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MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

NEEDS FOR AND ALTERNATIVES TO

PREFERRED DEVELOPMENT PLAN

TECHNICAL CONFERENCE

Ed Wojczynski - Facilitator

HELD AT:

Public Utilities Board

400, 330 Portage Avenue

Winnipeg, Manitoba

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Pages 1 to 253

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--- Upon commencing at 9:07 a.m.

THE FACILITATOR: Good morning, everybody. My name's Ed Wojczynski. I'm the division manager of Manitoba Hydro responsible for -- on behalf of Manitoba Hydro for the NFAT process and making the arrangements and leading the panel, and it's my pleasure to kick this off today.

The various lawyers are still outside making various arrangements, but I think we'll start without them because we're already running a little bit late. Just at the outset what we'd like to do is, as we did at the previous technical conference, just go around, quickly saying who everybody is.

But before we do that, we've -- our president, Scott Thomson, we invited him to come and just say a few words to kick this off. This is a pretty important milestone for us as a company, and so we thought it would be appropriate to have Scott say a few words. So, Scott...?

MR. SCOTT THOMSON: Good morning, everyone. Glad you could be here with us today, and welcome to the second NFAT technical conference.

As you know, Manitoba Hydro's mandate is to provide electricity to meet the needs for the

province in an economic and efficient manner. Our NFAT submission sets out how we propose to fill that mandate going forward.

The NFAT business case sets out the best long-term options to meet Manitoba elec -- Manitoba's electricity needs now and into the future. We've examined numerous future options: in total, fifteen (15) plans with underlying assumptions, resulting in twenty-seven (27) different scenarios for each plan to look at what we -- what we found to be the most beneficial for the province as a whole.

First and foremost, we're committed to ensuring that we serve the needs -- the energy needs of Manitobans, which continue to grow due to Manitoba's expanding economy and population. Our analysis based on current outlook and assumptions demonstrates that continuing to develop our hydro power resources is -- is in the best long-term interest of the province and our customers.

Our analysis also demonstrates that expanding our extraprovincial interconnection capacity, and our export and import arrangements, lowers the cost of supplying Manitobans and enhances the overall set of benefits. Our Preferred Development Plan provides Manitobans lower long-term rates, greater reliability

and security of supply, superior environmental and socioeconomic benefits, job creation, and cash transfers to the province, when we -- we compare these to the other options and alternatives that we've considered.

I'd like to assure you that the executive and board at Manitoba Hydro have given these issues extensive time and energy, and are in support of the -- the development plan that we're putting forward.

I'd like to acknowledge that there have been many questions raised. Welcome.

(BRIEF PAUSE)

MR. SCOTT THOMSON: I was saying that many questions have been raised about our -- our plans and the path that we're proposing for the future. These are frequently related to our capital cost estimates, future energy prices, the market for hydro power in the US -- in the US, demand-side management activities, wind generation, and, of course, natural gas generation, which was the underlying base case that we compared all of our alternative plans to.

In past presentations and in the media I've asked that judgment on these matters and indeed

our Preferred Development Plan be reserved until the proposals have been presented and analyzed in the appropriate independent public forum. That time has now come. And we're looking forward to having that opportunity as we move forward with the PUB review process.

Our filing represents the first stage of the review process. You -- the panel, Intervenors, and various technical experts are now going to test the evidence that we've submitted. At the end of the process the PUB will make their recommendations to the province based on all the evidence that will be presented and the testimony hear -- heard in the coming proceedings.

I guess I'll -- I'll divert here a little bit and -- and just acknowledge that as we've laid out our plan, what we presented doesn't lock us into a course of action for twenty (20) years, although there are some decisions that need to be made in the next twelve (12) to eighteen (18) months that will -- will set us down one (1) of the pathways that we've -- we've outlined in our submission.

And as economic circumstances change, underlying assumptions are proven out or -- or need to be adjusted, that will have an impact on -- on our

plans as we move forward. I guess what I'm trying to say is that this isn't a static, you know, point of no return that we're here at now, but we do have to make some decisions and what -- we do have to make those decisions based on all the information that we have available to us today, using the best information that we have available.

So we -- we do look forward to the review process. It's going to be an extensive one. And -- and your participation in it as Intervenors and interested parties is -- is what will make it a success for -- for Manitoba. I'd like to thank you again for participating today. And I'll turn things over to Ed now.

THE FACILITATOR: Thanks, Scott. Scott had volunteered to answer a few high level, general questions if anybody had -- not detailed NFAT questions, not cross-examination. Patti, right? Where's Patti? Not cross-examination, right, Patti?

MS. PATTI RAMAGE: No cross.

THE FACILITATOR: Yeah. But if there are any general, high level questions that you might have for Scott. Looks like he's getting off easy. Okay. Well, thank you, Scott.

MR. SCOTT THOMSON: I'm sure I'll see

you all again.

THE FACILITATOR: Okay. Thanks, Scott. We're going to -- there's an agenda that had -- it's gone around before, our agenda is on the table. We're going to start off with Lois Morrison who's going to do the DSM and load forecast, but -- yes. Oh, thank you.

I know there are a lot of people here and we're going to be spending two (2) days together, so I thought maybe if we just quickly went around the room -- just one (1) time we're going to do this, I promise -- just quickly say who -- who you are and maybe, you know, which organization you're with, just very quickly. And maybe we'll start here.

(BRIEF PAUSE)

MR. WILLIAM GANGE: Bill Gange, counsel to Green Action Centre.

DR. PETER MILLER: Peter Miller, Green Action Centre.

MR. JAMES MAGNUS-JOHNSTON: James Magnus-Johnston, Green Action Centre.

MR. RUSS TYSON: Russ Tyson, TyPlan Consulting, working with the PUB.

MR. BORIS FICHOT: Boris Fichot, with

Knight Piesold. We'll be looking at the cost estimates from the independent perspective.

MR. HOLLIS SINGH: Hollis Singh, Public Utilities Board.

MR. BOB PETERS: My name is Bob Peters, legal counsel to the Public Utilities Board.

MR. WALLY KOSCHIK: My name is Wally Koschik, advisor to the Public Utilities Board on transmission matters.

MS. ANITA SOUTHALL: Good morning. Anita Southall, counsel for the Public Utilities Board.

MS. MEGHAN MENZIES: Meghan Menzies, Consumers' Association of Canada, Manitoba branch.

MS. JESSICA SAUNDERS: Jessica Saunders. I'm counsel to the Manitoba Metis Federation.

MR. RICK HENDRIKS: Rick Hendriks, consultant to the Manitoba -- Manitoba Metis Federation.

MS. LAUREN REEVES: Lauren Reeves, at the Manitoba Metis Federation.

MS. MARCI RIEL: Good morning. I'm Marci Riel, Manitoba Metis Federation.

MR. JOHN ATHAS: John Athas, with La Capra Association, working as the independent eval --

expert for the PUB.

MR. DAN PEACO: Dan Peaco, with La Capra Associates, also independent expert, PUB.

MR. BILL HARPER: Bill Harper. I'm a consultant for CAC.

MR. WILL BRAUN: Will Braun, Interchurch counsel, and Hydro Power and CAC advisory group.

MR. BYRON WILLIAMS: Byron William, counsel CAC (Manitoba).

MR. ANTOINE HACAULT: Antoine Hacault, counsel, MIPUG.

MR. PATRICK BOWMAN: I'm Patrick Bowman, with InterGroup Consultants, and I work with the MIPUG group.

MS. MELISSA DAVIES: Melissa Davies, InterGroup Consultants, MIPUG group.

MR. ROGER CATHCART: Roger Cathcart, accounting regulatory advisor to PUB.

MR. LARRY BUHR: Larry Buhr, advisor to the PUB on engineering matters.

MR. JOHN TODD: John Todd, Elenchus, independent expert with the PUB.

MR. ROBERT SINCLAIR: Robert Sinclair, Potomac Economics, independent expert for PUB.

MR. CRAIG SABINE: Craig Sabine, MNP. Also independent expert for PUB on macro-environment.

MR. KURT SIMONSEN: Kurt Simonsen, associate secretary, PUB.

MS. JAN CARR: Jan Carr, advisor to the PUB.

MR. PELINO COLAIACOVO: Pelino Colaiacovo, Morrison Park Advisors, and independent expert for the PUB.

MS. JOSEE LEMOINE: Josee Lemoine, project manager with the PUB.

MS. MARLA BOYD: Marla Boyd, counsel to Manitoba Hydro.

MR. BRENT DEMPSEY: Brent Dempsey, Province of Manitoba.

MS. COLLEEN CURLICK: Colleen Curlick, Manitoba Hydro. I work on the DSM initiative.

MS. PATTI RAMAGE: Patti Ramage, counsel to Manitoba Hydro.

MR. DALE FRIESEN: Dale Friesen, Manitoba Hydro.

MR. LLOYD KUCZYK: I'm Lloyd Kuczyk. I'm the vice president of Customer Care and Energy Conservation for Manitoba Hydro.

MS. LOIS MORRISON: Lois Morrison,

Manitoba Hydro.

MS. JOANNE FLYNN: Joanne Flynn, Manitoba Hydro.

MR. DAVID CORMIE: David Cormie, Manitoba Hydro.

MR. SVEN HOMBACH: Sven Hombach, legal counsel to the PUB.

MS. JUDY CLENDENAN: Judy Clendenan, Manitoba Hydro.

MS. LIZ CARRIERE: Liz Carriere, Manitoba Hydro.

MS. CHERYL PILEK: Cheryl Pilek, Manitoba Hydro.

MR. TERRY MILES: Terry Miles, Manitoba Hydro.

MR. DAVE BOWEN: Dave Bowen, Manitoba Hydro.

MS. HANRI JACOBS: Hanri Jacobs, Manitoba Hydro.

THE FACILITATOR: Okay. So a good, big crowd. A few housekeeping items. If you haven't already discovered this, the bathrooms are right on the other side of this wall in the corridor leading off the -- the next hallway. Fire escape, should something happen, which I'm sure it won't but you never know, is

where Lynn Warkinton is, through that door. You continue down and turn left, and then turn left again. But if anything does happen, I can guarantee you we'll have Hydro people telling you where to go.

And I -- I'm sure you're aware of this, but please mute your cell phones, including Hydro staff. And I think we're ready to go.

Are there any logistical questions or schedule agenda questions before we get going? Okay. Ah. Yes. Thanks for reminding me.

MS. NICOLE FITKOWSKI: Okay. So, so far I have John Dalton, Mary Neal, Rick, I don't know how to pronounce his last name, H-O-R-O-C-H-O-L-Y-N --

THE FACILITATOR: Horocholyn.

MS. NICOLE FITKOWSKI: -- and then we've got Sarah Keyes, Susan Geller, Wes -- Wesley Stevens. Those are all the people who have logged in so far.

THE FACILITATOR: Okay. So if I could ask Lois to come forward. And while she's coming forward, maybe I'll just -- oh, sorry, something more?

(BRIEF PAUSE)

THE FACILITATOR: So if you're going to

speak, please speak into a mic.

(BRIEF PAUSE)

MS. PATTI RAMAGE: Okay. And just before Lois begins, one (1) of the things, because there's so many new faces here today that weren't at the previous technical conference, we just wanted to cover very briefly, Ed mentioned it about the cross-examination, but one (1) of the things we're asking people is that when they ask questions, it's of clarification of materials here as opposed to going into the cross-examination mode of, Why didn't you do this, or, Why isn't it this. It's to understand what we are presenting, not to go to that next step.

That's not where we're at, at this process, and that's not what this -- the technical conference is intended. It's just -- it -- it's a clarification process to understand our materials. This puts our presenters at far more ease that I say this at the beginning, just so everybody is working from the same page. So we'd appreciate that.

THE FACILITATOR: And there...

(BRIEF PAUSE)

THE FACILITATOR: Yes. When you speak, please say your name first. And that was Patti Ramage, our legal counsel.

MS. PATTI RAMAGE: Ramage.

THE FACILITATOR: Ramage. Sorry. Sorry. And if you have a question, raise your hand and someone will bring you a mic to use.

(BRIEF PAUSE)

THE FACILITATOR: Oh, at the beginning I did. I'm Ed Wojczynski, the division manager at Manitoba Hydro who is responsible for the NFAT, amongst other things. I have been planner, project developer, Aboriginal partnership negotiator, transmission engineer, research associate at the University of Saskatchewan, and a few other things.

As Patti is indicating, the idea here today is we're -- we're presenting material that is inside our submission already. The PUB had asked that we have this process to facilitate a better understanding of what's in there, recognizing we haven't gone through that full interrogatory process and our -- our witn -- we -- frankly, most of the witnesses have just come off of many months of fifteen

(15) hour days, Saturdays, Sundays.

And we really haven't got ourselves prepared for, you know, the cross-examination kind of stuff that -- and this is going to be transcripted. And I understand it could be a -- form some kind of evidence, or will be -- could be evidence. So that's why we're being a little bit careful about this cross-examination issue, so...

But please do feel free to ask questions and you don't have to just wait until the end. If you -- if there's some questions that would suit being asked at the time, that probably works. Is that okay with you, Lois? Yes, must be. Okay. So I -- so one (1) last thing, any last questions or thoughts?

No? Okay. So we can get started then. Okay. Thank you.

LOAD FORECAST PRESENTATION:

MS. LOIS MORRISON: I'm a little worried that something's going to fall off on me and I'll be wearing it shortly. So thank you very much. As -- as Ed mentioned, I'm Lois Morrison. I'm the division manager of Consumer Marketing and Sales.

And I'm here today to provide a short review of the information that's included within our

filing and that we presented at the technical conference in July. And so for those of you that were here with us in July, this will be a review. And for those of us that are -- those of you that are new, please feel free to -- well, everybody can ask all the questions that you'd like related to the materials that we've provided. But hopefully I can provide some clarity as to what we've included.

Our load forecast -- the load forecast is a key input to our planning -- to our Power Resource Plan and to our integrated financial forecast. Our forecast is prepared annually, with adjustments through the forecast to recalibrate to represent our most likely case.

(BRIEF PAUSE)

MS. LOIS MORRISON: I don't know if it's working.

(MOVED TO SLIDE 3)

Ms. LOIS MORRISON: So for today what I'm going to walk through is our 2012 forecast. And I'm going to speak briefly to the analysis of

variability and accuracy and then talk briefly again to our 2013 forecast update. As I mentioned, we update our forecast annually to represent -- to include the updated market information.

Obviously, from the time we began our preparation for this filing to today, we had a significant period of time go by. So we have an updated forecast.

(BRIEF PAUSE)

MS. LOIS MORRISON: Under our 2012 forecast, we are pre -- we have seen -- sorry. Over the last twenty (20) years, our gross firm energy has grown about 329 gigawatt hours per hour, or 1.7 percent per year. And under our 2012 forecast we are anticipating that growth at a higher rate, forecasting it to grow at 453 gigawatt hours, or 1.6 percent per year, over the next twenty (20) years. Whoops.

(MOVED TO SLIDE 4)

MS. LOIS MORRISON: In addition, we are -- we have seen -- in our gross peak -- we've seen our gross peak over the last twenty (20) years grow by 44

megawatt hours -- 44 megawatts and 1.2 percent per year. And we're fo -- forecasting that growth to increase to 83 megawatts, or 1.6 percent per year, over the next twenty (20) years.

(MOVED TO SLIDE 5)

MS. LOIS MORRISON: Now, there are a number of factors driving that increased growth that we'll discuss in more detail.

Manitoba Hydro prepares their load forecast on a sector basis. We indi -- we forecast each sector individually. We look at -- the three (3) sectors that we look at are the residential, gra -- general service mass market, and the general service top consumers are all forecasted separately using methodologies that best reflect their unique market characteristics. We then combine those as -- forecasts together to come up with an overall forecast, which we just described.

As with most forecasts, we start with the energy of the -- the actual energy consumed within the most recent year and then forecast forward. So in the 2012 forecast year we would start with 2011 as our base year. During that year, we consumed 24,376

gigawatt hours, and we forecast forward from there.

(MOVED TO SLIDE 6)

MS. LOIS MORRISON: So beginning with the residential sector. Our residential sector ha -- has seen growth over the last twenty (20) years of 87 gigawatt hours, or 1.4 percent per year. Going into -- looking forward to the next twenty (20) years, we're anticipating that sector to continue to grow but at a rate of 132 gigawatt hours, or 1.6 percent per year.

The primary drivers for this growth are population and a market share of electric heat. So under the 2012 forecast, we were anticipating annual population growth to be at approximately 1.2 percent per year. And we are also anticipating -- we also have been observing an increase in use of electric space and water heating, which is driving up the -- the average or the -- the per unit -- or per customer energy use. And these have been driving up our residential forecast.

(MOVED TO SLIDE 7)

MS. LOIS MORRISON: One (1) of the

items that we discussed briefly at the technical conference in July was the population forecast and why is Manitoba anticipating to see such -- so much more growth, or are we -- are we anticipating something different from other jurisdictions.

As I mentioned during that presentation, we use a consens -- we develop our forecasts based upon a consensus forecast. We purchase forecasts from other organizations to develop our forecast. And for the purposes of our discussion today, I thought it would be worthwhile for us to look at.

We did get permission from one (1) of the -- one (1) of the forecasters that we purchase from -- that would be the Conference Board of Canada -- to display this information. And the purpose of this is to give some context to Manitoba's growth or the projections of Manitoba's growth.

The dark black line represents the 2013 forecast for population growth. I am -- I apologize for speaking to the 2013 year. However, we did not have this data for the 2012 year, which is what was used in the 2012 forecast. But this provides the same contextual information.

So the 2013 forecast that we are using in all of our 2013 assumptions is denoted by the black

-- the heavy black line, and that represents our projections. However, what's interesting to note of the Conference Board of Canada's projections is each province is denoted by a different-coloured line. And the dark -- the heavier green line is Manitoba, their projection of Manitoba's forecasted growth, annual growth.

And what we can see is that in the early years, like 2012 to 2020, roughly, '22, Manitoba is one (1) of the top three (3) provinces for growth, expected growth, annual growth. Then as we get into the future years of 2022, they're anticipating Manitoba to grow at a higher -- or a lar -- a higher rate than the other provinces in Canada.

And so, really, this is what's a key consideration in our forecast moving forward. Every -- as the population in Manitoba increases, the number of customers in Manitoba increases; more houses et cetera. So this is having an influence on our projections of growth for the residential sector.

Turning to our general service mass market. Sorry, I wasn't keeping up with myself.

MR. ROGER Cathcart: Mr. Roger Cathcart. Just a quick question. The 2012 Conference Board of Canada forecast was used in the NFAT filing?

MS. LOIS MORRISON: The Conference Board of Canada 2012 forecast is one (1) of the forecasts --

MR. ROGER CATHCART: Yes.

MS. LOIS MORRISON: -- that we purchased to come up with our consensus forecast which was used in the 2012 filing. The 2012 filing -- or 2012 population forecast was anticipating 1.2 percent growth annually. Our 2013 forecast, which I will speak to later, is anticipating 1.1 percent growth annually.

MR. ROGER CATHCART: So -- so a downward -- both are available -- you said that one (1) wasn't available or you just didn't use one (1) --

MS. LOIS MORRISON: We didn't --

MR. ROGER CATHCART: -- in your presentation.

MS. LOIS MORRISON: -- have the data -- going back. So we didn't have the detailed data by provinces --

MR. ROGER CATHCART: Okay.

MS. LOIS MORRISON: -- for the twelve (12) year of the Conference Board of Canada's forecast. So in order to provide the context of the other jurisdictions in Canada, I'm -- I'm presenting the 2013.

MR. ROGER CATHCART: Okay, thanks Lois.

MS. LOIS MORRISON: So -- but what we did see -- or what was communicated to us was that that same trend or representation was what was present in the 2012.

(MOVED TO SLIDE 8)

MS. LOIS MORRISON: So looking to the general service mass market. This includes all of our commercial industrial customers, other than our top consumers. And that would be the top seventeen (17) largest users in Manitoba. So this encapsulates every -- all the other commercial industrial customers. Now, in this sector we have seen, over the last twenty (20) years, average annual low growth of 115 gigawatt hours, or 1.6 percent per year. And that is -- we are anticipating that growth to continue into the future at a rate of 161 gigawatt hours a year, or 1.7 percent per year, over the next twenty (20) years.

And again, the primary drivers for the growth in this sector are the population and gross domestic product. So obviously, if your economy is projected to grow, your industry will grow, you'll have more customers and such. Population grows -- well, if

there's more people in the province, there's more schools, there's more healthcare. There's more services being introduced to meet -- to serve that increasing population. That's where we've seen a correlation in our growth for commercial customers. So both of those are driving growth.

(MOVED TO SLIDE 9)

MS. LORIS MORRISON: Looking further at our top consumers, the top consumers sector has grown over the last twenty (20) years. You can see by the blue line that obviously top consumers have a more dynamic growth pattern than the general service mass market or the residential customer base.

And you can see that over the last twenty (20) years, that sector has grown by 1,800 gigawatt hours, represents the approximately overall average of 2 percent per year. However, if you look at the last ten (10) years, even with the economic slowdown that we experienced in the -- beginning in 2008, we saw an overall growth of two (2) hun -- a net growth of 200 gigawatt hours in that sector.

So forecasting forward, we're anticipating that -- that gro -- that sector to

continue to grow at a rate of 108 gigawatt hours per year, or 1.7 percent, over the next twenty (20) years.

Manitoba Hydro prepares their forecast for the top consumers based on individual customers for the short term. We tal -- we -- we work with the individual customers through our key and major account representatives to identify what their short-term committed plans are for growth. Those are factored into the short term. And that's represented by the first stage of that red line. The first three (3), four (4) dots/periods of that red line is representing what those short-term committed plans are for those individual sectors and individual customers.

We then look at what can we anticipate seeing, going on past that period of time. It's -- it's very difficult to forecast forward growth for individual customers beyond those years within a reasonable manner. So what we do is we do a forecast forward based on what past experience has been, and we apply some consistency to the forecast. We can't anticipate that in, say, 2024 we're going to have one (1) large expansion that's going to represent a 500 gigawatt hour expansion. So what we do is we look at the past history and project forward based on that as to what we can anticipate to see in terms of this

sector.

And those of you familiar with forecasting recognize that there's uncertainty in forecasting; it's inherent characteristic to all forecasting. However, our forecast represents Manitoba Hydro's best estimate of Manitoba's future energy requirements based upon the information that's available today and our past experience.

Recognizing that there's uncertainty in the forecast, Manitoba Hydro includes an estimate of the magnitude of potential variation from the forecast due to long-term economic effects, such as changes to population, changes to economic growth, and such. This is based on a probabilistic analysis. And so what this chart represents is the variation that could occur due to changes in our forecast or in -- to economic growth into the future and what the impact might be to our load.

And so based upon this, you can see that there would be approximately a plus or minus 2,555 gigawatt hour difference under our 2012 forecast, based on variability -- economic variability.

What this means is that there's a -- when we do our probabilistic analysis, what it means is that there's a 10 percent probability of -- under the

2012 forecast -- of the load being less than 30,870 gigawatt hours in thir -- 2031/'32, and being there's a 10 percent probability of the load being greater than 39,980 gigawatt hours in 2031/'32. And that's variation around our projected load for '31/'32 of 33,425 gigawatt hours.

MR. JOHN TODD: Question -- oh, sorry, John Todd, Elenchus. What's the -- what's the database you're using to come up with the 10 percent variability in growth rates? I mean, on what is that based?

MS. LOIS MORRISON: It's a probabilistic analysis based on past experience. It's a regression analysis. We look at the weather adjust -- we take the weather-adjusted load from the past twenty-five (25), thirty (30) years, and we regress it against the economic charact -- the -- the actual versus the -- what was act -- what was fore -- oh, sorry. I have to actually go to my expert on the exact details as to how we derived it, but it is based on a regression analysis, because I will not say it in a proper way.

MR. BOB PETERS: Hi, Lois. It's Bob Peters. If we can go back to Slide 9, please, the one (1) just before this.

Could you tell us the dip that occurs

from about '08 to -- to '12, what the factors are that caused your top seventeen (17) clients to reduce that load, and -- well, I'll have a couple others, but let's start with that one, please.

MS. LOIS MORRISON: Well, the -- the reduction in 2008, it's actually -- the majority of that would have actually occurred in 2008. And that was the loss of one (1) major load. One (1) major top consumer is the primary driver for that reduction.

MR. BOB PETERS: And, Lois, looking at the red line, you indicated the first three (3) dots of red are based on face-to-face meetings between Manitoba Hydro personnel and, as I understood it, the -- the top seventeen (17) customers, and that gave you your forecast for those three (3) years?

MS. LOIS MORRISON: Yes, what we do is our -- we -- our load forecasting group meets with our key account representatives and major account representatives that represent these seventeen (17) customers. And those representatives provide us with the information that we've been provided -- that they've been provided by the customers as to what their committed projects are.

So if they've already committed to, say, a transmission interconnection study to service certain

load requirement, that is all brought forward and -- and accumulated to come up with what we anticipate to see the growth in those different customers.

MR. BOB PETERS: And my last quest -- my last question, Lois, is in 2015, at the end of the third red dot, the green line comes in and it -- would it be a correct interpretation to say that, based on what your top seventeen (17) customers have told you, after 2015, there -- the load for these seventeen (17) customers goes flat?

MS. LOIS MORRISON: Well, what we do is -- okay, so what the green line is doing is it's demonstrating the short-term forecast, but we hold it constant. So one (1) -- at an individual basis.

So really what -- what -- from the last presentation, what I was demonstrating is how -- when I talked more about our methodology for the top consumers, I talked about how we forecast them separately and then -- for the short term. And then we add on the -- what we call our potential large industrial load growth as a -- as a -- an annual basis into the future to count for unexpected load growth that is lon -- more long term in nature.

Now, the green line is representing where we've -- where we've held constant after that

three (3) years, what those different customers have indicated. So we've just -- we've just straight-lined it after that. And then we add on the -- the 100 gigawatt hours a year going into the future.

MR. BOB PETERS: All right. And when I said it was my last question, you know that wasn't quite true. The -- the 100 gigawatts a year for the potential large industrial load that you mentioned, what is the basis that Manitoba Hydro calculates that number?

MS. LOIS MORRISON: That 100 gigawatts hours a load -- sorry, 100 gigawatt hours a year load is based on the -- what I mentioned, the 1,800 gigawatt hours of growth over the last twenty (20) years. And so -- okay, so last time I had a slide that demonstrated what we did for calculating that.

So the 100 gigawatt hours a year is an average that we use. And then every year we double-check to make sure, is that average still reasonable. Rather than adjusting it up and down every year, we -- we double-check to make sure that that one hundred (100) is still reasonable.

And if I can go back to my...

(MOVED TO SLIDE 10)

MS. LOIS MORRISON: Okay. If I go back to -- if you look at the growth -- the hist -- over the last twenty (20) years, we had historical growth on average of 92 gigawatt hours a year. So when you take -- of this sector, over the last twenty (20) years, we've seen unexpected growth, growth that wasn't planned for in our forecast specifically of 92 gigawatt hours.

And so that's how we come up with the one hundred (100), is so when we first started doing this forecast, we did an analysis and it was approximately 100 gigawatt hours. So that's what we used going forward. And every year, as I say, we double-check, does that still make sense, does that still meet the threshold of reasonability.

So we feel that that's still a reasonable approximation for what the growth going forward will be.

MS. NICOLE FITKOWSKI: Well, it's not a question, it's just a comment from people that are on the eConnect. They're having a difficult time hearing the questions that people are asking. They can hear the speaker. But the people who are asking questions, you are very faint, so maybe speak a little louder in your mic so they can hear the questions.

(BRIEF PAUSE)

MS. LOIS MORRISON: Okay.

(MOVED TO SLIDE 11)

MS. LOIS MORRISON: So as we mentioned, uncertainty in forecasting is an inherent characteristic. And Manitoba Hydro recognizes that. But Manitoba Hydro is satisfied with the methodology and approach we've undertaken. As part of our annual processes, we look at the accuracy of our past forecasts to -- again, it's basically performing a reasonability check. And our objective is to be within 1 percent per year of every year being forecast.

So we do an analysis based on a five (5) year forecast and a ten (10) year forecast. And so we are targeting to be within 5 percent on our five (5) year forecasts, or within 5 percent of -- have actual energy consumption be within 5 percent of what we forecast for each -- for the five (5) year forecast, and within 10 percent for the ten (10) year forecast.

(MOVED TO SLIDE 12)

MS. LOIS MORRISON: And what the chart here shows is that for the majority of our forecasts, we are well within meeting our target of 5 percent. When we look at our ten (10) year forecast, we are again meeting that target of being within 10 percent. And so we feel quite comfortable that the methodology and the -- and the modifications that we're making year to year to improve the methodo -- the -- the forecasts are delivering reasonable forecasts and forecasts that re -- represent the most likely scenario.

The one (1) thing that I would note is that the forecast assumes average expected economic conditions. We do not forecast for unexpected periods of recession or growth. What the -- what some people might see when they're looking at these is that it looks like we have periods of over-forecasting and under-forecasting. That's not a character -- that's not an outcome of the methodology so much as an outcome of the -- the cycles that we're looking at.

So, for example, when you're looking at the period leading up to 2002 -- sorry, for the -- when you look at the period of 2002 to 2007, it would look like we were under-forecasting. Well, we were -- we were not so much under-forecasting as we had forecast based on average expected or expected economic growth,

and what we were going into was a period of economic growth, unexpected economic growth. So for each of those five (5) years, we're going to be under what was actually -- we be un -- looking to be under-forecasting.

When we go to the period -- when we go to the period of 2008 forward, you can see that our five (5) year forecast would have been projecting some increased growth based on past history, but our ten (10) year forecasts are -- still be showing that we were expecting lower growth.

So really it's -- again, we -- these -- this is more of a demonstration of those fluctuations around unexpected periods of growth and recession. But the overall target of being within the -- the 5 percent or within 10 percent for those te -- five (5) and ten (10) year forecasts has been met.

(MOVED TO SLIDE 13)

MS. LOIS MORRISON: So as -- as I mentioned earlier, we update our forecast every year as market conditions change and as better information comes available. We have updated -- since the preparation of the fi -- information for the filing, we

have updated our forecast to represent the information for 2013.

And under our 2013 forecast, we're projecting that over the next twenty (20) years our load growth will be at a rate of 413 gigawatt hours, or 1.5 percent per year. And this is slightly lower than what was proje -- presented under our 2012 forecast. There are two (2) factors that are influencing that, and the primary factors are the population forecast. As we talked about earlier, the population forecast under the 2012 was projecting a 1.2 percent per year increase, and under the updated 2013 forecast we were -- we are seeing a projection, based upon the consensus forecast, of 1.1 percent per year.

The other thing that we introduced in 2013 is we recognized concerns around the increasing use of space heating in the -- in the residential sector, primarily in what we term to be the south gas available area. It would not necessarily be so much in Winnipeg, but in the areas outside and surrounding Winnipeg where we're seeing an increased use of electricity for space heating. In addition to overall, we're seeing an increased use of electricity for water heating.

(MOVED TO SLIDE 14)

MS. LOIS MORRISON: Now, what we've done is, we have adjusted our load forecast to represent initiatives that we are in the process of bringing in, that we have brought in, and are looking to expand to help customers make better choices; and to make sure that the appropriate price signals are in place for customers to choose natural gas for their space heating, as opposed to electric.

And so both of those factors have resulted in a decrease in our firm energy projections for our 2013 forecast. That -- those same influencers result in our forecast for total peak being reduced -- now we're fore -- forecasting a growth rate of 76 megawatts and 1.5 percent per year over the next twenty (20) years.

(MOVED TO SLIDE 15)

MS. LOIS MORRISON: So, to summarize the main changes between the 2013 forecast and the 2012 forecast, we can see that -- and -- and I'll focus more so on the 2031/'32 year. In 2031/'32, under the 2012 forecast, we were projecting energy requirements of

33,425 gigawatt hours. Under the 2013 forecast, that's reduced by approximately 1,200 gigawatt hours to 32,265 gigawatt hours as being our most likely energy requirements in the future.

We also see a reduction in our demand requirements from 6,032 megawatts to 5,886 megawatts in 2031/'32. The change in our annual load -- in our annual growth rate is -- instead of anticipating a 450 gigawatt hour growth rate, we're looking at a 420 gigawatt hour a year growth rate. And the annual -- and that represents a percentage of change of 0.1 percent between the -- the two (2) forecasts.

(MOVED TO SLIDE 16)

MS. LOIS MORRISON: Okay. So something didn't quite happen right when it's transferred over. So what we were trying to demonstrate here is, this is going back to our discussion of variability, and when we do our analysis for load forecasting and we look at the -- the probability -- the -- the potential for load to vary, so -- due to economic adjustments, and what we were attempting to demonstrate here by the red line, the heavy red line represents the 2012 forecast. The heavy yellow line represents the 2013 forecast.

Now, the lighter -- or the thinner red lines represent the bands of variability around our 2012 forecast, and the thinner, yellow lines represent the bands of variability that we were anti -- that we were projecting around our 2013 forecast.

And what we were simply trying to demonstrate here was that both the '12 and '13 forecasts fall within the bands of variability that are being projected. So, Byron...?

MR. BYRON WILLIAMS: Lois, I'm not going to be like Bob -- oh, it's Byron Williams. I'm not going to be like Bob Peters and pretend I'm going to ask three (3) questions and ask twelve (12) but --

MS. LOIS MORRISON: Are you going to ask twelve (12)?

MR. BYRON WILLIAMS: No, I -- hopefully just one (1) or two (2). Just -- if you can just remind me -- and I'm trying to remember from your July presentation -- when we look at the 2013 load forecast as compared to the 2012 load forecast, am I right in suggesting to you that in the 2013 load forecast your expected DS -- incremental DSM savings are lower, as well?

MS. LOIS MORRISON: Well, in the 2013 forecast we do -- so -- so we do not -- we -- we

forecast demand-side management separate from the load forecasts. They're not inclu -- they're not together. So the 2013 forecast is done separately from this. It does not include any of the program anticipated savings for DSM, so it's not factored in here. So any additional DSM savings would be additional reductions to this.

Only one (1) question, Byron?

MR. BYRON WILLIAMS: They took the mic away.

MS. LOIS MORRISON: Oh.

MR. BYRON WILLIAMS: It's all good.

MS. LOIS MORRISON: Okay.

MS. NICOLE FITKOWSKI: Philippe Dunsky has a question.

MR. PHILIPPE DUNSKY (VIA CHAT): To what extent does the forecast account the anticipated rate increase further impact on new and existing load?

MS. LOIS MORRISON: Our load forecast, we went through the methodology in quite a bit more detail in the July session, where we talked about how rate changes are included within the methodology for load forecasting.

We do not include a price elasticity within our load forecast, simply because in the past we

have not seen in a -- when we do our regression analysis we have not seen the price changes to be able to demonstrate a -- an ef -- an -- a demonstrable change within our forecast.

We did use price differentials between natural gas and electricity to determine fuel choice, or which customers would be choosing electric heat versus natural gas heat. But that was the only wa -- factor that we used in our price elasticity. That's the only way we used pricing within our forecast.

So we do not cons -- we do not include a price elasticity within the forecast.

MR. RICK HENDRIKS: Rick Hendriks. You indicated when you first put this up that it didn't transfer over well, so I'm assuming there's an error on this graph somewhere and I --

MS. LOIS MORRISON: Well, it --

MR. RICK HENDRIKS: -- I suspect it's with the material that's been slid down. Can I --

MS. LOIS MORRISON: Yeah, that's all it is. The shading should move up.

MR. RICK HENDRIKS: Yeah. Can I just ask that -- that this graph be -- when it's posted to the site, be corrected and also that the -- that a legend be included for the -- for the meaning of the

lines?

MS. LOIS MORRISON: Oh, yeah, we can do that.

MR. JOHN TODD: Lois, John Todd, Elenchus. I think you mentioned that when you've looked for elasticities in the past, you haven't found any and therefore you haven't included them. Do you --

MS. LOIS MORRISON: We -- we haven't said that there isn't. What we said is --

MR. JOHN TODD: Yeah.

MS. LOIS MORRISON: -- we haven't been able to demonstrate one (1) that we can use in our forecasting to --

MR. JOHN TODD: Right.

MS. LOIS MORRISON: -- predict future behaviour.

MR. JOHN TODD: And to iden -- presumably to identify one (1), you'd need enough of a rate increase relative to inflation to pick that up?

MS. LOIS MORRISON: M-hm.

MR. JOHN TODD: Has there been any experience in Manitoba Hydro in the past with cumulative real rate increases comparable to what's anticipated in the current development plan?

MS. LOIS MORRISON: This would be

subject to check, because we're go -- might be going past my tenure.

MR. JOHN TODD: In your -- in your -- maybe compared to the life of Manitoba Hydro.

MS. LOIS MORRISON: In -- in -- Manitoba Hydro's rate strategy has generally been with -- been slow, small incremental rate increases. In fact, we went through a period of time where there were -- I -- which was part of my tenure actually, of about approximately ten (10) years where there were no rate increases.

So we -- we do not have our own personal experience where we could state that we've experienced a, say, a one (1) year 10 percent rate increase that we could incorporate into the analysis, that I am aware of.

(MOVED TO SLIDE 17)

MS. LOIS MORRISON: So in summary, I just would like to point out again, or reiterate, that we -- our forecast is updated annually to reflect the most current available market data. And we feel that this represents Manitoba Hydro's best estimate of future energy requirements. The forecast models and

methods are adjusted wherever appropriate to make improvements, and we feel that those have been very effective.

And someone has a question.

MS. NICOLE FITKOWSKI: Philippe Dunsky has another question.

MR. PHILIPPE DUNSKY (VIA CHAT): To what extent are new and anticipated energy efficiency codes and/or standards included in the load forecast? Please be specific.

MS. LOIS MORRISON: I -- the -- we include in the -- when we're doing our forecasts, we forecast the growth for each sector then we subtract our forecasts for codes and standards. The codes and standards that we subtract are the ones that are already in place. The influence of those codes and standards that are already in place or that have been -- that have been noted to be go -- be coming in, in the near term, that have actually been committed to. So those -- those -- the impact of those codes and standards are removed from our load forecast.

I can't pull the number right off the top of my head as to what that represents. It is denoted in our 2013/2016 Power Smart Plan what the influence of codes and standards are that are included

within our load forecast.

(BRIEF PAUSE)

MR. RICK HENDRIKS: Sorry, I might be getting ahead of myself here. Rick Hendriks. You noted that it's included in your Power Smart Plan -- maybe I could defer this question to the DSM discussion --

MS. LOIS MORRISON: Yeah.

MR. RICK HENDRIKS: -- but -- so when you speak of DSM in the load forecast, it appears that your own -- that you're not including the effective codes and standards, you're only talking about your programs. So can you just clarify me what exactly is Manitoba Hydro's -- like normally when I think of DSM, I would think of a wide variety of things, such as programs, effects of standards and codes --

MS. LOIS MORRISON: M-hm.

MR. RICK HENDRIKS: -- conservation rates --

MS. LOIS MORRISON: M-hm.

MR. RICK HENDRIKS: -- the whole box. Can you just describe what you mean when you say, "DSM"?

MS. LOIS MORRISON: Okay. We mean the same thing but it's how we -- I am going to wear this soon. What we -- it's how we bin it. So when we talk about our overall conservation initiatives, we talk about all those components. Within -- within our Power Smart Plan, we denote all those different factors that you -- or those components that you spoke to. How we treat them in our integrated resource planning process and our load forecasting process is what we're speaking to now.

In terms of our load forecast, we reduce our load forecast to reflect the future effect of codes and standards in place. So, for example, Manitoba has introduced a energy code requirement under their Part 9 Building Code, which would be residential housing. The influence of that code is reflected in our load forecast becau -- the future effect of that code is reflected in our load forecast because that is a code in place.

If, perhaps, through one (1) of initiatives -- so one (1) of our incentive-based programs -- we are hoping to or working towards getting better codes in place, that would be denoted within the Power Smart Plan because that is not yet in place.

So those load forecast reflects the

codes that are in place or expected to be in place in the near term, not the ones we're hoping to influence.

MR. RICK HENDRIKS: Rick Hendriks again. Thanks for that clarification.

So when you look at the effect of DSM on the load forecast, are you saying that the effect of DSM is all of those things? Because when I read the -- when I read your -- your NFAT here, it seemed that DSM only referred to the programs. So, in other words, the effect of codes and standards is somehow subtracted first --

MS. LOIS MORRISON: Yes. So --

MR. RICK HENDRIKS: -- from the load forecast?

MS. LOIS MORRISON: Yeah.

MR. RICK HENDRIKS: And then you look at your -- effect of your programs?

MS. LOIS MORRISON: Yeah.

MR. RICK HENDRIKS: Okay.

MS. LOIS MORRISON: So -- so we're not double-counting.

MR. RICK HENDRIKS: Okay.

MS. LOIS MORRISON: So -- so what happens is the effective codes and standards that are in place as I described are removed from our load

forecast. Then, with all of our DSM planning, we only include -- we want to make sure we're not double-counting, so we take only those programs, savings, and initiative savings that are separate from codes and standards and we pass that to the integrated resource planning process folks. And then they take our load forecast; they do their models based on that. So they do -- they create the net load requirement.

MR. RICK HENDRIKS: Okay. So Rick Hendriks again. Just to clarify then, have you determined the overall effect of codes and standards, conservation rates, and your programs on the load forecast? That would make it easier for us to compare between other jurisdictions. Everybody does it a bit differently.

MS. LOIS MORRISON: Well, we would simply take -- we do that in Chapter 4. In Chapter 4, they do present the load impact net of DSM. And -- and there is a section where they show -- and what they've done is they've taken our load forecast and just taken off the program savings to demonstrate that.

MR. RICK HENDRIKS: Right. When you say, "DSM," though there --

MS. LOIS MORRISON: Sorry.

MR. RICK HENDRIKS: -- you're only

referring to the program savings?

MS. LOIS MORRISON: The in -- what you could call the -- the incremental program savings, yes.

MR. RICK HENDRIKS: Right. So what -- how -- how does one determine the overall effect of codes and standards, conservation rates, and programs on the load forecast?

MS. LOIS MORRISON: So you're asking us to go back to our load forecast, pull out the codes, and rebuild our load forecast --

MR. RICK HENDRIKS: You got it.

MS. LOIS MORRISON: -- without codes and standards.

MR. RICK HENDRIKS: Yes.

MS. LOIS MORRISON: We don't -- we don't have that listed anywhere. We don't have that outlined in any one (1) spot.

MR. RICK HENDRIKS: But you have the data?

MS. LOIS MORRISON: We have the data.

MR. RICK HENDRIKS: Okay.

MR. ROGER CATHCART: Hi. Roger Cathcart. Just a quick question. When you said that it's in your 2013 Power Smart -- 2013 to 2016 Power Smart Plan, you mean it's in Appendix E to your 2013 to

'16 Power Smart Plan?

MS. LOIS MORRISON: Yes, it's the Appendix E --

MR. ROGER CATHCART: In Appendix E.

MS. LOIS MORRISON: -- as part of the filing.

MR. ROGER CATHCART: And if you go to Appendix E, you see 824 point -- 842.4 gigawatt hours of savings on -- due to codes and standards. And at the top of it, you say that the Power Smart Plan has 4.9 percent savings over the load forecast --

MS. LOIS MORRISON: Yes.

MR. ROGER CATHCART: -- including codes and standards?

MS. LOIS MORRISON: Yeah, that's including codes and standards.

MR. ROGER CATHCART: So would it be possible to break down the difference between what is DSM versus what's codes and standards and give us a table of -- of that?

MS. MARLA BOYD: I think you're asking as an IR.

MR. ROGER CATHCART: No, I -- I don't, but it's -- if it's available. I'm sorry.

MS. MARLA BOYD: Now you're in trouble.

Marla Boyd. I -- I don't think that -- that we can give you those kind of detailed breakdowns here. If you're looking for an Information Request, certainly it can be part of that process. But in terms of what we're providing today, you've gone kind of beyond what Lois can do off the top of her head.

MS. LOIS MORRISON: Yes.

MR. ROGER CATHCART: My bad.

MS. NICOLE FITKOWSKI: I have another question from Philippe Dunsky. So he says:

MR. PHILIPPE DUNSKY (VIA CHAT): So can we assume that the future codes and standards are not accounted for? Just to be clear, I'm referring to the ones Manitoba Hydro -- Manitoba Hydro is hoping to influence in the future, not the ones already committed to or adopted.

MS. LOIS MORRISON: The ones that we are hoping to achieve are reflected in the Power -- the in -- the individual program savings. Maybe to use the -- the distinction that was denoted earlier, they would be within that program savings that would go to the resource planning Group under our -- our -- what we call our Power Smart Plan.

So the future ones that we're hoping to achieve through our initiatives and such are denoted in

our plan, but they're in the second bin, the bin of the what we call DSM net of codes and standards.

MR. BILL HARPER: Bill Harper, with CAC. Lois, on pages 668 -- and you probably don't have to turn it up, this is the one where you show the sectoral forecasts for -- for re -- for residential and for the GS mass markets. And when you look at the information there, in both cases, the forecasts going forward, the growth rate there was higher than if I looked back in -- in time.

And, you know, that's something pe -- people normally compare, is how are things -- you know, why... I just want to make sure those numbers really aren't -- I want to put a proposition to you because I think, from what you're saying, those numbers really aren't comparable because your historical numbers would have all the DSM built into them, whereas your forecasts don't have all of the DSM that you're planning in the future built into them.

So it would be incorrect for me to really compare the historical growth rates you've got here with your for -- forecast growth rates. Is -- is that a fair comment?

MS. LOIS MORRISON: That is -- that is correct. The his -- because we forecast forward from

the actual energy consumption used in that year, that's deemed to be including all past energy efficiency initiative, the result of all past energy efficiency and conservation effects.

MR. BILL HARPER: Right.

MS. LOIS MORRISON: So there is a different in those -- in those factors.

MR. BILL HARPER: One would then have to compare the -- what's post-DSM --

MS. LOIS MORRISON: Yeah.

MR. BILL HARPER: -- to the numbers you've got here in the past to sort of get an apples-to-apples comparison then?

MS. LOIS MORRISON: That's correct.

MR. BILL HARPER: Okay, thanks.

MS. LOIS MORRISON: Okay. So going back to my summary. We -- our forecast models are up -- and methods are updated and adjusted where appropriate to make improvements. And as I mentioned, we are quite comfortable with the adjustments that we've made. And our forecasting accuracy over the long term demonstrates that the meth -- demonstrates that these methodologies are reasonable and reliable.

MR. BYRON WILLIAMS: Lois, Byron Williams, CAC. Just go -- following up to Bill's

question. When you are looking at forecasting accuracy, and I'm not -- are you -- the original forecasts exclude --

MS. LOIS MORRISON: We add back in the DSM that we've achieved. So that would be the end of my presentation. If there are any other questions, I'd be happy to take them.

THE FACILITATOR: Are there any more questions on this part? Lois is doing the load forecast and the DSM. And I thought maybe, Lois, we would take a ten (10) minute break before going onto the next one. Does that make sense for you?

MS. LOIS MORRISON: Yeah, I'd appreciate that.

THE FACILITATOR: Okay. But -- but before we move on, any questions on the load forecast part of it? Going once, going twice, gone.

It's eleven (11) after 10:00. Why don't we go fourteen (14) minutes to 10:25 sharp. And I guess, Lois -- if you had a load forecast question that popped into your head over coffee, I -- I suspect she might be willing to answer it. Okay, thanks, 10:25. Thanks.

--- Upon recessing at 10:11 a.m.

--- Upon resuming at 10:26 a.m.

THE FACILITATOR: Okay. Good aft -- good morning, again. It's Ed Wojczynski again. So we'll get started. And our second presentation again will be Lois, with the load forecast. And I guess we'll just get started.

DSM AND ENERGY EFFICIENCY PRESENTATION:

MS. LOIS MORRISON: So I want to thank you for the opportunity to come to speak to Manitoba Hydro's DSM plan and how it fits within the submission for this public hearing.

Today what we're going to walk through is primarily what information we have provided in the chap -- in Chapter 4 of the submission. I'm going to speak briefly to our 2013 to '16 Power Smart plan, which is our current approved plan; talk to Manitoba Hydro's approach to accessing economic opportunities; and the -- and speak to additional DSM and the potential study.

As before, if you have any questions throughout the discussion, please feel free to ask. Hello. Mr. Todd would like the mic.

MR. JOHN TODD: John Todd again,

Elenchus. Just a high-level question. Your DSM plans have gone on for a number of years. With the NFAT in your development plan, it's sort of different than business as usual. It's something of a much bigger scale.

Has that had any impact on your DSM planning? I mean, do you do anything different because you've got this large expenditure looming ahead?

MS. LOIS MORRISON: We had -- what we did do was we under -- we did initiate the potential study. The potential study was initiated for both -- for two (2) purposes: one (1) recognizing we were moving into the NFAT analysis and, two (2) it is relatively -- it -- it's important that every so often you take that step back and look at your market as a whole and make sure that your programs or your -- your plan is in alignment with what's coming on the horizon.

So that was what we did do in -- in anticipation of the upcoming NFAT.

(BRIEF PAUSE)

MR. JOHN TODD: Yeah, just to follow up. Oh, sorry, John Todd, continuing. Has -- has Manitoba Hydro ever done or contemplated doing an

integrated resource plan?

MS. LOIS MORRISON: I think Ms. Flynn and Mr. Wojczynski say that we regularly do an integrated resource plan.

THE FACILITATOR: If you're -- it's Ed Wojczynski. If you're referring to an integrated resource plan in the sense of having DSM options in parallel -- in portfolio sense with supply options and then in effect finding an optimal level of DSM at the same time you're looking at your supply option and all the other things on your system, we have done that in the past. That was how the -- a number of years ago, not recently, how the DSM levels were obtained.

And actually, as those who are -- well, not many of you would have been in attendance yesterday, at the technical -- no, pre-hearing conference. But what we explained to everybody there yesterday is that we are going to be -- with this DSM market potential study, Lois and her people, as she's going to explain right away, are going to be developing an updated DSM plan for -- over the next number of months and also look at a higher level of DSM beyond the base plan, somewhat similar to the sensitivities we did, or approaching those.

Proba -- it won't be the same as those,

and that that would then be don -- applied into a economic power resource planning evaluation to assess the two (2) layers -- two (2) levels of DSM. So to that degree, that would be an integrated resource planning process. We're not looking at individual programs, but two (2) major levels of it.

Does that answer your question?

(BRIEF PAUSE)

THE FACILITATOR: We are -- we are going to be doing that.

(BRIEF PAUSE)

THE FACILITATOR: Okay.

MR. JOHN TODD: You -- you ment -- yeah. You mentioned that you had -- sorry, John Todd continuing. You mentioned you had done sort of a full IRP in the conventional sense of it's a resource to optimize.

Could -- do you know when in the past that was done?

THE FACILITATOR: Ed Wojczynski again. Actually, I don't remember how long ago was that. Was

it ten (10) years ago, Joanne? I don't -- you know, we'd have to get back to you in -- exactly when that was. I don't know if -- Lloyd, if you remember, but -- no. It was certainly many years ago. It was not recently.

MS. LOIS MORRISON: It was in my early years.

THE FACILITATOR: Yes. I was manager of -- of resource planning then and Lois was manager of something or another.

MS. LOIS MORRISON: No, I wasn't manager of anything then.

THE FACILITATOR: Oh, okay. Anyways, I'm guessing fifteen (15) years ago, but I -- you know, something in that order.

MS. LOIS MORRISON: Fifteen (15) to twenty (20), yeah.

THE FACILITATOR: Does -- does that satisfy your...

MR. JOHN TODD: Yes.

THE FACILITATOR: Okay.

(MOVED TO SLIDE 3)

MS. LOIS MORRISON: Okay. Okay. So --

sorry, this is -- so we'll be -- we'll be speaking to additional DSM as Mr. Wojczynski mentioned and potential study.

So it's important, when looking forward, that you look at where you've been. And so we would like to note that for Manitoba Hydro -- Manitoba Hydro's Power Smart initiative has accomplished over the last twenty (20) years.

We've achieved a hundred and ninety (190) -- 1,990 gigawatt hours of energy savings of -- of electricity savings, 586 megawatts of electricity savings, and 700 -- 77 million cubic metres of natural gas savings. We've invested to date $537 million in energy efficiency, of which four hundred and thirty-six (436) is specifically for electricity sav -- energy efficiency.

(MOVED TO SLIDE 4)

MS. LOIS MORRISON: Looking forward under our current plan, we will be investing and saving still more. We are projecting additional savings of 1,552 gigawatt hours per year and 490 megawatts of electricity savings and 59 million cubic metres of

natural gas. This is -- will be through an investment of $421 million in energy efficiency, of which three hundred and twenty-six (326) will be for electricity DSM.

Through our planned DSM initiatives, we're anticipating that plus -- participating customers can expect to save $52 million in the year '27/'28. Cumulatively, that repre -- that will be $486 million in their electricity bills by '27/'28.

(MOVED TO SLIDE 5)

MS. LOIS MORRISON: When we combine our efforts to date with what we're projecting to achieve over the next fifteen (15) years, we anticipate savings -- we will have saved by 2027/'28 3,113 gigawatt hours, and 846 megawatts of electricity savings, and 126 million cubic metres of natural gas. It'll represent an investment in DSM or energy conservation of $958 million, of which 762 million will have been in electricity efficiency.

So -- oh.

MR. BILL HARPER: Bill Harper. I'm sorry, if you go back, I was just trying to understand -- if you could just clarify, because your numbers on

the slide, the gigawatt hours had per year. Exact -- exactly what does a 3,133 gigawatt hours per years represent? Is that the total area under the curve for the entire --

MS. LOIS MORRISON: No. It represents that in '27/'28, if you accumulate all the activity, not the savings, but if you say for every CFL, every house insulated, every T8 converted to T -- every T8 conversion, every T5 conversion, you add all that up, by '27/'28 the load will have been reduced by 3,118 gigawatt hours.

MR. BILL HARPER: And -- and just to follow up. Bill Harper again. That's assuming that every program you put in place since 1990, those savings are continuing all the way through to 2028?

MS. LOIS MORRISON: It's net of those ones that don't continue.

MR. BILL HARPER: Okay. Fine. Thanks.

MS. LOIS MORRISON: We do -- we do factor in ones where they drop off.

MR. BILL HARPER: Okay. Thanks.

MR. JOHN TODD: John Todd. When you say, "dropping off," is that programs that sop -- stop or is that persistence of measure that are put in place?

MS. LOIS MORRISON: Persistence of measures.

MR. JOHN TODD: Okay.

(MOVED TO SLIDE 7)

MS. LOIS MORRISON: So how do we come up with our plan? We thought for the -- for the purposes of our discussion it would be worthwhile to -- to have a quick discussion about how -- how do we get here? How did we gt to the 2000 -- to our -- to our current Power Smart Plan?

So our DSM strategy is to pursue all economic energy efficiency opportunities. So the question is: Why do
we focus on economic opportunities?

DSM is a part of Manitoba Hydro's integrated resource plan. The -- all options for -- under that plan for meeting future requirements are assessed using standard economic evaluation. And so DSM is also examined, based upon an economic perspective.

(MOVED TO SLIDE 8)

MS. LOIS MORRISON: When we're looking at DSM opportunities, each DSM opportunity is an independent decision. Manitoba Hydro assesses the economics of pursuing each energy efficiency opportunity individually. And this is consistent with assessing the -- each supply side option on its own merits.

So for our approach, all categories, as I mentioned, are -- each initiative is looked at individually for all categories. All customers pay for the whole cost, therefore, it's important to consider the need of -- we need to consider the full costs in the installed kilowatt hour.

With DSM opportunities it's important to recognize that the relevant costs associated with the DSM opportunity is the total cost of the DSM opportunity, which includes the participating customers' cost in addition to the Utility's investment.

Similar to supply-side options, ratepayers ultimately pay the entire cost of DSM options. With DSM, the initiatives are paid for by the participating customer and by the ratepayers via the Utility's investment in the DSM options. This is why we look the resource cost.

So when we are looking at demand-side management and assessing the economics of an initiative or an opportunity, we look at a variety of metrics. However, as we've just stated, we look at the resource costs to determine which initiatives we will be pursuing.

So when -- when we are looking at an initiative, the first screen of an independent technology or a measure is based on a more simplified resourced cost assessment. So what we're looking at when we're looking at an energy conservation initiative or a energy efficiency initiative is what's the benefit of those energy savings or the value of the time -- that -- all the energy savings in the future, what's the value of those? We present value that. And we also include any measurable non-energy benefits, so if there's water savings, if there's a reduction in maintenance costs. Those all come in on the benefit side. Then we compare it to the cost of the product, cost of installing that kilowatt hours saved.

So that's a simplified approach. We look at that. If the measure is -- has a greater benefit than cost, it's a measure that we'll pursue from -- under Manitoba Hydro's Power Smart initiatives.

After we've -- we've looked at it from

that -- oh, sorry.

MR. DAN PEACO: Dan Peaco, La Capra Associates. Could you just describe briefly how you determine the marginal value of energy savings?

MS. LOIS MORRISON: The marginal value of the energy savings is provided to us by our resource planning group. And I believe Ms. Flynn will be able to speak to that in more detail later on. It's a -- they -- we are provided that value. And it's a forecast that is over time, so each year is different, and it differs by a winter value for energy, and a summer value for energy, and for on-peak and off-peak.

So that is applied against the energy savings. And for that specific measure it may have different characteristics as to when those energy savings are going to be realized. That's factored into the analysis of the benefit. And so we compare that to the product cost.

Sorry, we need the mic for...

MR. JOHN ATHAS: John Athas, La Capra Associates. I just want -- do you get only one (1) forecast for those energy savings that you use? Just a single forecast or do you have multiple energy savings costs?

MS. LOIS MORRISON: We -- for the --

the value, the dollar value for those energy savings?

MR. JOHN ATHAS: Yes.

MS. LOIS MORRISON: The dollar value of the energy savings is provided to us based on the type of customer. We do get -- because there's certain customers that are, say, transmission customers, they'll have a different value because of the -- the fact that there's maybe no distribution line losses and such.

MR. JOHN ATHAS: But there isn't any -- it's, essentially, one set of -- future for fuel costs and economics and the like?

MS. LOIS MORRISON: Yes, we receive one (1) set. And as I mentioned, so -- so from the -- the first level screening we look solely on the cost side just at the product cost. Once the measure has been identified as being economic, then we take the step back and we look at the program design. We look at what market barriers and what strategies need to be incor -- to -- pursued and are available to reduce or eliminate market barriers.

At that point, when we start looking at the overall program and the overall -- the best way to -- to reach that market, then we'll bring into that analysis again -- we'll look again at all these

components, but we'll add in the program administration and delivery costs, what does it cost for the Utility, what does the Utility have to invest to get that product to the marketplace, okay.

(MOVED TO SLIDE 13)

MS. LOIS MORRISON: So in Chapter 4, Figure 4.1.2, we show the levelized resource costs of the programs that are included within our 2000 -- our current approved Power Smart plan. And as you can see here, the -- the bars represent the level -- the -- the levelized resource cost. So it's the cost of the installed measure and the Utility's investment to support that levelized over the kilowatt hours saved over the life of the measure.

So the -- what you can see there -- what we were -- we were hoping to demonstrate with this is that you can see that the -- the resource cost varies by opportunity. So some are -- are -- the same as any other supply-side options. Some are less expensive. Some are more expensive. But they are all -- what we're doing is we're pursuing those ones that are falling bel -- that are -- that appear to be economic.

So the approach taken -- the approach or

strategy undertaken by Manitoba Hydro to pursue each DSM opportunity is determined by -- after undertaking a detailed assessment of each opportunity. The subsequent approach taken by Manitoba Hydro may consist of an incentive-based program or other financial tools, such as financing, an education awareness initiative, a code or regulation initiative, or a combination of the available approaches.

We may do an -- we may do one (1) or two (2) of those. We may do all three (3) in terms of how we're going to pursue a strategy. We may outline all of those components within -- once we've identified an opportunity as economic.

The degree or context of Manitoba Hydro's support for a specific opportunity is dependent on many factors, including the economics of the DSM product -- opportunity from the various perspectives. So, we'll talk about this in a little more detail again.

But there's -- we look at the economics from the resource perspective as we demonstrate here, and -- and as we've talked to you before. We look at it from the customer's perspective, and we look at it from the Utility's perspective when we are looking at the design and how we're going to come to market.

The -- we also look at where in the stage, or what stage the product or the opportunity is in terms of the market acceptance curve. And this -- this -- this approach is all outlined in more detail in Appendix E with the Power Smart plan.

We'll note that there are opportunities that are being explored, but that aren't being pursued as an incentive-based program, because they are not economic at this time, or they are not cost effective at this time, such as solar domestic water heating.

Manitoba Hydro continues to monitor these opportunities and will pursue them at the appropriate time. Manitoba Hydro's approach for supporting these types of DSM opportunities may include education, awareness, or research, or other types of approaches that help customers understand the technology and move forward until such time that it -- and we'll continue to monitor it until the time where it becomes economic.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): What exactly is the six dollars and sixty-nine cents ($6.69) per kilowatt hour? Is --

MS. LOIS MORRISON: Oh, I apol -- I

apologize.

MS. NICOLE FITKOWSKI: He:

MR. PHILIPPE DUNSKY (VIA CHAT): Is this an average blended avoided cost that blends in energy and capacity across all sectors and load shapes? And how aligned is this with the proposed NFAT investment?

MS. LOIS MORRISON: I can answer the first part of the question. The six point nine (6.9) cent -- six point six-nine (6.69) cents, or six point seven (6.7) cents, is the levelized value of the avoided cost that we use in our analysis for comparing to the economics -- or the economic benefit of the energy efficiency opportunities.

I am not sure how to answer his follow-up question related to the -- how closely that's aligned to -- maybe that's -- hi, Peter.

DR. PETER MILLER: Peter Miller. What is bioenergy opt -- optimization, and how do you measure the -- the savings on that?

MS. LOIS MORRISON: Bioenergy optimization is the use of bioenergy to produce electricity or to offset the requirement for electricity. It's site-specific. So it would be such -- something such as where you have a waste product

that can be burned to create electricity or to create fuel -- sorry, heat to offset the requirement for electric load.

It's -- we've been looking at a number of projects working with a number of the Hutterite colonies where we're using their, say, pellets and such that are a bio product of -- a biological product to burn to create the heat or to -- to meet the heating requirements of the customer.

DR. PETER MILLER: So that benefit would accrue entirely to the customer or does Hydro have any of that benefit?

MS. LOIS MORRISON: All we're talking about here is the -- the benefit is the offsetting the energy requirement, same as any other energy efficiency opportunity. It's a -- it's a load that we don't have to meet because it's being met in an alternative way. It's being met by having a reduced energy consumption at the site.

MR. BILL HARPER: This is probably a little bit of a follow -- oh, Bill Harper. It's a bit of a follow up to what Philippe was saying.

The six point six-nine (6.69) cents, I assume that's levelized over a certain period of time in the future, either ten (10) years, twenty (20) years

--

MS. LOIS MORRISON: Thirty (30) years.

MR. BILL HARPER: So -- so thirty (30) years. And, so that -- and would you agree that it -- and each -- each of these measures will actually have a different lifetime, and so that I guess if you had a five (5) year lifetime measure, the five (5) year levelized cost would be something different than six point six-nine (6.69) cents?

MS. LOIS MORRISON: Yes, it would be.

MR. BILL HARPER: Yes. So this is sort of a rough ben -- benchmark?

MS. LOIS MORRISON: Yes, we don't normally publish -- and I'll leave that to the lawyers to talk to what we do provide and don't provide. We don't normally publish like the five (5) year levelized, six (6) -- ten (10) year levelized, and -- and such. We tend to, when we're putting public documents out, talk to just the one (1) thirty (30) year levelized value.

MR. BILL HARPER: Okay. But when you're doing your analysis of projects --

MS. LOIS MORRISON: It's specific to --

MR. BILL HARPER: It's specific --

MS. LOIS MORRISON: -- the energy --

the life of the savings and the timing of the savings.

MR. BILL HARPER: Okay. That's what I want to clarify. Thanks.

MS. LOIS MORRISON: Yeah.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): Follow up. If the six point six nine (6.69) cents is meant to represent the average avoided cost, is that avoided cost based on the projected cost of new energy and capacity proposed in the NFAT?

THE FACILITATOR: Ed Wojczynski. We'll deal with that in the afternoon. That's more of a resource planning kind of question than the DSM group.

(BRIEF PAUSE)

MS. LOIS MORRISON: Okay. So I will...

(MOVED TO SLIDE 14)

MS. LOIS MORRISON: So to -- to assist in assessing the metrics -- the merits of various approaches to supporting and promoting DS -- a DSM opportunity, Manitoba Hydro, as I mentioned, uses a

number of metrics in -- in assessing what our approach would be. Those metrics are used as guidelines to determine what level of investment, what we should pursue, what level of investment we would be looking at. This is done -- when I say it's a guideline it's done in consideration of some qual -- along with the quantitative metrics, it's -- it's done in consideration with some qualitative metrics.

We want to make sure that we're considering equity within our design in terms of what we can offer to our customers, so we want to make sure there's reasonable participation for targeted ratepayer sectors, such as say, lower income. And we also want to make sure that there's an overall -- that the overall strategy contributes towards a balanced energy conservation strategy.

So what we look at when we're determining our approach to DSM is we look at all of the metrics together. And, as I mentioned, we look first is -- is the -- is the econ -- is the opportunity economic from a resource perspective. Once we've determined that then it becomes: Okay, well, given that there's two (2) parties here, how -- how is that cost shared? How is the cost of getting that kilowatt hour installed shared?

So we -- as we mentioned, whether the -- the customers pay for the resource, whether it's through the purchase of the measure directly or by all our customers as a ratepayer. So that's why we come to that analysis.

So we look at customer payback. What's an acceptable payback for customers -- sorry?

MR. JOHN ATHAS: Lois, I'm just wonder, do you have a -- John Athas, from La Capra Associates. Do you have a number for -- to how the measures that were on that prior bar chart all add up to for savings --

MS. LOIS MORRISON: What they add up to for savings?

MR. JOHN ATHAS: Yes.

MS. LOIS MORRISON: Or what they --

MR. JOHN ATHAS: So that if you -- because you said that that defines the measures that are cost effective. And a prior slide you said that your objective is to pursue all cost effective measures and DSM. So I was wondering if you had a total of what that delivers if you did all of those.

MS. LOIS MORRISON: What that is, is if we go all the way back there.

(MOVED TO SLIDE 4)

MS. LOIS MORRISON: What that represented, those bars, represented the -- the program components, like the incentive-based program components where -- that we are investing in to get to the 1,552 gigawatt hours. The 1,552 gigawatt hours includes both codes and standards and -- like, future codes and standards and incentive-based programs.

I can't recall off the top of my head, I'd have to -- all my books are back there.

MR. JOHN ATHAS: Just was -- this in -- if I understand you correctly, the --

MS. LOIS MORRISON: Yes?

MR. JOHN ATHAS: -- all of the programs in those bars are -- if you go forward with them, they produce a component of that number that you had at --

MS. LOIS MORRISON: Yes.

MR. JOHN ATHAS: And not -- it's not some subset of those from the rest of the testing process?

MS. LOIS MORRISON: No. This is -- this -- these are the ones that are in our current plan, and they're contributing towards the projected savings that we're going to be achieving over the next

fifteen (15) years.

MR. JOHN ATHAS: Are there other ones that -- have these -- has this list been pruned down to this list by any of the other tests other than the total resource cost test?

MS. LOIS MORRISON: There are measures that are not included because they don't meet the total resource cost test. There are measures right now that we are exploring. And once we have developed the strategy we will be implement -- we will be introducing them into our next iteration of the plan.

There's a number of measures that we're exploring right now that do meet that total resource cost test measure, or appear to right now as a -- as a -- they appear to be economic from a resource perspective. For example, we just recently launched a community-based geothermal initiative. That is economic but it's not in this list because it's not in our current plan.

We -- we've, in the past, included only those programs that were approved for implementation. We are revisiting that approach given the outcomes of the DSM potential study, that we would be looking at other opportunities and -- that might be coming in the future.

So I don't know if I'm answering your question as to what you're looking for that -- that may not be there. This was for characterization purposes just to show that under our current plan, that the costs vary -- can vary quite significantly. So I'm not sure what you're looking for in terms of an overall number.

MR. JOHN ATHAS: I -- I think I'm all set right now.

MS. LOIS MORRISON: Oh, okay.

MR. JOHN TODD: John Todd, Elenchus. I want to make sure I understand this correctly. So for purposes of the current filing, the DSM impacts that are offsetting load forecast, are those both based only on the current Power Smart plan? There's no projected incremental savings over the future years that will result from additional measures becoming economic. There's just no pro -- no projected additional DSM that'll come into the Power Smart program --

MS. LOIS MORRISON: The -- the --

MR. JOHN TODD: -- in future years?

MS. LOIS MORRISON: The base case in that analysis includes the Power Smart plan. There --

MR. JOHN TODD: Today's -- today's Power Smart?

MS. LOIS MORRISON: Today's Power Smart plan. The -- there were sensitivities done to look at increasing beyond and -- and representing that additional DSM in terms of what the -- how economic -- or what the -- how attractive the different options were under those scenarios with increased energy conservation initiatives.

MR. JOHN TODD: Okay, but that's done as a sensitivity. It's not done as -- you do not have a projection that as time goes by and as the price of electricity goes up --

MS. LOIS MORRISON: M-hm.

MR. JOHN TODD: -- and as trends in costs perhaps go down, you don't -- you have no projection of the expansion of the Power Smart plan over the years that is built into the base case?

MS. LOIS MORRISON: Not built into the base case.

MR. JOHN TODD: Okay.

MS. LOIS MORRISON: What we've built in -- like what is in the base case in terms of these plans, these -- they do represent growth over time of investment in -- in programs. So it's -- it's -- they -- they do include -- like, for example, there's -- like we have under our Home Inflation Program, there's

continuing ongoing new projects coming forward. Like there is --

MR. JOHN TODD: Right.

MS. LOIS MORRISON: -- a forecast under that program that projects participation and such. So there is future savings within this plan.

MR. JOHN TODD: Right.

MS. LOIS MORRISON: What it doesn't include is those projects that definitely -- that are not economic, so it doesn't include things like solar domestic water heating. It doesn't include technologies like heat pump water heaters which aren't viable in our market. So things like that aren't included.

MR. JOHN TODD: It doesn't include any new programs coming into the plan?

MS. LOIS MORRISON: It doesn't include any pro -- new programs that have not been approved, no.

MR. JOHN TODD: Oh, okay. In the last five (5) years, do you know how many new programs have been brought into your Power Smart plan, roughly?

MS. LOIS MORRISON: In the last five (5) years? Off the top of my head, I can't say how many specifically.

MR. JOHN TODD: I mean, it's more than zero?

MS. LOIS MORRISON: Yes, it's more than zero. In fact, we did just launch one (1). And -- and as I mentioned, we -- we are revisiting that strategy. That's based on the -- as I mentioned, looking at the DSM market potential study and looking at filling the gap in the future years, that we would be looking at readjusting that.

MR. JOHN TODD: And how likely is it in the next five (5) years there'll be no new programs?

MS. LOIS MORRISON: Very unlikely, considering we just launched one (1) in June.

MR. JOHN TODD: Yeah. So there's more likely to come that's not reflected in the current projections --

MS. LOIS MORRISON: Yeah.

MR. JOHN TODD: -- except through the sensitivity analysis?

MS. LOIS MORRISON: Yes. It's --

MR. JOHN TODD: Okay.

MS. LOIS MORRISON: -- demonstrated through the sensitivity analyses.

MS. NICOLE FITKOWSKI: Philippe Dunsky has a question.

MR. PHILIPPE DUNSKY (VIA CHAT): You've referred several times to the details contained in the Power Smart plan, example, projected saving to 2028. Can you point me in the document you're referring to? The plan I see as Appendix E doesn't seem to have everything beyond 2016. So I seem -- I -- so I assume I'm looking in the wrong place.

MS. LOIS MORRISON: Yes. We -- we changed slightly. With the introduction of the Manitoba Energy Savings Act we now provide a three (3) year plan for the -- for our Power Smart plan, but there is a supplemental document called the fifteen (15) year supplemental, which is part of that Appendix E also. So there's -- it's -- there's two (2) reports that constitute Appendix E. And so if -- if you could turn to the -- the second report within that appendix that's titled, "The 2013 to 2016 Power Smart Plan, Fifteen (15) Year Supplemental -- Supplementary Report," all that be -- beyond the 2016 information would be available. Okay.

(MOVED TO SLIDE 14)

MS. LOIS MORRISON: Sorry. So going back to this, when we -- when we look at how -- how we

allocate the costs, we look at -- as I mentioned, we look at the payback to the customer, we look at what the benefit to the customer as compared to their cost, so participating customer benefit-cost ratio. We look at the -- the Utility's costs, and we look at it from a variety of perspectives also. We look at it from what the levelized utility cost is. We look at the rate impact measure. And we look at the NPV, what is the net present value difference between the benefits and the costs.

(MOVED TO SLIDE 15)

MS. LOIS MORRISON: So in looking at the levelized utility costs, as demonstrated in Figure 4.13 of the Chapter 4 filing -- of the filing, what we demonstrate here is the levelized utility cost denoted by the blue bar, it varies quite differently.

But what we compare that to, when we're looking at a -- an opportunity we compare that to the net benefit to the Utility, which would be denoted by the little yellow dot, which is the marginal benefit for that opport -- for that program or that opportunity minus the revenue reduction. So it's the net benefit to the Utility.

And -- and -- so when we're doing our analysis we look at it from that perspective. We -- we look at it from that perspective because the -- the levelized utility cost for DSM opportunities can't simply be assessed against the Corporation's proxy, because it's a single value. So when we're doing our analysis, similar to what Mr. Harper spoke to before, we look at the value, or -- of the -- and the timing of those energy sav -- we look at the -- the value of those energy savings based on the timing of those energy savings. And so we want to make sure that we're having a full picture of -- of what that is.

So it's not simply a matter of comparing that to the levelized utility cost of six point nine (6.9) cents. We -- sorry, the levelized marginal value of six point nine (6.9) cents. We look at it on a case-by-case basis and on where those energy savings arrive.

The next -- oh, sorry.

MR. RICK HENDRIKS: Just -- Rick Hendriks here. Just to clarify then, when I look at refrigerator retirement, that --

MS. LOIS MORRISON: Yes.

MR. RICK HENDRIKS: -- has a negative net benefit from Hydro's perspective?

MS. LOIS MORRISON: From the perspective of the -- the revenue loss is greater than the benefit received in terms of the avoided cost on the -- the marginal values, yes.

MR. RICK HENDRIKS: From the Utility's perspective?

MS. LOIS MORRISON: From the Utility's perspective.

MR. RICK HENDRIKS: Right. But from the consumer's perspective it's a different story?

MS. LOIS MORRISON: Yes.

MR. RICK HENDRIKS: Yes.

MS. LOIS MORRISON: And -- and that's a very good point. We -- we look -- as I say, we look at all the metrics when we're determining how we're going to approach a program. The refrigerator retirement program is one (1) that is very unique in that when we were designing it we wanted to make sure that we had a program that -- our focus was to remove these second fridges, these fridges that were underutilized. My second fridge -- I admit I have a second fridge, is very well utilized. I have two (2) small boys. I have lots of milk and yogurt, and eggs, and I just can't keep up. So mine is not under-utilized.

But for those people that have the one

(1) or two (2) cans of pop, or maybe the one (1) or two (2) beers, or maybe only use it once in a while when they have extra company, what we're encouraging them to do is remove it from their -- their house. And so we were -- we were -- those energy savings were worthwhile to us.

But when we went out to the marketplace to -- to re -- to recover them, to bring them in, we wanted to make sure that we were also considering, from an environmental stewardship perspective, that they were being recycled properly. And so that's that balancing when you're doing program design.

We wanted to make sure that what we did was environmentally responsible. What -- and so that meant that the cost of this program had a higher cost on the Utility side in order to gain those savings. But from a resource perspective, factoring in all those costs, it was still economic overall.

So the Utility was willing to invest more to make sure that we were doing the right things to get those energy savings, but overall the resource was economic. Does that make sense?

MR. RICK HENDRIKS: So the total Utility cost becomes positive because you're recouping this?

MS. LOIS MORRISON: No, the resource cost. So if you looked back at this.

(MOVED TO SLIDE 12)

MS. LOIS MORRISON: The marginal value of the -- the marginal value of the savings plus -- compared to the overall costs was economic.

But the Utility's perspective, because if you take the marginal value of the energy savings and take off the revenue we're losing from that fridge not being run, means that it's a cost to the ratepayer. The ratepayer is paying. There's -- there's a -- there's potentially a rate impact --

MR. RICK HENDRIKS: Right --

MS. LOIS MORRISON: -- however --

MR. RICK HENDRIKS: -- so you recoup the costs.

MS. LOIS MORRISON: Pardon?

MR. RICK HENDRIKS: You recoup the costs from ratepayers.

MS. LOIS MORRISON: Yes.

MR. RICK HENDRIKS: Yes. So that's what I said, yeah.

MS. LOIS MORRISON: Okay. Sorry, yes.

MR. RICK HENDRIKS: Okay.

MR. JOHN TODD: Sorry, I'm lost. John Todd again. I mean, I'm asking a lot of questions 'cause this is actually one (1) of my areas.

MS. LOIS MORRISON: Yes --

MR. JOHN TODD: Okay.

MS. LOIS MORRISON: -- I believe we're going to spend a lot of time together.

MR. JOHN TODD: Yeah. So -- and I'm sorry, I haven't -- it's probably all in your evidence and I'll read all about it anyway, but, since I'm not quite there yet...

So, conceptually, a program could pass the TRC and be rejected based on the levelized utility cost?

MS. LOIS MORRISON: No.

MR. JOHN TODD: Okay. So if it passes the TRC it's in -- and this is just a matter of --

MS. LOIS MORRISON: How do we share the cost between the Utility and the customer?

MR. JOHN TODD: So this becomes a program design issue?

MS. LOIS MORRISON: Yes.

MR. JOHN TODD: Okay.

(MOVED TO SLIDE 16)

MS. LOIS MORRISON: As I mentioned, we don't look at just one (1) metric when we're -- when we're making our assessment. We look at -- we also look at the rate impact measure test and we look at the -- we look at the rate impact measure test and we look at the benefits, the utility from the net benefits, the utility from a actual NPV perspective.

So when we look at the rate impact measure test we look at -- what it's telling us is directionally if there's going to be a rate impact. Is it going to be a positive influence on rates or a negative influence on rates?

Overall our power -- our current Power Smart plan has a rate impact measure benefit-cost ratio of zero point nine (0.9) and has a negative NPV of $36.4 million. What that's telling us is it's -- it's nearly one (1). It's -- it's a very small impact. So we're -- we're quite satisfied with what we're -- what -- with the performance of that.

But the interesting thing to note is that the rate impact measures -- benefit-cost ratios can range quite drastic -- quite significantly. We have one benefit-cost ratio for the CO2 sensors ranging

from two (2) -- it ranges from two point one (2.1) to the zero point six (0.6) for the refridge -- refrigerator retirement program and commercial chillers.

We also see that the NPV can range quite significantly, from $25 million for the commercial new building program to negative $28 million for the commercial lighting program. So there's -- there's -- it comes back to what we talked about before.

This is -- you know, how do we share the cost between the -- the customer and the ratepayer in order to have a balanced portfolio of offerings.

(MOVED TO SLIDE 17)

MS. LOIS MORRISON: So we spoke a little bit about this -- oh, sorry.

MR. DAN PEACO: Dan Peaco, Le Capra. I just -- can you explain how the rate impact measure is used in determining your overall program?

MS. LOIS MORRISON: It's -- the rate impact measure benefit-cost ratio, it's only used to -- to -- it -- it differs by program. We look at it and we say, Okay, well, you know, we would like to not have a rate impact on customers. However, is this a program

that, you know, in order to have greater involvement in the market, do we need to invest more on our ratepayers' behalf in order to get that energy savings. Or -- it's -- it's do we need to invest to get those energy savings, or can we balance it off between the benefits to the customers?

It's really on a case-by-case and program-by-program basis how we look at it, and that's why it can vary quite drastically.

DR. PETER MILLER: Peter Miller. Lois, when you talk about balancing the participating customer and the ratepayer, do you -- does that mean -- does it have an impact on rates, or does it have an impact on the total bills, including the savings from some customers?

Shouldn't it -- shouldn't the comparison be, does it reduce the cost to Manitobans in general, averaging in the savings for the -- the participants?

MS. LOIS MORRISON: That analysis at the higher level is what we'll be looking at in more detail when we do our -- but from a program perspective, like individual program perspective, where -- when we -- when I talk balancing between the customer and -- and the Utility, it's really what does the Utility need to invest to get the customer to

change their behaviour or to make that different decision.

And it's really -- it's more of a marketing-based approach of what -- what do they need in order to encourage them to undertake that measure? Do I need to provide an incentive, or is financing all that's required? Is -- if the customer is willing -- if the customer is going to realize a payback on their investment within, say, one and a half (1 1/2) years, or even within six (6) months, the Utility may not be required to invest as much unless it's a technology that's early in its curve and needs more attention drawn to it to get the customers to be aware, interested, and accepting.

So it really comes down to a case-by-case basis when I'm talking about balancing and -- between the Utility and the -- and the customer at this level.

DR. PETER MILLER: Peter Miller following up. No, I'm talking about at the aggregate level.

MS. LOIS MORRISON: Yes.

DR. PETER MILLER: When you -- a RIM test is an impact on rates that all customers pay, but some customers would have lower bills, having received

savings.

And so wouldn't it be more appropriate to look at an aggregate bill impact and when you -- as the -- the comparison?

MS. LOIS MORRISON: We will be looking at -- when we look at the design, we do look at the cust -- participating customers' perspective and we are looking at the reduction they see in their bill. And that's the other part of what we're looking at when I talk about balancing between the two (2).

From the aggregate level, what you're describing there, we recognize that although we try to offer a program -- a portfolio that offers programs so that all people have the opportunity to participate, not all people do. And so we, as a utility, try to be responsible and not put pressure -- upward pressure on rates as much as possible.

So -- but what you're describing in terms of that overall analysis is what we will be looking at when we do our -- our additional analysis that Mr. Wojczynski referred to earlier, from the financial perspective.

(MOVED TO SLIDE 17)

MS. LOIS MORRISON: Okay. So -- so we talked a little bit about this in terms of how our program -- our design -- plan is constructed and that we are looking at some new opportunities coming forward.

(MOVED TO SLIDE 18)

MS. LOIS MORRISON: So I'm going to flip over to our discussion of additional DSM opportunities. Now, as mentioned, Manitoba Hydro is continuing and we're economically feasible expanding our commitment to demand-side management.

To complement our ongoing and internal efforts to identify and quantify potential energy efficiency opportunities in savings, Manitoba Hydro contracted a third-party consultant to undertake a DSM market potential study in concert with the Corporation. The study broadly examines, at a conceptual level, the market potential for existing energy efficient technologies which are economic in Manitoba and those technologies that may be on the horizon.

Really, to put it into context, we were taking a step back to -- to really kind of come up with an idea, is -- is it as big as a Chevy Volt or is it as

big a bus? Electric bus, preferably, but -- so, that when we're doing our planning, are we on the right track? Are we -- are we moving in the right direction? Are there opportu -- we -- we feel we have a good grasp of what the opportunities are. What does it look like going forward?

(MOVED TO SLIDE 19)

MS. LOIS MORRISON: And with that, with the study, what we looked at was four (4) levels of potential. We looked at technical potential, which is the absolute level of demand-side management without regard for costs and other barriers. So it's what technically can we do regardless of how much it costs; whether or not the customer wants you to do it or is even willing to let you do it. What technically can you do? And it represents a theoretical level.

The other -- the next step we looked at is the economic potential, what represents for the -- for the purposes of this study we looked solely at the economics of the technology from its installed product cost perspective. We didn't apply any -- what might be involved in -- costs involved in delivering it to the market or increasing market acceptance. It's solely

looking at the energy benefits compared to what the installed cost of that product is.

And so, from an economic potential, under that approach what you're looking at is if we replace every inefficient product with the economic efficient product, what's the maximum? So it, again, represents a theoretical level, but it's representing the adoption of all the energy efficient measures that are cost effective.

Then you start -- the next step is we looked at market potential which represents the absolute level of savings that are technically feasible, economically attractive, and assuming ideal market conditions. Ideal market conditions, we know they -- they -- you know, those of us that work in marketing know they don't exist, but we can come -- certain markets can come closer to it.

But what we're talking about here is that we recognize that even if all the market conditions are perfect for you to come to market with your product, there's still those people that will not buy it. So what can we reasonably expect to achieve -- or, sorry, what can -- what could we expect to achieve even if the market conditions were perfect? What could we expect to achieve if -- recognizing that there's

still customer behaviour and customer decision-making coming into play?

The next step we looked at was achievable potential. And this is recognizing that markets are not perfect and not ideal. And, therefore, we are looking at factoring in that there's the cu -- the customers' decision-making process and the fact that you do have to intervene, and educate, and create incentives for customers to participate.

(MOVED TO SLIDE 20)

MS. LOIS MORRISON: So the process that was undertaken in the study is outlined in -- in detail in Chapter 2 of the DSM market potential study, which I believe is Appendix 4.3 of the filing. And I will try to go through this very quickly. I -- we -- we thought it might be valuable to provide some insight into the detail of what was undertaken.

Under the potential study, the first step was identifying the segments -- the sectors and the segments that Manitoba Hydro was interested in looking at in more detail. And once we identified those se -- sectors and segments, we did the market -- we -- we assigned a market characteristics -- we -- we

defined the market characteristic.

So what we did was we took the energy consumption across for one (1) -- for a base year and applied that energy across all the sectors, across all the segments, across all the end uses, and across all the technology to come up with a base year, what the base year looked like in terms of all of those end uses.

Then, from there, the -- they modelled -- they forecast from each end use forward what the energy consumption might look like in terms of growth and such and -- or retraction, to come up with -- to -- to try to align with what our current forecast is. At that point, we had our baseline forecast.

After that we then took the step back, and using the -- the consultant's universal measure list, which identifies energy efficiency measures covering all major types of the end-use equipment, as well as devices and actions to reduce energy consumption, looked at each of those different technologies at the measure screening stage, and took the fore -- those baseline forecasts for each of those technologies and applied -- at the technical level we applied the most econom -- the most energy efficient technology at each of those points within that

forecast, and then that developed our technical potential. Then we said, Okay, which of those measures are economic?

Now, some of those econ -- some of those measures may not have been economic today, but in this analysis were they economic in future years. And so the way the model worked was they assessed if that measure was economic today, then that -- the most energy efficient economic model was applied to the -- the most economic ener -- the most energy efficient economic op -- option was applied to that technology. If it wasn't, then it went to the next year.

And is it economic now? Well, now we'll put the most econ -- the most energy efficient economic model so.

MR. JOHN TODD: John Todd again.

MS. LOIS MORRISON: Hello.

MR. JOHN TODD: So sort of a follow-up to my previous question about forecasting DSM.

MS. LOIS MORRISON: Yes.

MR. JOHN TODD: Do you have a plan to take this work and use it as the basis for forecasting what you expect to achieve, in terms of DSM from new programs, in order to adjust and get a -- a better net load forecast?

MS. LOIS MORRISON: We aren't specifically -- the model is -- the model is owned by the consultant. We aren't planning to necessarily use the model that they have, but we'll be using all of the information that is incorp -- that -- that we've developed through this process to better align what our opportunities would be.

All of this information that's arising out of this DSM potential study is going to be used to come up with our next iteration. First and foremost, the next iteration of our Power Smart plan -- because, as outlined under the Manitoba Energy Savings Act, we are required to provide an updated plan every year. And -- pardon?

MR. JOHN TODD: The next step in the forecast?

MS. LOIS MORRISON: We have not -- honestly, no, we have not looked at using this model specifically to -- to start doing our load forecasting.

MR. BYRON WILLIAMS: Byron Williams, CAC. Lois, just in terms of the DSM potential study, after getting the results, has Hydro undertaken any sort of comparative analysis with other jurisdictions to examine whether the results from this study are an outlier compared to other jurisdictions?

MS. LOIS MORRISON: No, we haven't. We -- as you know, we recently received it so we haven't done any additional analysis at this point.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): When did this study begin?

MS. LOIS MORRISON: The study began approximately two (2) years ago.

MR. RICK HENDRIKS: Rick Hendriks. Just to follow on Byron's question there, I think -- just a suggestion -- that a comparison between jurisdictions would be helpful. BC Hydro's Integrated Resource Plan shows net growth after DSM of 300 gigawatt hours per year. You're showing net growth of 450 gigawatt hours per year. You have essentially the same population growth, so.

MS. PATTI RAMAGE: Excuse me. I think we're -- we're no longer clarifying the materials. We're either going into Information Requests or evidence.

MR. RICK HENDRIKS: So --

MS. PATTI RAMAGE: And I don't think that's the purpose here.

MR. RICK HENDRIKS: Fair enough, I

agree. So you indicated in your earlier comments on the load forecast that population is a main driver here.

What are the other drivers of the load growth?

MS. LOIS MORRISON: The -- the main drivers of the load growth in Manitoba for the residential sector, as we mentioned, is the population. And as I showed in that chart, BC Hy -- BC's population isn't one of the ones that's above -- like, they're not one of the top projected areas for growth in terms of population.

The other factor that we talked about was that -- that constitutes the majority of our growth in the residential sector, and it also is one (1) of the primary drivers for the growth in our commercial sector.

People move here, we -- they move here, right? We're -- we're -- we are not able to reduce -- we would rather not reduce the number of people moving here, because economic growth is a good thing for the province.

The other thing driving the residential sector, as I mentioned, is that increasing -- increased saturation of electric heat in what we deem to be the -

- the gas available area south of -- around the city of Winnipeg and that. And, as I mentioned in our 2013 forecast, we have reduced -- we've -- we've implemented a reduction to reflect measures that we're taking to try to better educate customers and send the appropriate signals to them that they shouldn't be choosing -- that it's not in their best interest to choose electric heat if they have natural gas available. Sorry, is...

MR. RICK HENDRIKS: I had one (1) other -- one (1) other question.

MS. LOIS MORRISON: Okay.

MR. RICK HENDRIKS: Just going back to your -- your table there, that showed the six point six-nine (6.69) marginal cost there, now is that an -- an average of -- do you have a variable rate structure, I guess, is my question?

MS. LOIS MORRISON: A variable rate structure from our -- what we charge customers?

MR. RICK HENDRIKS: Yes.

MS. LOIS MORRISON: We do not. We have a unit -- we have a rate structure that has a minimum monthly payment and has one (1) block for the residential. The commercial sector has a construct, which we have the minimum and then we have, depending

on the size of the commercial, they'll have a demand charge and a monthly energy charge.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): Have you verified to what extent the load forecasts are aligned with your own load forecasts?

MS. LOIS MORRISON: Yes, we have looked at that.

MR. JOHN ATHAS: John Athas again. Do you -- can you give me an idea as to what kind of -- qualitatively, what kind of assumptions were made to get achievable? Because obviously in there is some implication of what kind of aggressiveness you will have at trying to get participation.

MS. LOIS MORRISON: What we did was, we relied primarily upon adoption curves that were used by the Northwest Power and Conservation Council's sixth plan. So the consultant provided us with what might be a -- a good -- provided us with a starting point, and then we just adjusted them to reflect what would be characteristics representative of the Manitoba market.

So we were -- this -- this is a -- it -- it's -- it's supposed to represent an approximation. And so, as with any forecast, there's going to be a

band around the -- the line. And what we did was, we relied on the consultant to provide us with what was a reasonable adoption curve, or adoption rates, to represent both the market and the achievable.

MR. JOHN ATHAS: So almost like a business as usual kind of program?

MS. LOIS MORRISON: The achievable is representing more so, you know, what is reasonable to achieve within the marketplace, based on past experience by other utilities. It also reflects our past experience. And so that's -- so, as I mentioned, the starter point was the Northwest Power's adoption curves. And then where we -- we were able to say, you know, we had better experience, or that's not a technology that's well-accepted here -- like, for example, there were things that we couldn't include in our analysis, such as setting back the hot water tank because it's against -- it's -- it's against our plumbing code to do that. So those types of things were brought into the analysis.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking another question.

MR. PHILIPPE DUNSKY (VIA CHAT): Can you elaborate on your previous answer, re alignment of load forecasts? Specifically, how close were there,

and what significant differences did you find?

MS. LOIS MORRISON: I -- I don't have that off the top of my head.

MR. BILL HARPER: Bill Harper, actually. Maybe just a little bit more simpler. You said this work started two (2) years ago, so I -- I would assume that you would have been aligning this with the 2011 forecast, or the 2010 forecast?

MS. LOIS MORRISON: 2011 forecast.

MR. BILL HARPER: Okay. So just so we know what -- thanks.

MS. LOIS MORRISON: Yeah.

MR. DAN PEACO: Dan Peaco. On the -- the economic potential, did you use the same six point nine (6.9) of what it cost numbers, or is there a different number in there?

MS. LOIS MORRISON: No, we used eight point five (8.5).

MR. DAN PEACO: Eight point five (8.5).

MS. LOIS MORRISON: Yes.

MR. DAN PEACO: And the basis for that?

MS. LOIS MORRISON: That was the marginal value that was current at the time when we initiated the study.

MR. DAN PEACO: Okay.

THE FACILITATOR: Just a quick logistical question. We were scheduled to stop at 11:30. I see you've got about eight (8) overheads left. Lots of interest here. Ed -- Ed Wojczynski. Lois, when I look at the overheads it looks like they're fairly substantial overheads, right?

MS. LOIS MORRISON: I -- I can -- I can get through them.

THE FACILITATOR: Okay. So what if we got through the overheads quickly, and then see about a few questions, see what time it is. And if necessary we can always follow up after lunch with the questions 'cause we do have some meetings that are -- are supposed to be occurring over the lunchtime. So from a logistical point of view, that would probably work best.

Would that be okay with people? Okay, I -- I see one (1) person nodding. Thank you, Bob. And Lois nodding. So that for me is a unanimous. And, go for it, Lois.

(MOVED TO SLIDE 21)

MS. LOIS MORRISON: Okay. So the next slide although is busy does -- I -- I was just trying

to -- to demonstrate the -- the level of detail that we looked at in terms of the potential study in terms of -- as I mentioned we talked about -- we looked at the sectors. The sectors are straight -- straightforward. Residential, commercial, and industrial. And then we broke it down into individual segments. So within each of those segments we looked at end uses and technologies, so. See -- see, that was quick.

(MOVED TO SLIDE 22)

MS. LOIS MORRISON: So overall the findings of the -- the study indicate that across all sectors the energy savings range from 1,300 -- sorry, 1,135 gigawatt hours for achievable potential to 2,029 -- sorry, 2,915 gigawatt hours for market achievable potential into the 2027/'28 year. We focussed on the '27/'28 year because that's aligned with our Power Smart plan and so that's what we were looking at when we were comparing to the potential study.

At this point in time our current projected savings under our current plan represent about 62 percent of the forecast achievable potential in 2027/'28.

(MOVED TO SLIDE 23)

MS. LOIS MORRISON: Looking at the results of the study for the achievable potential and the market potential across the sectors, what they identified was opportunities.

The opportunities are relatively evenly proportioned across all three (3) sectors with more being identified for the residential and commercial sector. The areas that we -- that they identified in the study with the -- the great -- the greatest opportunity for the residential sector obviously is in the heating -- in the area of heating, being envelope and systems, lighting, and water heating. Those are the top three (3). We -- for commercial it was ventilation, lighting, and cooling. And in industrial it was motors, pumps, and lighting. So all of those are -- are relatively not surprising.

(MOVED TO SLIDE 24)

MS. LOIS MORRISON: So what we looked at -- and where that brings us to is today and going forward. So what we can see is -- or what Manitoba Hydro is going to be doing in the next little while we

-- as we described is we're going to be looking to closing the gap.

So as I mentioned we will be updating our Power Smart plan in order to make sure that we are meeting the directives under the ener -- Manitoba Energy Savings Act where we have to provide an updated plan by March 31st of 2014 and every year after in consultation with the provincial government. And we will be using the potential study findings to help us develop that plan. In addition, we're going to be evaluating the possibility of going to higher levels of DSM.

(MOVED TO SLIDE 25)

MS. LOIS MORRISON: So for the purposes of this submission, because the potential study wasn't available in time for us to do the analyses that we wanted to do in preparation, we did look at -- we did include a sensitivity analysis for increased DSM. And we included increasing DSM savings by one point five (1.5) times, and similarly a stress test for increased DSM savings was undertaken at four (4) times the current planned DSM.

And based on the results of the market

potential study, and as evidenced in the chart shown, the sensitivity analyses capture the potential for increasing Manitoba Hydro's DSM plans to include both reasonable and additional ideal market threshold energy savings. Really, what we're -- what we are stating here, and as we stated in chapter 7, is that the sensitivity analyses that we used, and the stress test threshold that we used, remains reasonable with the final outcome of the DSM potential study findings.

MR. ROGER CATHCART: Hi, Roger Cathcart. Very quickly, the four (4) times current level of savings, is that savings to sales ratio? Does it -- does it equate to 1.5 percent, or 1 percent? I was --

MS. LOIS MORRISON: I'm not sure I'm following -- when we did the four (4) times DSM, what we said was in -- in the -- in the scenario analyses and the stress test that our resource planning group did, was they basically took our current plan and took every year and multiplied it by one-point-five (1.5), and every year multiplied it by four (4), to --

MR. ROGER CATHCART: Multiplying the savings?

MS. LOIS MORRISON: Save -- the energy reduction --

MR. ROGER CATHCART: Savings.

MS. LOIS MORRISON: -- resulting from our plan --

MR. ROGER CATHCART: Okay.

MS. LOIS MORRISON: -- was multiplied by.

MR. ROGER CATHCART: Okay. Well, thank you.

MS. LOIS MORRISON: And so, as I -- as I stated, the -- the initial -- that the -- the one point five (1.5) times DSM and the four (4) times DSM still remains reasonable when we look at the achievable coming in at one point six (1.6) times, or 159 percent of our current plan in '27/'28. And at four (4) -- four point one (4.1) times, or 408 percent of our current plan in '27/'28.

(MOVED TO SLIDE 26)

MS. LOIS MORRISON: And so, in summary, Manitoba Hydro is continuing, and where feasible -- and where economically feasible, we're expanding our commitment to demand-side management. As demonstrated in Chapter 12, and Ms. Flynn and Mr. Wojczynski will speak to this in more detail, increasing DSM within a

reasonable range for this analysis did not change our conclusion.

And Manitoba Hydro will be updating its Power Smart planning consultation with the government, as required by the Energy Savings Act, by March 31st, 2014. And we will be incorporating the information contained within the DSM market potential study to do so. In the process of updating our DSM plan, we are going to be evaluating the possibility of a higher level of DSM. And Power Smart staff have already been assessing emerging energy efficiency opportunities, and the Corporation intends to pursue these opportunities at the appropriate time. Thank you.

THE FACILITATOR: So just a couple of questions that are just burning to be asked right now rather than after -- Ed Wojczynski -- than after lunch? Burning number 1.

MR. DAN PEACO: Dan Peaco. You mentioned the fuel savings, or the heating savings programs. Did you look at fuel switching as part of this study?

MS. LOIS MORRISON: Not as part of this study, no. We -- this study focussed on energy efficiency. It did not look at fuel switching between, say, electricity and then natural gas. We did, as I

mention, account for that in our update to the 2013 load forecast, to represent -- I believe it's a 360 gigawatt hour reduction in load, specifically related to encouraging -- or, encouraging and sending the appropriate messaging to customers to choose natural gas in natural gas available areas.

THE FACILITATOR: One (1) more question, and we're running a little bit over time, already. Just -- okay. Oops. Hang on, there's one (1) from the...

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): Please confirm the study included or excluded fuel switching demand response codes and standards.

MS. LOIS MORRISON: The study did not address fuel switching from the perspective of moving from, say, electric heat to natural gas. Like, the -- the study, for us, was done for both electricity and natural gas, because we provide energy efficiency programming for both fuels. When we looked at the study, it focussed on solely the energy efficiency component. It didn't look at fuel switching, and it did not look at demand response specifically. We do recognize that there's demand savings as a result of

the energy efficiency improvements.

Now, in terms of codes and standards, it netted out -- the analysis did reflect codes that were anticipated to be in -- that are in place and anticipated to be coming in place, and the savings are recognizing that there might be -- we -- we didn't specifically say 'X' is for codes and standards going to the future.

We do recognize though that there may be opportunities to advance codes in that, and that would be part of an overall marketing strategy with a -- with that program. So we do look at -- in setting the baseline forecast and the opportunity for energy savings. It did include -- it did net out the codes and standards that are existing today and likely to come in place. Like the minimum energy performance standards for lighting that's coming, that was netted out of -- so these savings that are being projected are -- are not including savings that would be achieved through say something like the minimum energy performance standards for lighting.

THE FACILITATOR: So I think we're running ten (10) minutes late and there's some meetings that are supposed to happen. We said we would take an hour and a half for lunch. I wonder if we couldn't

just stick to coming back at 1:00, and -- and I think, Lois, you -- as long as you drink some water over lunch you'll be able to answer some questions at one o'clock, if there are any at that time.

MS. LOIS MORRISON: Sure.

THE FACILITATOR: So if you have any questions, if you could hold them till then. And we'll take our break for lunch.

There's lunch outside, Barb? Okay, lunch is outside. Take a break. Back here at one o'clock. Thank you.

--- Upon recessing at 11:41 a.m.

--- Upon resuming at 1:01 p.m.

THE FACILITATOR: Okay. Hello. So Ed Wojczynski again. We're starting again. We cut off a little bit because of running out of time. And Lois finished her presentation, but what we had said if there were some questions that had not been asked yet, this would be the time. Lois is still here. She's had a glass of water to deal with her parched throat.

Are there any questions for Lois on her DSM presentation this morning?

Okay. I don't see any. So then we're

going to follow through as per the agenda. We've got Davie Cormie starting off and Joanne. Dave...?

MISO MARKETPLACE, EXPORT SALES, AND US INTERCONNECTION UPDATE PRESENTATION:

MR. DAVID CORMIE: Thank you, Ed. It appears that I have a presentation because something -- I think something has been handed out, but I really don't have a presentation. I'm -- I'm more here this afternoon to answer questions on the MISO market, the status of the export sales, and the status of the US interconnection. Nothing -- let's see what we have here.

(MOVED TO SLIDE 2)

MR. DAVID CORMIE: So essentially the filing was reflecting the state of my world in the export market as of mid-August. It's only been a couple of weeks since then, so not a lot has changed.

For those who don't know me, I'm the division manager of Power Sales and Operations and I'm responsible for Manitoba Hydro's activities in the wholesale market outside of Manitoba. That includes our activities in the United States, Saskatchewan,

Alberta, Ontario, now Quebec, and potentially New York in -- in the near term. So all those activities associated with -- from five (5) minute energy trading out to long-term export transactions are part of my responsibilities.

The filing in Chapter 5 talks about our export markets, and there's a major focus in there on the MISO. Sections 5.4 to 5.4(ii) talk about the MISO market; that's where Manitoba Hydro sells the majority of its electricity. Sales to Canadian entities are a relatively small portion of our sales portfolio.

Appendix 5 talks about MISO, five point one (5.1), and describes the market products, and the operation of the market and locational market -- marginal pricing in Appendix 5.2. So if there's anything in the filing that you've read that -- in these areas that you have questions you want clarification on, I can answer those questions now. There's a lot to understand there.

(BRIEF PAUSE)

MR. DAVID CORMIE: Yes, Peter?

DR. PETER MILLER: Dave -- Peter Miller. I believe somewhere in there, there was a

discussion of MISO doing a hydro/wind -- hydro/wind complementarity study. Is that -- is my memory correct?

MR. DAVID CORMIE: Yes, in the -- in the filing we talk about a Manitoba Hydro MISO wind synergy study that MISO has done to determine the value to the MISO market, the utilities in MISO. And then MISO states the value of a major new interconnection with Manitoba Hydro and Manitoba Hydro proceeding with the development of large hydro in Manitoba.

That study has now been issued in draft form, and that was done either earlier this week or late last week. And so that's now available. We can provide a link to that so you can look at those results. It's in draft form out -- out for stakeholder comment, and we expect it will be finalized very shortly.

The study shows the significant benefits to the MISO footprint by having a strong connection between the storage that's available in Manitoba and -- and the benefits from increased efficient operation of the generation fleet in MISO, the lowering of LMP prices, the benefits to load, the -- the benefits of the rapid response generation that Manitoba Hydro has, and how the size of the interconnection is critical to

maximizing the values to the -- to the MISO footprint.

And, so that study has been going on for probably three (3) -- is it three (3) years, Daryl? About three (3) years. And some of -- some very detailed modelling, I think right down to the five (5) minute dispatch and the response of Hydro reservoirs to LMP prices for the planned development of the wind resource in the United States.

And so that study was important to Manitoba Hydro because we are asking the State of Minnesota to permit the construction of a large line for the benefit of the development of hydro resources in Manitoba, and there has to be demonstrated benefits in the US to -- to do that. And we -- we're using the study to help justify the permitting of that line.

DR. PETER MILLER: Peter Miller again. So that's supportive of the 750 megawatt line then?

MR. DAVID CORMIE: Absolutely, yeah.

DR. PETER MILLER: Yeah. And what are the implications for the product that you market? It seems when you just ply -- supply base power, you're -- you know, like a coal generator or -- or base gas generator, and you're not getting the value of -- of hydro, that complementarity or synergy?

MR. DAVID CORMIE: Well, the -- the

value of the interconnection is that it increases the price that Manitoba Hydro can see it at -- at the border because there is a reduced congestion at the interface. We're able to sell more energy on peak, sell less energy off peak, by using our storage. And so Manitoba Hydro benefits from having access to higher prices.

US utilities benefit from having lower prices because when you connect a low-price region to a high-price region, you get levelization of prices. So our prices go up, their prices go down, and there's a sharing of benefits there. And so we -- we benefit by getting a better -- better price for our product. They benefit by having access to the storage and -- and having the responsive -- and hydro units available to deal with the -- the uncertainty associated with -- that's been created by the large-scale development of wind generation in the US.

DR. PETER MILLER: But that's just opportunity sales as you describe it. Can you write long-term, dependable contracts in partnership with wind in the States?

Does -- does it open that -- that possibility?

MR. DAVID CORMIE: The export contracts

allow us to -- the physical dispatch of the generation is in response to the market price. And -- and so you -- you have to see the export contract as a financial hedge. They've locked in their fixed prices, and they're not really worrying about what's happening to the real-time prices. But the Manitoba Hydro power system will respond to the nodal price.

And -- and so they get the efficiencies associated -- you know, although that -- that resource has been committed to that customer, its dispatch is still in response to the -- the MISO real-time price.

So you have the -- right now we have 2,200 megawatts of export capability, and it'll become around 3,000 megawatts of export capability once we build the new line. And so you have a bigger -- a bigger interconnection and therefore the battery effect is better and -- and you get the -- the responsiveness. And that -- that happens regardless of -- of whether there is a firm power contract in place.

So they contract for a -- a product, they contract for the capacity, but that doesn't dictate the dispatch of the generation. The dispatch of the generation is dictated by the moment-by-moment pricing levels that Manitoba Hydro sees at the border. That's -- that's just under the --

DR. PETER MILLER: You are describing your current dependable contracts?

MR. DAVID CORMIE: And the -- and the new contracts.

DR. PETER MILLER: And the new? Okay.

MR. DAVID CORMIE: Yeah. Yes?

MR. ROBERT SINCLAIR: Yeah, Robert Sinclair, Potomac Economics. Our area is the MISO markets. And when I reviewed the filing, I noticed in Chapter 5 you mentioned some of the developments in the MISO market: the gradual demand growth and the impending retirements, and some of the -- you also mentioned some of the environmental trends.

I was just wondering whether those discussions actually lead to a specific assumption in some of the calculations? For instance, for retirements, do you make a -- do you make a assumption about retirements, and does that feed into the -- some of the financial calculations?

MR. DAVID CORMIE: Actually, the -- the retirement of generation would -- reflects in our price consultant's view of what the forward -- the future prices of electricity will be. So Manitoba Hydro is not making those assumptions. We go to the five (5) independent pricing consultants, who do their own

modelling of supply and demand balance; what the new resources are going to be; what it's going to cost to run them; and, thence, the market price.

So, you know, each of the consultants has its own view of -- of how the generation fleet in the United States will be developed over time, and how it will -- how the environmental regulations will evolve, and -- and how the utilities will respond to that through their investment decisions.

MR. ROBERT SINCLAIR: Okay.

MR. DAVID CORMIE: And so that -- that will affect the long-run price that Manitoba Hydro shows in -- it -- it -- for sales of electricity from dependable resources that we have yet to commit to. For the sale prices that utilities are willing to pay for the purchase of firm power from Manitoba, that's dependent on their specific situation and their risk tolerance, their desire to have a balanced portfolio of resources.

You know, they want to hedge against being an all-gas utility. They -- they worry about environmental constraints in the future, future regulation, their -- their need to provide their customers with rate stability. And -- and so all those -- all those factors feed into their desire to purchase

the product that Manitoba Hydro has available.

MR. ROBERT SINCLAIR: Okay. So if we're looking for -- and this is Robert Sinclair again. If we're looking for the specific assumptions about retirements, energy, environmental impacts on prices, those would be found in the consultants' energy price forecast -- export price forecast.

Is that correct?

MR. DAVID CORMIE: Ultimately they will all reflect in the price that the consultant has -- has -- will -- provides Manitoba Hydro through its forecast.

MR. ROBERT SINCLAIR: Okay. So will that also include any changes, expected changes, in capacity market structure? Any changes in transmission investments in MISO?

MR. DAVID CORMIE: To the extent that -- that their models are dependent -- that -- that are dependent on that, it -- it would.

MR. ROBERT SINCLAIR: Okay.

MR. DAVID CORMIE: Now, we -- those are proprietary models. We don't really know what they're doing, what they're assuming, but we -- we test the -- the -- their models for -- to -- to ensure that they have the relevant factors that we consider important.

And, you know, somebody can say, I have a model. Okay, well, tell me what's in your model. Oh, you do this, this, and this, and this is the technology that you're using. We understand that. Okay. The results would then -- would then be credible and -- and we would accept -- accept them.

THE FACILITATOR: One (1) second. Some of the discussion on what the -- Ed -- Ed Wojczynski. Some of the discussion on what the forecast models do to the export price, it's probably better -- when Joanne does her presentation. Dave is top-notch on all this stuff, but on the -- the forecast consultants, really that's -- Joanne deals with them.

MR. DAVID CORMIE: Yeah, Joanne's going to go through in -- in the next presen -- all of the various issues that you're talking about, and -- and the view that one (1) consultant is actually taking. So maybe that will help.

MR. BILL HARPER: Bill -- Bill Harper. I -- I think one (1) -- well, one (1) of the decisions I think your president -- your president said there was some decisions you had to make in the next twelve (12) -- twelve (12) to eighteen (18) months. And reading the application, I believe one (1) of those is whether you build an interconnection and whether it's two-fifty

(250) or seven (7) -- seven-fifty (750). And the same -- coupled with that, there's some uncertainties, you know: Is there going to be a large 300 megawatt contract with WPS? Who's going to provide financing if you build a large station?

And I guess -- so I just want to get my mind wrapped around what exactly is -- is the timeline on which you have to make a decision in terms of whether or not you're going to build an interconnect, like, the date? And at that point in time, do you have to decide at the same time whether it's two-fifty (250) or seven-fifty (750), or can that decision come a little bit later? Or it comes a little bit later but at a price because it would cost you something if you had to change your plan from one to another?

If you could maybe sort of just elaborate on -- on that -- on that a little bit, because, you know, the long -- excuse me, the longer those timelines can go, the more you're liable to be certain about whether or not you have a WPS contract or whether or not you've got another investor to build in the line or something.

So I was trying to understand the time frame in which you actually have to make those decisions.

MR. DAVID CORMIE: Yes, with regard to the sizing of the interconnection, Minnesota Power, in order to achieve an in-service date for a 230 kV line that will meet their needs and the -- and the requirements of the contract to start deliveries on that line in 2020, means that we need -- they need to file as soon as possible their certificate need with the Minnesota regulator.

So that's driving a -- an early decision on the size of the line. And -- and...

(BRIEF PAUSE)

MR. BILL HARPER: I'm sorry, I was trying to clarify whether that was on the size of the line or whether, in fact, you need any line?

MR. DAVID CORMIE: No, there's no doubt that a line is required. A line is required by contract. The question is will it be a two-thirty (230) line or a 500 kV line. So that's -- that's why we're -- you know, we're -- we're trying to work with WPS to -- to firm up their commitment. And that will affect our decision ultimately whether we continue to work with MP on a big line or whether we let them default back to the smaller line that's specifically

required under contract.

THE FACILITATOR: It's Ed Wojczynski. Just to supplement that. The timing from the transmission line routing, siting, and approval process is they have started on the seven-fifty (750) line ,which Dave already referred to and they -- both in Manitoba and the US.

And that if, let's say, one (1) year from now the seven-fifty (750) option gets dropped in favour of the two-fifty (250) option, what we've been told by the licence or the -- pardon me, the -- the transmission people on both the States and Canada, they could do that flip from seven-fifty (750) to two-fifty (250) a year from now and still meet a 2020 in-service date. But if you go beyond that, you start having to start -- delay the project.

MR. BYRON WILLIAMS: Byron Williams, CAC. Dave, you'll -- you'll correct me, as usual, if I'm -- I'm wrong here. But in terms of investment in -- - in the big line south of the -- south of the border, as I understand it WPS is out of the picture now.

And I guess if you can elaborate on -- on how Hydro intends to keep its investment in that at 49 percent or -- or otherwise, what -- what's going on with that?

MR. DAVID CORMIE: Yes, as -- as you've indicated, Byron, the Wisconsin Public Service said they -- they are not interested in investing in US transmission. They're still in -- interested in purchasing power. And so we're -- we're continuing to negotiate the 300 megawatt sale agreement with them.

In the meantime, we are working with Minnesota Power under an arrangement where we would be the minority investor in the line and Minnesota Power would be the majority investor in the US. And -- and those negotiations are underway. And I -- I really can't tell you much more than that. But we are -- we are developing business arrangements that preserves that option of proceeding with the 500 kV line.

MR. BYRON WILLIAMS: Recognizing there's not much -- it's Byron again. Recognizing that there's some uncertainty there, when do we expect more certainty, Dave? In a year?

What time frame are we looking at?

MR. DAVID CORMIE: More certainty over what?

MR. BYRON WILLIAMS: Your potential arrangements with Minnesota Power, in terms of the big line and a contribution to it.

MR. DAVID CORMIE: Well, there -- there

won't be certainty until the big line -- until we -- until we go through the NFAT process, we get a government order in council approving our plans. There -- there will -- and we get all regulatory approval in the United States and Canada.

So we are proceeding assuming that there will be a large line built, and we're putting the business arrangements in place necessary for Minnesota Power and Manitoba Hydro to make that happen in the United States. And -- and as Ed -- Ed said, if in a year from now we have to revert back to a smaller line those business arrangements will be much simpler but we -- we -- there will be a line. It's just a matter of whether it will be a big line or a small line.

DR. PETER MILLER: Peter Miller. I believe the filing said you're willing to put up two-thirds of the capital cost of the 750 megawatt line. How do you square that with the 49 percent ownership?

MR. DAVID CORMIE: Well, ownership and -- and cost sharing are two (2) different things. So we -- we may have to cover -- well, we will have to -- we will have to cover the additional costs associated with building a larger line. Minnesota Power is not going to pay more for transmission service than they have to to serve their sale.

The ownership structure is something that -- that Manitoba Hydro has decided for a matter of policy that we won't be the majority owner in a transmission asset in the United States. And -- and so that's a policy decision.

It still means that -- that doesn't mean that Minnesota Power is willing to fund the -- the additional 133 megawatts of transfer capability. That has to be funded by Manitoba Hydro. And we're working on an arrangement with them so that that happens.

DR. PETER MILLER: How do you recover your investment in such a line?

MR. DAVID CORMIE: We recover our investment in such a line by building a large generating station at Conawapa, and the benefits will flow to Conawapa. It's -- that's where the benefits from the -- from the Preferred Development plan flow because that line is existent and -- and those costs are -- are built into the -- into the analysis.

MR. ROGER CATHCART: Just to foll -- Roger Cathcart. Just to follow up to that question from Peter. If you're going to fund two-thirds of the capital costs of the project but cap your investment to less than 50 percent, how do you recover the next 16 percent? Are you going to build that into pricing or

are -- are you tying it back to opportunities that might come in the future from the generation?

MR. DAVID CORMIE: Well, this is getting into the business case of the Preferred Development plan, and -- and the Preferred Development Plan assumes that all those costs are -- are --

MR. ROGER CATHCART: Okay

MR. DAVID CORMIE: -- are part of the Preferred Development plan. And -- and in the same way we have to recover the cost of building 100 -- paying for 100 percent of the cost of the transmission on the Canadian side of the border.

MR. ROGER CATHCART: Okay. That's fair. Thank you.

MR. DAVID CORMIE: Yeah. So -- and then -- and we'll -- and -- and Ed and Joanne will be able to talk about that as -- 'cause it's -- it's (1) one of the scenarios.

(MOVED TO SLIDE 3)

MR. DAVID CORMIE: So with regard to the export sales agreements that are tied to the Preferred Development plan, there are four (4) agreements: the Minnesota Power 250 megawatt sale

agreement, an energy exchange agreement, we have the option with NSP of selling them 125 megawatts subject to us building new hydro, and we have a sale agreement signed with Wisconsin Public Service for 100 megawatts that goes to Wisconsin on existing transmission.

Those -- those -- all those transactions are tied to the construction of -- of new generation and so those are the transactions that we're talking about here.

There are other transactions that -- that are -- are coming out of existing facilities that we're not talking about and, you know, these are short-term agreements that are -- that are taking place. And so those -- those are not part of our -- not part of the filing. And -- and those contracts, there are summaries in Appendix 6.1 that talk about the details of those.

With regard to the sale negotiations with Wisconsin Public Service, we are in active negotiations with them to finalize a power purchase agreement. And all I can say is that they're underway and -- and Wisconsin has shown every -- the interest necessary to continue negotiating. They -- they feel there's value in this, and we're -- we're working on a power purchase agreement with them. And we -- we have

set a deadline of having that agreement being available for this -- this process to see later on in -- in this -- in this year.

In addition to that, in the filing we talk about our MOU with Saskatchewan. And we're in negotiations with Saskatchewan for several transactions, and those negotiations are underway. Some of that is out of existing facilities and some of that would be dependent upon the development of new hydro resources as part of the Preferred Development Plan.

(MOVED TO SLIDE 4)

MR. DAVID CORMIE: And I -- I think the -- one (1) other transaction, and I'm not sure that it's listed here, is the Great River -- Great River energy seasonal diversity agreement. Manitoba Hydro and Great River signed the 200 megawatt seasonal diversity agreement in August. So that transaction is now going through the approval process. And we will -- we expect that that agreement will be approved at both companies this fall.

You may have noticed in the Winnipeg Free Press a few weeks ago, there was a -- an -- a

notice with the National Energy Board filing for the export permit associated with that transaction. So that -- that transaction is -- is well in hand. And that diversity agreement has been part of the -- the base case of -- in -- in all the scenarios that we've -- that we've looked at in the NFAT process.

With regard to the -- Ed, did you...

THE FACILITATOR: Just -- Ed Wojczynski, David, just a small comment in the 2013 update, that we added five (5) more years to that diversity, right?

MR. DAVID CORMIE: Yeah, the diversity agreement goes to 2030. It's -- it -- we're terminating the existing 150-megawatt agreement six (6) months early, to align with the 50-megawatt transaction with Great River so that, in effect, we will restart the transaction at 200 megawatts in -- and -- and carry that on till 2030. It's a fifteen and a half (15 1/2) year transaction.

Again, it's a capacity swap, and involves the transfer of transmission assets to Manitoba Hydro. And, essentially, there's no new facilities required for it and there's no net cost to either utility to engage in this transaction. It provides 200 megawatts of -- of winter capacity and

about 1.7 terawatt hours of dependable energy a year for the period of the agreement. So that's -- again, that's all part of the -- the base assumptions that -- that's in every scenario that we've looked at.

DR. PETER MILLER: Peter Miller again. Is -- is that conditional on the new inter-tie? Or that goes with the existing inter-ties?

MR. DAVID CORMIE: The transmission arrangements between Manitoba Hydro and Great River Energy are on the existing inter-tie. And we're just rolling those -- we're rolling those transmission arrangements over. It doesn't involve -- it doesn't involve the new interconnection.

DR. PETER MILLER: It -- Peter Miller again. If you have a new inter-tie, presumably you could increase diversity arrangements, and you could increase it more with the seven-fifty (750) than with the two-fifty (250). Is -- are those correct assumptions?

MR. DAVID CORMIE: More diversity is a possibility, yes, because Manitoba Hydro is a winter peaker and US utilities are summer peakers. So there is -- given that there is firm transmission available, we could entertain more. It's our expectation that we will continue to roll over the diversity arrangement we

have with NSP when the existing arrangement expires in 2025. Whether we want more than 550 megawatts of diversity, we haven't determined whether that's the -- economic for Manitoba Hydro to do.

DR. PETER MILLER: Peter Miller. But you wouldn't anticipate any difficulties finding a counterparty for a higher diversity exchange?

MS. PATTI RAMAGE: Peter, I think we're going outside the filing again with that. We're -- we're now going ahead. I don't --

MR. DAVID CORMIE: Yeah, you're asking me to brainstorm, so.

MS. PATTI RAMAGE: Yeah.

MR. DAVID CORMIE: That's not part of our filing, but I can talk to you about that afterwards. But it -- there -- there are some issues associated with that, so.

MR. ROGER CATHCART: Roger Cathcart. Dave, you said earlier that the decision to hold only 49 percent of the transmission ownership interest was a policy decision. Are there any restrictions or anything for you to hold a higher than 49 percent? Or are there any implications that you can provide here without -- just on holding more than 49 percent, given that your current capital investment might -- might

exceed 49 percent?

MR. DAVID CORMIE: Manitoba Hydro has decided that it will not be the majority owner of a transmission line in the United States. It creates a lot of issues for us and --

MR. ROGER CATHCART: Can you share any of those issues that -- just for background?

MR. DAVID CORMIE: I don't -- I don't think so, not at this time. We -- we -- you know, we're -- we're still...

MS. PATTI RAMAGE: No, I think we're -- we're getting ahead of ourselves again at -- at this --

MR. DAVID CORMIE: Yeah.

MR. ROGER CATHCART: Sorry. Roger Cathcart. Sorry, I -- that'll be part of the IR process. Thank you.

MS. PATTI RAMAGE: Thanks, Roger.

MR. DAVID CORMIE: So with regard to the interconnection, the MISO Manitoba Hydro wind synergy study draft report has been issued. And we talked about the importance of building the transmission line, but really the value that's generated is because Manitoba Hydro's developing new hydro resources that are capable of swinging.

So the -- the study has pointing -- is

pointing to the generation resource. Without the interconnection the generation resource can't be responsive to the -- to the price signals that MISO is sending. And so it's really the -- the trans -- it supports the decision to build a large line so that the Manitoba storage can be effective in -- in following the MISO price signal.

And -- and it -- I'd invite you to read the report and it'll -- it -- it -- you can see from there how building a line without building the generation doesn't -- doesn't really provide any benefits.

With regard to the interconnection, Manitoba Hydro and Minnesota Power signed a letter of intent in the middle of August to -- to talk about the specific issues that will be dealt with in the term sheet that will lay the -- out the business case for Manitoba Hydro and Minnesota Power investing in the US portion of the transmission lines.

And that term sheet negot -- those negotiations are underway and -- and the results of that are -- are still pending. And until we have the interconnection term sheet, Minnesota Power won't file their certificate of need, because they can't file their certificate of need until they know what the

business arrangements are so they can go to their regulator and say, Here's -- here's the implications for ratepayers in Minnesota.

And we can't proceed with a -- a facilities construction agreement with MISO until that -- until that term sheet is -- is finalized.

MR. WILLIAM GANGE: David, Bill Gange. The intercon -- interconnection term sheet, once it has been signed, will that be -- will -- will that document be a confidential document, or will that be something that will be available to us in the NFAT process?

MR. DAVID CORMIE: Like all the contracts, it will be part of the set of contracts that will be confidential but will be available to those people who have -- have -- through their -- through the confidential process that -- that's been established. So as soon as we have a term sheet we will -- we will be filing that on a confidential basis.

(BRIEF PAUSE)

MR. WALLY KOSCHIK: Wally Koschik, advisor to the PUB on transmission matters. I have two (2) questions. And one (1) is in regard to the transmission ownership question. As far as I

understand, this would be a first for Manitoba Hydro owning transmission facilities outside of the province. Also, given that the MISO is in an open access transmission regime, obviously this facility should attract some transmission services revenue. That is, you know, third parties will use the transmission and will have to pay for it.

Does Manitoba Hydro expect to receive revenue from transmission services on that facility? That's the first question. Then the second question is, regarding the 250 megawatt and 750 megawatt line, I presume -- am I correct in understanding that the two-fifty (250) and the seven-fifty (750) would represent the increase in Manitoba to US transfer capability? Are those nominal figures, or are they supported by system studies with the MISO or with Minnesota Power or with joint technical teams, or are they just nominal estimates? A 230 kV line should give you this much. A 500 kV line should give you this much.

Or are they -- you know, do they have some standing through studies?

MR. DAVID CORMIE: The -- well, you're -- you're correct, this would be the first time that Manitoba Hydro would own assets in the United States. We will have the rights to all the firm transmission

that's available as a result of our investment. So third parties will not be eligible to use that as that line.

With regard to the issue of netbacks from MISO, I can't speak to that. I -- I don't know the answer to that, and that will have to be determined.

With regard to the -- the design of the interconnection, we've gone through the MISO TSR process. We've done system impact studies that have led to facility studies that have led to detailed designs, and we're in the corridor selection process. So there are -- there are electrical engineering studies supporting those transfer capabilities. Those are firm limits and they are incremental to the existing transfer capability between Canada and the United States.

In addition to that, we're also getting 750 megawatts of firm import capability with the 750 megawatt export capability. So it's not just a export, it's an import capability. So that's probably as important to Manitoba Hydro as -- as the export capability, but they've all -- they've -- they've -- these ratings are all as a result of Utility and -- and MISO system studies.

And they're not just a nominal -- we've gone to this stage because we need to have a hard estimate of what that -- that line is going to cost. So we know which breakers need to be built. We know how many towers need to be built. We know the size of the conductor. We know what the other facilities that are affected need to be.

MR. WALLY KOSCHIK: So that 750 megawatts import capability that's an increase from seven hundred (700) to --

MR. DAVID CORMIE: Yes.

MR. WALLY KOSCHIK: -- to fourteen fifty (1,450)?

MR. DAVID CORMIE: Yes.

MR. WALLY KOSCHIK: Okay. Thank you.

MR. DAVID CORMIE: Whereas with the two-fifty (250) we don't get that trans -- in -- in -- we don't get that import capability.

THE FACILITATOR: Dave --

MR. DAVID CORMIE: Yes?

THE FACILITATOR: -- Ed Wojczynski. I might have missed it. On your first overhead there was the SaskPower, and could you just elaborate on what that is about? Or maybe you did and I missed it.

MR. DAVID CORMIE: What I said, Ed, was

that there have -- has been an MOU signed between Manitoba Hydro and -- and SaskPower, and that's been publicly announced that there will be discussions for power sales ranging from 25 megawatts up to 500 megawatts.

Saskatchewan is seeing relatively high rates of load growth, they've got a huge capital program, and they're interested in purchasing large amounts of hydro from Manitoba Hydro. So we're -- we -- we're working with them to deal with their short-term need as well as their -- as -- as well as their long-term need that would be met from facilities that were built as part of the Preferred Development plan.

Except for very small amounts of power sales, it will be -- it will -- we will have to build new transmission into Saskatchewan for a major power sale. So part of the process of understanding the costs and the benefits of -- of a power sale is what are the -- what -- what transmission studies you have to do and what -- what investment both companies would have to make.

And so those transmission studies are underway so that the parties can come together and find out, Is -- is there an opportunity here and does it make economic sense for both companies.

(BRIEF PAUSE)

MR. DAVID CORMIE: Okay. If there's other questions you can catch me at break.

LONG-TERM ELECTRICITY PRICE FORECASTING PRESENTATION:

MS. JOANNE FLYNN: Good afternoon. I'm Joanne Flynn, and I'm the division manager of Power Planning for Manitoba Hydro. I guess we'll just wait a sec while the presentation comes up.

(BRIEF PAUSE)

MS. JOANNE FLYNN: Okay. I'll try this again. Oh, this sounds like it's on. Okay. My name is Joanne Flynn, and I'm the division manager of Power Planning at Manitoba Hydro. Okay. Let's see if this thing works.

(MOVED TO SLIDE 2)

MS. JOANNE FLYNN: All right. And the topic for this afternoon is the long-term electricity price forecasting at Manitoba Hydro. So Manitoba Hydro seeks the opinion of a number of independent price

forecast consultants, whose perspectives form Manitoba Hydro's consensus electricity price forecast as part of our resource planning process.

Now, Manitoba Hydro considers the consensus electricity price forecast to be confidential and so the -- the specifics are -- are not -- are not available. What we have provided in Appendix 9.3 is a description of the price forecasting methodology.

(MOVED TO SLIDE 3)

MS. JOANNE FLYNN: And in addition to that, we indicated at the technical conference in July that we would provide an electricity price forecast in the NFAT submission. And the price forecast that has been provided will -- will give a general indication of the expected trend of future electricity prices in MISO.

It's a twenty (20) year price forecast prepared by The Brattle Group. It's their two (2) -- 2013 work. And in chapter 3, it can be found in Figure 3.13, or -- or there's a -- a summary of it in Figure 3.13. The Brattle Group is one (1) of the independent price forecast consultants that Manitoba Hydro uses to produce the consensus export price forecast. So what

they do is they produce eleven (11) distinct scenarios.

(MOVED TO SLIDE 4)

MS. JOANNE FLYNN: And 'scenarios' is a word used by the Brattle Group. In the context of the NFAT submission, we use 'scenarios' in a different context but because we are providing the -- the Brattle price forecast, this is the -- this is the wording they use. So they have eleven (11) distinct scenarios that -- that are included in their work.

Figure 3.13 picks three (3) of these scenarios. The base case, and a scenario that would provide the upper bound, and one (1) that would provide the lower bo -- bound of prolonged pricing. The full report is available in Appendix 3.1.

(MOVED TO SLIDE 5)

MS. JOANNE FLYNN: So this is the figure that you will find in Chapter 3, and it pulls together the three (3) scenarios. And these are -- the scenarios as named by the Brattle Group, so high CO2, base case, and extreme low. The base case forecast is for the Minnesota Hub, and they project that on-peak

energy prices will increase in real terms on average about 4 percent per year over the forecast horizon.

The forecast horizon here is twenty (20) years. This graph is expressed in dollars per megawatt hour in 2013 US dollars per -- per megawatt hour. The High CO2 scenario assumes the introduction of a more substantial carbon price starting in the 2016 time frame, while the Extreme Low scenario assumes no carbon price at all.

And what you can -- can also see is that there's a considerable uncertainty around the key factors that drive energy prices and so there is approximately a fifty dollar ($50) difference between the highest and lowest price scenario by the end of the forecast horizon.

(MOVED TO SLIDE 6)

MS. JOANNE FLYNN: So the Brattle price forecast is only one (1) of a number that Manitoba Hydro uses in the consensus price forecast and therefore it's only indicative of a single perspective and doesn't necessarily reflect absolute pricing levels outlined in the consensus export price forecast.

Well that it all that I was going to

present in terms of -- of long-term price forecasting. Are there any questions on that?

MR. RICK HENDRIKS: Rick Hendriks. Can you just go back to the previous graph there?

(MOVED TO SLIDE 5)

MR. RICK HENDRIKS: Okay. You mentioned that the -- the bottom line is the 'no carbon price'. Is that -- is that correct?

MS. JOANNE FLYNN: That's correct. There's no carbon included in the low.

MR. RICK HENDRIKS: Okay. So -- and I'm assuming because of the jump in the base case there's a carbon price introduced around 2019?

MS. JOANNE FLYNN: That's -- yeah, I believe that's -- that's --

MR. RICK HENDRIKS: Okay. So between now and 2019, why is there a difference between the base case and the Extreme Low?

MS. JOANNE FLYNN: Well, there's -- there's other factors that they are forecasting; like, carbon is only one (1) of the factors that is being forecasted in it. So this is there whole -- what are their assumptions for load growth; what are their

assumptions for what resources will be in place; and -- so it's all of the assumptions that they're making; that they have determined sort of a -- a low -- like eleven (11) different scenarios of what --

MR. RICK HENDRIKS: Okay.

MS. JOANNE FLYNN: -- what that future would --

MR. RICK HENDRIKS: Thank you.

MS. JOANNE FLYNN: -- look like.

MR. RICK HENDRIKS: I'm just -- yeah, I misunderstood what you had said. Okay.

So the -- the Extreme Low is not only that there's no carbon price, another -- a number of other things have contributed --

MS. JOANNE FLYNN: That's right.

MR. RICK HENDRIKS: -- to low price?

MS. JOANNE FLYNN: Yeah.

MR. RICK HENDRIKS: Okay. I just wanted to clarify that. Thanks.

MS. JOANNE FLYNN: Okay.

MR. CRAIG SABINE: Hi Joanne. Craig Sabine for MPUB (phonetic). I have three (3) questions, two (2) very quick I'm sure, and one (1) more substantive, I suppose.

One (1), the carbon in the Extreme Low

scenario is there a voluntary carbon market at all assumed or is it no carbon price from a regulated compliance-driven --

MS. JOANNE FLYNN: My understanding, or recollection, I guess, is that there's just no carbon assumed in it for -- like, just no carbon.

MR. CRAIG SABINE: Okay.

MS. JOANNE FLYNN: But probably your best bet is to go to the appendix and --

MR. CRAIG SABINE: Sure.

MS. JOANNE FLYNN: -- have a look.

MR. CRAIG SABINE: Sure. Two (2), you're not able to divulge who the other consultants were at all --

MS. JOANNE FLYNN: -- only Brattle? And are he products -- or the studies that were used, were they product-based? Because typically what I know of firms like Brattle, and I can make some assumptions on who some of the other firms might have been, but you -- they'll have products that are sort of their views on -- on the world. And they'll also do one-offs, or -- or, you know, specialized runs for a client.

MS. JOANNE FLYNN: Right.

MR. CRAIG SABINE: So can -- can you divulge whether they were product based, or -- or one-

off based?

MS. JOANNE FLYNN: There's actually a mix --

MR. CRAIG SABINE: Okay.

MS. JOANNE FLYNN: -- in -- in play, in terms of the -- the overall suite of consultant.

MR. CRAIG SABINE: Okay. Thank you.

MS. NICOLE FITKOWSKI: I have a question from Mary Neal:

MS. MARY NEAL (VIA CHAT): Do the independent consultants forecast off-peak and on-peak prices? And also, do they forecast capacity prices?

MS. JOANNE FLYNN: Yes, they forecast all of them.

MR. ROBERT SINCLAIR: So you say -- Robert Sinclair. You say that the other consultants' studies can't be divulged. You mean they can't be divulged in your filing? Can they be divulged to -- to us for further analysis, confidentially --

MS. JOANNE FLYNN: Yes, they can. They're part of the confidential process.

MR. ROBERT SINCLAIR: Okay. And when you get your various consultants' forecasts, how much analysis do you put into it to sort of combine them?

MS. JOANNE FLYNN: A lot of the

analysis that we put into it is in ensuring that we understand what the consultants have done, so that we are using the -- the information correctly. But in terms of how much judgment we apply to it, very little.

MR. ROBERT SINCLAIR: So you try to avoid judgment?

MS. JOANNE FLYNN: Yes.

MR. ROBERT SINCLAIR: Okay. And the -- the process you use to aggregate these forecasts, is that also available to us?

MS. JOANNE FLYNN: To aggregate them?

MR. ROBERT SINCLAIR: To -- you must use five (5) of them to come up with a single number, right? It's a process --

MS. JOANNE FLYNN: Yes. It's a simple averaging process.

MR. ROBERT SINCLAIR: Okay. And is that available too?

MS. JOANNE FLYNN: Under the confidential process, yes.

MR. ROBERT SINCLAIR: Okay.

MR. DAN PEACO: Dan Peaco. Just to follow up on that question. So your consensus view from these five (5) consultant studies is a -- is a single price strip?

MS. JOANNE FLYNN: A single price strip? As opposed to on-peak, off-peak?

MR. DAVID PUTNAM: No, as opposed to, for example, I'm assu -- I'm presuming each of the five (5) would have similar kind of scenarios.

Did you do any price scenario analysis with your -- in your economic analysis, or did you simply use a -- a single consensus. If you took an average of these three (3), plus -- times five (5), and came up with a single price forecast, is that what -- is that you're using in your -- your economic analysis?

MS. JOANNE FLYNN: What we use is we use a ref -- reference price, and we have the twenty-seven (27) scenarios that combine high and low prices, where high and low prices are included in --

MR. ROBERT SINCLAIR: So you come up with a -- a reference in the high and a low?

MS. JOANNE FLYNN: Consensus. All three (3) are consensus.

MR. ROBERT SINCLAIR: Okay. And then you use that in -- in your economic analysis?

MS. JOANNE FLYNN: Correct.

MR. ROBERT SINCLAIR: Okay. Thanks.

MS. NICOLE FITKOWSKI: Mary Neal has a question:

MS. MARY NEAL (VIA CHAT): Do the consultants include any potential impacts of new Manitoba Hydro generation into the price forecast?

MS. JOANNE FLYNN: The con -- the consultants are doing what I would describe as a fundamentals based analysis with their -- and they have models that support that. So they're looking at what their view is out in the future for that market area. So they may or may not consider what -- they may or may not consider what Manitoba Hydro is doing as significant to the outcome of their models.

MR. ROGER CATHCART: Hi. Roger Cathcart. Just quickly, these forecasts are done annually, or purchased annually?

MS. JOANNE FLYNN: They have been for the last several years. Historically, they haven't always been done on an annual basis.

MR. ROGER CATHCART: Okay. The NFAT filing is based on what vintage forecasts?

MS. JOANNE FLYNN: Good question. Okay. So the -- the 2012 analysis, so the analysis year you see in chapters 9 and 10 of the -- of the submission, they're based on, basically, the 2012 planning assumptions. But the export price was one (1) of the assumptions that we adjusted partway through the

year to try and get, you know, sort of the -- the best information we could before we had to lock down our assumptions, and basically that adjustment was primarily downward on -- from the 2012 base assumptions.

Chapter 12, which is our 2013 update, has the 2013 planning assumptions to the 2013 forecasts of export price forecast. And what we found is that, on -- on a reference basis, that the adjustment was now -- from -- from the 2012 assumption we made for the analysis, the 2013 price forecast has gone up from that value.

MR. ROBERT SINCLAIR: Robert Sinclair. When you say you made an adjustment from 2012 to 2013, you said "we", you meant your consultants or yourself?

MS. JOANNE FLYNN: It was informal with the consultants, sort of a polling of the consultants, and the use of other consultants, as well. So, yeah, it -- it wasn't a full fledged price forecast, but a sense of where the forecasts were going.

MR. ROBERT SINCLAIR: Yeah. And as we go through the discovery process, will your consultants be available to respond to technical questions about their forecasts?

MS. JOANNE FLYNN: I don't know the

answer to that right now.

MS. NICOLE FITKOWSKI: Joanne, I have a question from John Dalton:

MR. JOHN DALTON (VIA CHAT): Is there any effort to confirm the consistency of the consensus forecasts and the assumptions used for evaluation DSM programs? I.e., does the assessment of DSM of potential cons -- potential consider the value of energy in ex -- in export markets?

MS. JOANNE FLYNN: Can you read the question again?

MR. JOHN DALTON (VIA CHAT): Is there any effort to confirm the consistency of the consensus forecasts and the assumptions used for evaluating DSM programs? I.e., does the assessment of DSM of potential consider the value of energy in export markets?

MS. JOANNE FLYNN: Okay. Well, I'll -- I'll try this for an answer, if -- I hope I'm answering the question.

The -- the values that are -- the marginal costs that are provided to our hydro staff to do the DSM evaluations are based on the same information as we're getting from the consensus price forecasts. So I would say that there is consistency

there.

MR. ROGER CATHCART: Hi. Roger Cathcart. Just a follow up from my previous question. 2012 vintage were used for 2012, 2013 forecasts, same five (5) consultants, and other consultants. You said there were other consultants.

MS. JOANNE FLYNN: The -- the adjustment to 2012 included a mix of consultants. That included more than the -- the original five (5) consultants.

MR. ROGER CATHCART: All right --

MS. JOANNE FLYNN: The 2013 is -- we -- we did a bit of an alignment internally in terms of some of our forecasts, and we've used six (6) consultants in 2013.

MR. ROGER CATHCART: Okay. And -- and how did you -- what kind of framework did you throw around this alignment?

MS. JOANNE FLYNN: Basically it was driven by wanting to ensure we have aligned the natural gas and electricity price forecasts.

MR. RICK HENDRIKS: Yeah. Rick Hendriks. Along the same lines, just can you give us a sense of -- of the direction, or the -- the framework around the terms that you're giving to these

consultants before you provide -- they provide you with the price forecast?

MS. JOANNE FLYNN: I actually -- I don't know if I can remember them off the top of my head, but they are included in Appendix 9.3 under the export price methodology section.

But, you know, basically we're telling them we want a Minnesota Hub price. We want it to be prolonged pricing, not trying to forecast the business cycles over the years, and to -- to consider -- we -- we're looking for the -- those different products, the on-peak pro -- product, off-peak, and capacity.

MR. RICK HENDRIKS: Rick Hendriks again. And did you follow up? Like, in terms of when you get the material back, what sort of validation process do you use to ensure that you're actually comparing apples to apples, that these folks have actually made the same, or very similar assumptions about future conditions?

MS. JOANNE FLYNN: There's -- there's quite an extensive process where we deal with each of the consultants individually. And -- like that is what the majority of our analysis is, is making sure that we understand what they have done in their -- in their process.

(BRIEF PAUSE)

MS. JOANNE FLYNN: All right. That looks like we've exhausted the questions.

THE FACILITATOR: Are there anymore questions for Dave or Joanne on the price forecast, or MISO, or on the export contract update that Dave gave us?

(BRIEF PAUSE)

THE FACILITATOR: It doesn't look like it. We're -- this part went a little bit faster than we projected. We were told to leave lots of room for questions, which we did. We could start, but I -- but I think what we should do is Joanne is also the next presenter, so I think what we should do is give her a chance to collect her stuff. And why don't we take a -- a thirteen (13) minute break and come back at a quarter after 2:00.

--- Upon recessing at 2:01 p.m.

--- Upon resuming at 2:21 p.m.

THE FACILITATOR: Okay. Good

afternoon. So we'll get started again. It's the last presentation of the afternoon. This is the presentation which in all likelihood we'll need to wrap over into tomorrow morning. We did set it up that way in the agenda, so. There's quite a few overheads on it, but we -- Joanne will be coming back and starting up at nine o'clock in the morning on the same presentation, assuming we don't get through it.

And I guess, Joanne, we can ask questions as we go along, just like --

MS. JOANNE FLYNN: Oh, absolutely. There's a lot of --

THE FACILITATOR: Yeah.

MS. JOANNE FLYNN: -- different topics being covered.

THE FACILITATOR: Okay.

(MOVED TO SLIDE 2)

POWER RESOURCE PLANNING, ALTERNATIVES, AND ECONOMIC EVALUATIONS PRESENTATION:

MS. JOANNE FLYNN: Okay. So -- so chapter 4, the list of chapters that was on the front slide there, chapter 4 is the need for new resources chapter. And I've picked a couple slides to kind of

summarize the essence of -- of that portion of the chapter anyway.

And what I've picked is Figure 4.19 our of Chapter 4, which is the winter peak capacity. So it reflects the need for new resources as it pertains to winter peak capacity, based on these 2012 adjusted assumptions that we were talking about, used for the main evaluations in the NFAT submission.

It shows the capacity balance as either a surplus, if you look on the right-hand side of the slide -- left-hand side of the slide -- if you're looking at it the same way -- and as a deficit, on the right-hand side of the slide. So this is capacity, so it's -- the units are megawatts and it's showing the years from 2012/'13 to 2031/'32.

And what you see is that the Manitoba Hydro system will have a surplus of winter peak capacity until the year '25/'26. And at that point there will no longer be sufficient capacity in the winter available to meet forecast peak demand and export commitments.

(MOVED TO SLIDE 3)

Now, similarly, this is the -- this is

the graph for energy, which is Figure 4-21 in Chapter 4, and this shows, again, the same -- same thing, the dependable energy balance is either a surplus or deficit for the next twenty (20) years. And in the case of energy, it is the year '22/'23 where we're showing a deficit that begins.

And since the persistent dependable energy deficit begins earlier than the persistent winter peak capacity deficit, it's the shortfall of dependable energy that drives the need for new resources in the year '22/'23.

And that is all I was going to cover on the need for new resources.

(MOVED TO SLIDE 4)

MS. JOANNE FLYNN: So now we'll move on to chapter 7, which covers the screening of Manitoba resource options. And in that chapter we went through sixteen (16) resource technologies that are potentially suitable for utility-scale generation. That's -- those are the -- the resources that we're -- or the technologies that we're interested in.

The characteristics were grouped into categories and those categories are: technical,

environmental, social poss -- policy, and economic. And they are summarized in Table 7.1 in Chapter 7. So the high level screening of technologies uses a -- a general characterization as to whether the technology is suitable to proceed to the next stage of evaluation.

Now, one (1) of the -- one (1) of the charateri -- characteristics I'm going to talk about here is -- is cost. And this -- the -- the graph that is shown on here is also part of the chapter, and it's giving levelized cost information. So levelized cost is standard measure that we use and it provides the costs of constructing and operating a generating resource over its life, and it's represented in units as dollars per megawatt hour. And it is a useful measure for screening technologies, but it -- what it does not do is indicate the value of the generation. It's simply a cost measure associated with the unit of energy.

So to determine the value of additional ener -- generation to the system, the impact of not just a single resource and not just the cost of that resource but of the entire development plan on the system needs to be considered, as well as the value from the market and the ability to meet Manitoba Hydro's planning criteria.

(MOVED TO SLIDE 5)

MS. JOANNE FLYNN: So we do use levelized costs at the screening level. Beyond that we go into -- into full system evaluation.

Okay. There's a question here?

MR. JOHN ATHAS: Thank you. John Athas. Could you explain what the -- on that prior chart what the min and max -- how that's...

MS. JOANNE FLYNN: Okay. The -- the min -- well, okay, let me think for a sec here.

That is the range that's looked at -- now, there's two (2) different slide -- two (2) different graphs that are provided in the chapter. One (1) is on the basis of EIA -- US EIA information, and the other is Manitoba based resource costs. And so what it is, is it's the ranges that are provided for that information. So the light blue being, of course, the higher cost -- higher costs associated with those particular resources.

DR. PETER MILLER: Peter Miller. Just to clarify, you -- we have enhanced geothermal and biomass here. The biomass refers to biomass for electrical generation rather than the previous one presented by Lois as a heat substitute for -- for

electric heat by the end user?

MS. JOANNE FLYNN: Right. This is not from the customer view, this is utility scale.

DR. PETER MILLER: And similarly, the -- the geothermal is not what you'd find in your home but going deep into the earth where it's hot --

MS. JOANNE FLYNN: That's correct. Where you can --

DR. PETER MILLER: -- and produces steam?

MS. JOANNE FLYNN: -- put a plant on top of it, yes.

DR. PETER MILLER: Okay.

MS. JOANNE FLYNN: Okay. So the screening process shown in Chapter 7 yields the following resource technologies that would advance to the next stage of evaluation. So additional DSM, hydro, wind, natural gas fired, and imports.

So we take these resources and we formulate them into development plans, and all of the development plans must be able to meet our domestic load and existing firm export commitments. They must be able to meet our planning criteria. And the plans are determined also considering various strategic business opportunities and are comparatively evaluated

to identify the optimal plan.

So, for example, development plans with new transmission interconnections incorporate opportunities to serve export market customers and increase our US interconnection capability. A development plan that provides the opportunity to minimize capital investment uses natural-gas-based generation resources sufficient to meet only Manitoba Hydro's expected domestic load and existing firm export commitments.

(MOVED TO SLIDE 8)

MS. JOANNE FLYNN: Now, I'll just talk a little bit more about the new US interconnection and how we've treated it in the evaluation. So as -- as David had explained, there's two (2) interconnection projects that are considered. So the 750 megawatt import/export, or the small line which would have a 50 megawatt import capability as assumed for the NFAT submission analysis and 250 megawatts of export. The interconnections will consist of two (2) parts: so the portion constructed in Manitoba and the portion constructed in the US.

Manitoba Hydro is responsible for the

cost and development of the interconnection facilities in Manitoba. US and counterparties are responsible for the development of the US portion of the interconnection projects. And for the plans that include a new 750 megawatt interconnection, the cost of those interconnection facilities in the US is assumed to be shared in -- in varying degrees by the US counterparties and Manitoba Hydro.

As -- as David also mentioned, Manitoba Hydro will only enter into arrangements where it will not own more than the 49 percent of the interconnection facilities in the US. And in return for that, we get the benefits of having the right to use and/or sell a proportionate share of that transmission service sometime in the future.

Further, there are five (5) plans that have a 750 megawatt interconnection assumed in it. And there are two (2) plans, and the plan numbers will be coming up, and they are certainly documented in the submission. So there's two (2) plans that assume the WPS investment in transmission and 300 megawatt sale. And in those plans the assumption on the cost of not just the capital cost, but also ongoing operating and costs associated with the US portion of the interconnection, is 40 percent of those costs.

And in the other three (3) plans that have a 750 megawatt interconnection -- and those are three (3) plans that do not assume a sale to WPS or, of course, any investment in interconnection if there is no sale. And those are the ones where Manitoba Hydro will be responsible for approximately two-thirds (2/3) of the capital and ongoing operating costs, so the total of the capital and operating costs together.

DR. PETER MILLER: If -- Peter Miller. If WPS has said they're not interested in investing in transmission, how do you get just a 40 percent level of capital costs and -- and operating costs?

MS. JOANNE FLYNN: Those -- those two (2) plans, it -- it's -- it's a matter of timing here. We had already been through a lot of our analysis before that became clear, that they were not willing to invest in the transmission. So we have two (2) plans that still have them investing in the transmission. So it's showing you the difference between a party that will invest in the transmission and a party that -- that doesn't.

DR. PETER MILLER: So five (5) and fourteen (14) are now off the table because WPS's recent position that they won't invest?

MS. JOANNE FLYNN: They -- what those

plans represent is what it would look like if another party were to in -- invest. But it is using the specifics around the WPS arrangement. And as I said, that's a -- that's a matter of timing around the -- the analysis, in terms of -- of their decision.

THE FACILITATOR: Ed Wojczynski. Joanne, maybe just a small comment though. Five (5) and fourteen (14) do have the WPS sale -- 300 megawatt sale. So it has two (2) components, the investment and the WPS sale. So that -- as Dave said earlier, the WPS sale itself is still on the table.

So five (5) and fourteen (14) are there but -- but they're not quite representing what we're looking at because it has the investment. But it's -- it's not that they're fully off the table. Yes.

MR. ROGER CATHCART: Roger Cathcart. Just for clarification. Five (5) and fourteen (14) are alternatives that have a WPS three hundred (300) sale, but the assumption about WPS actually contributing to the capital for the transmission is something that is in it but maybe shouldn't be.

Or -- or that's the part of it that should be removed from those alternatives?

MS. JOANNE FLYNN: And actually it is -- plans 5 and 14 are as if WPS was going to invest in

the transmission. If -- it's plan 15 that would be -- that is a comparison where it still maintains the WPS 300 megawatt sale but does not have them investing in transmission. So there are -- the three (3) plans -- six (6), twelve (12), and fifteen (15) -- that have -- oh, sorry, I -- I think that's -- there's no WPS sale at all, right.

Okay. So six (6), twelve (12), and fifteen (15) are the three (3) plans with no WPS sale or investment.

MR. BILL HARPER: Bill Harper. I think -- is it fair to say that -- and maybe they can comment to that -- one (1) -- one (1) of the prospects now is something that isn't here which is a three hundred (300) WPS sale following this analysis with a two-thirds (2/3) capital investment by Manitoba Hydro?

That's really one of the things that's on the table now?

MS. JOANNE FLYNN: Right. The -- the terms and conditions for the WPS sale are still being negotiated, yes.

(MOVED TO SLIDE 10)

MS. JOANNE FLYNN: Okay. This is the

table of -- that describes the fifteen (15) development plans, and you can find it in -- it's Table 9.3, Chapter 9. It gives you the plans. The numbers of the plans are the order of capital investment. And I will be explaining more about that as -- as we go forward. But really what that means is the least -- it's -- it's ordered in the least capital investment plan to the highest capital investment plan.

You've got a short name next to it, and then a brief description of what the components of that plan are. So basically all I've done here is split it up over three (3) slides. And I wasn't going to go through what each of the plans are. That's available to you in -- in nine point three (9.3).

(MOVED TO SLIDE 11)

MS. JOANNE FLYNN: Whoops, I think that might have been too far.

(MOVED TO SLIDE 13)

MS. JOANNE FLYNN: Okay. So I'm just going to give you a brief overview, I guess, of the three (3) chapters that have economic evaluation

information in them, and then we'll get into some of the more hardcore stuff related to those chapters.

So Chapter 9 -- oh.

(BRIEF PAUSE)

MR. JOHN ATHAS: Just a clarifying question on -- on your needs that you showed in the front. Did that include any of the firm contracts that are contingent upon the -- the hydro developments?

MS. JOANNE FLYNN: No. Those are only existing contracts. Those are contracts that were signed and can be served out of the resources -- out of the existing resources that we have.

MR. JOHN ATHAS: Okay. Thank you.

MS. JOANNE FLYNN: Yeah.

MS. NICOLE FITKOWSKI: Philippe Dunsky is asking:

MR. PHILIPPE DUNSKY (VIA CHAT): Since stress tests don't allow you to use DSM to optimize the system, what would it take for your model to include DSM among resource options?

(BRIEF PAUSE)

MS. PATTI RAMAGE: That's not a question arising out of the filing. I think that's going to the next step, so I don't think Joanne can answer that.

MS. JOANNE FLYNN: Okay. So Chapter 9 covers the economic evaluations from the reference scenario perspective. So it's based on the inputs and assumptions based on what I will further be describing as that reference scenario.

The referenced scenario represents the most likely outcome for the factors affecting Manitoba Hydro's future. And for the purposes of the main analysis in the NFAT submission, these assumptions and forecasts for the referenced scenario were based on the 2012 resource planning assumption.

So this is the question that Roger asked earlier about what -- what the assumptions were. And this is where we adjusted the price forecast downward, the electricity price forecast downward as -- for those -- for those evaluations.

(MOVED TO SLIDE 14)

MS. JOANNE FLYNN: Chapter 10 covers economic uncertainty analysis, probabilistic analysis,

and sensitivities, and introduces the concept of scenarios and presents probabilistic analysis on twelve (12) of the development plans using the factors that have a high impact on the economics.

This is also where you would find the sensitivity analysis on drought, climate change, load growth, and in-service delay. And at the end of the chapter is also an uncertainty analysis summary provided in Table 10.15. I won't be talking about the sensi -- those sensitivities or the uncertainty analysis summary.

(MOVED TO SLIDE 15)

MS. JOANNE FLYNN: Chapter 12 is the 2013 update on selected development plans. And those -- those evaluations are based on the assumptions and forecasts from the 2013 planning assumptions. And this is the chapter that contains the DSM sensitivity and stress test. And that test is evaluating the attractiveness of higher levels of DSM -- or sorry, what it's -- what they're doing is demonstrating whether the preferred plan remains attractive under higher levels of DSM, not the attractiveness of higher levels of DSM. That's a separate exercise.

(MOVED TO SLIDE 16)

MS. JOANNE FLYNN: So now going back to chapter 9. So chapter 9 we're going to some of the assumptions and then get into some of the results. So the analysis and evaluations -- oh, yes?

MR. RICK HENDRIKS: I notice -- this is Rick Hendriks here. I notice you're going to go into some detail on chapter 9, so I just had a quick question about -- that applied to a number of -- of sections that you just went over there fairly quickly.

MS. JOANNE FLYNN: Okay.

MR. RICK HENDRIKS: How are you -- how do you deal with -- with escalation? So in -- in two (2) ways I ask that question. So, for example, Conawapa is several years away.

MS. JOANNE FLYNN: M-hm.

MR. RICK HENDRIKS: And so obviously you have a capital cost estimate that -- you know, of a certain standard at this point. Do you simply straight line escalate that in terms of determining what the capital cost would be in 2026? Or how do you account for trends in say component costs to that? So say the cost of steel could be trending in a certain direction at this time, concrete could be trending in a certain

direction; so it's not just a point to consideration, you'd be looking at the trend.

So how -- how does Hydro do that?

MS. JOANNE FLYNN: They would -- first -- first of all, I will say that the economic evaluations are -- are based on base costs, not in-service costs, okay? And there is a whole process behind that, and we happen to have one (1) of our capital estimating experts in the room, so I'll turn it over to Dave.

MR. DAVE BOWEN: Dave Bowen, Manitoba Hydro. In terms of capturing escalation for capital costs, I'll get into this in a little more detail tomorrow, but -- but when we do our estimates, it's -- we -- we first establish a point estimate which is in current day dollars overnight costs. And then, like -- like many others in the room, we're quite concerned about escalation, and certainly what's occurred in the last decade or more.

So -- so when we establish our in-service costs, we -- once we -- once we establish our base cost, which is based on our point estimate, we apply escalation rate to -- to an interest rate to bring it to an in-service cost. But we also look at the risk of escalation exceeding what we've typically

used as CPI to escalate our cost. And, for that reason, we've actually established a -- a reserve for escalation to help better deal with the -- the risk of escalation. And so that's -- that's what we've -- we've done.

MR. RICK HENDRIKS: Okay. So thank you for that. So our related question would go back to the chart you had there, the bar chart, in which you excluded certain resources.

So how do you deal with de-escalation? So, for example, solar photo -- photovoltaic is de-escalating at a fairly rapid pace. So to take only the point price right now, it's not really an indication of what role it might play within your planning period. So it -- it's too expensive now, but is it -- how do you determine that it's too expensive twenty (20) years out?

MS. JOANNE FLYNN: What -- we -- we do -- one (1) of the appendices is our emerging technology reports, which -- which report -- which -- which recognizes what's going on with solar photovoltaic. Basically what you've got is hydro is a long lead time resource. Many of the other options are not, you don't have that sort of long lead time associated with them.

So what we do from a planning

perspective is -- is we put in the resources that are one (1) of the least cost resources at this point in time. And that doesn't prevent us from doing any kind of optimization out into the future. And in fact, Ed's going to talk quite a bit about optimization tomorrow afternoon.

So the economic -- the straight economic analysis that I'm going to talk about, it does assume that over the -- the study horizon that we're going to put these specific resources in. But we realize that because you can make those decisions out in time that we'll optimize them when we'll have -- when we're -- when we need to make the decisions. We don't need to optimize those decisions today.

(BRIEF PAUSE)

MR. BILL HARPER: Bill Harper. Could you just -- in terms of the economic analysis issue -- I just wanted to be clear, because rea -- reading the application, I must have meant I probably read it too quickly and I wasn't clear -- the -- the perspective you're taking in terms of costs and benefits becoming is that -- is that costs incurred by Manitoba Hydro or total costs and benefits regardless of where?

And I guess the issue being sort of the parsing between the different partners that are obvious -- parties that are obviously involved in the overall project, and some being First Nations. So I was just curious whether it was total cost, total benefits, or whether it was looking at what's coming to Manitoba Hydro and an economic evaluation from that perspective?

MS. JOANNE FLYNN: We -- our analysis considers the full value of the project in the economic evaluations.

Okay. All right. Incremental economics -- yeah?

THE FACILITATOR: Maybe I'd just supplement that.

MS. JOANNE FLYNN: Okay.

THE FACILITATOR: Oh, Ed Wojczynski. The economic evaluation, as Joanne just said, takes the total capital costs and takes the total revenue, and looks at it from that Manitoba Hydro project kind of point of view. We have -- in Keeyask, we have co-owners, co-investors, income sharers. In Conawapa we're expecting it'll be income sharing, and we're receiving that in our analysis.

And where we show the capital sharing on Keeyask and the income sharing on Keeyask and Conawapa,

that's done on the financial analysis, 'cause the income sharing will be based on how the -- the profitability of the project and you can -- on a -- on a year-by-year basis and that's picked up in the financials.

MS. NICOLE FITKOWSKI: Philippe Dunsky has a question:

MR. PHILIPPE DUNSKY (VIA CHAT): How -- has your analysis accounted for the increased risk associated with long lead time resources? If so, how?

MS. JOANNE FLYNN: I think that's a big part of what the probabilistic analysis is about, is recognizing that there's uncertainty in the results -- there's uncertainty in the future and therefore we need to look at not just a reference case assumption, but the -- something broader than that.

Okay. All right. We'll try one (1) more time.

Incremental economics. So incremental economics means that we are going to compare one (1) alternative against another. And what we're doing is we start with the least cost -- least capital cost investment plan and we test whether it is worthwhile to make the additional increment of investment required to get to the next -- to the next plan. So what that

means is that the cost and benefits that are common to all development plans are not included in the analysis, as these values are the same for each development plan.

Likewise, sunk costs are not included in the economic evaluations. Total costs are included in the financials but sunk costs are not included in the economic evaluations as these represent money that's already been spent or commitments that can't be changed relative to the decision point when choosing among the plans.

For the purpose of this submission, all costs incurred were estimated to be incurred prior to June of 2014 are considered as sunk. And -- and that's because these have been made to protect the in-service dates for Keeyask and Conawapa generating stations as well as the US interconnection and the export agreements. And that date was chosen because according to the schedule the NFAT panel report will have been made public and the Government of Manitoba will have made a decision on the development plan by that date. So that was the date chosen for -- for sinking the costs.

Least-capital cost investment alternative, I want to talk about that for a moment. From an economic analysis perspective it is typical to

look at a do-nothing option for comparing alternatives. But Manitoba Hydro doesn't have a do-nothing option. As -- as we talked about in the need for new resources earlier in the presentation and in chapter 4, the need is being driven by persistent, dependable energy deficits which start in the year '22/'23. So this means that Manitoba Hydro is required to make some form of an investment to continue to provide dependable and reliable supply of power for the needs of the province.

In the case of our analysis, then, the closest representation of a do-nothing alternative is the least-capital cost investment. So all our comparisons are to the least-capital cost investment.

(MOVED TO SLIDE 17)

MS. JOANNE FLYNN: We are using standard economic analysis, net present value. The net present value is calculated by discounting the annual costs and annual revenues to a common point in time. And this allows for alternatives with different streams of costs and revenues that occur at different times to be compared on an equivalent basis at a single point in time.

All of the cash flows of costs and

revenues are discounted using a real discount rate which removes the effective inflation, and the net present value is expressed in 2014 constant dollars throughout the evaluation. So when we do the net present value the higher cost option is considered to be economically preferable if it provides a positive incremental net present value.

(MOVED TO SLIDE 18)

MS. JOANNE FLYNN: Now, I'm going to get into a few of the assumptions, the major assumptions. Okay, yes...?

MR. PATRICK BOWMAN: Oh, it's Patrick Bowman. It was on the previous slide, actually. I don't know if that -- and I guess my question is just: If -- was any consideration given to using different discount rates to different scenarios or plans based on the -- the degree to which they represent opportunities as opposed to the -- the simpler pathways like one (1) and two (2)?

(MOVED TO SLIDE 17)

MS. JOANNE FLYNN: Yes, consideration

was given to that and -- but what we did is we used a -- - a discount rate. And in the probabilistic analysis, when it -- it also goes -- it goes through a high and low. Yes...?

MR. PELINO COLAIACOVO: This is Pelino Colaiacovo from MPA. Just to clarify, so I realize you use -- you tested different discount rates but across scenarios, across -- across options, did you use the same range of discount rates for each option or were some options given higher or lower discount rates?

MS. JOANNE FLYNN: The same discount rates were used across all options.

MR. PELINO COLAIACOVO: Pelino Colaiacovo with Morrison Park Advisors.

THE FACILITATOR: Ed -- Ed Wojczynski. Just maybe to supplement that answer. We did not use different discount rates for different scenarios. We, as -- consciously as a corporate policy, we took the approach that given the -- the large size of the investment we're talking about and the long time frames and -- that the more appropriate approach was to do an extensive assessment of the full range of scenarios. And rather than use something like a hurdle rate, rather instead do a detailed risk assessment and be assessed and weigh-in what the risks are rather than

trying to do it through a hurdle rate kind of approach.

(MOVED TO SLIDE 18)

MS. JOANNE FLYNN: Okay. Some of the major planning assumptions. And this first slide describes the economic lives of new generation resources. This is found in Appendix 9.3. And you can see the -- how much of a -- of a range there is in the life of different types of assets. So sixty-seven (67) years for the average mix of hydroelectric generating stations, wind at twenty (20), simple cycle thirty (30), same with combined cycle, and transmission stations at thirty-five (35) years, and transmission lines at fifty (50) years.

(MOVED TO SLIDE 19)

MS. JOANNE FLYNN: So the total study life is a period of seventy-eight (78) years. It goes out to 2092. And it combines two (2) approaches, a thirty-five (35) year detailed evaluation period, and then a long-life asset evaluation period for the remainder. And the cash flow components for each of the plans is available in the economic summary tables

in Section 3 of Appendix 9.3.

So how we deal with the study life beyond the thirty-five (35) year detailed study period is firstly from a capital perspective. Replacement costs are assumed for assets that reach the end of their economic lives.

MR. ROGER CATHCART: I -- Roger Cathcart. Hi, Joanne. Ed mentioned that you didn't run hurdle rates. Did you do -- did you do any analysis on internal rates of return and hurdle rates on any of these alternatives?

MS. JOANNE FLYNN: No, we used net present value.

MR. ROGER CATHCART: Okay. Okay. Thank you.

(MOVED TO SLIDE 20)

MS. JOANNE FLYNN: Okay. So beyond the thirty-five (35) year study period, we took the net product -- so firstly from a capital cost perspective, for assets that reached the end of their service life -- or their economic lives before the end of the long study period, so for assets that are twenty (20) years in length, then they would be replaced several times

before the end of the study period from a capital cost perspective.

From a net production cost perspective, so this is where we're including major capital operating and maintenance investments for hydro and -- and anything else, and also extending the average net revenues over the -- or extending the average revenues as well. And this is all done averaging over the last three (3) years of results from the thirty-five (35) year detailed study.

So just to give you a little bit of perspective on that, this is from the net production cost perspective, so not -- not how the capital will be reinvested but what effect it has from a net production cost perspective. So you can see the -- the timeline here is going from the year 2000 to the year 2100. And you can see where the -- the net associated with -- with the All Gas Plan, compared to the Preferred Development plan, how much of a difference there is between those plans as you go over -- through the years.

So this is one (1) of the reasons that we've extended the -- the -- put the second part to the study, and taken it out to seventy-eight (78) years, is to try and more realistically capture the value.

There's no escalation beyond the thirty-five (35) years. It's kind of frozen in time, and just -- and just moved out.

MR. JOHN ATHAS: John Athas again. Can -- can you go back to that chart for a minute.

Does -- from earlier discussions -- I understand what you're doing with the averaging there, but one (1) of the influences on that -- those two (2) lines is off syst -- sales to the US?

MS. JOANNE FLYNN: Yes.

MR. JOHN ATHAS: And if you -- and the sales to the US are based on how much surplus hydro you have above domestic?

MS. JOANNE FLYNN: Yes.

MR. JOHN ATHAS: So wouldn't that be going away over the -- in this later time period in the cases that are heavily hydro versus -- and -- and thus have a different trend line to them after this -- for the second thirty-five (35) years than the all gas, for instance?

MS. JOANNE FLYNN: Could you repeat that, please?

MR. JOHN ATHAS: Sure. Wouldn't the erosion of the amou -- amount of available surplus water for the -- for sales -- opportunity sales to the

US, and firm sales, mean that the hydro plans would have a very different trend in their post thirty-five (35) -- second thirty-five years than perhaps an all gas plan, which didn't rely on surplus sales?

MS. JOANNE FLYNN: Well, I mean, that is what -- that is part of the benefit that is being shown here, is that they will continue to produce value from the sale of surplus energy.

MR. JOHN ATHAS: But they wouldn't necessarily have -- the surpluses would be dwindling over time, wouldn't -- if I understand your modelling process --

MS. JOANNE FLYNN: Well, the --

MR. JOHN ATHAS: -- as your -- as your domestic load grows?

MS. JOANNE FLYNN: Right. But this -- this is one (1) plan compared to another, so domestic load is not a consideration in this.

MR. JOHN ATHAS: But the line that you would credit the revenue on -- I just want to make sure that the line you credit the revenue on is essentially being kept constant at the -- at the last -- at the last three (3) years average, to kind of make sure I was sticking with the -- the agenda of today of just getting clarifying questions.

THE FACILITATOR: Maybe I could jump in here. The -- Joanne knows the answer, but I think it's -- when you're standing up there it's harder to follow the questions.

At that point in time, once you're that far out, all the dependable from the hydro is used up and all you're selling is non-dependable hydro. So that is constant as an average after that. You've used up all the dependable hydro and that revenue is strictly unfirm hydro. So that doesn't get smaller anymore.

Every time you add another hydro station you increase the amount of -- of unfirm energy on the average that's available for sale. As the Manitoba load grows you have to add more combustion turbines, or maybe by then we'll add solar cells, or maybe by then we'll add more wind, whatever it is it, doesn't matter. That's what's --

MR. JOHN ATHAS: I -- I understand from your question now. If that -- so just to make sure I -- I follow you, but make sure I understand what you said.

So the -- so there is no -- the surplus dependable is gone by 2032, the last -- like, the years they get into an average. Is -- do you know if there's

a bookkeeping of the depend -- of the dependable energy surplus going away for each of the plans in the -- in the application?

MS. JOANNE FLYNN: Well, the -- in the submission, we -- we provide the supply demand tables, which are the dependable energy tables, so you can see what happens with each plan out in time.

MR. JOHN ATHAS: Okay. Thank you.

(MOVED TO SLIDE 22)

MS. JOANNE FLYNN: Okay. We -- we talked briefly about sunk costs. What -- what this table does, and it's available in the appendix, is it -- it highlights the different in-service dates that are used in the different plans for Keeyask and Conawapa, and the economic analysis is done on -- on base costs, billions of 2014 dollars.

It identifies the amount of sunk costs that we're talking about for each of the in-service years for Keeyask and Conawapa, and comes down to the valuation costs that -- in total that we're using. And the cash flows for these is what is also available in those many, many pages at the end of Appendix 9.3.

(MOVED TO SLIDE 23)

MS. JOANNE FLYNN: Now, we -- we've talked about the discount rate, and what this table does is it shows you the components of the discount rate. And what we're using is Manitoba Hydro's real weighted average cost of cap -- capital. It's calculated using the long-term interest rate and associated with debt and -- and imputed interest rate associated with equity which are then weighted by Manitoba Hydro's targeted capital structure of 75:25. Okay.

And what the table shows is the weighted average cost of capital in both nominal and real terms. So from the economics perspective we're using real rates. And this one is for the rate used for the 2012 NFAT reference scenario.

So you see five point zero five (5.05) in the right-hand corner there. The -- the weighted average cost of capital of -- is seven point zero five (7.05) in nominal terms and five point zero five (5.05) in real terms. The inflation rate used is 1.9 percent to determine the weighted average cost of capital in real terms.

The 2013 -- the 2013 real weighted

average cost of capital is 5.4 percent using the same formula and methodology.

MR. JOHN TODD: John Todd. The risk analysis looks at the individual scenarios. That should give you -- or does it give you the ability to quantify sort of comparative levels of risk for the different scenarios?

MS. JOANNE FLYNN: Effectively, yes. I -- we have the cumulative probability distributions that -- that compare a complete set of scenarios against each other.

MR. JOHN TODD: So have you considered that in the normal capital market scene that different levels of risk would require different risk premia to be attached to them that could be used in the analysis for comparing different scenarios with different risks?

MS. JOANNE FLYNN: Yes. And this is what Ed was talking about, that instead of using -- using a percentage add-on to the interest rate to represent risk, that we've done a more detailed study of what the risks are. So -- and -- and I guess in addition to that, what is included in the -- the long-term debt rate for Manitoba Hydro is over and above market interest rates, is the provincial guarantee fee of 1 percent.

MR. JOHN TODD: But, unless I missed it, there's no differential across different scenarios with different loads of risk.

Is that right?

MS. JOANNE FLYNN: There is no differential in discount rates between --

MR. JOHN TODD: Yes. So it's just a -- it's a -- it's an analysis of the risks in the different scenarios but under sort of -- with the same discount rate -- the PVs cannot be compared using scenario-based risk adjusted discount rates.

Is that right? That has not been done, but could it be done with the numbers you've got? Could you quantify the risk and quantify risk premium for that?

MS. JOANNE FLYNN: I -- I'm not sure if we could or couldn't, at this point.

THE FACILITATOR: We're -- we're probably getting to a slight different topic, but implicit in the assumption Joanne just mentioned that provincial debt guarantee fee. Our operating assumption, whether there's always -- there's always a risk that we might be wrong, of course -- is that with the different plans con -- that we have with the underlying basic capital expenditure, it does increase

significantly for some of the plans versus others, but that we are -- we have the benefit of the provincial guarantee, and that the operating assumption is that the interest rate we get charged will not differ from plan to plan. But -- but that's -- there's always a risk we're wrong on that. That's one (1) of the -- that's one (1) of the reasons we pay the -- the 1 percent debt guarantee fee.

MR. JOHN TODD: The -- I'm going back a few years. Wasn't the risk -- the -- the premium paid to the province is because you're getting a below market rate, in effect, by having the government guarantee. And isn't that just sort of to bring you back to what would be a -- a normal market rate for Manitoba Hydro on a standalone basis, or -- or a proxy for that?

MS. PATTI RAMAGE: Yeah. John, I think we're once again -- we're going beyond what we have up here for these folks to answer today. There -- there are other people who aren't in the room who might be able to do that, for example, in an IR, but not the folks here. Thanks.

MR. JOHN ATHAS: John. Just a simple one. This example is very helpful for a 75:25. Is there -- if -- in -- in some of the plans, the capital

structure varies over time. At that point, do you change the cost of equity at debt at any point in the analysis?

MS. JOANNE FLYNN: No, the -- the equity is alway -- it's -- it's fixed at 75:25.

MR. JOHN ATHAS: Okay. So those are the numbers, even if the capital structure was to go up to, like a 90 percent debt at some point in time --

MS. JOANNE FLYNN: Right. From -- from a discount rate perspective, it -- it stays -- it's -- this is the calculation.

MR. JOHN ATHAS: Okay. Both the discount rate and the cost of borrowing that gets into the financial modelling? Okay.

MS. JOANNE FLYNN: Yeah, based -- based on the long-term debt rates, yes.

MR. JOHN ATHAS: Okay. Thank you.

(MOVED TO SLIDE 24)

MS. JOANNE FLYNN: All right. One (1) of the other major assumptions is the export and import contracts that are a part of the -- the portfolio. And the details of these are -- they're split into those sales that are common to all development plans, and

those that are contingent upon development. So a summary of that information is -- is supplied in the appendix.

And the other point that I was going to -- to touch on here, was this item of cash transfers to the province. And the economic evaluations of the development plans include capital taxes and water rentals as costs, which are paid to the Province of Manitoba. The provincial guarantee fee is embedded in the discount rate that is used. And these -- these transfers to the province are considered as costs to Manitoba Hydro, but they do provide benefit to the provincial government and, indirectly, to Manitoba -- to Manitobans.

As assumptions, the water rental rate, the capital tax rate, and the provincial guarantee fee are assumed to remain the same throughout the entire study period. So no in -- no -- no increase of any kind to those three (3) costs. And there is more description on -- on what these are in the appendix.

So -- and I will be showing -- I wanted to -- to bring this up at this point. I will be showing the -- the chart of the numbers, and how that -- how that affects the numbers.

(MOVED TO SLIDE 26)

MS. JOANNE FLYNN: So now starting into the incremental economics analysis. The first chart that I've shown here is Table 9.4. And it is the Keeyask-22, followed by Gas Development Plan compared to the All Gas Development Plan. The All Gas Development Plan is plan number 1, which means it is the least capital investment development plan. So -- and that -- so that is -- that is our closest representation of the do no -- do nothing plan.

The order of the development plans is based on the principle that we will undertake the lowest capital cost option available unless the incremental investment associated with the more costly option provides greater incremental benefits when evaluated at the reference scenario discount rate of 5.05 percent.

The All Gas Development Plan, as the one requiring the lowest capital investment, is then compared to development plans of increasingly higher investment. In this case in this table, the All Gas development plan is being compared to the development plan with the next lowest capital investment, plan number 2, Keeyask-22, followed by gas.

What you see in the table and all these tep -- step charts that are in Chapter 9 is you see the list of the plans and you see the incremental MPV in millions of 2014 dollars using the 5.05 discount rate.

So what this means is it's not that the net present value of the entire plan is 887 million, that is the -- the net present value associated with the increment of investment over the All Gas Plan.

MR. ROBERT SINCLAIR: Okay. So -- Robert Sinclair. So obviously the -- the benefit -- additional benefit from the K22 or the Keeyask is that there's these opportunity sales and also the other dependable exports.

Did -- did I hear at one (1) point that any dependable surplus is sold as a dependable export? Is that right? If there's dependable capacity that's not needed for load then it's assumed to be sold as a firm export?

MS. JOANNE FLYNN: Yeah. Yes, the assumption is that if we have surplus dependable energy that isn't captured in a term sheet or a signed contract, that we make the assumption that we will be able to sell that energy to -- to a third party at the long-term price.

MR. ROBERT SINCLAIR: The long-term

price.

MS. JOANNE FLYNN: M-hm.

MR. ROBERT SINCLAIR: And then the -- and that's -- that's in your forecast?

MS. JOANNE FLYNN: Right.

MR. ROBERT SINCLAIR: Right. And so the opportunity sales or the sales out of the undependable energy --

MS. JOANNE FLYNN: M-hm.

MR. ROBERT SINCLAIR: -- is sold at a -- is there a separate forecast for, like a spot price?

MS. JOANNE FLYNN: Yes.

MR. ROBERT SINCLAIR: Okay. Thanks.

(MOVED TO SLIDE 27)

MS. JOANNE FLYNN: Okay. So this is one (1) of the bigger step charts that we have in chapter 9, and this one provides a comparison of a number of development plans that include either the 250-megawatt or the 750-megawatt US interconnection.

And in terms of how to read the chart or what the chart is telling us, you can see if you look through the All Gas column that what we're doing -- or what -- what is happening here is the All Gas Plan is

compared to every other plan that's on the page. So what this is showing us is that every plan on this page has over a billion dollars worth of incremental net present value or net benefit over and above the investment in the All Gas Plan.

As you go across the page, it does -- it kind of does the work for you in -- in providing the comparisons to each of the other plans that are on the page. So you can see in the second column, those are all the comparisons to the -- to Plan 4: Keeyask 19, Gas 24 with the two-fifty (250) line.

What you see if you look across to the Plan 12 line or column, you see that the comparison of Plan 13 to Plan 12 is yielding a negative value. So this is where there is not as much benefit from making that investment in Plan 13 over Plan 12.

And one (1) of the numbers that I'd like you to keep in mind is the comparison of Plan 14 to Plan 1, because we'll use it as a reference, as sort of a place -- place that you can come back to and have a base of -- base information of -- of sixteen ninety-six (1,696) or a billion six ninety-six (696) over the All Gas Plan.

(MOVED TO SLIDE 28)

MS. JOANNE FLYNN: Now, this is the chart that has the cash transfers to the province kind of built into it. So the numbers that you see in -- hopefully it looks blue to you, on -- on sort of the left-hand portion of the chart. Those are the economics and the net present values that you've been seeing in the step charts.

So this is where the cash transfers to the province are treated as costs to Manitoba Hydro. The provincial guarantee fee is embedded in the five point zero five (5.05) discount rate. And those are the net present values that result. When we look at the water rentals and capital taxes, we split that out from the provincial guarantee fee and shown what impact the actual cash transfers to the province have.

So if you were to look at -- oh, let's just look at Plan 2, Keeyask 22 gas. So there's the eight eighty-seven (887) that we saw. And the water rentals and capital taxes for this development plan that would be transferred to the province -- and this is over the long study life period, would be four hundred (400) -- an additional 486 million. And the 1 percent guarantee fee would represent another 577 million in cash transferred to the province.

If you go down and look at Plan 14,

there's that sixteen ninety-six (1,696), which is the net present value compared to the All Gas Plan. In addition to that, water rentals and capital taxes under this plan for the total study life would result in a transfer to the province of a billion and ninety-four (94). And these are present value dollars, not in-service dollars, not the -- the dollars of the day. In addition to that, the provincial guarantee fee would result in a further transfer to the province of a billion two forty-seven (247). So fairly significant effects.

MR. JOHN TODD: John Todd again. If I'm thinking about this correctly, it's basically viewing the debt guarantee free as, should we say, free to the province, no impact. Has any analysis been done on whether the guarantee of this level of incremental debt could have an impact on the cost of debt to the province?

(BRIEF PAUSE)

MS. PATTI RAMAGE: Yeah, again, John, those are witnesses who aren't here. It's not -- hasn't been done, but it's not something that Joanne certainly can speak to.

MR. RICK HENDRIKS: Rick Hendriks here. There's a couple points in the -- sorry to reflect my ignorance of the relationship between Manitoba Hydro and your shareholder, there's a couple times in the -- in the NFAT when it says that the PDP will pay dividends. And I don't know if that's a euphemism for "good things," or whether that means that Manitoba Hydro pays dividends to the province. And if that's the -- is that a yes or a no? Do you pay a dividend other than these fees?

MS. JOANNE FLYNN: No. So -- but that word must be used in a different context than -- than --

MR. RICK HENDRIKS: Right. So it doesn't mean dividend in the financial sense, it just means --

MS. JOANNE FLYNN: No. That's right.

MR. RICK HENDRIKS: -- good things?

MS. JOANNE FLYNN: Yeah.

MR. PATRICK BOWMAN: It's Patrick Bowman. Pardon me, I -- I guess I have two (2) questions about this. One (1) is, just to make sure that we're understanding the graph correctly, if we look at something like say Case 2 and Case 9, for example, on -- on the chart, the total length of the

bar is the sum total of the benefits to the government and ratepayers without getting into how they're carved up, and the coloured sections then go into how those are carved up.

Is that a fair summary of what it's trying to portray?

MS. JOANNE FLYNN: Yes.

MR. PATRICK BOWMAN: So looking at something like Case 9 and Case 2, the total length of the bar of Case 9 would suggest that there's overall benefits to Case 9 as compared to 2. It's a -- overall for Manitoba it's a better scenario, but because of the scale of government charges that would occur, ratepayers are actually worse off with Case 9 than Case 2? Just to understand if we're reading the graph correctly.

Is that fair?

MS. JOANNE FLYNN: Yeah.

MR. PATRICK BOWMAN: Okay. The other question is: In terms of the discussion earlier today about the WPS investment, how does one look at Cases 14 and 15 here in terms of what is now available as scenarios? As I understand it, 14 has the sale and the investment, and 15 has neither the sale nor the investment --

MS. JOANNE FLYNN: Correct.

MR. PATRICK BOWMAN: -- and really we're sort of in a halfway. We have the sale but no -- or the potential for the sale but not the investment.

Is that correct?

MS. JOANNE FLYNN: Yes. The -- the sale is still under negotiation. So it's -- there's still a term sheet around it and ongoing negotiations, as David described. So -- but we don't know what the terms and conditions are going to be at this point. So that's why in Plan 15 we just took it out altogether and -- Plan 14 though does have both.

MR. PATRICK BOWMAN: But Plan 15 has all the same facilities as 14.

Is that correct?

MS. JOANNE FLYNN: Yes.

MR. PATRICK BOWMAN: And it assume -- it would assume as I understand it all the firm energy -- all the dependable energy is sold under -- under long-term pricing?

MS. JOANNE FLYNN: Yes.

MR. PATRICK BOWMAN: So if -- so it could just as easily encapsulate a scenario where that long-term sale is to WPS as any other party.

Is -- is that fair?

MS. JOANNE FLYNN: Yes, that -- that's why we did it that way. It's -- what -- what you'll see when we get to the probabilistic analysis is that when you don't have fixed prices because the long-term export prices are, you know, sub -- subject to risk, whereas contract prices, of course, are contract prices so they're not.

So you see a difference in that when you get to the -- the probabilistic analysis. You don't see it so much when you look at the reference case here.

MR. PATRICK BOWMAN: So -- so the difference in financial results between fourteen (14) and fifteen (15) are in part due to the fact that there's no investment, in part due to the fact that the sale isn't necessarily confirmed to WPS at a fixed price.

MS. JOANNE FLYNN: M-hm.

MR. PATRICK BOWMAN: It's at a price that has a risk associated with it.

Is it in part due to the fact that WPS is -- like I -- I want to ask the question correctly but -- but WPS's price is preferable to what you would otherwise imagine you'd get on the market? Like, are we losing the WPS sale and filling that void with a

generic marketing of that same energy, only a negative financial impact because of risk, or does it also make a negative financial impact because of the -- the likely price to be received under the -- the most likely scenarios?

MS. JOANNE FLYNN: I think we might be crossing into confidential territory.

Is there another question?

DR. PETER MILLER: Peter Miller. Fourteen (14), just to be clear, that's investment by Manitoba Hydro in US transmission?

MS. JOANNE FLYNN: That's WPS sale and them investing. There's still --

DR. PETER MILLER: Them investing?

MS. JOANNE FLYNN: Them investing. So this is where --

DR. PETER MILLER: Okay.

MS. JOANNE FLYNN: -- the cost to Manitoba Hydro of investing would be the 40 percent --

DR. PETER MILLER: Okay.

MS. JOANNE FLYNN: -- of the total cost. So when you see WPS sale and investment together in brackets that means they're investing.

DR. PETER MILLER: Their investment?

MS. JOANNE FLYNN: Yeah.

DR. PETER MILLER: So fifteen (15) would be our investment?

MS. JOANNE FLYNN: Yes.

DR. PETER MILLER: And -- all right. And that's why -- and that would create more debt, which would mean more debt guarantee fees to the province, and -- okay.

MS. JOANNE FLYNN: Yes. It's just marginally higher, yes.

DR. PETER MILLER: Thank you.

MS. JOANNE FLYNN: Okay. I'm going to move onto the chapter 10 probabilistic analysis unless you have any further questions on the reference economics.

(MOVED TO SLIDE 29)

MS. JOANNE FLYNN: Okay. So Chapter 10 as -- this is the same -- same slide I showed you before. I just didn't want to dive into the -- the probabilistic stuff. So we're going to talk about scenarios and then we're going to show you the probabilistic analysis on twelve (12) of the development plans.

(MOVED TO SLIDE 30)

MS. JOANNE FLYNN: Okay. So the first step is looking at the highest impact factors. And Figure 10.1 appears in chapter 10 and provides a tornado diagram which shows the impact of uncertainty in ten (10) individual factors. And the length of the bar, which you can see in this sort of squished up diagram, is -- shows the impact of varying each factor from low to high.

So the high impact factors are electricity and natural gas prices, discount rate, and capital costs. And then the low impact factors include O&M cost and changes in water rental and capital tax rates.

Now, it's important to note that the impact refers to the uncertainty in each factor, not the factor itself. So, for example, what this doesn't tell you; it doesn't tell you that O&M is unimportant. O&M is important. What it means is that there's not much uncertainty around what the O&M costs are going to be and so that impact is what is relatively unimportant in the context of all these factors. So the uncertainty analysis focuses on the high impact factors.

(MOVED TO SLIDE 31)

MS. JOANNE FLYNN: So -- now the energy prices factors -- so we've got these three (3) factors group here: energy prices for the purposes of economic evaluation, discount rate, and capital costs. So what's included in the energy prices factors are natural gas, electricity, and carbon prices together.

And natural gas is a significant factor in the determination of electricity prices in the North American market. The effect of natural gas prices on electricity export prices is imbedded in the energy prices, as is the effect of carbon. So this is because our price forecasters, they consider natural gas prices and carbon prices when they give us the electricity export price forecasts.

There are a number of economic indicators but the one that is -- is applicable to the economic evaluation is the discount rate. The capital cost group includes the generation costs for all resource types, transmission costs, and applicable real escalation.

So what -- yes?

MR. JOHN ATHAS: Just -- just for clarity. Is the -- John Athas again. Is the discount

meaning the full cost of capital, so you changed the -- the interest rates as well in the analysis, or did you just change the -- the discount rate that you used to --

MS. JOANNE FLYNN: No, it was developed from the full slate of economic indicators. So those were changed and then recalculated.

MR. JOHN ATHAS: Okay. Thank you.

MR. JOHN TODD: The -- is the analysis assume -- is it in real or nominal terms?

MS. JOANNE FLYNN: The economic one is in real terms. The financials are in nominal, in service costs.

MR. JOHN TODD: Right. Okay. Now, if I'm reading this correctly, you're assuming that the different factors are totally uncorrelated. They're --

MS. JOANNE FLYNN: Oh, the different factors?

MR. JOHN TODD: Yeah. So it's random as to whether --

MS. JOANNE FLYNN: M-hm.

MR. JOHN TODD: -- one is high or low and so on?

MS. JOANNE FLYNN: Yes. We didn't do -

- we didn't do cross-correlations across the groups of factors.

MR. JOHN TODD: Has any consideration been given sort of looking historically whether there is any correlation? I mean, is that based on analysis that says they're not correlated, or is that just you didn't think -- didn't worry about it?

MS. JOANNE FLYNN: Well, I -- I do think there is a fairly lengthy process to come up with the -- with the groupings and with how they were treated, so I do think there is some consideration of that, but we'd have to get our expert witness to -- to be talking about that in more detail.

It might be helpful to look at what is in Appendix 9.3, because it's a fairly lengthy description of what was done in terms of determining the probabilities.

MS. NICOLE FITKOWSKI: Joanne...?

MS. JOANNE FLYNN: Yes.

MS. NICOLE FITKOWSKI: I have John Dalton who asks:

MR. JOHN DALTON (VIA CHAT): Do you recall what uncertainty bounds were considered for the Conawapa capital costs?

MS. NICOLE FITKOWSKI: And then a

second question:

MR. JOHN DALTON (VIA CHAT): Were different --

MS. PATTI RAMAGE: That's a topic for tomorrow.

MS. NICOLE FITKOWSKI: Okay. So the next question is:

MR. JOHN DALTON (VIA CHAT): Were different uncertainty bounds assumed for different termino -- terminology types, exa -- example, hydro versus gas projects?

MS. JOANNE FLYNN: I think --

MS. PATTI RAMAGE: That is tomorrow also.

MS. JOANNE FLYNN: I -- I think we might have something a little bit later on coming up on that. Let's -- let's hold off on -- on that one.

Okay. So we've got reference high and low for each of these three (3) groups of factors. So the twenty-seven (27) scenarios, they're simply the three (3) times energy prices times the three (3) discount rates, times three (3) capital costs. And that gives you your twenty-seven (27) scenarios.

(MOVED TO SLIDE 32)

MS. JOANNE FLYNN: So now in terms of representing them, one (1) of the tools we've used is what's called a quilt. So what this lets you do is provide a framework for comparing the twelve (12) development plans under the twenty-seven (27) scenarios. So the left-hand side of the chart, which is kind of grey looking, it has the three (3) factors listed: energy prices, discount rate, and capital costs; low reference high for each one of them. So that gives you the twenty-seven (27) scenarios.

And the plans are listed across the columns, so that you have, when it's fully populated, twenty-seven (27) times fourteen (14) cases of -- of outputs to look at.

So just to kind of introduce it, I've only put three (3) lines on here, so the -- the line that is labelled "Ref/Ref/Ref", which is referenced energy prices, referenced discount rates, and referenced capital costs, if you look across the line, you'll see that eight-eighty-seven (887) for Plan 2, Keeyask gas, and you'll see the sixteen-ninety-six (1,696) under Plan 14. So there's the same line that we've been talking about in chapter 9.

The other examples on this chart are low energy prices with referenced discount rate and

referenced capital costs on the top part of the chart; and high -- high energy prices with referenced discount rates, and referenced capital costs on the bottom of the chart.

The colour red indicates a negative NPV, and the colour green indicates a positive NDP -- NPV. And this is when comparing the All Gas Ref/Ref/Ref case as the single base point for comparison. So everything is subtracted, considering that that reference point, which is represented by a zero on the chart in column 1. And what you'll see is when we put them all together, the colours are -- are useful in looking at what the outcomes are.

The table then provides a measure of relative performance between each of the twelve (12) development plans and the All Gas Ref/Ref/Ref case, for the three (3) scenarios identified. So for -- sorry, for all of the scenarios in this case.

The darkest colours of green represent an NPV that's equal to or greater than $3 billion. And the darkest colours of red represent a net present value that is equal to or less than $3 billion negative. The colours become lighter as the net present value approaches zero.

(MOVED TO SLIDE 33)

MR. CRAIG SABINE: Craig Sabine again. I may have missed this, so forgive me if I did. But the -- the Ref case discount rate is the same as the real WAC, as I understand it?

MS. JOANNE FLYNN: Yes, it is. Yes.

MR. CRAIG SABINE: So there was a -- so there was sort of a methodological approach behind the Ref discount rate. How did you arrive at the low and -- on the low and the high side?

MS. JOANNE FLYNN: I'm just getting to that.

MR. CRAIG SABINE: Oh, thank you.

(MOVED TO SLIDE 34)

MS. JOANNE FLYNN: Okay. So now we'll -- we'll talk about how we established the probability weightings. And, again, it's -- it's described in more detail in -- in Appendix 9.3.

But there is sort of a common approach used. So, first of all, identifying the relationships among the variables. So, typically, with some form of a model of the relationships among the variables in

each of the representative areas: so energy prices, discount rates or economic indicators, and capital costs.

Then a probability assessment was done. And that was basically done on historical data and also using expert judgment. And from that the actual inputs of what the high and low range or probab -- probabilities were -- or the probabilities for all of them were identified in that way.

(MOVED TO SLIDE 35)

MS. JOANNE FLYNN: So the probabilities on energy prices -- or -- well, I guess just -- just to speak in general first, what we recognized is that the combinations of the highest impact fact -- factors don't have the same likelihood of occurring. So when we look at these what you see is the reference case representing the most likely and having the highest probability. So for energy prices it's 55 percent. For the other two (2) it's at 50 percent, representing that most likely outcome.

In the case of energy prices, instead -- or in -- in all cases instead of just looking at it as a -- as a normal distribution, and high and low would

be the same, and -- and the reference would be the most likely case, it was recognized that in each case that it wasn't going to be symmetric. So for energy prices there is a higher probability for energy prices being low than energy prices being high. For the discount rate, there is a higher probability that the discount rate will be higher -- or high, than it is that it will be low. And for the capital costs there's also the recognition that it's more likely that the capital costs will be high than they will be low.

MR. ROGER CATHCART: Hi, it's Roger Cathcart one (1) more time. How did you pick the relative probabilistic weightings for 15 percent higher versus 35 percent for the discount rate? Like was it judgmentally selected or was -- was a distribution run?

(MOVED TO SLIDE 34)

MS. JOANNE FLYNN: Well, this is where -- that's -- that's what I just described in the previous slide. So this common approach was used to develop a relationship amongst the variables. So the -- the same approach was used for all three (3) of the factors, and it is explained in some detail in Appendix 9.3.

MR. ROGER CATHCART: Okay. I'll go through it. Thank you.

MS. JOANNE FLYNN: Okay.

MR. ROGER CATHCART: Just one (1) more question though. The probabilistic anl -- anly -- analysis quilt, does it cover all the alternatives?

MS. JOANNE FLYNN: It covers twelve (12) of them.

MR. ROGER CATHCART: Okay. Why does it -- why would the others not be on it?

MS. JOANNE FLYNN: From an -- from the chapter perspective of analyzing all fifteen (15) of them, there were definitely plans that were not going to be -- there -- there wasn't going to be any value in having further evaluation on them. But what we have included in the appendix is the quilt for all fifteen (15).

(BRIEF PAUSE)

MS. JOANNE FLYNN: Yep...?

MR. JOHN ATHAS: Just clarifying, on the -- when -- so all the other parameters, besides electric, gas -- in the energy prices it was electric and gas and --

MS. JOANNE FLYNN: Carbon.

MR. JOHN ATHAS: -- and carbon. In the discount rate it was just changing costs of money -- just changing the cost of borrowing and the cost of equity?

MS. JOANNE FLYNN: No, the -- the full slate of economic indicators, so like all the borrowing rates, the escalation, like, the CPI, all -- all of the components of economic indicators were -- were considered.

MR. JOHN ATHAS: Okay. Did that change? Is -- is load forecast in that bailiwick?

MS. JOANNE FLYNN: No. No, load forecast is treated as a sensitivity, as a separate analysis, a separate sensitivity in chapter 10.

MR. JOHN ATHAS: Okay. And in capital costs it's the capital costs of all investments?

MS. JOANNE FLYNN: Yes.

MR. BILL HARPER: I -- I -- Bill Harper. I just want to follow up on the answer you just gave because my understanding was the discount rates you're using here were real discount rates.

MS. JOANNE FLYNN: Yes, they are.

MR. BILL HARPER: And, so to some -- but you just said to some extent that the -- that they

varied with inflation. One (1) -- one (1) of the underlying reasons as to why these things were varying was the whole slate of variant inflation as well. And I thought this whole analysis was done exclusive of what -- inflation could be 15 percent, it could be 3 percent. Everything was done in real dollars.

MS. JOANNE FLYNN: But there's a relationship between interest rates and inflation, or CPI. And so that relationship was made -- was considered when looking at the high and low.

MR. BILL HARPER: Oh, so -- so the reason why your discount rate would change in terms of your real cost of borrowing is because you're implicitly assuming as interest rates change there's not a percent -- percent change in the -- in the borrowing rate.

MS. JOANNE FLYNN: Well, it's --

MR. BILL HARPER: Excuse me, as inflation changes there's not a one (1) to one (1) lockstep in the change in the -- in -- in --

MS. JOANNE FLYNN: You know, there may or may not be. I -- I think if you take a look at Appendix 9.3 it will give you a better description because I know all the economic indicators are list -- are shown there and -- and how they were treated.

MR. BILL HARPER: Okay, thank you.

MS. JOANNE FLYNN: Okay.

MS. NICOLE FITKOWSKI: Philippe -- Philippe Dunsky asks:

MR. PHILIPPE DUNSKY (VIA CHAT): Are the uncertainty bounds the same irrespective of the resource option? If so, how did the account of the inherently different risk levels associated with shorter or longer resource -- resource lead times?

MS. JOANNE FLYNN: Yes, the factors are the same -- or the probabilities are the same or applied to all development plans. Let me think about that.

In terms of -- of the different risks between the different plans, I think Ed explained this earlier, that what we were looking at is not trying to use rates to represent risk but to try and include in the -- in the assumptions the risk for each of the plans.

(MOVED TO SLIDE 36)

MS. JOANNE FLYNN: Okay. So once we have established the probabilities we can do probabilistic analysis. So -- so the quilt is -- does

not have probabilities applied to the values. The values in the quilt can be -- can be viewed as being equal. Equal probability to each one of the factors is what's shown in the quilt.

When we do probabilistic analysis we're now using the probabilities associated with each of those factors. So we pulled this table off of one (1) of the S-curves that is shown in the -- in the chapter. I would have shown you all -- all of them but it doesn't really fit on the page.

So what this is is a chart that shows -- or a table that shows, I think, all of the seven fifty (750) plans. And what you see on it, we've put for reference the -- the Ref/Ref/Ref, NPV. So these are the NPVs out of chapter 9 or out of the quilt.

And there you see Plan 14 at sixteen ninety-six (1,696). So that's the same number that you saw in chapter 9 and earlier in this chapter on the quilt. What the probabilities allow you to do is calculate the weighted average or the expected value for each of the plans.

So you can see that is on the bottom line of this table. So where the NPV under reference assumptions is sixteen ninety-six (1,696), the expected value is a billion and eighty-five (85). So that's

taking into account the application of the probabilities.

The P10 value is -- represents the tenth percentile value. So only 10 percent of the outcomes would be less than that value. And the P90, only 10 percent of the values would be higher than that value. And we -- and they're labelled as risk and reward.

As you see that the risk numbers, P10 numbers, in this case all of them are negative. The P90 have pretty high positive values. That's sort of indicative of the range of potential outcomes when you consider the uncertainty of the -- that -- that is captured in the twenty-seven (27) discrete scenarios.

(MOVED TO SLIDE 37)

MS. JOANNE FLYNN: This is -- we've just called it a 'box plot' on here, but it's also called a 'box and whisker plot'. And it's another method that allows you to visualize the range of net present values for the different development plans being considered. The box plot is based on the same NPV information used to develop the NPVs in the quilt, but uses the probabilities.

The probability is then used to develop

the percentile shown -- shown in the table. And in this table, it's -- the -- the box is the 25th and 75th percentiles. And the lines, or the whiskers, are the 10th and 90th percentiles. The expected value is shown as the dash inside the box. The smaller the size of the box, the less the variability. And the shorter the whiskers, the lower the risk and the upside potential.

MR. ROBERT SINCLAIR: Robert Sinclair. Plan number 14 doesn't have a gas investment. Is that right?

MS. JOANNE FLYNN: Sorry, what's that?

MR. ROBERT SINCLAIR: Plan number 14, there's no gas investment?

MS. JOANNE FLYNN: There -- there's probably gas investment out in time, but the major components of the plan are Keeyask and Conawapa. So that's what the short name at the top is telling you. Keeyask 2019, Conawapa 2025, as the major components of the plan.

MR. ROBERT SINCLAIR: I -- I was looking at the Preferred Plan description. It doesn't have any gas at any point. Are you saying that it's implicit that there'll be gas at some point?

MS. JOANNE FLYNN: Where -- where are you looking at the description?

MR. ROBERT SINCLAIR: In the executive summary.

MS. JOANNE FLYNN: Okay. If you look at chapter 8, there's a table in chapter 8 that lists all of the resources for each of the development plans.

MR. ROBERT SINCLAIR: And there's gas there?

MS. JOANNE FLYNN: I'm thinking there's gas later on after Conawapa. Because we're going out to 2035.

MR. ROBERT SINCLAIR: Okay. Because I noticed that there was a increase in peak demand presented earlier today on -- for domestic load.

MS. JOANNE FLYNN: Right.

MR. ROBERT SINCLAIR: And I also understand that the hydro syst -- hydro additions themselves won't provide any extra peak capacity.

Is that correct?

MS. JOANNE FLYNN: The hydro resources?

MR. ROBERT SINCLAIR: Right. The extra ones.

MS. JOANNE FLYNN: Yes, they will. Yes.

MR. ROBERT SINCLAIR: I was under the impression that they provided only energy.

MS. JOANNE FLYNN: No, no.

MR. ROBERT SINCLAIR: Okay.

MS. JOANNE FLYNN: No, definitely not. Both -- both capacity and energy. Yeah.

MR. ROBERT SINCLAIR: Okay. Thanks.

MS. JOANNE FLYNN: Okay. Well, okay. How is everybody doing? Because we're going to go into S-curves.

THE FACILITATOR: We've got another thirty-seven (37) minutes to go. Why don't we take seven (7) minute break? And I can tell you, we're getting into S-curves, for those who don't know them, you need to have a fresh mind. It also gives Joanne a chance to rest a bit.

--- Upon recessing at 3:53 p.m.

--- Upon resuming at 4:01 p.m.

THE FACILITATOR: So we've had our break, and Joanne will carry on and introduce us to S-curves. I've had a few people ask me -- the agenda says we're going to finish at 4:30, and some people have various commitments, whatever. We are finishing at 4:30 sharp, and then starting again at 9:00 in the morning. And, obviously, Joanne, I don't think you're

finishing today. So try.

MS. JOANNE FLYNN: Now, what I would suggest is that we get through the S-curves and -- because after that is the 2013 -- the twenty (20) -- 2013 update. And that would be a good point to break and start.

THE FACILITATOR: So why don't you, Joanne, finish the S-curves and then stop for questions. And -- and even if we're not at 4:30 we'll stop then.

MS. JOANNE FLYNN: Yeah.

THE FACILITATOR: Okay.

MS. JOANNE FLYNN: That's what I would suggest.

(MOVED TO SLIDE 38)

MS. JOANNE FLYNN: So the S-curve is known as a cumulative distribution function. And what it allows you to do is display the full range of values, in our case for each of the twenty-seven (27) discrete scenarios, with an individual li -- or with a single line. So that gives you sort of the snapshot all at once of the twenty-seven (27) discrete scenarios.

The points are connected linearly so we did not employ a smoothing function on these lines. We left them somewhat jagged as you will see. Each of the twenty-seven (27) discrete points is -- is plotted. And the other thing to note about this is that the rank of a particular scenario will not be the same in all of the plans. So although we've got different plans side-by-side, Plan number 1 can be in a different place in -- in any one (1) of the development plans.

And if you want to see that a little more clearly, I would direct you to the scatter plot in chapter 10, because the -- each of the twenty-seven (27) scenarios is presented for -- for the development plans, or for the twelve (12) development plans, and there's different symbols for them so you can see that they're not all in the same order.

(MOVED TO SLIDE 39)

MS. JOANNE FLYNN: Okay. So this is Figure 10.11 out of chapter 10, and it shows four (4) of the development plans with -- which are there to serve Manitoba loads. So there's no assumptions of an export line or the firm sales that we've been talking about. Oh, and I'm on slide 41. Oh, sorry, you're

right, thirty-nine (39).

Now, what we see on this chart is the four (4) plans. So I guess first of all, the -- the percentages are going up the middle. So this is the probab -- this is the percentiles. So from zero to a hundred percent. And the zero line across the bottom is the net present value dollars. So millions of 2014 net present value dollars and the range is going from minus 8 billion to plus 8 billion.

The table is in the corner that shows the -- the reference scenario net present value. So you can see once again that once -- one (1) point of reference of eight eighty-seven (887) for Keeyask 22 gas.

You see the expected values -- and for these four (4) plans you're seeing expected values for the All Gas and for the Wind/Gas plans that are negative. And you see positive net present values for the other two (2) plans that are shown on this -- on this graph.

The P10 and P90 are also shown so you can see how much upside potential and how much downside risk there is to these plans. So if we look at the Wind/Gas plan and they're colour coded so Wind/Glass -- Gas plan number 3, in the light blue; the Keeyask Gas

plan number 2 in the purple; the All Gas Plan number 1 in the orangey colour; and Plan number 7, simple cycle gas turbines followed by Conawapa in the green, sort-of-grey, colour.

Now, because the negative numbers on the bottom of the scale are on the left side of the chart, and the positive numbers are on the right side of the chart, the more to the right the plan is the more value the plan will have.

So in the case of the Wind/Gas with the assumptions made in the 2012 analysis and the probabilities applied, the results of the twenty-seven (27) scenarios show the Wind/Gas plan crosses over the zero line around the 60th percentile. So 60 percent -- or values below the 60th percentile are all negative net present values.

Now, this is compared to the All Gas Plan. All of the comparisons are still to that Ref/Ref/Ref scenario for the -- or case for the All Gas Plan. Yes...?

MR. JOHN ATHAS: These are relative to the All Gas, you said?

MS. JOANNE FLYNN: The All Gas reference. Reference energy price, reference discount rate, reference capital costs. So just like in the

quilt, you see the zero for the All Gas ref/ref/ref, all the net present values shown on that quilt are incremental to that zero.

MR. JOHN ATHAS: So the -- a different branch on the uncertainty tree does -- they -- all those outcomes for the different plans aren't compared to the outcome of the All Gas Plan on that branch? They're compared to the reference/reference/reference?

MS. JOANNE FLYNN: Yeah. There's a single point of -- of comparison, and that is to the All Gas reference case.

MR. JOHN ATHAS: Can you help me out -- help me understand the relevance of comparing the preferred plan -- Preferred Development plan at one future to the All Gas Plan at another future?

MS. JOANNE FLYNN: That is the -- basically we've developed twenty-seven (27) scenarios, and we don't know which future is likely, but we are looking at still the least cost thing that -- that we could do. And that is put in the All Gas Plan, because it's our representation of a do-nothing plan.

MR. JOHN ATHAS: Yeah, I understand about the plan choice as the reference. I'm just trying to understand the -- the appropriateness of comparing a -- two (2) plans at different futures and

saying that that tells me which one I prefer.

MS. JOANNE FLYNN: What it's showing you is the range of risk from highs to lows on an incremental basis.

MR. JOHN ATHAS: Okay.

MR. RICK HENDRIKS: Rick Hendriks. Apologies for the math question but I just want to make sure I understand. When I look at the All Gas example on this S-curve, it doesn't cross -- two (2) questions. It doesn't cross at the 50 percent mark, so it's not crossing at what intuitively in my mind is the reference point. But I assume though that the area, okay, under the curve to the left of the zero point is equal to the area above the curve to the right of the zero point, and that's how you get a zero NPV.

MS. JOANNE FLYNN: Yes.

MR. RICK HENDRIKS: Okay. So my second understanding is correct. Just mathematically I'm trying to make sense of why this -- the line does not cross at 50 percent.

MS. JOANNE FLYNN: I -- I'm thinking why the line doesn't cross at fifty (50) -- yeah. I -- I'm thinking it's -- it's because of the twenty-seven (27) discrete points and then they're -- they're connected.

THE FACILITATOR: And another way to explain what Joanne has said is that ref/ref/ref is not 50 percent.

MR. RICK HENDRIKS: Right, it's not the expected value.

THE FACILITATOR: No.

MR. RICK HENDRIKS: It's a reference value. Okay. That --

MS. JOANNE FLYNN: That's right.

MR. RICK HENDRIKS: -- that'll make -- make more sense. Okay, thank you.

MS. JOANNE FLYNN: Okay. So one (1) of the concepts that is used in looking at the S-curves is this concept of dominance. And a plan can be said to be dominated if it is completely to the left of other plans. So in this case, the Wind/Gas plan is completely dominated by the other plans on the page. So there are no combination, no scenario, in which the All Gas Plan has a value greater than the -- than the other plans.

When you look at the All Gas Plan, which is in the orange, you see it -- at the 50th percentile generally it -- it's starting to cross into the -- into the minus net present values, and the plan can be described as having a greater downside risk than there

is upside potential. And you see the values stretching out beyond the $6 billion negative mark and reaching maybe not quite a $2 billion positive mark. And if you look at the P10 value and the P90 value, that gives you somewhat of an indication of where those values are following at -- falling at the 10th and 90th percentile.

Some would still consider the All Gas Plan to be dominated by the Keeyask gas and the simple cycle Conawapa plan. Those two (2) plans are clearly better than either of the All Gas or Wind/Gas. So what this means is that we would be better off putting in a hydro plant than -- than pursuing plans with -- that are strictly gas or a combination of wind and gas in their entirety.

(MOVED TO SLIDE 40)

MS. JOANNE FLYNN: So the -- the next graph is Figure 10.18. And what we've done in this -- in this graph is, we've selected the second plan, so Keeyask22 gas, as one (1) of the best plans from the previous four (4) that we'd looked at and then compared it to a plan that has a small interconnection. So it's plan 4, Keeyask19 gas 24, with the two-fifty (250)

line.

And although the -- the distance might not look to be that great, the expected value is -- is saying that the Plan 4 has a higher expected value than Plan 2. So nine seventy-one (971) compared to five sixty-four (564). And if you look at the reference values, and this is slide 40, the -- it's -- it's telling you -- it's giving you the same message, that plan 4 at thirteen forty-six (1,346) is a higher value than the Keeyask22 gas with no interconnection at eight eighty-seven (887).

In this plan, both of them seem to have more downside risk than they do upside potential. But when looking between these two (2) plans, again, you could say that the Keeyask19 gas 24, with the two-fifty (250) line, dominates the plan that doesn't have an interconnection.

So it's showing that it's more beneficial to advance Keeyask and invest in a small interconnection, than to consider any of the development plans without a new US interconnection. And I haven't shown you all of the plans without any -- with -- without an -- an interconnection. But if you consider what you see in chapter 9, and look at the -- the twelve (12) plans in -- in chapter 10, that --

that's what you'll see. So moving -- oh, yeah...?

MR. JOHN TODD: Thank you. John Todd. This is sort of going back, but I'm trying to get my handle on how we compare these. But you've got three (3) variables: energy prices, discount rate, and capital costs.

MS. JOANNE FLYNN: Yes.

MR. JOHN TODD: If I go back to slide 30, the energy prices is a high impact factor, being electricity and natural gas prices?

MS. JOANNE FLYNN: Right.

MR. JOHN TODD: So if I'm interpreting that correctly, that means that the variance in -- in energy prices imply -- assumes that the variance in the electricity price and the variance in the gas price is identical.

Is that right?

MS. JOANNE FLYNN: Well, the natural gas prices, for the most part for this analysis, the natural gas prices are embedded in the electricity price forecast. The natural gas costs that we would have outside of the electricity price forecast realm are the cost of natural gas, of burning -- the -- the burn cost for natural gas resources in Manitoba, which is pretty small.

So the reason that we're -- we're doing it that way is because basically our price forecast consultants have taken those things into consideration in doing their price forecasts, the natural gas and the carbon, and embedded that in the export -- or electricity export price forecast. So in the energy prices that we're relying on in the analysis.

MR. JOHN TODD: Okay. So the only place that the natural gas price comes into play is the burn rate for All Gas scenario. And to the extent that gas is the marginal supply, therefore, the costs -- the price-maker for electricity, it's actually -- the variance in electricity price you're looking at and whether -- and part of that variance is picked up if -- if gas is no longer the marginal production. That's just all pick -- that's irrelevant to this analysis because you're just looking at the variance in the electricity price?

MS. JOANNE FLYNN: Right.

MR. JOHN TODD: Okay. So it's almost -- so really, if you look back at the high impact, I think what I just heard is that the electricity prices, the high impact to the natural gas price is not a -- is not a high impact factor.

Is that right?

MS. JOANNE FLYNN: It's considered because it's a -- it's a big driver of the electricity price.

MR. JOHN TODD: But if you've got electricity prices they're collinear, so you can sort of say that's -- that's not really part of the analysis.

Is that right?

MS. JOANNE FLYNN: Right. Because -- yes, we're saying that it's been considered in it because it's such a big part of the electricity prices. So it is hard to kind of separate those two (2) things out.

But yeah, it's not like there's this whole big separate --

MR. JOHN TODD: Yeah. For all this --

MS. JOANNE FLYNN: -- initiative about --

MR. JOHN TODD: For this analysis it's only the electricity, variance in electricity prices that matters.

MS. JOANNE FLYNN: Yes. Yeah. Okay. All right. So I'll go through one (1) last S-curve.

(MOVED TO SLIDE 41)

MS. JOANNE FLYNN: And this is slide 41. And what this comparison is is that same two-fifty (250) line that we looked at on the previous S-curve, so Plan 4, and it's being compared against Plan 14, which is the Preferred plan.

And generally, at -- and what you see here is you see -- now -- now what you're looking at is you're looking at one (1) hydro plant followed by gas, and a two (2) hydro plant plan. And you see higher upside potential on the Preferred plan and a little bit more downside risk. And you see less upside potential with the natural gas and a little bit -- oh, actually, I guess there's a little bit more downside risk for the natural gas plan -- or the plan with natural gas.

But you see a crossover at the 50th percentile. So at the 50th percentile the Preferred plan is to the right of the -- or sorry, to the left of the -- of Plan 4, which means that at those lower percentiles that the -- the Gas plan is giving you preferred values.

So while some would say -- if you look at the expected value you see a difference of ten eighty-five (1,085) to nine seventy-one (971), you see at the -- at the ref/ref/ref values, which is the most likely, that the Preferred plan is sixteen ninety-six

(1,696) compared to thirteen forty-six (1,346), there's more upside potential with the -- with the plan, that there would be some confidence that the Preferred plan would be the superior of the plans.

But from an economics perspective in -- in our analysis, and because the plants have these very different characteristics -- so you're looking at Conawapa versus gas, you're looking at a seventy-fifty (750) line versus a two-fifty (250) line, that the decision -- well, it wouldn't be made solely on the economics anyway, but from an economics perspective we're not saying clearly that we can choose between these plans, that other considerations should be considered, that the tradeoffs between the plans, the values of -- and the characteristics of the plans need to be considered, and the financials and multiple accounts and the optionality need to be considered before a decision is made on -- on which plan would be considered the better plan.

And that is all I was going to do. Okay. There's questions. So I'll just go back.

MR. JOHN ATHAS: John Athas again. Joanne, can you -- can you take your observations that you've made here and go back to the box and whisker chart comparing four (4) and fourteen (14), and tell us

about how you would -- how you read that and observations versus this?

(BRIEF PAUSE)

MS. JOANNE FLYNN: Oh, right. Right there. Okay. I was thinking it was way back. It's not really way back. So on -- on the box and whiskers what we see is the -- it's -- it's very clear in the All Gas and the Wind/Gas plan the length of the whisker down. So that's downside risk.

So when you look at -- you know, as compared to an S-curve, you're going to see -- and that's what you see on the S-curve. You see those values that are like approaching $8 billion on the -- on the S-curve, and that's that whiskery part trailing out there.

So what this is showing you is you're seeing the box at the 25th and 75th percentiles. The expected value is the dash in the box. And the -- the end of the whisker point is the -- either the 10th or the 90th percentile. So in terms of -- of what it's showing you is, again, you see the -- so the Plan 14 is -- is the one (1) coloured at the end, and you see an expected value that is fairly high in the box. It's

got the highest expected value of all the plans on the page. And you see that it has one (1) of the highest, if not the highest, upside potential.

It does have downside risk, because it's a big capital investment plan. So discount rate is an important factor when you have two (2) hydro plants because of all the upfront capital investment. And the benefit though, of the two (2) hydro plants, or the upside potential, especially with the seven-fifty (750) line, is the ability to -- to sell the surplus energy into the market. And from a probabilistic perspective you would get the benefit of the high energy prices.

MR. JOHN ATHAS: Sorry, I just wanted to make that -- I mean, I would assume that the box part of this is shaped like it is because it's for people that would use this the 25:75 points are more relevant in their decision -- in their thought process than -- than 90:10?

MS. JOANNE FLYNN: Yeah, I think -- I think you could look at it that way.

MR. JOHN ATHAS: And so could -- could you say in that regard how you would -- how you would think that in this 25:75 boxes, 4 and 14 compare?

MS. JOANNE FLYNN: Okay. So one (1) of the points about the boxes is the smaller the box the

less risk there is. So Plan 4 would appear to have a slightly smaller box than Plan 14. What it doesn't have from the whisker perspective is it doesn't have the upside potential. The upside potential is taken into consideration, and -- and the downside risk, when the expected value is created. So you see the expected value is higher for the -- for Plan 14 than it is for Plan 4.

(BRIEF PAUSE)

MR. WALLY KOSCHIK: Thanks. It's Wally Koschik again, PUB advisor. Just a very fundamental question about this analysis. How -- how is the variability of the water captured from year-to-year in the analysis? Is it some kind of Monte Carlo simulation? Some kind of averaging? Obviously, the -- the large surpluses in certain years when there's high flows has to be captured. How -- how is that done?

MS. JOANNE FLYNN: That's done in the -- in the basic modelling. And when we do our -- when we develop our plans and run them through the model, the model uses all ninety-nine (99) flow years, the -- the entire historical record. So what you're seeing is the average of all flow years. The revenues and costs

associated with the average of all flow years.

(BRIEF PAUSE)

THE FACILITATOR: This is the last question by -- this is the last question by the way. No, no, tomorrow morning there is still time. Joanne is not going away. Don't worry.

MR. WALLY KOSCHIK: So are you saying a calculation is done for every one (1) of ninety-nine (99) flow scenarios?

MS. JOANNE FLYNN: Yes. For every plan, yes.

MR. WALLY KOSCHIK: For -- oh, I see. Okay. And that's --

MS. JOANNE FLYNN: Yeah.

MR. WALLY KOSCHIK: -- averaged?

MS. JOANNE FLYNN: It's the average of all those outcomes of -- of --

MR. WALLY KOSCHIK: Okay.

MS. JOANNE FLYNN: -- applying each water condition to the plan.

MR. WALLY KOSCHIK: Okay. Gotcha. Thank you.

MS. JOANNE FLYNN: Okay.

MR. WALLY KOSCHIK: I thought that was it. I had forgotten.

MS. JOANNE FLYNN: Okay.

THE FACILITATOR: So we're going to cut it off now. Tomorrow morning, Joanne will carry on with her presentation. If you have more questions on the S-curves or any other part of the presentation, of course, she'll be just super-glad to answer them then. Otherwise, we'll -- we'll see you in the morning. Thank you.

--- Upon adjourning at 4:28 p.m.

Certified correct,

_____

Cheryl Lavigne, Ms.

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