFF purposes uses a mean as opposed to a P50 calculation for water flows on the hundred

and two (102) years?

MR. DOUGLAS SMITH: Yes. They -- they use a mean of the -- of the hundred and two (102).

MR. ANTOINE HACAULT: So if the mean of the water flows leads us to net export revenue of 152 million versus a median or P50 gives us a number of 192 million, against what base case is Daymark rendering its conclusions on reasonableness?

Is it on the P50 number or is it on the mean calculation?

MR. DOUGLAS SMITH: With respect to the calculation of the hundred and two (102) runs, we were evaluating the method that Hydro was using which is the average.

MR. ANTOINE HACAULT: So you were evaluating the P50 method, just to be clear on the record?

MR. DOUGLAS SMITH: I -- I think I -- I'd want to be careful about my language here. I -- I don't know the -- I have not reviewed the derivation of this particular set of numbers. I don't know without that review how that compares to the numbers that -- that we reviewed that go into their IFF, but our review is based on their methodology of -- of the use of those hundred and two (102) as it flows into

their IFF not this.

MR. ANTOINE HACAULT: I'm not sure I understand that answer. If you say you use the calculations that go into the IFF, why didn't you use $152 million instead of 192, which is shown on the slide that you produced for the Board this morning?

Why didn't we see a chart showing the 152 million as opposed the 192 million, if that's what you were assessing was the 152 million?

MR. DOUGLAS SMITH: We were assessing the reasonableness of their results, given their stated objectives.

The approach that they use isn't their objective it's their methodology. The -- the analysis was of their methodology.

MR. ANTOINE HACAULT: But -- maybe I'm not being articulated in my questions. There are two (2) methodologies, the first is a mean calculation methodology and the second methodology is a median methodology; which ones of the two (2) did you analyse because the one that we see on the screen in front of us, which is PUB/MH-2-41(a) is a median methodology, not a mean methodology.

MR. DOUGLAS SMITH: Correct.

MR. ANTOINE HACAULT: So which one did

you evaluate?

MR. DOUGLAS SMITH: The -- the method used -- the method used for the determination of the IFF which is the export revenue forecast that we were asked to review was an averaging of the hundred and two (102). It was a mean methodology.

MR. ANTOINE HACAULT: Okay. So if you analysed the mean methodology, that is not the P50 methodology. Are we agreed on that?

MR. DOUGLAS SMITH: That is -- that is not a median methodology, correct.

MR. ANTOINE HACAULT: Okay. And just to make the point on the results and the difference with respect to net income, if we go to page 8 of the same second round interrogatory, we will see Manitoba Hydro giving us the annual net income for the year 2020 at a P50 being 245 million.

Do you see that, sir?

MR. DOUGLAS SMITH: I do.

MR. ANTOINE HACAULT: Okay. And if we go to the integrated financial forecast at appendix 3.8, and we go to the year 2020 and to the bottom where it says "net income attributable for Manitoba Hydro -- or to Manitoba Hydro before nonrecurring item," we see 205 million.

Do you see that?

MR. DOUGLAS SMITH: I do.

MR. ANTOINE HACAULT: So we've seen -- just want to keep that in mind, the P50 would give us $245 million in net revenue.

Are we agreed so far; that's what we just saw on the previous slide?

MR. DOUGLAS SMITH: The P50 as they presented in that IR was 245, yes.

MR. ANTOINE HACAULT: But the IFF, integrated financial forecast, for that same year shows $40 million less revenue at 205 million, correct?

MR. DOUGLAS SMITH: That's what I'm seeing here, correct.

MR. ANTOINE HACAULT: And that maybe coincidentally, I don't know, is exactly the same difference that I just took you through with respect to net exports. We had 192 million under the P50 and that went down by 40 million down to 152 million under the IFF mean calculation.

Are you with me so far?

MR. DOUGLAS SMITH: I am.

MR. ANTOINE HACAULT: Okay. So if we go back to slide 7 of your presentation this morning,

Daymark recorded on the bottom of the slide that the probabilistic goal for Manitoba Hydro was a 50 percent chance that Manitoba Hydro will achieve the minimum 25 percent equity target.

The IFF is not a 50 percent chance. We saw the 50 percent chance at P50; correct?

MR. DOUGLAS SMITH: Without having reviewed what -- what their P50 is supposed to represent, I don't believe I can say more than I have. They -- they represent that as a 50 percent chance of something. I don't know if it was an input or an output. So, I -- I don't know that I can go further in my answer.

MR. ANTOINE HACAULT: Thank you. You've done your best to answer the question. I was just trying to see if we go to the next graph page -- or slide 8 I believe it is.

I just want to be clear that what we're looking at on this slide and we were looking at as far as numbers, does not incorporate the suggestions, or I'm going to say maybe criticisms is too strong of a word, of Daymark with respect to the forecasting issues that it's identified.

So, for example, this graph assumes that once the Northern States Power contract is ended,

you will no longer be selling it at contract prices, that surplus energy will be put on the opportunity market; correct?

MR. DOUGLAS SMITH: Correct. That is one (1) of Hydro's assumptions underlying their modelling.

MR. ANTOINE HACAULT: And so this model doesn't allow for any probability that you might be able to extend contracts?

MR. DOUGLAS SMITH: At least at a price above opportunity energy.

MR. ANTOINE HACAULT: Okay. And it doesn't assume that your -- there might be a probability that you could get some premium for the dependable surplus power that they have?

MR. DOUGLAS SMITH: Correct. All future dependable energy sales are priced at market energy in the forecasts underlying these numbers.

MR. ANTOINE HACAULT: And I had taken Mr. Cormier through a similar slide, but we see around 2025 there is a fairly notable drop in the millions of dollars of expected revenue around 2025. And that's when that contract with Northern States Power expires; correct?

MR. DOUGLAS SMITH: That is when those

contracts expire, correct.

MR. ANTOINE HACAULT: Okay. Now, I'd like to take you to page 72 of your evidence and the second last paragraph on that particular page.

And lawyers are always very interested in adjectives and in that paragraph Daymark says:

> "Eliminating all forecasted capacity revenues associated with surplus dependable energy represents a this is the word I want to have more explanation on] a very conservative assumption."

Are you able to put a probability or just like a P5, P95, P100 to that adjective?

MR. DANIEL PEACO: I think in our presentation we said it approached P100.

MR. ANTOINE HACAULT: Okay. Now, on the next page 72, again in the second last paragraph in the middle of the paragraph, Daymark is saying:

> "Given that the counterparties will need to replace those products, it is extremely adjective] conservative to presume, as Manitoba Hydro has, that no amount of energy can be resold above

the spot energy price and that the capacity will have a value of zero after the contracts expire."

And this is under the heading "no assumed replacements for expiring firm sales."

Can you advise me in the terms of probabilities, again, what the adjective would be intended to convey, "extremely"?

MR. DANIEL PEACO: The same answer. It's the same -- basically it's the same statement.

MR. ANTOINE HACAULT: P100.

MR. DANIEL PEACO: Close to P100, yeah.

MR. ANTOINE HACAULT: The next question I have relates to page 74 of the evidence. And again, although I didn't state at the beginning, if any of the questions that I'm asking would require some kind of a CSI response or commercially sensitive information please let me know. I'm trying to stay away from that.

But I have some clarification questions. There's a reference to blocks in the first full sentence after the first blackout. So it's says:

"Furthermore, since there is already a large volume of opportunity sales

in those hours, the SPLASH opportunity pricing blocks..."

Could you explain to me and to this Board what is meant by "opportunity pricing blocks"?

MR. DANIEL PEACO: Sure. I mean, and the blocks really have to do with the representation of the pricing within the SPLASH model. So they -- they have a series of blocks with different types of prices for certain amounts. So it's just simply -- the blocks is really referring to the -- the way the pricing for various amounts of energy are built into that model.

MR. ANTOINE HACAULT: Okay. So again, without getting into commercially sensitive information, we know that Manitoba Hydro is putting surplus energy into the market opportunity prices and that would take up a certain block of pricing; is that correct?

Before we get into analysing what happens with respect to the excess.

(BRIEF PAUSE)

MR. DOUGLAS SMITH: Maybe I can try

this. Before we even think about Hydro, if there's somebody who has energy to sell into a market such as MISO, there isn't an unlimited ability to sell that -- that energy at any given price. As you -- as you contribute more energy into the market, the value of the next piece of energy is going to be less because you've already served some.

And so in -- in a general sense in modelling and thinking about how to price the potential to sell energy into a market like MISO, you're going to expect that the early sales or the first sales have a better price just within a -- a market such as this, then if you have more of that same commodity to sell.

And so one way that is -- is frequently used in just general production modelling is to recognize that as -- as more energy is -- is sold that that may not receive the same price. And there's a variety of ways to handle that that -- and -- and Hydro has their -- their method of doing that that is probably not something we can discuss here.

But in general, conceptually, that's -- that's what's occurring is, you don't want to see it be in a situation where no matter how much additional energy they have in a -- in, say, a very high year

that -- that you just assume you can sell it all at -- at very high prices on-peak prices or something like that.

MR. ANTOINE HACAULT: Yes. And what I understand you to be saying is the thing that you can't discussed, for example, is that for the block of energy that will free up with NSP, whether that block of energy is assumed to be getting the higher price block of energy or that on the surplus energy market, or whether it's assumed to be getting -- I'm going to call it -- the residual value at the top which is a lesser value, you can't have that discussion with me now? That's something you can have later?

MR. DOUGLAS SMITH: Any -- anything along those lines would -- would likely be commercially sensitive.

(BRIEF PAUSE)

MR. DOUGLAS SMITH: I'm sorry, apologies.

MR. ANTOINE HACAULT: So the one thing I can't discuss with you is whether or not the NSP power which would be kind of a premium price goes to a really really low price, and the opportunity to market

being the last block or whether it goes to the first block which is a bit better price for the opportunity; that discussion we can't have, but it's gone somewhere in those blocks; is that correct?

MR. DOUGLAS SMITH: It is -- it -- any -- any -- any surplus energy is priced at opportunity prices and is subject to some methodology to identify what -- what form of pricing it will receive.

MR. ANTOINE HACAULT: If I was able to get an answer given to this Board and it doesn't have to be given to me, I would like this Board to know whether or not the price of the NSP extra energy that frees up, whether that ends up being modelled as the cheapest -- I'll call it -- the higher block level because the first blocks have already been filled up by all other sales.

So I appreciate you can't answer that but that's some information that if you had been able to answer I would appreciate knowing and, hopefully, you'll be able to give that answer to the Board.

MR. DANIEL PEACO: I think it is fair to say -- you talk about the NSP energy. Once the contract is done, there isn't really NSP energy. They're just an additional amount of surplus energy and I think that's treated as, you know, an amount of

surplus energy to be sold and priced out within the model.

So I don't know that there -- there isn't really sort of a tracking of that particular piece of energy in the model, it's just, you know, the -- the total amount of available, you know, committed for energy changes when the contract expires.

MR. ANTOINE HACAULT: Okay, thank you. I'll move on to a different subject, and it relates to whether or not in 2020 Manitoba Hydro will have access to a greater market for its energy; that's the subject area.

Are you aware, generally, that Manitoba Hydro expects in June of 2020 to have its great northern transmission line and Manitoba/Minnesota transmission line in place?

MR. DANIEL PEACO: I'm not familiar with the exact date but I understand it's in that vicinity, yes.

MR. ANTOINE HACAULT: Yes. And is it all -- has Daymark assessed in deciding the reasonableness of the Hydro forecasts, the opportunity which Manitoba Hydro will have in 2020 by having access to this new market?

MR. DANIEL PEACO: We haven't done a

specific assessment of the market conditions in 2020 related to your question. We -- our -- our assessment of the MISO market was more long-term trends.

MR. ANTOINE HACAULT: Okay. That's useful. But maybe you can give me your understanding.

If this new line gives access by Manitoba Hydro to the Wisconsin market, what's the size of that market as compared to the Minnesota market?

MR. DANIEL PEACO: I don't know the number off the top of my head. I'd have to look.

MR. ANTOINE HACAULT: Would it be about as large or about the same type of market?

MR. DANIEL PEACO: I -- they're both sizable markets but I -- like I said, I don't have the numbers in front of me.

MR. ANTOINE HACAULT: Okay. And are you able to comment on whether or not the Wisconsin market might have different Utilities than the Minnesota market looking for power?

MR. DANIEL PEACO: As I said, we -- we did not look specifically at 2020. And what the Utilities positions were in 2020 with respect to their interest in buying power, so, I -- I really can't answer the question.

MR. ANTOINE HACAULT: Okay. But in any event, as I understand your evidence, none of the potential which Manitoba Hydro has of accessing that market in 2020 is put in the integrated financial forecast or its modelling?

MR. DANIEL PEACO: To the extent that they have surplus energy available in 2020 in their model that would be sold at energy -- at the energy prices as -- as is all the rest of the uncommitted for surplus energy. So it would be included to that extent.

MR. ANTOINE HACAULT: Okay.

MR. DANIEL PEACO: But it would -- it would like all the rest of that, it wouldn't have any capacity or any premium associated with it.

MR. ANTOINE HACAULT: Okay. Now, in Denmark's evidence, at the first page of its evidence, there is a conclusion which shows up on this slide at the bottom which says:

> "We conclude that Manitoba Hydro's export revenue forecast is conservative/low relative to a value that is consistent with Manitoba Hydro's stated goal that it will have a 50 percent chance of

achieving the equity ratio target within ten (10) years."

To what extent did Daymark assess the 50 percent chance of achieving an equity ratio within twenty (20) years?

MR. DANIEL PEACO: We did not assess that. Our analysis was limited to determining the -- the factors of what -- that were inputs to determining of the export revenue forecast. We didn't -- we didn't do any analysis in respect to how that flows through to their achieving an equity target.

MR. ANTOINE HACAULT: Okay. Would you agree with me, especially in light of the expiry of the Northern States Power contract in 2025, which is about eight (8) years from now, that the -- there will be a significant impact in the last ten (10) years of an integrated financial forecast of the policy decision by Manitoba Hydro not to give any premiums to capacity or other attributes of Manitoba Hydro power, and this assumption that no contracts will be extended?

MR. DANIEL PEACO: Yeah. So if I understand your question correctly, you're -- you're asking in terms of would it be a material difference in the twenty (20) year forecast for revenues if they

assumed the premium and capacity for some amount of their surplus dependable through the twenty (20) year period?

MR. ANTOINE HACAULT: Yes.

MR. DANIEL PEACO: Yes. That -- that would be true.

MR. ANTOINE HACAULT: And that leads -- it -- it seems to me it's a logical result, because at least with the NSP power, you have a contracted power for eight (8) years of the ten (10) years, and in the next ten (10) years, you assume that none of it will have this contract premium. So there has to be a material differences --

MR. DANIEL PEACO: But in aggregate, there's a -- there's a -- as we mentioned earlier in the presentation this morning, there is a substantial amount of surplus dependable throughout much of the twenty (20) year period. So that would have a -- those -- those changes in assumption would have an impact -- a noticeable impact on the -- on the overall forecast. And I presume that that would flow through to the equity ratio calculations.

MR. ANTOINE HACAULT: And the -- the last question is one which I'm not sure whether it's appropriate for this panel or the Saskatchewan export

contract panel, but it relates to what I'll call the baseline, or the measuring stick that was used to evaluate the Saskatchewan export contract and/or any others.

And let me provide a little bit of explanation on that. We've -- I've taken you through two (2) measuring sticks earlier on in my cross-examination. One (1) was a P50 measuring stick. The other one was a mean measuring stick. And there might conceivably be a third measuring stick, the one that was used for NFAT.

Is it an appropriate question to ask now, or to the next panel as to what type of measuring stick, without getting into commercially-sensitive information, is used to evaluate the reasonableness of the export contract?

(BRIEF PAUSE)

MR. DANIEL PEACO: I guess I'm -- I'm trying to make sure that I understand your question.

MR. ANTOINE HACAULT: Okay. Let me try again.

There's different approaches to a baseline that might be possible. One (1) approach

might be the approach that was used by Manitoba Hydro in the NFAT proceedings, which assumed the premium for capacity, other premium values, and assuming some extensions of contracts. That's one (1) approach. Another approach might be using a mean waterflow approach. Another approach might be using a P50 approach.

What I'm trying to determine without es -- eliciting any commercially-sensitive information, is there an approach that is used to determine the reasonableness of any export contracts?

(BRIEF PAUSE)

MR. DANIEL PEACO: I'm not sure if I'm -- again, I'm not sure if I'm understanding, but there's a few different concepts mixed into your question, and that's sort of what -- what I'm -- I'm struggling with.

Is -- is your question: Is there -- is to the -- is to the -- the general methodology to evaluate a transaction by Hydro?

MR. ANTOINE HACAULT: From an inter -- the approach used in the fore -- forecasting model. I'm trying to determine whether there's two (2) -- two

(2) approaches. Is there one (1) approach when you -- you start to evaluate an export contract? Is there another approach when it comes to an IFF?

(BRIEF PAUSE)

MR. DANIEL PEACO: Well, I'm not sure I'm -- I'm not sure that this sort of stays within the scope of what we did -- reviewed in either this case or the -- or the SaskPower case. It may fit better in the discussion of SaskPower.

But we -- some of your question goes to the -- sort of the probabilistic analysis that they did in the -- in the IFF, and that methodology may be specific to this. I -- and so, I guess I'm -- I'm struggling with how to talk about that.

We did -- the best thing I can do, I think, is the point in this proc -- in this case, in our evidence here, in terms of our discussions about the changes in methodology over time, and -- and I think that's -- but that -- that doesn't specifically speak to the -- the mean versus P50 question that you have, and those -- those two (2) things are in your question together, which is causing me a little bit of confusion.

MR. ANTOINE HACAULT: So I'll -- maybe I'll try and reflect on how I may better ask the question. I don't want to be stuck on the P50 and the mean. I'm more focused on understanding whether or not there is a different methodology or approach used for purposes of calculating what's probable in an IFF and what's probable in assessing the reasonableness of an export contract.

MR. DANIEL PEACO: Yeah. Well, as a general policy matter, I mean, we -- we look specifically at what Manitoba Hydro did in evaluating the SaskPower deal at the time that they did it, and -- and were -- was asked to sort of look at the economics today. And we could talk -- we'll talk about that when we come back in a week or so, but we didn't look at the broader question of, what is their general policy terms of evaluating deals and how that pertains to what they're doing in their IFF.

So I -- I hesitate sort of -- sort of extending what we've done into -- into your question. That may be better put to Hydro as to -- as to how they do that, than -- because it -- I think it really sort of goes beyond the -- the work that we did.

MR. ANTOINE HACAULT: So my take from that is I've got some homework to do, and I'll try and

tighten up my question, and hopefully I'll be able to frame the question in a way that it can be responded--

MR. DANIEL PEACO: Yeah. So -- yeah. Correct.

MR. ANTOINE HACAULT: -- to by this -- the next panel that's going to deal with the SaskPower contract.

MR. DANIEL PEACO: Okay.

MR. ANTOINE HACAULT: Thank you very much for attempting to answer my questions. Those are all my questions for this afternoon.

MR. DANIEL PEACO: Great. Thanks.

THE CHAIRPERSON: Thank you, Mr. Hacault. Ms. Boyd...?

(BRIEF PAUSE)

CROSS-EXAMINATION BY MS. MARLA BOYD:

MS. MARLA BOYD: Thank you, Mr. Chair. If I could just have a minute while Ms. Carriere gets settled, and I'll be ready to go.

(BRIEF PAUSE)

MS. MARLA BOYD: Good afternoon, Mr.

Peaco, Mr. Smith.

MR. DANIEL PEACO: Good afternoon.

MR. DOUGLAS SMITH: Good afternoon.

MS. MARLA BOYD: Just to be clear, and I'm sure you're already aware, that none of the questions that I ask you today are intended to elicit confidential information. If you feel that your response would require you to share confidential information, I'd ask that you simply alert us to that, and we'll repose the question in a CSI session. I -- I am not encouraging you to put it on the public record at all.

MR. DANIEL PEACO: Okay.

MS. MARLA BOYD: I want to start with slide 22 of your presentation from today. And you discussed that on page 17 of your report, and that was what you described as a visual depiction of the locational distribution of the retirements assumed in MTEP17, correct?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: And your response to Manitoba Hydro/Daymark question number 5 indicates that these are potential retirements. Do you recall that?

MR. DANIEL PEACO: Yeah, I -- I

believe -- I don't have it in front of me, but I -- I believe that's correct.

MS. MARLA BOYD: Through the magic of technology.

MR. DANIEL PEACO: I knew it would be there.

MS. MARLA BOYD: Yes, and thank Kristen for that.

(BRIEF PAUSE)

MR. DANIEL PEACO: All right. I'm -- where --

MS. MARLA BOYD: I'm not seeing it either. This is MH-5 --

MR. DANIEL PEACO: It's the question, I guess. Are we looking at the questions, not the answers?

(BRIEF PAUSE)

MS. MARLA BOYD: There. Could we just scroll down a little bit more, please? Am I missing it?

MR. DANIEL PEACO: We need to get down

to the responses.

MS. MARLA BOYD: We need to go a little bit further yet.

(BRIEF PAUSE)

MS. MARLA BOYD: I think you need to go a little lower yet.

(BRIEF PAUSE)

MS. MARLA BOYD: No, still further, right?

(BRIEF PAUSE)

MS. MARLA BOYD: Sorry, now we've gone too far. Part (c). Third line.

The policy regulations feature was used by Daymark --

MR. DANIEL PEACO: Yeah. Thank you. I see that.

MS. MARLA BOYD: -- for potential retirements?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: Sorry, that was painful. Now, that's derived from MISO's Midwest Transmission Expansion Plan 17, correct?

MR. DANIEL PEACO: That's our understanding, yes.

MS. MARLA BOYD: And it's -- you can tell if I'm correct in my understanding, that MISO considers three (3) scenarios in making an assessment of future requirements of the region?

MR. DANIEL PEACO: That's right.

MS. MARLA BOYD: And what is described as the policy regulations -- regulations future is one (1) such scenario?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: And those aren't necessarily the retirements that are assumed in MTEP17, are they?

MR. DANIEL PEACO: Well, they -- they evaluated three (3) scenarios, right.

MS. MARLA BOYD: And although those locations are shown on the map, there's no commitment at this stage that those plants will be retired within a defined time frame, correct?

MR. DANIEL PEACO: Some of them may have, some -- some not, but this is clearly a -- a

planning scenario that MISO put -- put together some of those -- or -- or assumptions, and they -- as we alluded to earlier, they did make some of these assumptions just based on age.

MS. MARLA BOYD: If we could have information request PUB/Daymark-4 brought up, please.

(BRIEF PAUSE)

MS. MARLA BOYD: I just wanted to clarify your response, here. First off, can you explain what's meant by "not confirmed"?

(BRIEF PAUSE)

MR. DANIEL PEACO: My understanding of the question was whether we could confirm that Hydro exports meet the requirements, and our answer is, It's not confirmed, because there's some limitations to size, which would preclude.

MS. MARLA BOYD: You're not suggesting that none of Hydro's energy sales to Minnesota and Wisconsin's qualify, are you?

MR. DANIEL PEACO: I -- I understood the question as a general matter, and I -- are simply

pointing to the fact that they have some -- some limitations on size in their policy.

MS. MARLA BOYD: So did you identify which of Manitoba Hydro resources would be eligible resources?

MR. DANIEL PEACO: No.

MS. MARLA BOYD: And your report didn't consider wind energy as an eligible resource?

MR. DANIEL PEACO: That wasn't in the question.

MS. MARLA BOYD: Did your report consider it, or no?

MR. DANIEL PEACO: For compiling with Wisconsin?

MS. MARLA BOYD: Wisconsin or Minnesota.

MR. DANIEL PEACO: We didn't -- we -- no, that wasn't part of our review.

MS. MARLA BOYD: So were you aware of, or did you consider the special dispensation regarding eligibility of energy generated by Wuskwatim and Keeyask towards meeting Wisconsin's renewable portfolio standard?

MR. DANIEL PEACO: I'm not specifically aware of that, no.

MS. MARLA BOYD: And did you examine how Manitoba Hydro ensures that its customers receive credit for renewable energy that's eligible for renewable energy certificates or the renewable portfolio standards?

MR. DANIEL PEACO: No.

MS. MARLA BOYD: Are you aware that Manitoba Hydro is obliged to provide reports to its customers under its Power Purchase Agreements, and then transfer renewable energy certificates to customers by way of the Midwest Renewable Energy Tracking System?

MR. DANIEL PEACO: We didn't review that, no.

MS. MARLA BOYD: And even if the energy didn't qualify for renewable energy certificates, would you -- would you agree that Manitoba Hydro's energy would be considered a non-emitting product?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: And that would achieve some of the same public policy goals?

MR. DANIEL PEACO: Absolutely.

MS. MARLA BOYD: Would you agree that Hydro generally updates its electricity export

forecast annually? Are you aware --

MR. DANIEL PEACO: That's -- that's my understanding, yes.

MS. MARLA BOYD: And are you also aware that Manitoba Hydro would generally update its revenue and financial forecasts at least annually?

MR. DANIEL PEACO: That -- that's also my understanding.

MS. MARLA BOYD: And would you accept that Manitoba Hydro typically files a rate application with the Public Utilities Board with those updated forecasts, generally every two (2) years?

MR. DANIEL PEACO: I'm not familiar with the cycle.

MS. MARLA BOYD: Your report indicates on page 72 that, on quoting many sources, utility IRPs, MISO reports, state and federal processes, and others indicate that it's likely that MISO will be short capacity within the next ten (10) years, possibly as soon as 2025. Do you recall that?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: And to the extent that new sales with generation capacity are entered into and additional ren -- revenue is thereby potentially obtained, would you acknowledge that there

will be two (2) or three (3) opportunities through upcoming General Rate Applications to update the export revenue forecast with the latest price forecasts and contract revenue projections before 2025?

MR. DANIEL PEACO: There may be, but that was really not the scope of our work.

MS. MARLA BOYD: With respect to capacity planning, would you agree that utilities planning will make provision for their needs several years in advance?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: And I think you showed us slide 18 this morning that demonstrated that regardless of how circumstances change, we can't be in a position to expect that we'll generate significant new capacity revenue in the five (5) years, correct?

MR. DANIEL PEACO: Is this the -- the slide that you're referring to?

MS. MARLA BOYD: Yeah. It would simply be a function of the fact that counterparties will have already made their arrangements for the next five (5) years.

MR. DANIEL PEACO: This is specific to the revenue -- revenue you might get from the PRA.

MS. MARLA BOYD: And I took it that your 96 percent meant that most of those people had cleared their contracts before going to market?

MR. DANIEL PEACO: For the twenty-seven eighteen (2718) period (sic). Your question was for a different year, right?

MS. MARLA BOYD: Within the next five (5).

MR. DANIEL PEACO: Right. That would be an entirely different matter.

MS. MARLA BOYD: Did you make any assessment of what that would be over the following four (4) years?

MR. DANIEL PEACO: Not specifically over the following four (4) years. The general point here is -- that we made is that the PRA is really not the primary opportunity for Hydro to garner capacity revenues in the long term for their forward products. And so it -- it more goes to when counterparties that you potentially interact with would need capacity, and would be willing to pay more than commodity energy prices for your -- for your product.

MS. MARLA BOYD: And I understood your evidence to be that that wouldn't be a significant source of revenue until -- at least for the next five

(5) years, and perhaps 2025?

MR. DANIEL PEACO: We did not find a lot of evidence in -- in either individual counterparties or the MISO market generally being short of capacity until that time, right.

MS. MARLA BOYD: Thank you. Did you review the material that was filed by Manitoba Hydro in its rebuttal evidence that noted back the impact of adding back in the capacity premium -- sorry, the capacity revenue and the premium for planning purposes after 2024/'25?

MR. DANIEL PEACO: I saw the number in their report. We haven't seen any backup for that, so I'm not sure how the calculation was done, but I saw the numbers.

MS. MARLA BOYD: Did you review the IR that was referenced? I'm going to have to be careful where we go here, because it is a CSI IR.

MR. DANIEL PEACO: Yeah. It was a CSI IR, and we do not have that, so we did not review it.

MS. MARLA BOYD: Do you have any reason to question the -- the 200 to $300 million number that's included in the rebuttal evidence?

MR. DANIEL PEACO: I have no basis to -- to make any opinion on it, because we haven't seen

the analysis.

MS. MARLA BOYD: Now, you made a comment today that you thought that the inclusion would be significant -- or material, I believe, was your word.

MR. DANIEL PEACO: Yes. I said it could be, yeah.

MS. MARLA BOYD: Would you consider 200, $300 million significant or material in a three (3) year period?

MR. DANIEL PEACO: Sure.

MS. MARLA BOYD: I'm sorry?

MR. DANIEL PEACO: Yes.

MS. MARLA BOYD: It wouldn't -- and would you consider it to be material in the context of a interest expense in the order of 1.1 billion?

MR. DANIEL PEACO: I -- with respect to a change in the export revenue price for revenues, it's -- it's a material change. How that -- how that flows through to the overall finances, I -- we didn't do any work on the -- beyond the export revenue forecast.

MS. MARLA BOYD: And if I was to take that 200 or 300 million over the three (3) year period, and compare that -- that would be 75 or $80

million a year -- and compare that to Manitoba Hydro overall revenue of 3.5 billion, it would be approximately 2.2 percent, correct?

MR. DANIEL PEACO: I'd have to skip -- I haven't seen the math, so I'll have to accept your -- your representation, there.

MS. MARLA BOYD: And would you consider that to be material?

MR. DANIEL PEACO: In the -- the material -- materiality that we offered was -- was simply, with respect, it would be a -- a noticeable difference in the export revenues. How that -- how that flows through to the entirety of the financial forecast is not -- is -- was beyond the scope of our work.

(BRIEF PAUSE)

MS. MARLA BOYD: Would you agree with the evidence of Mr. Cormie that Manitoba Hydro does not have significant surplus capacity available to sell until after Keeyask comes into service?

MR. DANIEL PEACO: You know, we may best pull that to this afternoon.

MS. MARLA BOYD: Thank you. And have

you reviewed the current market forecast for export prices relative to MH-16 with update?

MR. DANIEL PEACO: I'm sorry, your question again?

MS. MARLA BOYD: Have you reviewed the current market expert forecast -- forecast for export prices relative to Manitoba Hydro's IFF16 with update?

MR. DANIEL PEACO: And when you say "current," what are you -- what are you referring to?

MS. MARLA BOYD: More recent than what was contained in your report.

MR. DANIEL PEACO: Is there a more recent forecast?

MS. MARLA BOYD: Have -- have you been following the forecast market?

MR. DANIEL PEACO: I guess I'm -- I'm lost. What forecast are you talking about?

MS. MARLA BOYD: Let me try a little more specifically. Are you aware that Manitoba Hydro's evidence that the fall of 2017 forecast of export prices has demonstrated that export prices will continue to deteriorate?

MR. DANIEL PEACO: I'm -- I'm still not sure what you're referring to.

MS. MARLA BOYD: You haven't looked at

Manitoba Hydro's second quarter filing?

MR. DANIEL PEACO: Second quarter filing, no. I'm not familiar with what that is.

MS. MARLA BOYD: Have you looked generally, then, at any recent forecasts, the EIA forecast, for example?

MR. DANIEL PEACO: Forecast of what?

MS. MARLA BOYD: Export prices.

MR. DANIEL PEACO: In MISO?

MS. MARLA BOYD: Yes.

MR. DANIEL PEACO: Not beyond what we've identified in our evidence, no.

MS. MARLA BOYD: So you wouldn't be in a position to comment on the trend of market prices?

MR. DANIEL PEACO: Again, without any specific reference to the forecast that you're talking about, I'm not sure how to answer the question.

(BRIEF PAUSE)

MS. MARLA BOYD: Mr. Peaco, are you aware that Manitoba Hydro has reported that its net export revenues are now estimated to be 22 percent lower than what was forecast in the MH-16 update with interim in our minimum filing requirement?

MR. DANIEL PEACO: Do you have a document that I can look at?

MS. MARLA BOYD: It's -- it's the minimum filing requirement 13 updated. Sorry, Kristen, I didn't give you advance notice of that one.

MR. WILLIAM HAIGHT: Well, without looking at the document, if it's not available, I'm going to suggest that -- that Mr. Peaco be given full opportunity to look at that before he ventures any -- any form of answer.

(BRIEF PAUSE)

CONTINUED BY MS. MARLA BOYD:

MS. MARLA BOYD: PUB minimum filing requirement 13 updated. I believe it's Exhibit 62.

(BRIEF PAUSE)

MS. MARLA BOYD: You can take as much time as you need to read that, Mr. Peaco. I was referring to the fourth paragraph, the second one from the bottom of the page.

(BRIEF PAUSE)

MR. DANIEL PEACO: This -- this information was not provided to us, so we haven't reviewed it, and I'm -- so I'm -- I'm not sure how -- how to -- how to answer to that now.

MS. MARLA BOYD: Yeah. Yeah. You weren't aware of --

MR. DANIEL PEACO: It came after our--

MS. MARLA BOYD: -- that information?

MR. DANIEL PEACO: No. It came after our report was prepared.

(BRIEF PAUSE)

CONTINUED BY MS. MARLA BOYD:

MS. MARLA BOYD: Mr. Peaco, I understood you to have experience with the -- the market forecasts, and that I understood from your evidence this morning to Mr. Haight, that that was a regular part of your -- your practice.

Does it surprise you to see that Manitoba Hydro's outlook is now 22 percent lower?

MR. DANIEL PEACO: Now that I'm looking at this, I understand that this is -- this forecast is simply a one (1) year ahead forecast, correct, just for twenty-seven eighteen (2718)?

MS. MARLA BOYD: Yes, sorry. Yes.

MR. DANIEL PEACO: All right. So that's -- you know, we were -- we were looking at ten (10) and twenty (20) year forecasts in our analysis. We weren't really focused on the next quarter or the next year in our analysis. But -- and again, this came after we did our evidence, so we haven't reviewed this.

MS. MARLA BOYD: But given your experience --

MR. DANIEL PEACO: But in terms of the --

MS. MARLA BOYD: -- are you able to comment on whether -- that you find that to be surprising, or unusual, or would that be typical of your expectation with the --

MR. DANIEL PEACO: It's consistent with -- it's generally consistent with, but I -- we didn't look specifically, but I think we've indicated in our evidence that in the near term, we were in concurrence with the fact that there weren't a lot of opportunities for sale, and we -- our focus was more on years. Years five (5) and after were -- the -- the material difference. But we had not looked specifically at the next twelve (12) months in any of

the work that we did.

MS. MARLA BOYD: Thank you, gentlemen. Thank you. Those are our questions.

THE CHAIRPERSON: Thank you. Mr. Peters...?

CROSS-EXAMINATION BY MR. BOB PETERS:

MR. BOB PETERS: Thank you, Mr. Chair. Good afternoon to Mr. Peaco and Mr. Smith.

MR. DANIEL PEACO: Good afternoon.

MR. BOB PETERS: I want to echo the caution that My Friend Ms. Boyd gave you, that none of my questions are seeking to elicit information that may be commercially sensitive to the Utility or is found by this Board to be commercially sensitive or confidential. And if any of the questions require an answer in that regard, please don't put it on the public record. Advise me that that's a matter we can talk about later this afternoon.

Would that be acceptable?

MR. DANIEL PEACO: It is.

MR. BOB PETERS: All right. Maybe on PUB Exhibit 98, we can orient ourselves.

(BRIEF PAUSE)

MR. BOB PETERS: I know Mr. Hacault had a -- a version of this up, but let's just look -- let's just look not at the numbers for a change, and let's just look down the -- the words in the left-hand column. We get down to the extraprovincial revenue line, and that is the line, gentleman that Daymark reviewed as to whether the amounts disclosed by Manitoba Hydro were reasonable, or had raised concerns for Daymark. Would that be correct?

MR. DOUGLAS SMITH: Correct.

MR. BOB PETERS: And that extraprovincial line item is comprised -- and one (1) of the components of that is the existing firm contracts that Manitoba Hydro has entered into, correct?

MR. DOUGLAS SMITH: Correct.

MR. BOB PETERS: And that line item, if you follow it across, would also include the prospective new extraprovincial contracts that Manitoba Hydro is going to enter into into future years? And I'm specifically identifying SaskPower as an example.

MR. DOUGLAS SMITH: Correct.

MR. DANIEL PEACO: It's -- I guess they -- they've already entered into the contract.

MR. BOB PETERS: And the contract, we've been told when it starts, and the year in which it starts, the revenues from that contract will be included in the extraprovincial line?

MR. DANIEL PEACO: Right, but it -- it -- you -- I -- I -- if I misunderstood your question, I apologize, but it sounded like you -- you -- it was as if they hadn't entered into the contract as yet.

MR. BOB PETERS: All right, then. If -- I may have misspoke, Mr. Peaco, and it was contracts that hadn't yet commenced?

MR. DANIEL PEACO: Yeah, fair enough. Yeah.

MR. BOB PETERS: On this forecast, they will commence in the forecast period?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: All right. And if we turn -- with just this understanding -- and we're looking at numbers in the 400 to 500 million in the near term. Let's turn to slide 56 of the presentation you gave this morning, which is Daymark's Exhibit 7. The last item of your presentation, you indicate the revenue forecast derived from existing firm contracts is reasonable. That's what we take from this slide?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And when we talk about the export drive from existing firm contracts, those are the bilateral contracts that this Board has learned that the Utility has ended -- entered into with various counterparties, correct?

MR. DANIEL PEACO: That's correct.

MR. BOB PETERS: Also on this page found to be reasonable by Daymark is Manitoba Hydro's calculation of surplus dependable energy, correct?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And that -- that, sir, is the quantity of energy, not necessarily the -- the value or the price of it?

MR. DANIEL PEACO: That's -- that's exactly right.

MR. BOB PETERS: All right. So it was only quantity related?

MR. DANIEL PEACO: Yes. Both -- first -- the -- the first two (2) bullets of those three (3) bullets are quantity.

MR. BOB PETERS: Thank you. And then the surplus energy, again, the quantity is found to be reasonable. And your process of doing that was to look at their -- Manitoba Hydro's processes for forecasting what -- what energy they will have in the

future as surplus?

MR. DANIEL PEACO: Correct.

MR. BOB PETERS: All right. Then...

(BRIEF PAUSE)

MR. BOB PETERS: One (1) of the things that I want to turn to is the capacity value removal from the export revenue forecast, and this relates to export sales that exclude the bilateral contracts, correct?

MR. DANIEL PEACO: Yes, it would be for any energies presumed to be sold that's not currently under existing contracts.

MR. BOB PETERS: And as a result of the methodology followed by Manitoba Hydro with capacity values, their export revenue forecast numbers that we had seen on the previous integrated financial forecast have been reduced to what they would be if they had included the capacity values?

MR. DANIEL PEACO: I'm sorry, I'm -- I'm --

MR. BOB PETERS: Let -- let me -- let me rephrase that shorter. Had Manitoba Hydro included capacity values, the export revenue line item that we

looked at would have a -- a higher number?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And I suppose following that loop through, the more money that Manitoba Hydro is able to gain from their export customers, that would mean -- and is it your understanding from Daymark's perspective -- that would mean less revenues are required from domestic customers?

MR. DANIEL PEACO: Well, I -- I presume that would be the case. But again, our -- our work didn't go beyond looking at the -- the level of the export forecast. How that would flow through to the -- the rate-making process was beyond what we -- we really considered.

MR. BOB PETERS: All right. Staying with the capacity issue, and we turn to page 46 of the Daymark Exhibit 1, which is the report that's on the public record, and we scroll down to the paragraph just above the redactions, that's -- and again we're not going to get into -- at this time, anyway, what's redacted, but we see on this page, Daymark is telling this Board that after looking in more detail at the data provided by independent consultants, we identify inconsistencies between Manitoba Hydro's market view,

and the consultant's view, and I read that correctly?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And on page -- sorry, and on slide 50 of what you presented to the panel this morning, what you're telling the Board is that there is zero capacity revenue for twenty (20) years on the surplus energy?

MR. DANIEL PEACO: That's correct.

(BRIEF PAUSE)

MR. BOB PETERS: You had some discussion with Ms. Boyd on this matter, but maybe we'll go to your page 18 of your DEA Exhibit 1. And there, Daymark has extracted and reproduced a 2016 indication as to what the organization of MISO states has learned in its survey?

MR. DANIEL PEACO: Well, that actually is extracted from the MTEP17.

MR. BOB PETERS: Well -- and -- and I was -- just want to be sure about that, because Mr. Williams had a similar chart, although from a different source. Do you recall that this morning in the Consumers Coalition Exhibit 39?

MR. DANIEL PEACO: From the NAERC

document?

MR. BOB PETERS: Yes, it was the North American Electric Reliability Corporation.

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And Mr. Williams took you out -- or Dr. Williams took you out to I believe it was 2023, and was showing that the anticipated compared to the reference margin level in 2023, turned into a deficit?

MR. DANIEL PEACO: I -- yeah, I recall that.

MR. BOB PETERS: All right. Well, let's see if that holds true on page 18 of Daymark Exhibit 1. Maybe we can enlarge the font for only those of us who need it.

(BRIEF PAUSE)

MR. BOB PETERS: Thank you. We've seen Manitoba Hydro's power resource schedules, and if we take the -- and we'll start in the 2023/'24 year, if we could. And if you could explain this table, Mr. Peaco or Mr. Smith to the panel as to what they're seeing by looking at this chart?

MR. DANIEL PEACO: Sure. And just for

-- for reference, we had a visual of this that we prepared and they're -- into our PowerPoint, and we reviewed that today. So the -- the data that's in this table is the same data that we presented in that -- the year in our -- in our presentation. But if we just go down the -- the left-hand side, there's a -- a row called existing resources, which is their accounting of given that the -- the power facilities that are in the -- in the market today and their expectation of the megawatts that they'll receive from them through the -- through the duration of this chart --

MR. BOB PETERS: And -- and just interrupt you if I could, Mr. Peaco, when they're talking -- and -- and let's pick the 2023/'24 proposed year, they're talking about 145 gigawatts hours of capacity, correct?

MR. DOUGLAS SMITH: A hundred and forty-five gigawatts, or 445,000 megawatts of capacity.

MR. BOB PETERS: Right. And -- and just so the panel understands, that's the existing resources in the MISO footprint?

MR. DANIEL PEACO: Correct, as -- as they would be -- and to the extent that existing --

there's retirements of the existing resources that would be reflected in that 2023 number.

MR. BOB PETERS: Yes, and -- and that's one (1) of the reasons, Mr. Peaco, that the number, when we start over closer to the left side, from the 2018/19 year and work our way over to the '22 -- sorry, the '23/'24 year, the existing resource number goes down to reflect retirements?

MR. DANIEL PEACO: Correct.

MR. BOB PETERS: All right. I understand that point. Relative to Manitoba Hydro -- thank goodness Mr. Miles isn't in the room, but I always think of Manitoba Hydro as about 5,100 megawatts of -- of hydraulic capacity, and maybe totally around the 5,400 megawatt size, correct?

MR. DANIEL PEACO: Okay.

MR. BOB PETERS: So in essence, what you're saying here is that MISO's about thirty (30) times larger than the capacity of Manitoba Hydro?

MR. DANIEL PEACO: Yeah -- roughly, yeah, that would be correct.

MR. BOB PETERS: And on this chart, under the 2023/'24 year, there appears to be new resources that are coming -- coming forward?

MR. DANIEL PEACO: The -- the second

row is -- is an entry for new resources, correct.

MR. BOB PETERS: And some of these represent those that are more likely than others that are less likely.

Is that -- is that correct?

MR. DANIEL PEACO: That's correct.

MR. BOB PETERS: And we'll perhaps come back to that. And then if we end up going down to the available resources line, we see that in the '23/'24 years theres's147.8 gigawatts

MR. DANIEL PEACO: Correct.

MR. BOB PETERS: And then we also have to recognize that, just like in Manitoba, MISO has its own demand requirements, and those demand requirements of 128.9 gigawatts are subtracted from the total; correct?

MR. DANIEL PEACO: Well, I believe the calculation there is -- there -- the demand is the -- the peak demand in the system. And then the following row is -- is the reserve requirement. So the -- the one 128.9 is increased by the reserve requirement to a total requirement on the demand-side of 149.2.

MR. BOB PETERS: And so that leads a planning resource -- sorry. I've --

MR. DANIEL PEACO: So -- so what

they're doing is they're -- they're then comparing the -- the ERMR, which is the total requirement for capacity in the system in that year to the available resource line. So -- and you can see that the 149.2, which is demand plus reserves is -- is higher than the available resources. So there's -- there's a shortfall in the surplus shortfall row.

MR. BOB PETERS: And it's this shortfall, Mr. Peaco and Mr. Smith, that gave rise to Daymark's answer to the Vice Chair Ms. Kapitany when you indicated that the capacity market will change and there may -- that there may be a market for Manitoba Hydro's capacity out in approximately 2023?

MR. DANIEL PEACO: Correct.

MR. BOB PETERS: When -- before I leave this chart under new resources there's a line item, and on page -- I'm going to keep that page, but also take you back to page 23 of your slide presentation today.

And this is the graph you were referring to, Mr. Peaco?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And what I was referring to was that of those new resources, have you been able to break it down here as to what is -- what

are going to be new resources and what are low certainty of new resources?

MR. DANIEL PEACO: We -- we took these numbers, take those two (2) entries. I don't know if you want go back and --

MR. BOB PETERS: Sure. We can go back to --

MR. DANIEL PEACO: Go back to the table.

MR. BOB PETERS: -- 18, yeah.

MR. DANIEL PEACO: So how we get those two (2). The -- the new resource row, the second row in this, is the sum total of more certain new resources and low certainty. So if you see there's a one (1), two (2), three (3), four (4), the fifth row of this table is a minus, low certainty resources.

So what they're doing is they're -- they've got a -- an assumption on total new resources in this case. And for purposes of determining expected new generation they back out these low certainty resources, which are ones that they've assumed, but they -- but they don't have -- they have -- they're -- these are resources they have presumably limited commitments.

And so in coming up with the -- with

the 2023/'24 shortfall they've backed those pie -- those pieces out. So what we've shown in the chart would be the low certainty resources line and the -- the other new resources would be the difference between, in 2023, the four-point-five (4.5) total and the two-point-three (2.3) that are low certainty. So there's basically two-point-two (2.2) of -- of resources -- new resources that are not in the low certainty category.

MR. BOB PETERS: Is Daymark Energy Advisors aware as to whether distributed energy resources are included in those new resource lines?

MR. DANIEL PEACO: We -- we didn't find a lot of detail back up from MISO in terms of what's embedded in those numbers.

MR. BOB PETERS: So you're not aware of -- of whether wind and solar or aggregated energy efficiency matters are included in the new resource line?

MR. DANIEL PEACO: I -- my -- we're not specifically aware. My understanding is this is everything that they would presume would qualify to provide qualifying capacity in the market. But what -- what that specifically includes we're not -- we don't have the information on that.

MR. BOB PETERS: Are you in a position to tell the Board what impact on the market costs those distributed energy resources would have directionally?

MR. DANIEL PEACO: I'm not sure if I underst --

MR. BOB PETERS: Are those distributed energy resources causing MISO prices to increase or to decrease?

MR. DANIEL PEACO: So to the extent that utilities are committing to add distributed resources that are included in these numbers or were excluded from these numbers?

MR. BOB PETERS: I'm suggesting included in these numbers, Mr. Peaco.

MR. DANIEL PEACO: Well, to the extent that they are adding distributed resources such as solar and wind? Is that specifically what you're referring to?

MR. BOB PETERS: Yes.

MR. DANIEL PEACO: Those would tend to -- addition of those types of zero energy cost resources would tend to lower the overall market prices.

MR. BOB PETERS: And I also understand

there's a -- an ability to aggregate energy efficiency gains in the MISO market.

Are you aware of that?

MR. DANIEL PEACO: Not specifically, no.

(BRIEF PAUSE)

MR. BOB PETERS: Before I leave this chart that's found in the your report, Exhibit 1, page 18, the conclusion that Daymark has reached is that Manitoba Hydro's revenue forecast from exports may be understated after five (5) or six (6) years because of, for example, there being a capacity shortage in the MISO market in that time frame.

MR. DANIEL PEACO: Well, there's -- there's two (2) reasons -- two (2) -- two (2) aspects of that in this particular -- to -- even before you get to the shortfall calculation you clearly are adding new resources. And to the extent that those new resources are planned but not yet committed, then those are -- those are potentially market opportunities. So not -- it's not clear to me exactly how many megawatts of the -- or gigawatts of the new resources in this plan are actually firmly committed

and non-avoidable at this point.

So -- but -- but the -- but to the particular point of the fact that there's a shortfall and that the low certainty resources clearly are in the category of not being committed, those would represent market opportunities for new resources to come in. And that will be -- utilities in some way, shape, or form will be investing and committing to new resources in that time frame to make -- make the shortfall go away.

MR. BOB PETERS: And do I take from your answer, Mr. Peaco, that included in that new resource line is an opportunity for Mr. Cormie to sell some Manitoba Hydro --

MR. DANIEL PEACO: Potentially.

MR. BOB PETERS: -- energy.

MR. DANIEL PEACO: Potentially.

(BRIEF PAUSE)

MR. BOB PETERS: In Manitoba Hydro's rebuttal evidence, and I won't necessarily turn it up unless you want to see it, do you recall Manitoba Hydro indicating that the date of need is uncertain and, in my words, a moving target?

MR. DANIEL PEACO: If I'm recalling, that was in the con -- they were discussing the -- the MISO PRA auction?

MR. BOB PETERS: Correct.

MR. DANIEL PEACO: Yes. I -- I have a recollection of that.

MR. BOB PETERS: You were talking, Mr. Peaco, with the Chair about information back at the Needs For and Alternatives To review that you were involved in.

Do you recall that?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: Can you recall -- and can Daymark recall that during that Needs For and Alternatives To review, whether Manitoba Hydro's forecast of capacity and its export revenues was including capacity, even with the uncertain date of need at that time?

MR. DANIEL PEACO: Yes, my understanding is -- my recollection is that all of the dependable energy surplus was -- was presumed to be sold into the market with -- with the capacity and a premium.

(BRIEF PAUSE)

MR. BOB PETERS: In the Manitoba Hydro rebuttal there was a point made that the projected additions exceed retirements in the 2016 to 2031 period. And the perhaps I should put that up on the screen. I think that's Exhibit Manitoba Hydro 83. And I believe I'm looking on page 32 of 37 of the document. And the graph at the top of the page was to suggest that there were additions being planned that would more than remove the possible deficits.

Are you familiar with that?

MR. DANIEL PEACO: I've -- I've seen their evidence and I've -- I've looked at this chart, yes.

MR. BOB PETERS: Is Daymark in a position to advise whether these new projects are in the interconnection queue?

MR. DANIEL PEACO: Not that specific answer, no.

MR. BOB PETERS: So is it Daymark's view then that some of these additions won't be coming through to fruition?

MR. DANIEL PEACO: Well, let's sort of take -- step back a minute and let's talk about what this chart is. First, I would note that the -- the title -- the title of the figure makes clear this is

nameplate capacity.

MR. BOB PETERS: Is that the unforced capacity that Mr. Smith talked to --

MR. DANIEL PEACO: Yes, so --

MR. BOB PETERS: -- the Vice Chair about?

MR. DANIEL PEACO: -- so to the extent that you add, for example, if you add a hundred megawatt wind turbine you have 100 megawatts of nameplate sitting on the pole, on the tower. But what counts in the capacity market is -- is a substantially lower number. So this is not an accounting of megawatts that would qualify for capacity in the capacity accounting that we were just looking at. This is nameplate. Okay.

And the other thing that I would note is that you'll see in the parenthetical in the title of the figure that this is an EGEAS model. And the EGEAS model is a planning model that MISO uses to develop the postulated expansion plans that it uses to do its transmission planning, as I talked to earlier this morning.

So there's a set of assumptions they they've put together, and included in the EGEAS model, to -- to build out a scenario for them to evaluate in

their transmission planning. So these are, I would say, prospective. They -- they have populated the EGEAS with a set of assumptions on potential resource options and have -- and this is the output of that modelling, as I understand it.

And so this isn't nec -- this -- this could include a number of options that are simply, you know, postulated options that they've included in their EGEAS modelling to develop a scenario for purposes of their planning.

MR. BOB PETERS: All right. Well, thank you for that clarification. You've addressed the point that I wanted to have the Board be aware of. I want to turn still in Manitoba Hydro's rebuttal document which is on the screen, Manitoba Hydro Exhibit 83, to page 23 of 37. And we'll start up on line 14. I'll just read it for the record:

> "Based on current information available to Manitoba Hydro, the consensus value of carbon from the four (4) electric -- from the four (4) electricity export price forecaster remains the best estimate of future carbon values at the time Manitoba Hydro 16 update with

interim was filed."

See that item?

MR. DANIEL PEACO: I'm sorry, which lin are you on?

MR. BOB PETERS: I was attempting to read, starting on line 14.

MR. DANIEL PEACO: Oh, I'm sorry. Yeah.

MR. BOB PETERS: Can you just have a quick second to look at that?

MR. DANIEL PEACO: Yes, I see that.

MR. BOB PETERS: And if Manitoba Hydro's view as stated there is that the consensus value of carbon from the four (4) forecasters remains the best estimate of future -- of future carbon values, is it Daymark's view that the consensus value of capacity from these same four (4) forecasters is also the best estimate of capacity value to be included in the revenue forecast?

MR. DANIEL PEACO: That would be consistent with the -- Manitoba Hydro's use of the energy forecast, yes.

MR. BOB PETERS: Going down to line 24, Manitoba Hydro indicates that:

"The goal to have an unbiased

consensus forecast is achieved by accepting the other experts' views of the future are not imposing its biases by choosing a forecast to produce a predetermined result."

Do you see that?

MR. DANIEL PEACO: I see that.

MR. BOB PETERS: Do you agree with Manitoba Hydro's statement?

MR. DANIEL PEACO: Well, they didn't -- they didn't implement that in their analysis.

MR. BOB PETERS: Okay. And so the question I asked was: Do you agree with Manitoba Hydro's statement, is that the goal is to have an unbiased consensus forecast and that's achieved by accepting the expert views of -- of the other forecasters?

MR. DANIEL PEACO: If -- if their goal is to have an unbiased consensus forecast accepting the experts' views, I would agree with that. I'm, I guess, I was jumping ahead to -- to your prior question to say that that's not what they implemented.

MR. BOB PETERS: All right. And then on page 24 of this document on lines 18 to 21, we've switched then over to the capacity specific reference.

And I'll quote from line 18:

> "In determining the export revenue forecast and having regard for the uncertainty associated with capacity values, a policy decision has been made by Manitoba Hydro to remove the potential capacity revenue that is as yet uncontracted from its revenue forecast."

And then as Manitoba Hydro further discussed in section 2.3.

Do you see that?

MR. DANIEL PEACO: I do.

MR. BOB PETERS: And so does Daymark conclude that this would be an example of Manitoba Hydro applying its biases with respect to the forecast of capacity revenue?

MR. DANIEL PEACO: Well, it -- it clearly is applying a judgement to not accept in total the -- the consensus view from the -- their third-party export -- ex -- third-party forecasts.

MR. BOB PETERS: On slide 18 -- I believe Ms. Boyd had this slide up earlier, Mr. Smith or Mr. Peaco, is the planning resource auction a good indicator of the value Manitoba Hydro can achieve with

a long-term capacity contract?

MR. DANIEL PEACO: No.

MR. BOB PETERS: Why do you say that?

MR. DANIEL PEACO: Well, let me -- et me give you an answer now and I -- I -- we will come back to this this afternoon with some detail. But in general, I think as Mr. Smith explained this morning, the PRA auction is one (1) year ahead. And it's -- it's a balancing auction. It's not -- in contrast to some other markets which have -- actually have a forward capacity market, whereas the market bond -- actually let me use our home market as an example. It's not the only example, but it's one (1) that I'm familiar with.

ISO New England has a forward capacity market, and all of the capacity in the market is procured in that market and -- and in an auction that's -- that's done three (3) years in advance. And the result -- the result of that for new resources is -- is multi-year contracts for any new capacity that enters the market.

The MISO market, the PRA is an auction that's one (1) year had for one (1) year contracts that are exchanged between those in the market that are short and those that are long. And so I would say

it's a -- it's a -- basically a truing up of folks' commitments to have enough reserves to meet MISO requirements before -- before real-time hits. But it's -- it's not a place where forward capacity exchanged. That all occurs in the bilateral markets.

MR. BOB PETERS: All right. Let's follow that through for the benefit of the panel. If we can go to Daymark's report Exhibit DEA-1. And I'm on page 65 of the document. Here is where Daymark lists the contracts that Manitoba Hydro has entered into for the sale of its products; correct?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And some products are energy products, some are capacity, and some are both.

Would that be fair take away?

MR. DANIEL PEACO: That's correct.

MR. BOB PETERS: All right. Well, let's stay with -- let's just start with the contracts that are only capacity.

Can you describe, without specific to any of these, what a -- what a capacity contract is or how that's different from an energy contract?

MR. DANIEL PEACO: Well, a capacity contract would be simply providing some assurances to perform at times necessary to allow the buyer to have

resources that would qualify to meet its reserve requirement and obligations with MISO. Some of these are in the form of simply exchanges of capacity. And -- and there's ways to do that. But that's essentially what they're doing is that they're providing an assurance of performance sufficient so that -- that the contract can -- can be accounted for in the -- the buyer's the accounting of its meeting reserve requirement obligations.

MR. BOB PETERS: Okay. Keeping in mind those capacity contracts, and there appeared to be about a half a dozen of them.

Do you see them at the bottom part of the page? And we go back to page -- slide 18 of your presentation from today.

Which side of the page do those six (6) capacity contracts find themselves included in, in terms of this chart?

MR. DANIEL PEACO: Well, they would be -- they would be in the right-hand side. And -- because these are -- these are contracts with specific counterparties and they would be presumably -- I -- I believe they're all entered into in advance of the PRA. But...

MR. BOB PETERS: So the only

qualification you have, as long as the contract has -- the commencement date has started, they'd be on the right-hand side of the page?

MR. DANIEL PEACO: Well, it's a question of whether they're actually -- these are -- these are bilateral contracts and not -- they're not contracts entered into the -- specifically into the PRA auction.

MR. BOB PETERS: They'd be capacity commitments made directly with a bilateral party?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: On page 60 of your report, I want to turn to the removal of the dependable energy premiums on uncontracted dependable supply. And we see in the middle of the page, starting with the paragraph:

> "Upon review of the reasons for first instituting a premium."

And then removing the premium:

> "We believe the elimination of the premium in its entirety for the twenty (20) year forecast is not well supported and not consistent with the information available to Manitoba Hydro from the independent

market consultants or the information from MISO, NERC, and the utility IRP's."

Correct?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: On the findings at the bottom of that page, I want to turn to a couple of them on that page, and have you explain with some detail to the Board what is -- what is meant. The first bullet, what you're telling the panel is that compared to how Manitoba Hydro used to do it they are taking a more conservative approach now than they did before.

MR. DANIEL PEACO: That's correct.

MR. BOB PETERS: And then can you explain what you're getting at in the second bullet, and how that applies to Manitoba Hydro's available products?

(BRIEF PAUSE)

MR. DANIEL PEACO: Yeah, they -- and hopefully the context we laid this morning will help with this. But the premium would come from attributes other than energy, being able to -- to provide energy

to satisfy MISO's resource adequacy reserve requirements. It would be along the -- it would be either the fact that it's clean energy, as -- as we discussed with Ms. Boyd a few minutes ago, that the -- the sale of the power carries environmental attributes that are favourable to some counterparties.

And depending on how they structure the contracts that could provide some price certainty, some -- some risk hedge, some operating flexibility perhaps. So there other -- other attributes other than energy and capacity that would contribute to being able to be -- to -- to some buyers be worth paying more than just the straight energy and capacity value of that output.

MR. BOB PETERS: And for that they'll pay the premium, and that premium --

MR. DANIEL PEACO: And that --

MR. BOB PETERS: -- is -- is a negotiated premium?

MR. DANIEL PEACO: Yes. And -- and to the point we said earlier, those premiums only come from negotiating with a counterparty in a bilateral manner. Having a buyer who actually values those attributes and is willing to pay a premium for them.

MR. BOB PETERS: On the next page,

page 61, I just want to look at a couple more of the findings. The elimination of the premium appears reasonable for the near term.

You see that?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And that's your -- that's Daymark's finding?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And as the Vice Chair before asked you, I'll ask you now, the near term, what -- how many years is that?

MR. DANIEL PEACO: That's -- really we're thinking in terms of when -- when the market -- the MISO market generally, and the -- and the specific counterparties in particular, begin to need new resources. Then they would be in a position to -- to need to add new resources, and would be looking at resources that -- that perhaps would carry premiums with them. And so it's -- it's in the '23 to '25 time frame that that begins to be, you know, likely to be available based upon the resource plans in the MISO -- MISO analyses that we've been talking about.

MR. BOB PETERS: Didn't we see new resources being added in -- in every year between now and 2023?

MR. DANIEL PEACO: There are some, but it gets -- it gets more significant as you get out towards 2025.

MR. BOB PETERS: Do I take from your last bullet in finding that Manitoba Hydro's product should be attractive because of its being clean energy?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And I believe on this page, on page 61, the -- I think Manitoba Hydro in its rebuttal corrected that the premium was initiated, is it 2008 as opposed to 2013? Are you aware of that?

MR. DANIEL PEACO: You may be right. I -- I -- we kind of -- we were looking specifically at the 2013 to 2015 time frame and it was -- it may have predated that. But I'm not sure.

MR. BOB PETERS: All right.

MR. DANIEL PEACO: That was -- that was the limit of our -- of the documents that we reviewed.

MR. BOB PETERS: Mr. Chairman, with your approval and patience, I think I can complete my last question before the top of the hour.

There's been considerable discussion about whether Manitoba Hydro's export revenue forecast

is P50 forecast, and I don't want to repeat what we've talked about.

On page 75 of the Daymark report there is discussion about the asymmetrical risk; correct?

MR. DANIEL PEACO: Yes.

MR. BOB PETERS: And that's the risk you talked with Mr. Hacault about when he was talking about the asymmetry and he showed you the box and whiskers went through those information -- that information.

MR. DANIEL PEACO: Correct. Correct.

MR. BOB PETERS: All right. What contributes to that asymmetry appears to be two (2) factors. One (1) is natural gas.

Is that correct?

MR. DANIEL PEACO: In -- in Hydro's analysis?

MR. BOB PETERS: Yes.

MR. DANIEL PEACO: Yes. Yeah.

MR. BOB PETERS: Does Manitoba Hydro agree with Manitoba Hydro's analysis on the natural gas? Sorry, does Daymark agree with the analysis that Manitoba Hydro did?

MR. DANIEL PEACO: No, I was going to say you'd have to ask Hydro whether they agree with

1 themselves or not.
2 MR. BOB PETERS: Sorry, I was rushing
3 myself here.
4 MR. DANIEL PEACO: We -- I think as we
5 -- I think we indicated either in the report or in the
6 IRs that we -- we found that their representation of
7 the distribution on natural gas prices was a
8 reasonable representation of the skewness of -- of the
9 natural gas outlook, at least at the -- at that time.
10 MR. BOB PETERS: The message you're
11 telling the panel is that in terms of this asymmetry
12 that Daymark has seen, natural gas prices are more
13 likely to go up than down from their record low
14 prices?
15 MR. DANIEL PEACO: Well, it's not so
16 much likelihood. It's a question of how far up and
17 how far down could they go within the range of
18 people's -- the Energy Information Administration and
19 many other forecasters will define a range of
20 uncertainty around natural gas prices. And almost all
21 of those ranges will show potential for the gas prices
22 to be much higher than reference prices these days
23 than lower, in part because reference prices for
24 natural gas are already pretty close to historic lows
25 as it is.

And so prices -- the -- the magnitude of decline from reference case prices is -- is small, and it's along the lines of the discussion we had with Mr. Hacault about the fact that there's more potential. There's -- the values could go much higher than the reference and there's only so much lower than they could go to the reference this point. Now, the probabilities around those occurrences are a different matter.

MR. BOB PETERS: Understood. And we've already talked about the second of the two (2) risk components. So I'd like you to take those and turn to page 76 and figure 35 and the Daymark exhibit, and explain to the panel what you're trying to impart with this chart.

MR. DANIEL PEACO: Okay.

MR. DOUGLAS SMITH: Certainly. This -- this chart was actually produced by Manitoba Hydro at our request. We had asked them to assist us in understanding the -- the individual impacts of the -- of the different variables that they packaged together in their uncertainty analysis.

They actually had three (3) separate driver variables behind their uncertainty. They had the -- the hundred and two (102) flow cases. They had

three (3) natural gas cases. And they had, subject to check, I think it was inflation. We -- we didn't focus on that. I believe -- I believe that's what the third was. But the first two (2) were what we focused on because that was within our scope. They provided for us an unpacking of that and -- and this is one (1) of the steps of that.

The light blue in the middle represents the uncertainty around the flow cases. That was the first step in their -- in their calculation of -- of the total uncertainty. And then they layered on top of that the -- the high and low. So -- so the -- the light blue is the hundred and two (102) flow cases, the reference gas, and shows the uncertainty around flow.

The -- they then added in -- layered in the high and low gas forecasts and the impact that that had. And the additional uncertainty in the dark blue represents the amount of the uncertainty due to either the low gas case at the bottom or the high gas case.

(BRIEF PAUSE)

MR. BOB PETERS: Mr. Smith, at Board

counsels' book of documents, volume 4, page 134 there was a reproduction of various key variable sensitivities from Manitoba Hydro. And on this chart there is, down the left-hand column, low export price and high export price.

Do you see that?

MR. DOUGLAS SMITH: I do.

MR. BOB PETERS: If we follow those over, and we'll take them right over to 2027/'28, we see the low export price would result in -- in impacts of negative $483 million. And the -- the high version -- the high export price would go to $1.519 billion.

Do you see that?

MR. DOUGLAS SMITH: I do.

MR. BOB PETERS: This demonstrates to the panel, does it, the asymmetry between the low exports and the high exports?

(BRIEF PAUSE)

MR. DOUGLAS SMITH: It -- well, it doesn't -- I -- I don't see the reference in between, which would -- would be necessary to do illustrate asymmetry.

(BRIEF PAUSE)

MR. BOB PETERS: All right. Well, if it's -- if it's referenced to zero, Mr. Smith, does that change your answer?

MR. DOUGLAS SMITH: That would certainly -- if -- if the reference was to zero that would certainly show asymmetry.

MR. BOB PETERS: All right. And looking at those two (2) line items, can you confirm to the panel that Hydro's removal of capacity values and dependability premiums is not embedded in the scenarios of the low exports or the high exports?

MR. DOUGLAS SMITH: In the -- the low and high cases that we reviewed there was no capacity or premium in either of those.

MR. BOB PETERS: You're not sure if what you reviewed is what's depicted here is what I'm hearing.

MR. DOUGLAS SMITH: That is correct. I don't know the source of these particular numbers.

MR. BOB PETERS: All right. And if -- if we assume that...

(BRIEF PAUSE)

MR. BOB PETERS: If we turn to page 76 of the Daymark evidence, and we go back to the figure 35, Mr. Smith, can you confirm to the panel that Manitoba Hydro's removal of capacity value and dependability premiums from Manitoba Hydro's export forecast is not included in the high or low cases as shown on this figure?

MR. DOUGLAS SMITH: That is my understanding. Correct.

MR. DANIEL PEACO: Well, if I might. I just want to make sure we're clear on that question. Maybe state it another way and let me tell you if the -- tell me -- tell me if this is what you had in mind? That the uncertainty in market prices shown in this chart only show variability in natural gas prices. And there is no capacity values included in this -- in the base or -- or in the sensitivity.

(BRIEF PAUSE)

MR. DANIEL PEACO: Is that --

MR. BOB PETERS: I'm sorry you were --

MR. DANIEL PEACO: I was -- I was confused with the question and answer and I just wanted to make sure we were clear as to what -- what

we were stating. And I -- just as a -- as a statement of what's in this chart, the -- with respect to market price uncertainty. The market prices are the energy -- - the market prices that include only energy value. There's no capacity value in the reference high or low cases.

MR. BOB PETERS: Thank you. That's -- that's -- I have your understanding. I'd like to thank Mr. Peaco and Mr. Smith for answering the questions on the public record, Mr. Chair. I think they'll get an opportunity to have a short break while we reconfigure the room and allow them to make their presentation on the in camera session. So thank you.

THE CHAIRPERSON: Mr. Haight, any re-examination?

MR. WILLIAM HAIGHT: I -- I have one (1) question by way of re-examination, Mr. Chair, and it's to Mr. Peaco.

RE-EXAMINATION BY MR. WILLIAM HAIGHT:

MR. WILLIAM HAIGHT: Mr. Peaco, when you were answering questions from Ms. Boyd and she posed to you the results of Manitoba Hydro's third quarter report, and you looked at that and you indicated that it was consistent with -- and I don't

think you finished that sentence.

It's consistent with what?

MR. DANIEL PEACO: Fair enough. I was indicating the -- the -- as I recall the exhibit was looking at a downturn in the forecast in the -- in the forward twelve (12) months from the forecast date, which was, I think, in November. And we had indicated in our report that in the very near term that premiums -- that the market prices were down and the premiums would likely not be available to Manitoba Hydro. And -- and the near term downturn in market prices was consistent with that general statement that we had included in our report and we've talked about today.

MR. WILLIAM HAIGHT: And your point being that that third quarter report is looking at short-term results, whereas your report was looking at long-term results?

MR. DANIEL PEACO: Correct.

MR. WILLIAM HAIGHT: No further questions. Thank you.

THE CHAIRPERSON: Thank you, Mr. Haight. We're going to adjourn the public portion of today's session and move in camera, so we will take a break for fifteen (15) minutes. Only people who are required for this hearing should remain in the room,

and -- and we will be disconnecting the live streaming and testing. I -- I just don't know which part you lost.

So we're adjourning the public portion of today's session and moving in camera. We will take a fifteen (15) minute break. Only those people who are required for the in camera session should remain in the room. And we will be disconnecting the live streaming of the hearing, so if anybody is watching we'll be back at 9:00 a.m. tomorrow morning. And we will test to make sure that the live stream is disconnected. So we will adjourn until 3:20.

--- Upon adjourning at 3:02 p.m.

Certified Correct

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Cheryl Lavigne, Ms.