MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

2017/18 and 2018/19

GENERAL RATE APPLICATION

PUBLIC HEARING

Before Board Panel:

Robert Gabor   - Board Chairperson

Marilyn Kapitany   - Vice-Chairperson

Larry Ring, QC   - Board Member

Shawn McCutcheon   - Board Member

Sharon McKay   - Board Member

Hugh Grant   - Board Member

HELD AT:

Public Utilities Board

400, 330 Portage Avenue

Winnipeg, Manitoba

January 10th, 2018

Pages 3854 to 4112

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 1                    APPEARANCES

 2  Bob Peters                     )Board Counsel

 3  Dayna Steinfeld                )

 4

 5  Patti Ramage      (np)         )Manitoba Hydro

 6  Odette Fernandes (np)          )

 7  Helga Van Iderstine (np)       )

 8  Doug Bedford                   )

 9  Marla Boyd       (np)          )

10

11  Byron Williams                 )Consumers Coalition

12  Katrine Dilay                  )

13

14  William Gange                  )GAC

15  Peter Miller                   )

16  David Cordingley (np)          )

17

18  Antoine Hacault                )MIPUG

19

20  George Orle      (np)          )MKO

21

22  Senwung Luk      (np)          ) Assembly of

23  Corey Shefman    (np)          ) Manitoba Chiefs

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25
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1   LIST OF APPEARANCES (cont'd)

2

3 Kevin Williams   (np)   ) Business Council

4 Douglas Finkbeiner (np)   ) of Manitoba

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6 Daryl Ferguson   (np)   ) City of Winnipeg

7

8 Christian Monnin   )General Service

9   )Small, General

10   )Service Medium

11   )Customer Classes

12

13 William Haight   )Independent Expert

14 William Gardner   )Witnesses

15 Kimberley Gilson   )

16

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1   LIST OF EXHIBITS

2   EXHIBIT NO.   DESCRIPTION   PAGE NO.

3   PUB-DEA-2-1   Day 2 the load forecast report of

4   Daymark Energy Advisors   3862

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1   LIST OF UNDERTAKINGS

2 NO.   DESCRIPTION   PAGE NO.

3 45   Daymark panel will review their

4   records and confirm that they have

5   concluded that since 2010 Manitoba

6   Hydro has been over forecasting

7   population growth in Manitoba.   4051

8 46   Daymark Energy Advisors and

9   particularly Ms. Kelly and Dr. Gautam,

10   advise as to whether the load forecast

11   for those seven (7) former top

12   consumers that have now been put into

13   the general service mass market

14   customer grouping would be greater or

15   less. And if they can quantify it, as

16   a result of the different methodologies

17   that are used for the load forecasting

18   for those two (2) groups. And that the

19   client revisit PUB/Daymark load

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21   additional information is provided as

22   part of that undertaking.   4069

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1   LIST OF UNDERTAKINGS (CONT'D)

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3 47   Daymark to recalculate this chart

4   that's shown in PUB/Daymark load

5   Information Request 16 and to start

6   it in the year of 2018/'19 and

7   provide it for the five (5) years

8   that the short-term forecasts

9   are being used by Manitoba Hydro. 4110

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1 --- Upon commencing at 9:04 a.m.

2

3   THE CHAIRPERSON: Good morning,

4 everyone. Ms. Steinfeld, if you could take us through

5 today.

6   MS. DAYNA STEINFELD: Thank you, Mr.

7 Chair. Today we have scheduled the independent expert

8 consultant witness panel, the Daymark Energy Advisors

9 Load expert evidence.

10   We'll start with their direct evidence

11 followed by cross-examination by the Intervenors,

12 Manitoba Hydro and Board counsel. If required, an in-

13 camera session will be held following the public

14 session. We'll have Kathy Kelly here in person and

15 Suman Gautam is joining as by video link.

16   THE CHAIRPERSON: Thank you. Mr.

17 Haight...?

18   MR. WILLIAM HAIGHT: Thank you, Mr.

19 Chair. Just a couple of things before I take both Ms.

20 Kelly and Mr. Gautam through their background, the --

21 there is so for the purposes of the record, we will be

22 referring to day 2 the load forecast report of Daymark

23 Energy Advisors which is Exhibit 2.1 -- or 2 hyphen 1,

24 and the errata which is a 2-2. The CVs for Ms. Kelly

25 and Mr. Gautam are marked as Exhibit 6.

1   And when we do get to the PowerPoint

2 presentation which you -- which has been circulated,

3 it has been tendered as Exhibit DEA-5. And, of

4 course, all of those exhibits are prefaced with the

5 acronym DEA for Denmark -- Daymark Energy Advisors.

6

7 --- EXHIBIT NO. PUB-DEA-2-1: Day 2 the load forecast

8   report of Daymark Energy

9   Advisors

10

11 --- EXHIBIT NO. PUB-DEA-2-2: Errata.

12

13 --- EXHIBIT NO. PUB-DEA-5: Daymark Energy Advisors

14   powerpoint presentation.

15

16 --- EXHIBIT NO. PUB-DEA-6: CVs for Ms. Kelly and Dr.

17   Gautam

18

19   MR. WILLIAM HAIGHT: So with your

20 permission, Mr. Chair, I'll -- I'll take both Ms.

21 Kelly and Mr. Gautam through their backgrounds.

22   THE CHAIRPERSON: Certainly.

23

24 EXAMINATION-IN-CHIEF BY MR. WILLIAM HAIGHT:

25   MR. WILLIAM HAIGHT: I understand that

1 Mr. Gautam is on video link and is available. I

2 intend to first start with -- and there is Mr. Gautam.

3   DR. SUMAN GAUTAM: (by CCTV):   Good

4 morning.

5   MR. WILLIAM HAIGHT: Good morning,

6 Suman. You can read us loud and clear?

7   MR. WILLIAM HAIGHT: Yes, I can.

8   MR. WILLIAM HAIGHT: Wonderful.

9 Suman, I was just saying that I'm going to take Ms.

10 Kelly through her background and then I will then move

11 to you to take you through your background.

12   So, Ms. Kelly, you are a vice-president

13 and principal consultant with Daymark Energy Advisors?

14   MS. KATHLEEN KELLY: That is correct.

15   MR. WILLIAM HAIGHT: And you --

16 Daymark provides integrated planning, policy and

17 strategic analysis and advisory services to the North

18 American electric and natural gas industries?

19   MS. KATHLEEN KELLY: That's correct,

20 yes.

21   MR. WILLIAM HAIGHT: You have an MBA

22 in Finance from Northeastern University?

23   MS. KATHLEEN KELLY: Yes.

24   MR. WILLIAM HAIGHT: You also have a

25 Bachelor of Science in Mathematics?

1   MS. KATHLEEN KELLY: Correct.

2   MR. WILLIAM HAIGHT: You've been

3 involved in the energy business and I'm sorry to put

4 this on the public record, but for approximately forty

5 (40) years?

6   MS. KATHLEEN KELLY: Unfortunately,

7 yes, that's correct.

8   MR. WILLIAM HAIGHT: Okay. And for

9 twenty (20) of those years you worked for a major

10 utility in the United States?

11   MS. KATHLEEN KELLY: Yes.

12   MR. WILLIAM HAIGHT: That's the Boston

13 Edison Company?

14   MS. KATHLEEN KELLY: Yes, that is

15 currently Eversource today and all of its --

16   MR. WILLIAM HAIGHT: Right. Formally

17 known as Boston Edison.

18   And while employed with that Utility,

19 among other duties, you were involved in forecasting

20 including load forecasting?

21   MS. KATHLEEN KELLY: That's correct.

22   MR. WILLIAM HAIGHT: And your duties

23 involved a wide range of planning -- the planning

24 process for the Utility, including distribution

25 planning and financial forecasting, both short and

1 long-term?

2   MS. KATHLEEN KELLY: Yes.

3   MR. WILLIAM HAIGHT: And these

4 planning process -- and processes involved the review

5 and preparation of load forecasts?

6   MS. KATHLEEN KELLY: Yes, it did.

7   MR. WILLIAM HAIGHT: And after Boston

8 Edison you remained in the energy sector with a

9 consulting firm known as Stone and Webster Management

10 Consultants formally known as Loomis Consultants

11 International?

12   MS. KATHLEEN KELLY: That's correct.

13   MR. DARREN CHRISTLE: Point of order,

14 Mr. Chair. The witness hasn't been sworn yet.

15   THE CHAIRPERSON: Yeah, no, I was

16 just waiting to get your attention, you know, I think

17 that, yeah. Okay, let's swear them both in.

18   MR. WILLIAM HAIGHT: Thank you.

19

20 INDEPENDENT EXPERT CONSULTANT WITNESS PANEL 1 -

21 DAYMARK LOAD:

22

23   KATHLEEN KELLY, Sworn

24   SUMAN GAUTAM, Sworn (by CCTV)

25

 1   MR. WILLIAM HAIGHT: And, Mr. Chair,

 2 I'd ask that the evidence that's already been

 3 presented prior to Ms. Kelly be applied mutatis

 4 mutandis as if she has been sworn?

 5   THE CHAIRPERSON: Yes.

 6

 7 CONTINUED BY MR. WILLIAM HAIGHT:

 8   MR. WILLIAM HAIGHT: So you were

 9 seventeen (17) years with that consulting firm?

10   MS. KATHLEEN KELLY: Yes.

11   MR. WILLIAM HAIGHT: And fifteen (15))

12 of which you were the director and practice lead of

13 Utility and strategy practice?

14   MS. KATHLEEN KELLY: That's correct.

15   MR. WILLIAM HAIGHT: And you moved to

16 Daymark in 2016?

17   MS. KATHLEEN KELLY: Yes, February of

18 '16.

19   MR. WILLIAM HAIGHT: And over the

20 course of your employment with these three (3)

21 companies you evaluated numerous load forecasts?

22   MS. KATHLEEN KELLY: Yes.

23   MR. WILLIAM HAIGHT: Approximately

24 between fifty (50) and a hundred (100)?

25   MS. KATHLEEN KELLY: As best as I can

 1 recall, yes.

 2   MR. WILLIAM HAIGHT: That you analyzed

 3 and reviewed?

 4   MS. KATHLEEN KELLY: Yes.

 5   MR. WILLIAM HAIGHT: And you also

 6 evaluated projects from the load forecast perspective?

 7   MS. KATHLEEN KELLY: Yes.

 8   MR. WILLIAM HAIGHT: And you have

 9 provided an expert opinion evidence to utilities --

10 Utility Boards in the United States?

11   MS. KATHLEEN KELLY: Yes, I have.

12   MR. WILLIAM HAIGHT: And some of that

13 evidence involved analysis and review of load

14 forecasts?

15   MS. KATHLEEN KELLY: Yes, it did.

16   MR. WILLIAM HAIGHT: And you were

17 accepted to give expert opinion evidence before those

18 Utility Boards?

19   MS. KATHLEEN KELLY: Yes, several

20 times.

21   MR. WILLIAM HAIGHT: All right. Those

22 are my questions for Ms. Kelly. I accept (sic) to --

23 to confirm, Ms. Kelly, that you were involved with the

24 preparation of a report that has been tendered in this

25 proceeding as DEA Exhibit 2.1?

1   MS. KATHLEEN KELLY: Yes, I

2 participated in that and directed it.

3   MR. WILLIAM HAIGHT: Correct. And you

4 also were involved with the preparation of an errata

5 for that report, which is DEA Exhibit 2.2?

6   MS. KATHLEEN KELLY: That's correct.

7   MR. WILLIAM HAIGHT: And then now, Mr.

8 Gautam, moving to you, sir, you have a PhD in Energy

9 Economics; is that correct?

10   DR. SUMAN GAUTAM: That's right.

11   MR. WILLIAM HAIGHT: And you obtained

12 this degree in 2014?

13   DR. SUMAN GAUTAM: Yes.

14   MR. WILLIAM HAIGHT: And you also have

15 a Masters of Science in Energy Economics.

16   DR. SUMAN GAUTAM: Yes, that's --

17 yeah.

18   MR. WILLIAM HAIGHT: Which you

19 obtained in 2012?

20   DR. SUMAN GAUTAM: Yes, definitely in

21 2012.

22   MR. WILLIAM HAIGHT: Okay. And you

23 also have a Bachelor of Arts in Physics and Economics?

24   DR. SUMAN GAUTAM: That's right.

25   MR. WILLIAM HAIGHT: And in order to

1 obtain your PhD I understand you wrote three (3)

2 different papers covering different aspects of

3 electricity policy?

4   DR. SUMAN GAUTAM: That's right,

5 electricity markets.

6   MR. WILLIAM HAIGHT: And the papers

7 dealt with electricity demand and price patterns?

8   DR. SUMAN GAUTAM: Yes.

9   MR. WILLIAM HAIGHT: And the concepts

10 and methods that you analyzed are concepts -- and

11 these papers are concepts and methods that are

12 utilized for load forecasts?

13   DR. SUMAN GAUTAM: Yes.

14   MR. WILLIAM HAIGHT: And one of the --

15 the dissertation that you received, all three (3) of

16 your papers involved an analysis of econometric

17 principles and regression modelling?

18   DR. SUMAN GAUTAM: Yes, that's right.

19 That was the method used primarily.

20   MR. WILLIAM HAIGHT: Okay. And after

21 graduating, you began your professional employment

22 with a consulting firm known as DNVGL?

23   DR. SUMAN GAUTAM: That's right.

24   MR. WILLIAM HAIGHT: And you were

25 employed as an energy consultant and policy advisor?

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 1   DR. SUMAN GAUTAM: Yes.

 2   MR. WILLIAM HAIGHT: You began your

 3 employment with Daymark in 2016?

 4   DR. SUMAN GAUTAM: Yes, that's right,

 5 yeah.

 6   MR. WILLIAM HAIGHT: And through your

 7 employment with DVL (sic) and Daymark, you've

 8 evaluated projects, including load forecasts for these

 9 projects?

10   DR. SUMAN GAUTAM: Yes.

11   MR. WILLIAM HAIGHT: And your

12 involvement with load forecasts, sir, is both academic

13 because it -- the concepts that you dealt with in

14 preparing your dissertations were -- or your papers,

15 your thesis, involved analysis of those concepts that

16 would apply to load forecast, as well as

17 professionally through Daymark and DMV (sic)?

18   DR. SUMAN GAUTAM: That's right.

19   MR. WILLIAM HAIGHT: One (1) of the

20 things you do at Daymark is that you look at data and

21 analyze that data through various forms of statistical

22 analysis to determine if the results of the analysis

23 are a reliable -- reliable predictor of mood of use

24 for a load forecast?

25   DR. SUMAN GAUTAM: That is correct.

1   MR. WILLIAM HAIGHT: And you, along

2 with Ms. Kelly, were involved in the preparation of a

3 load forecast report for the Public Utilities Board,

4 which I can tell you, sir, has been marked as DEA

5 Exhibit 2.1?

6   DR. SUMAN GAUTAM: That's right.

7   MR. WILLIAM HAIGHT: And also an errata

8 which I can tell you, sir, has been marked in this

9 proceeding as DEA Exhibit 2.2?

10   DR. SUMAN GAUTAM: Yes, correct.

11   MR. WILLIAM HAIGHT: And, sir, both

12 you and Mr. Kelly were involved in a -- in the

13 preparation of a PowerPoint presentation and -- which

14 is a -- for the load forecast review, which has been

15 marked as Exhibit 5, in this proceeding I can tell

16 you, sir?

17   DR. SUMAN GAUTAM: Yes.

18   MR. WILLIAM HAIGHT: And -- and for

19 the purposes of the record, I'll just clarify, Mr.

20 Chair, before I hand it over to Ms. Kelly and Mr.

21 Gautam that -- that the load forecast report, which

22 has been marked as Exhibit 2.2, contains some

23 redactions with very minimal. The only redactions

24 are, in fact, redactions which identify names of

25 Manitoba Hydro customers, but other than that the

1 report is -- is basically unredacted. So I just

2 thought I would put that on the record.

3   And I will now turn it over to both Ms.

4 Kelly and Mr. Gautam to present the PowerPoint

5 presentation which is Exhibit 5.

6   THE CHAIRPERSON: Thank you.

7   MS. KATHLEEN KELLY: Thank you. I

8 appreciate the opportunity --

9   THE CHAIRPERSON: I would warn the

10 witnesses you have to press the button.

11   MS. KATHLEEN KELLY: Thank you.

12   THE CHAIRPERSON: You're going to have

13 to be within a very specific distance because

14 otherwise the reporter won't be able to pick it up and

15 either she or I will interrupt you if you don't do it.

16 So, these are very sensitive and unfortunately the

17 button is -- is quite hard to push. So, with that,

18 please go ahead.

19   MS. KATHLEEN KELLY: Thank you. Can

20 you hear me at this point? Great, thank you.

21   We appreciate the opportunity to bring

22 our -- our review in front of the Board today. Suman

23 and I will be doing this presentation jointly so there

24 will be a bit of back and forth. We will attempt to

25 make sure that everybody's on the same page as we go

1 through it and if I forget, please remind me because

2 it -- sometimes you forget about it and think

3 everybody's on the same page with you.

4   On the second page of the presentation,

5 I'd just like to run a little bit through the agenda

6 for this presentation. The first is to run through

7 some load forecasting concepts and backgrounds to kind

8 of get us all grounded in the same place as to what a

9 load forecast is for; how it's used; and how difficult

10 they are too.

11   Secondly, we'll give a quick summary of

12 the scope of work for Daymark for the load forecasting

13 review.

14   Third, we'll take a look at the key

15 findings from our report. We'll follow that up with a

16 summary of the steps of our review process and kind of

17 where we went and how we got to the point we're at

18 today.

19   Then we'll get into more of the detail

20 behind the review, looking at the load forecasting

21 methodology used by Manitoba Hydro and our review

22 followed by a description of what's changed between

23 2014 and 2017.

24   And then a summary and conclusion

25 sections and we'll go through this as quickly or as

1 slowly as possible as needed for folks. So, feel free

2 to jump in and ask questions.

3   If we can go to slide 3, which is load

4 forecast concepts and background that we're going to

5 talk. I'd actually like to go to move to slide 4,

6 since that's a section break.

7   Load forecasting is -- is a very basic

8 piece of information that is necessary for the

9 planners and the decision-makers at the Utilities

10 throughout North America. It's -- in order to be able

11 to plan for the future and understand how to invest,

12 understand where to invest and to make trade-off

13 decisions among those investments, the load forecast

14 provides a basis upon which they can predict the

15 revenues for the organization. So that load forecast

16 is -- is a primary vehicle for analysis decision-

17 making and communication to its multiple stakeholders

18 as to what's happening and where the Utility is

19 heading.

20   Load is primarily made up of two (2)

21 separate parts that we talk about all the time and

22 assume everyone understands; one is energy and one is

23 demand, and they are routinely referred to as load and

24 no one's ever sure of whether you are referring to

25 energy or demand or both.

1   Basically the energy is the consumption

2 across a period of time; pretty much similar to when

3 you're driving a car on a highway and you're doing 60

4 miles an hour for an hour, over that one (1) hour

5 period you've con -- you've done sixty (60) miles. So

6 essentially the same thing.

7   It takes all the technologies you use

8 that -- that consume electricity, and how much they're

9 own and how much they're drawing for some period of

10 time.

11   The demand for energy, on the other

12 hand, is a single point in time. It's looking at the

13 maximum that -- at one (1) point in time that's being

14 consumed by all; typically, a peak demand. So in that

15 same instance, we might've been doing approximately

16 sixty (60) miles an hour for that one (1) hour. And

17 in reality, my -- my foot got a little heavy-handed on

18 the -- at the time and I -- I reached a maximum speed

19 of seventy (70). So that would be our demand; that

20 would be our peak demand during that one (1) hour

21 period.

22   So when you're looking at those two (2)

23 concepts, that's what we're all talking about when we

24 talk about energy and peak and the planning for those

25 two (2) things that -- that requires little different

1 perspectives.

2   I'd like to step -- take a step back to

3 why is the load forecast important. The load forecast

4 is important for a number of reasons. Number 1, you

5 see it before you in -- in this rate decision-making

6 case because it is an underlying factor that drives

7 the revenue forecasts that you're using to consider

8 what -- what's going to occur.

9   It's also used in resource investment

10 decisions. Major decisions like adding -- adding a

11 new generation facility; smaller decisions like where

12 you're going to put your next distribution investment.

13 There's a host of things that it -- it underlies and

14 it's -- it's a tool that allows people to take the

15 information that they have and look at alternatives.

16 If -- if this were to happen, what's going to happen.

17 If -- if we're going to have more solar on our system,

18 what are the implications for the load in the system.

19   It's a tool for doing "what if"

20 analysis. It's a tool for doing a lot of different

21 investment analyses or decision-making around where

22 the -- where the Utility' going to go for the future.

23 So it's an important tool but I -- I would add that it

24 is -- well, there's a lot of science upon which this

25 is based. You'll hear a lot about the regression

1 analysis, the analytics that have been done by

2 Manitoba Hydro to make this load forecast happen.

3 There is no hard and fast answer about what is the

4 exact right way to do it. There are industry

5 standards, industry practices that people are using.

6 There are always improvements that are being made.

7 People investigating new ways of looking at the data.

8 There's a lot more data becoming more and more

9 available as we get more and more metres in place that

10 collect more fine-tuned information.

11   So it's a bit -- there's a big pool of

12 data that people have to be able to take that and make

13 -- make heads or tails of literally. So it's more of

14 an art than it is a science because there's a lot of

15 decision-making that goes into it. There's a lot of

16 trade-offs that go into it, but it is -- it is a -- a

17 piece of work that -- that affords itself to taking a

18 look at it and saying, Is this what others are doing?

19 Are we -- are we way out in, you know, ahead of

20 everybody by using this type of methodology and how

21 risky is it.

22   So, those are the kind of the ways that

23 we would look at the load forecasts of a Utility like

24 Manitoba Hydro. Is it standard in the industry? Are

25 they using common approaches to things? Are they a

1 little out ahead of everybody else and is it a

2 reasonable change in the forecast? Based on our

3 discussions and our analysis of the work, Manitoba

4 Hydro is doing many things similar to other -- other

5 Utilities in the industry and what you'll find here in

6 our report is primarily some recommendations for

7 enhancements and some things that they might do to

8 make your job a little easier relative to making

9 decisions so.

10   Suman, anything to add?

11   DR. SUMAN GAUTAM: That's good, Kathy.

12   MS. KATHLEEN KELLY: Thank you. If we

13 could turn to slide 5. I kind of went through all of

14 -- some of the key business planning tool discussion,

15 the short and long-term resource and distribution

16 planning, the financial planning.

17   I'd like to focus on the third bullet

18 which speaks a little bit to the alternative futures.

19 When you're looking at the P50 approach to the load

20 forecast that we've -- we've seen here for Manitoba

21 Hydro, that's assuming that 50 percent chance that

22 things are going to be greater than that and 50

23 percent of the results could actually be lower than

24 that.

25   That -- that's a useful piece of

1 information but many Utilities and those Utilities

2 that are in the forefront of the industry and looking

3 at how they plan for their future, they are moving

4 towards and taking on more alternatives planning,

5 using a bunch of different approaches to doing that.

6   Some simply create scenarios, and those

7 scenarios could -- could assume that in the next ten

8 (10) years the province could establish new guidelines

9 or policies that would drive the adoption of, say,

10 solar energy in homes and businesses; or it could

11 reduce the DSM plans; it could increase the DSM plans.

12 It would also take a look at what would happen if the

13 economy grew at a different pace than is assumed in

14 the base forecast.

15   So it -- it allows the planner to take

16 a look at a variety of information and say, if the P50

17 is here on a chart, so where does that other scenario

18 fit and how -- how much do I think those kinds of

19 changes might happen.

20   And the use of it is really in -- in

21 understanding and preparing yourself for change.

22 Forecasts are inherently wrong. If you -- if you make

23 100 percent -- if you're accurate a hundred percent

24 you should be out playing the stock market, or -- or

25 perhaps playing Powerball on some of those other

1 wonderful games. If you can predict that well, you

2 should be doing that.

3   But forecasts are inherently wrong.

4 They're -- they're a tool to be used to make

5 decisions.

6   THE VICE-CHAIRPERSON: Ms. Kelly, is

7 P50 a common way for utilities to assess their load

8 forecast?

9   MS. KATHLEEN KELLY: P50 is very

10 common but I find that they use that as a single point

11 estimate and then, typically, are planning to some

12 other point. At least in -- in many of the very large

13 Utilities in the US, they will be using the -- the

14 alternative analysis or the scenario, the stochastic

15 approach, which some are beginning to move to to look

16 at a different planning tool. So, P50 is a common

17 number that they generate but may not always be what

18 they plan to.

19   So some of the other changes, new

20 generation technologies. Ideally, the use of

21 alternative futures, scenarios and some stochastic

22 analysis around the P50 level is, basically, to act as

23 an early warning system. If you plan to one (1)

24 single number and don't look at alternatives, then you

25 can be surprised by some of the changes in the

1 industry and not be ready for it.

2 By looking at these various futures and

3 looking at alternatives, looking at stochastic

4 approaches, it gives you more information about the --

5 the warning signs that may come down the road in the

6 next year or two (2) after you do your initial

7 forecasts. So, it's a means by which it educates your

8 planners to understand kind of when there's a signal

9 that says, I need to make a change in how I'm planning

10 and what I'm doing, and we need -- we need to shift

11 our approach.

12 Anything to add, Suman, to slide 5?

13 DR. SUMAN GAUTAM: No, Kathy.

14 MS. KATHLEEN KELLY: And slide 6.

15 Forecasts rely heavily on historical information and

16 the drivers that forecasters have adopted to address

17 how -- how things will change.

18 Historical information informs the

19 future usage. Drivers are used to explain the

20 consumption patterns and this is standard regression

21 statistical analysis that we all went through when we

22 were in school and may -- some of us may still use

23 today, but the drivers are used to try and explain how

24 consumption will change.

25 So, it's looking at things that are

1 important to the consumption of energy by the various

2 folks that use it. So the price of electricity is

3 very common; substitute products, prices is very

4 common; economic variables such as the GDP, the CPI,

5 population forecasts, customer accounts, and weather

6 variables. All very common in the industry.

7   The realization is that what happened

8 yesterday is not always an accurate predictor of

9 what's going to happen tomorrow. So we recognize that

10 as we go through these forecasts; that's another

11 reason for looking at alternative futures so that you

12 can better understand kind of what will happen as new

13 technologies become more available, especially things

14 for central station generation, policies for energy

15 efficiency. There are a number of policies in the US

16 markets these days; the storage technology adoption

17 which is changing the flavour; sudden shifts in

18 economic growth.

19   We've all seen forecast goes along.

20 We're assuming that growth is going to be fairly

21 stable but the recession of 2008/2009 was something

22 that wasn't predicted and certainly wasn't predicted

23 to be that difficult. So those kind of dramatic

24 swings typically are not forecasted using the

25 methodologies we have so.

1   THE CHAIRPERSON: Ms. Kelly...?

2   MS. KATHLEEN KELLY: Yes.

3   THE CHAIRPERSON: Can I ask you, in

4 terms of the historical usage, what about the track

5 record of the -- of the entity providing the forecast?

6 What role does it play going back to, say, well, here

7 is -- you -- you're looking at objective factors here

8 in these points but what role does the track record,

9 going back ten (10) or fifteen (15) years in terms of,

10 you know, here -- here are the factors they looked at

11 and here's where they came from and whether they're

12 accurate or inaccurate in previous forecasts?

13   MS. KATHLEEN KELLY: I'm going to

14 answer that, I guess, a couple of ways.

15   The track record informs you when

16 you've had systematic misses. So, for example, you

17 could be high for five (5) or six (6) years in a row

18 and then you'll go low for five (5) or six (6) years

19 in a row.

20   Having been a forecaster for a number

21 of years, it's -- it's always difficult to know when

22 that change is occurring. So you might miss it for a

23 little bit of a point in time, and then you shift and

24 sometimes you overreact and then things are a little

25 more negative, and you tend towards the negative.

1   It's -- it's -- it's informational for

2   the people who are doing those forecasts to go back

3   and look at what occurred in that timeframe. What

4   were we thinking as we went through the forecast? Over

5   time, fifteen (15), twenty (20) years ago most of the

6   people who were doing that in any Utility is probably

7   not there anymore. So, it's very difficult to go back

8   and look at.

9   But it is -- it is a -- a tool to look,

10   recognizing you're not always right. Go back and make

11   sure that when you're thinking through your decision

12   process for the -- the economic drivers that you're

13   choosing or the other predictor variables that you're

14   choosing, make sure you're not -- you don't have a

15   bias, internal bias, towards selecting something

16   that's -- that's going to drive things lower or drive

17   things higher. And it's very difficult to do, but

18   it's -- but it's something that -- that that kind of

19   review of your history is -- is good to kind of

20   internalize and take a look at but sometimes you can't

21   always explain it.

22   Can we move on to slide 7. Suman,

23   anything I missed.

24   DR. SUMAN GAUTAM: Not so far, Kathy.

25   MS. KATHLEEN KELLY: Thank you. I --

1 I apologize, but since we are in two (2) different

2 places it's a little -- a little more difficult so.

3   Anyways, forecast term. Some of the

4 key terms being used by Manitoba Hydro and others in

5 the industry. Manitoba Hydro is forecasting by

6 sector. The sector is a grouping of like customers.

7 So the sectors -- the largest sectors are residential

8 small, general service large, general service and the

9 top consumers.

10   And then if we could turn to slide 8 as

11 we go through this. The three (3) boxes at the bottom

12 there, that 32 percent residential, 41 percent general

13 service mass-market, and 26 percent general service

14 top consumers contributes to what Manitoba Hydro puts

15 forth as consumer sales. That's the term they use for

16 that.

17   When you add distribution losses and

18 construction power to that, that -- we then get to

19 common bus load. Once you add the transmission losses

20 and station service, then you get to the gross firm

21 energy that Manitoba Hydro is serving. So those are

22 all terms that you'll hear as we go throughout the

23 day.

24   It's a process of taking what's coming

25 in at the meter at the very bottom from consumers,

1 adding losses as you distribute the power, and then

2 adding the transmission losses as you transmit the

3 power long distances here in Manitoba to the

4 customers, and some miscellaneous usage that occurs by

5 Manitoba Hydro in their stations and in construction.

6 So that gets you to the total gross firm energy

7 provided.

8   DR. SUMAN GAUTAM: I'd like to add a

9 couple of points here, Kathy. So the percentages that

10 we are seeing on -- on the last blocks are the percent

11 cells for 2016/'17. And this is the figure that

12 Daymark generated, and we're going to come back to

13 this figure at least a couple of times as we move

14 through the presentation.

15   MS. KATHLEEN KELLY: Thank you. So

16 Suman, slide 9 is yours.

17   DR. SUMAN GAUTAM: Do we have slide 9?

18   MS. KATHLEEN KELLY: Yes.

19   DR. SUMAN GAUTAM: Yeah. So it looks

20 like -- so we have this pop-up glitch as well. So

21 once we move the slide, let's make sure that we have

22 all the contents of that slide before we start

23 talking, as I cannot see the screen here.

24   So on -- on slide 9, when we looked at

25 industry practices, we found four (4) common

1 approaches for -- methods used for load forecasting

2 purposes. And -- and here on number 2, we have a

3 cross-sectional via econometric regression modelling.

4 That's -- that is what Manitoba Hydro primarily uses.

5 Cross-sectional meaning a forecast done at the sector

6 level. And then econometric regression modelling

7 meaning as -- as one utilized by Manitoba Hydro that

8 uses many predictor variables, such as demographic and

9 economic variables, customer users information, and --

10 and critical variable sixty-six (66) and -- and

11 weather related variables.

12   So now we can move to slide 10. As

13 Kathy discussed, different concepts that are used on -

14 - on load forecasting and also the importance of load

15 forecast, I thought we would also give a little bit of

16 background information on -- on technical aspects of -

17 - of load forecast methods, primarily focussing on

18 what Manita -- Manitoba Hydro has done.

19   So starting with econometric modelling,

20 we have been using this term a lot and will be using

21 it a lot. It basically means that it's a method used

22 to specify the sudden -- statistical relationship

23 between -- between different relationships that --

24 that we can use. For -- for example, on this case, we

25 have for --Manitoba Hydro has forecasted either

1 average uses per customer, depending on what sectors

2 we're looking or – or there's a forecast of customer

3 count for those different sectors. So econometric

4 modelling is a -- is a method to be able to forecast

5 forced credit using the historical information and use

6 that relationship, that -- to -- to forecast for

7 future years.

8   And -- and one (1) of the techniques --

9 one (1) of the common techniques used in econometric

10 modelling is regression analysis. And this is a -- a

11 -- it is a mathematical way of sorting out which

12 variables are important, and -- and -- or whether --

13 and also figuring out what factors matter most, and --

14 and how they do it. Those factors that are used

15 interact with each other, and -- and how certain --

16 how confident we can be of certain relationship that

17 we get from -- from regression analysis.

18   And -- and I would like to point out

19 one (1) thing. So these are -- are correlation -- a

20 difference between correlation and causation. You can

21 -- well, one can use any tool -- variables --

22 unrelated variables, and -- and try -- and try to find

23 -- you can get one (1) rela -- relationship using

24 regression analysis. But there has to be some

25 economic, logical designing for -- or -- or -- before

1 we use regression analysis.

2   BOARD MEMBER GRANT: Can I just

3 interrupt for one (1) second? I don't want to get

4 lost too early --

5   DR. SUMAN GAUTAM: Sure.

6   BOARD MEMBER GRANT: -- in this

7 discussion.

8   DR. SUMAN GAUTAM: Sure.

9   BOARD MEMBER GRANT: But if you're

10 using cross-sectional data, what are your

11 observations? You've got a pan -- panel of data.

12 What do your observations say for the residential

13 sector?

14   DR. SUMAN GAUTAM: So -- so what we

15 meant, cross-sectional, is a cross-sectoral analysis,

16 so --

17   BOARD MEMBER GRANT: It's sectoral --

18   DR. SUMAN GAUTAM: Yes. So the --

19   BOARD MEMBER GRANT: -- or cross-

20 sectional? Cross-sectional would imply a panel is --

21 sorry. Are -- are you using time series, or are you

22 using a -- a panel -- panel data?

23   DR. SUMAN GAUTAM: So this is a -- a -

24 - annual data used for -- for each sector separately,

25 as we will discuss later.

1   BOARD MEMBER GRANT: So it's time

2 series data?

3   DR. SUMAN GAUTAM: Yes.

4   BOARD MEMBER GRANT: Thank you.

5   DR. SUMAN GAUTAM: And here we have a

6 simple regression equation. I just wanted to give a

7 little bit of background information here. Is --

8 dependant variable is 'Y' here, and all we see as we

9 go through this discussion, there is either averaging

10 a customer count that are dependent variables, and --

11 and predictor variables, commonly specified as 'X' on

12 -- on the right-hand side here. So -- so it can -- so

13 it be can be demographic variables are price -- you

14 look to see the price variable are economic variables,

15 depending on -- on what model or what sector we're

16 talking about.

17   The -- the key -- key information that

18 we get from regression equation is the -- is the

19 regression coefficient that tells us the relationship

20 between dependent and -- and independent variable

21 we're using. So here, the term in front of 'X', which

22 is alpha, gives -- gives that -- estimates that

23 relationship.

24   And depending on what kind of model

25 we're using, we can interpret that differently. And -

1 - and that's a -- that's a important factor before we

2 discuss price elasticity, because when -- when we take

3 a look at this, a lot of what -- dependent and

4 independent variables so that regression coefficient,

5 and -- and if we are using price variable and demand

6 variable, demand variable is a -- a dependent variable

7 and price variable is independent, as expressed as 'X'

8 here, so the coefficient will give price elasticity.

9   The -- the concept -- another concept

10 that we would like to introduce is step-wise

11 regressions. So as -- as we discussed, there can be

12 more than one (1) critical variables, as -- as we were

13 -- as in that simple example. So there can be more

14 than one (1) variable on -- on the right-hand side.

15 So if we have more than one (1) variable used in any

16 model, step-wise regression gives a -- a -- it's --

17 it's a method that will allow us to introduce one (1)

18 variable at a time, and see how -- how the model fits,

19 or how the -- the fit of the model and the -- the

20 relationship between variables change once we start

21 introducing new variables in the model.

22   BOARD MEMBER GRANT: Shouldn't you be

23 selecting your variables by theory as opposed to

24 experiment?

25   DR. SUMAN GAUTAM: So that's --

1   BOARD MEMBER GRANT: Don't you have a

2 -- you -- you're forecasting a demand curve and don't

3 have a theory for it? Why would you use step-wise

4 regression?

5   DR. SUMAN GAUTAM: So, sir, that --

6 that's a good point. So definitely there has to be a

7 logic and economic reasoning before picking any

8 variables, but among the -- the -- among variables

9 that we pick that have logic and economic reasoning,

10 then if we would like to see how each variable affects

11 the -- the model fit, or if it introduces any kind of

12 statistical issues, so step-wise regression gives --

13 allows us to do that.

14   BOARD MEMBER GRANT: Okay.

15   MS. KATHLEEN KELLY: If -- if I could

16 add to what Suman said --

17   BOARD MEMBER GRANT: Sure.

18   MS. KATHLEEN KELLY: -- basically,

19 what we -- what we did when we were reviewing the

20 regression equations that -- that Manitoba Hydro

21 shared with us is we re-ran them on a step-wise

22 approach so that we could understand as we added each

23 variable what happened to the coefficients, what

24 happened to the relationships between the variables,

25 how they improved the forecast, basically R-Square,

1 and the ability to fit the variables so that we could

2 -- we could see kind of what they might have gone

3 through over the years, because they're doing load

4 forecasting here for themselves for a number of years.

5 So they have a lot of built-in knowledge that we

6 didn't have.

7   So we used step-wise regression to try

8 and educate ourselves, and look at the process, and

9 then evaluate the choice of the -- the independent

10 variables as we went through there. So we're not

11 suggesting that step-wise is a good way -- is

12 necessarily the right answer to doing things, but it's

13 a tool that we used as we went through this kind of

14 breakdown and break-apart regression analysis. Does

15 that help? Thank you. Go ahead, Suman.

16   DR. SUMAN GAUTAM: Thank you, Kathy.

17 And a couple of statistical terms that we would like

18 to introduce here, one (1) being multicollinearity.

19 As we discussed, we -- we can use more than one (1)

20 critical variable in a model, and if there is some

21 sort of correlation between those two (2) critical

22 variables, then -- then there -- there can be an issue

23 with multicollinearity and -- and that can affect the

24 -- that can affect the coefficient, or -- or of the

25 reliability of the coefficient of a particular

1 independent variable. We -- we will discuss in regard

2 to Manitoba Hydro's load forecast method in a bit in -

3 - with -- with this multicollinearity issue as well.

4   And then one (1) last term that I would

5 like to introduce is statistical significance. That

6 basically means that if statistics is reliable, and --

7 and 'significant' tells -- tells us that whether --

8 whether these are -- that the relationship that --

9 that we can rely between -- between two (2) variables

10 or not.

11   Let's move to slide 11.

12   MS. KATHLEEN KELLY: Okay. Thanks,

13 Suman. Slide 11 is a page break for the Daymark scope

14 of work, which is primarily on page 12. We were asked

15 to assess Manitoba Hydro's load forecasting

16 methodologies, primarily for the -- the major sectors,

17 residential, general service mass market, and the top

18 consumers. We were also asked to take a look at other

19 aspects of the load forecasting methodology, including

20 transmission and distribution losses and their impact

21 on the forecast. We were looking at the historical

22 performance, which Manitoba Hydro had reported on in

23 their load forecast report, and looking at the

24 methodology that they've used historically, and how

25 that has changed over time. And we identified and

1 assessed changes between the 2014 and the 2017

2 Manitoba Hydro load forecasting methodology, so that

3 we could understand those changes and make some

4 recommendations for perhaps something additional, or

5 making further changes.

6   Now, if we could go to slide 14, we're

7 going to talk about some of our key findings from the

8 forecast review. I'll just tell everybody, these --

9 these are some highlights, some summary highlights,

10 but there'll be more detail coming on many of these as

11 we go through the presentation.

12   As -- as I stated early on, Manitoba

13 Hydro's forecast methodologies are reflective -- fully

14 reflective of industry practice. We've seen exactly

15 what they're doing in other places before, and other -

16 - most utilities are relying on similar tools and

17 technologies to do their forecasts. We believe that,

18 based on our review, that we have identified some

19 areas of enhancement, some areas where there could be

20 some improvement on the base forecast methodology that

21 would -- that Manitoba Hydro should consider as it

22 moves into the future and looks at things, and that

23 this -- this Board should consider as it reviews the

24 forecast in front of them.

25   DR. SUMAN GAUTAM: Kathy, a couple of

1 examples that I would like to give here about Manitoba

2 Hydro's load forecast methodology that is reflective

3 of industry practices. For example, Manitoba Hydro's

4 sector-level regression model, this load forecast is

5 consistent with industry practice, and also, the use

6 of independent variables are predicted variables used

7 in these different models that are also reflective of

8 indu -- industry practices.

9   MS. KATHLEEN KELLY: Great. Thank

10 you, Suman.

11   If we could turn to slide 15, one (1)

12 of the questions that we were -- we were asked was:

13 What -- what is the directional impact of -- of some

14 of the observations that we've made? In some cases,

15 we -- we could identify them and develop an estimate

16 of that. In others, there was not enough information

17 that we were able to go back and say exactly one (1)

18 way or the other. But we -- we put this table

19 together as to kind of talk a little bit about each of

20 them.

21   The first is the use of the

22 conservative PLIL methodology. The methodology that

23 Manitoba Hydro used in 2017 projects more than 500

24 gigawatt hours less load than the 2014 method over the

25 twenty (20) year period. So it is a significant

1 reduction in the forecasted load.

2   There are some questions around the

3 population and the use of population to generate

4 customer counts as well. The -- those -- those issues

5 of immigration and things like that that are inherent

6 in some of the earlier population forecasts, but the

7 customer count is lower, and that results in lower

8 general service forecast as well. It lowers the

9 residential forecast. It will -- it lowers the

10 general service forecast, because customer count is a

11 key component to each of those.

12   So the use of the population forecasts

13 and the level of the population forecast needs greater

14 investigation and greater review by Manitoba Hydro as

15 it moves forward with this. It's -- it's always an

16 area that, when you rely on other peoples' forecasts,

17 you are accepting their -- their assumptions, and

18 accepting their approach to things. Manitoba Hydro

19 uses a consensus approach to most of its factors that

20 it's relying on from outside, kind of averaging out

21 and using that. We have some -- some suggestions that

22 might help for the future.

23   Fuel switching is considered in the

24 residential regression equations by looking at the

25 price of elec -- electric versus gas for heating

1 systems, and -- as customers move forward. But it is

2 not explicitly included in the remainder of the

3 sectors. It is treated as a -- when -- when you look

4 at the load forecast, Manitoba Hydro has done its P50

5 load forecast, and then it investigates what would

6 happen if, on a one-by-one approach, so they -- they

7 take a -- a look at, perhaps, electrification as a

8 single instance and say, If this would occur, this is

9 what it would add to the forecast, as opposed to

10 looking at things explicitly within this and saying,

11 Will the differential that will occur going forward

12 between natural gas prices and electricity prices make

13 some sort of change in consumption patterns in the

14 other two (2) major sectors that are here?

15   And finally, the -- the short-term

16 impact of the rate increase is not explicitly

17 considered as well. The first five (5) years of the

18 top consumer forecast, and that's what I'm referring

19 to here as the top consumer forecast, the first five

20 (5) years are based on discussions with the major

21 customers which is -- is a good and common approach to

22 things, but it is unclear what those customers

23 understood as far as price increases coming, and

24 whether there was any consideration of the fact that

25 there were some fairly large increases over the next

1 few years that -- that those customers would be --

2 would be seeing.

3   So it's -- when we looked at that, if -

4 - if we used the price elasticity that is included in

5 the equation, there could be an additional 185

6 gigawatt hours of load that could be lost due to the

7 rate increase, assuming that relationship holds true.

8   THE VICE-CHAIRPERSON: Ms. Kelly, have

9 you, in other jurisdictions, seen utilities that did

10 use price increases as part of their -- their forecast

11 here?

12   MS. KATHLEEN KELLY: I'm sorry, I

13 didn't hear the whole question.

14   THE VICE-CHAIRPERSON: Have -- in

15 other jurisdictions, have you seen utilities that did

16 use price increases as part of their forecasting

17 methodology?

18   MS. KATHLEEN KELLY: Yes, there are

19 many jurisdictions. Everyone uses price increases as

20 part of their methodology. It's difficult to include

21 when you are discussing with large consumers like

22 that. They tend to be very quiet about their -- their

23 project plans and what their business plans are. They

24 don't want them written in Manitoba Hydro's load

25 forecast, for example, and -- and in many cases, may

 1 write off the information.

 2   So it -- it may not actually generate

 3 anything that says, Yeah, it's definitely going to

 4 happen. But I would have considered -- if I were

 5 doing the forecast, I would have considered what the

 6 implication might be and might have reduced the

 7 forecast a bit for the fact that these folks are going

 8 to see some major price increases. And where they

 9 can, they can probably invest quickly to avoid

10 electricity costs in a lot of cases, so.

11   Suman, do you have something to add to

12 this slide?

13   DR. SUMAN GAUTAM: No, Kathy.

14   MS. KATHLEEN KELLY: If we could move

15 onto slide 16. Suman, I'll let you take this one.

16   DR. SUMAN GAUTAM: Sure. So we -- we

17 also, as a part of our evaluation, we also looked at

18 the -- the price elasticity of -- of different sectors

19 estimated by Manitoba Hydro in its load forecast

20 process. And -- and we found that -- so there are few

21 issues in different models that may -- that may mean

22 that the -- the elas -- elasticity that has been

23 reported may not be reliable.

24   So one (1) being statistical constants,

25 here, what -- what we're saying is when we looked at

1 the -- the residential model used for -- for

2 predicting average users, that model had

3 multicollinearity issue, and that that

4 multicollinearity issue was not specific to a price

5 variable. We just wanted to point this out. The --

6 the multicollinearity was the issue with other

7 predictor variables that were used in the -- in the

8 model. And so the issue with multicollinearity is

9 that the -- the coefficient that is estimated, which

10 is price elasticity, may not be -- may not be

11 reliable.

12   And -- and we also saw -- as we

13 discussed earlier, we -- we employed a step-wise

14 regression method to see what variable has -- what

15 kind of variables used by Manitoba Hydro had what kind

16 of impact.

17   And we also saw that the use of chained

18 or dummy variables used in -- in the general service

19 mass market sector models reduced the price elasticity

20 coefficient. So -- so the coefficient of price

21 variable reduced once those variables were introduced

22 in the model. I'm -- I'm -- with the model it's

23 specific to top consumers and PLIL methodology. The

24 conservative method used on 2017 produced more price

25 elasticity than when we -- when we used the method

1 that Manitoba Hydro used in -- in 2014, but using 2017

2 data.

3   So those are the three (3) con -- three

4 (3) different concepts that -- that we -- we have

5 regarding price elasticity.

6   BOARD MEMBER GRANT: Sorry, I just

7 want to jump in.

8   DR. SUMAN GAUTAM: Sure.

9   BOARD MEMBER GRANT: Why did you lag

10 it two and a half (2 1/2) years?

11   DR. SUMAN GAUTAM: So I believe you

12 are talking about the -- the price variable used in --

13 in residential sector model?

14   BOARD MEMBER GRANT: Yes.

15   DR. SUMAN GAUTAM: Is that right?

16   BOARD MEMBER GRANT: Yes.

17   DR. SUMAN GAUTAM: So -- so let's

18 first talk about the lagging. So -- so why -- why the

19 -- the -- why the -- why lagging has been used in --

20 in regression model. So that's -- so lagging is used

21 basically to -- to capture -- so customers may respond

22 to prices at -- at little bit later than -- than they

23 -- they see the price increase. So -- so there's a

24 lag. Since there's a -- there can be a lag between

25 customers' response to price and -- and then the --

1 the moment the price is increased, so it's a common

2 method to capture that in the model.

3   BOARD MEMBER GRANT: No, I -- so I --

4 I know time of adjustment is the most significant

5 aspect in a price elasticity, but I'm just saying why

6 -- what's magical about two and a half (2 1/2) years?

7 Because what you're implicitly saying, if there was a

8 7.9 percent increase in rates next year, it would have

9 zero effect on the load. Is that correct?

10   DR. SUMAN GAUTAM: So the use of price

11 -- we use of the lag, yes. So that -- that would mean

12 -- yeah. Yes.

13   BOARD MEMBER GRANT: So what's the

14 magic in two and half (2 1/2) years?

15   DR. SUMAN GAUTAM: So we had this

16 discussion with -- with Manitoba Hydro. So subject to

17 check, so we discussed with Manitoba Hydro about this

18 issue about a two point five (2.5) year lag. And then

19 if I remember correctly, I think they mentioned,

20 because two point five (2.5) year gave the -- the

21 optimum statistical results.

22   Kathy, please chime in if you have any

23 -- any recollection, but that -- that was our

24 understanding of using specifically of two point five

25 (2.5) years.

1   MS. KATHLEEN KELLY: That's my

2 recollection as well, Suman, but subject to check.

3 I'd have to go back to my notes, and I don't have

4 those with me.

5   BOARD MEMBER GRANT: Yeah. And that's

6 not good theory, is it?

7   MS. KATHLEEN KELLY: I'm sorry?

8   BOARD MEMBER GRANT: Good correlation?

9 That's -- but I thought we had a talk about

10 correlation and causality. So you got a good fit, so

11 you used two point five (2.5)?

12   MS. KATHLEEN KELLY: Two point five

13 (2.5) provided the best explanatory variable -- best

14 explanatory, best statistical results for the equation

15 as a whole, not looking at any specific variable

16 individually and that -- and I'm interpreting what I -

17 - what I heard, so.

18   BOARD MEMBER GRANT: Is this with

19 monthly data, quarterly...?

20   MS. KATHLEEN KELLY: They're using

21 annual data.

22   DR. SUMAN GAUTAM: Annual data.

23   MS. KATHLEEN KELLY: So --

24   DR. SUMAN GAUTAM: And -- and one (1)

25 of the -- well, one (1) thing I would like to point

1 out, one (1) of the (INDISCERNIBLE) on our report that

2 we gave was basing this, you know, different years

3 based on -- on economic and logical reasoning.

4   BOARD MEMBER GRANT: Okay.

5   MS. KATHLEEN KELLY: Did we respond to

6 your question? Thank you.

7   DR. SUMAN GAUTAM: Kathy, do you have

8 anything to on slide 16?

9   MS. KATHLEEN KELLY: No, I don't.

10   DR. SUMAN GAUTAM: Okay.

11   MS. KATHLEEN KELLY: Shall we move on

12 to slide 17?

13   DR. SUMAN GAUTAM: Yes, let's move on

14 to slide 17 now.

15   MS. KATHLEEN KELLY: Some of the

16 suggestions for enhancing Manitoba Hydro's methodology

17 we've already referred to a number of times to some of

18 these. Looking at informed sensitivities and sincer -

19 - scenario analysis so that you can get a better

20 understanding of -- of change -- as changes happen in

21 some of your key driver variables. What are the

22 implications on -- on load. And so that you can kind

23 of get a better feeling for if this -- if this happens

24 then what, but on a combined basis not looking at each

25 and every one (1) of them individually. Let's look at

1 some of them and -= and understand how it works.

2   The second approach is looking at --

3 looking at and understanding load uncertainty better.

4 As one (1) of you pointed out earlier, you know, they

5 -- their historical accuracy for Manitoba Hydro and --

6 and all utilities certainly exhibits funky patterns

7 and they're never correct. It's very difficult to be

8 perfectly accurate.

9   But one (1) of the things that you can

10 do is take a look at the underlying predictive

11 variables, and look at the -- their potential future

12 values, not as a single point in time for each year,

13 but looking at them on a probabilistic basis or

14 selecting high and a low or selecting something else

15 that represents a different future, and -- and

16 understanding in the forecasting what -- what those

17 changes mean for your planning.

18   For example, at P50, as we said, is --

19 is kind of at the median, with 50 percent of the

20 possible futures above it and fifty (50) below. Is --

21 - is the high side for Manitoba really close to that

22 P50, even though there's a lot of potential additional

23 futures there? And is the low side very low, or is

24 the alter -- alternative? But where does it fit?

25   From -- for a utility decision-maker,

1 and for folks who are trying -- trying to run a

2 business and understand their business, you want a

3 better understanding of where those potential futures.

4 And Manitoba Hydro may do it, but it's not included in

5 their load forecast, but it -- it is important to

6 understand from a risk perspective how high can you

7 go, how low can you go, and what are the things that

8 are driving that? And what's a realistic perspective

9 on that as you go through this?

10   So the stochastic risk assessments and

11 stochastic analysis of the underlying variables is one

12 (1) way to do that. It allows you to assign

13 probabilities to things and actually look -- look at

14 the information and say, You know, this is -- this is

15 out there. It's probably not going to happen. This

16 probably has a pretty good chance of happening, and I

17 prepared for that. Do I need to do something

18 different than I'm doing today to be ready.

19   THE VICE-CHAIRPERSON: Ms. Kelly, just

20 before we leave this issue of load uncertainty, could

21 we go back to your slide 15?

22   MS. KATHLEEN KELLY: Yes.

23   THE VICE-CHAIRPERSON: I just want to

24 be sure I understand, because on the conservative PLIL

25 methodology that seemed to be saying that we were

1 underestimating load. But then I thought I heard you

2 say that because price increases weren't built in,

3 that there's a possibility that we're over estimating

4 load.

5   So could you clarify this?

6   MS. KATHLEEN KELLY: Sure. The

7 question relates to the use of the conservative PLIL.

8 The -- slide 15 speaks to the long-term change. The

9 hundred and eight-five (185) is in addition to this.

10 The hundred and eight-five (185) would be the first

11 five (5). The five hundred and twenty-three (523)

12 less is over the whole time frame. And, Suman, was

13 that additive or not?

14   DR. SUMAN GAUTAM: So that is -- that

15 is additive because --

16   MS. KATHLEEN KELLY: Thank you.

17   DR. SUMAN GAUTAM: -- the short-term is

18 only capturing five (5) years using the price

19 elasticity information. Whereas, PLIL methodology is

20 from year six (6) going forward to -- all the way to

21 twenty (20) years.

22   MS. KATHLEEN KELLY: So that's two (2)

23 different -- two (2) different changes. The

24 conservative PLIL methodology is -- is not

25 specifically on price elasticity. It's on the

1 methodology. The hundred and eighty-five (185) that

2 we spoke to earlier is just related to the first five

3 (5) years potential reduction, using the price

4 elasticity in the model. Sorry if I confused people,

5 but a lot to remember.

6   Suman, do you want to go into the

7 weather normalization?

8   DR. SUMAN GAUTAM: Sure. We --

9   MS. KATHLEEN KELLY: We're still on

10 slide 17.

11   DR. SUMAN GAUTAM: Yeah. Now -- now,

12 back on slide 17. There are -- there two (2)

13 different things -- two (2) different ways that

14 Manitoba Hydro could -- could improve weather

15 normalization process. So before -- we will -- we are

16 also discussing in detail about Manitoba Hydro's load

17 -- weather normalization process later in the

18 presentation. But here I just wanted to give a brief

19 information.

20   So Man -- Manitoba Hydro's weather

21 normalization happens in two (2) steps. So one (1) is

22 determining the relationship between weather pattern

23 and users. So that -- that's done using a regression

24 model. And then the second step is isolating weather

25 dependent lo -- weather dependent load from -- from

1 actual load. And then -- and then for load

2 forecasting purposes, then the -- so weather adjusted

3 load are used, which is the difference between actual

4 load and the weather dependent component coming from

5 weather normalization process.

6   So -- so on the first step, that's --

7 that is used to estimate the relationship between

8 weather and users, so Manitoba Hydro is using two (2)

9 years worth of -- two (2) years monthly data. And

10 then on the second step where -- where weather

11 dependent load is calculated, so -- so there is a --

12 there is a process where -- where current years

13 weather is compared with the -- with the normal

14 weather, normal year weather.

15   And then the way the normal year

16 weather is calculated is -- currently is by using

17 twenty-five (25) -- running last twenty-five (25)

18 years of weather -- weather data. So two (2) steps.

19 So -- so I would like to highlight two (2) different

20 time periods that's being used here. One (1) is in

21 order to determine that weather relationship two (2)

22 years monthly data is used and, you know, to compare

23 how current year's weather -- weather is with the --

24 with the normal year weather, then twenty-five (25)

25 year weather is used.

 1   So what we are suggesting is that --

 2 that there is a possibility that using a longer period

 3 than two (2) year data may give more consistent

 4 weather and users relationship. So that's -- that's

 5 one (1) solution that -- that we have. And another

 6 years is maybe using le -- using a smaller time period

 7 than twenty-five (25) year could be a -- could be a

 8 way -- could be another way to -- to define normal

 9 year weather, just -- just concerning with the -- with

10 the global temperatures rising in -- in recent years.

11   MS. KATHLEEN KELLY: I'd just add to

12 that, Suman, the -- now discussions with Manitoba

13 Hydro, the shift to a two (2) year period to look at -

14 - to develop the regression, to understand how much

15 weather-related load there is in that -- in that time

16 frame is to reflect an increase in weather-based

17 equipment, and also the climate change and -- and

18 those kind of issues.

19   I guess our point would be: Is two (2)

20 years enough data that would give us twenty-four (24)

21 data points as -- and the more data points you have

22 the better. So it's -- it's -- those are some of the

23 rationale behind it. Go ahead, Suman.

24   DR. SUMAN GAUTAM: Yeah, that's right.

25 And I would like to highlight that the method --

1 method used by Manitoba Hydro in these two (2) steps

2 in isolating weather dependent load and adjusting

3 before using that actual load in -- load forecasting

4 process is -- is industry practice. So we were just

5 suggesting maybe use of more data could -- could give

6 consistent weather relationship.

7   And then another solution that once we

8 reviewed Manitoba Hydro's load forecast methodology

9 was testing for statistical issues in -- in different

10 econometric models as we highlighted multicollinearity

11 issue in -- in some -- some of the models.

12   MS. KATHLEEN KELLY: I'd like to add

13 to that, Suman, as well. I think we talked about it

14 in the report, but didn't put it here. In addition to

15 that testing for the statistical issues, it -- it

16 would be documenting and -- and communicating the

17 implications of those issues so that folks understand

18 we looked at it, we recognize it, and here's -- here's

19 our conclusions why we continue to use it or do not

20 use it. I think that kind of transparency in the

21 report makes it easier for the rest of us to look at

22 the report and assess it and evaluate it to move

23 forward.

24   Okay. Let's move on to slide 19, which

25 describes the Daymark review process. We basically

1 were brought on board and provided a good amount of

2 public and commercially sensitive information so that

3 we could review Manitoba Hydro's approach. Manitoba

4 Hydro spent a week with us, pretty much, as we went

5 through meetings with them individually and talked

6 about what they did, and why they did it.

7 And we appreciate their time and their

8 openness during our meeting in September, where we

9 tried to get through as much as we could, and then

10 meetings that occurred by phone thereafter to go

11 through a lot of information and a lot of analysis and

12 understand where they're at.

13 We reviewed a lot of their publicly

14 available reports. We went back through some of the

15 history of the reports, going back several years of

16 forecasts to see how they -- how they have changed

17 over time a bit. And then we took the data that was

18 provided to us and did some independent analysis and

19 review of the regressions as Suman discussed earlier

20 so that we could look at the implications of some of

21 the decisions they made, and whether we would have

22 made the same decisions, and how that might impact the

23 ultimate regression equation. And we especially

24 wanted to look and see what kind of statistical issues

25 might be -- might exist.

1   So with that we're going to change to

2 page 21 and in this section we are going to go through

3 a more detailed description of Manitoba Hydro's

4 approach and our recommendations for enhancements or

5 change as we go through those. If we're going too

6 slow, tell us. If we're going too fast, please tell

7 us. Okay. I get the signal from Bob that we should

8 speed it up a little, so let's keep that in mind,

9 Suman, as we go through.

10   DR. SUMAN GAUTAM: Sure.

11   MS. KATHLEEN KELLY: Page 21. I think

12 that we've all seen this one (1) before. We -- we

13 placed it here just to remind people of the sectors,

14 and how things add up. So I think we can -- we can

15 move ahead on this one (1), and move to slide 22.

16 Suman...?

17   DR. SUMAN GAUTAM: Yes. So -- so back

18 to slide 21 just for a second. So what we'll do next

19 is -- so we saw those -- we saw three (3) bottom

20 blocks of residential basic general service, mass

21 market, and -- and general service top consumers. So

22 we're going to spend a little bit time on describing

23 how those load forecasts are developed. And then as

24 we move forward we'll also talk about any -- any

25 issues related with -- with those sectors or ones we -

1   - ones we discuss the -- the load forecasting method.

2   So on slide 22, let me know when everything -- all the

3   content on slide 23 is up.

4   MS. KATHLEEN KELLY: Yeah, it's up.

5   Go ahead.

6   DR. SUMAN GAUTAM: Good. Thank you.

7   So residential methodology, there -- there are two (2)

8   different components that are forecasted on -- on

9   residential methodology. So one (1) is we discussed

10 about average usage per residential customer. And

11 then also number of residential customers. And -- and

12 then once those two (2) components are forecasted then

13 -- then they're multiplied to get -- to get the

14 residential sales information.

15   And we would also like to point out

16 that Manitoba Hydro did end-use forecasting method.

17 They developed end-use forecasting method only for

18 residential sector, but which we found was limited --

19 limitedly or limited in the use. So -- so one (1)

20 thing is from end-use forecasting method there --

21 there is a variable that comes into average users

22 regression model called saturation, which is the ratio

23 of electric heating customers to total customers in --

24 in Mani -- Manitoba service area.

25   So that variable is essentially coming

1 from end-use forecasting method. And then under the

2 years -- so -- so there is a discussion in the report

3 that end -- and also discussion with Manitoba Hydro is

4 that end-use forecasting method is used to balance --

5 balance the load that -- that is generated using two

6 (2) forecast component of average users and number of

7 -- number of residential customers. But it wasn't

8 clear how that balancing was done to us.

9   And -- and to discuss two (2) different

10 components of residential forecast, so one (1) is

11 average users per residential customer and -- and key

12 -- so this is a regression best model where key

13 predictor variables that were -- that were used were

14 specifically electricity price, income of residential

15 customers, and -- and saturation variables that I

16 discussed earlier, and -- and a trend variable.

17   And then one (1) thing I wanted to -- I

18 want to point out here that we discussed earlier, as

19 well, so this model is a log-log regression --

20 regression model meaning dependent and independent

21 variables are not -- are -- are natural log, and is

22 specifically on independent variables, electricity

23 price, and income are natural log variables.

24   BOARD MEMBER GRANT: Sir, I know we're

25 trying to hurry, but why did you include a trend

1 variable?

2   DR. SUMAN GAUTAM: So -- so we -- we

3 had this discussion with -- with Manitoba Hydro as

4 well. So there I'm trying to look into the report

5 here. So -- so basically the trend variable was --

6 was used to account -- I would have to go back to the

7 report and -- and look at it.

8   BOARD MEMBER GRANT: But -- so what's

9 the economic logic for a trend variable because all

10 it's saying demand is going up over time, we don't

11 know why.

12   Is that correct?

13   MS. KATHLEEN KELLY: So --

14   DR. SUMAN GAUTAM: So -- yes, Kathy?

15   MS. KATHLEEN KELLY: -- I think,

16 Suman, subject to check, I believe that there was --

17 there was a -- a billing change or there was some

18 factor that changed. And again, there's a lot to

19 remember here. So it might be that we -- we can get

20 back to you with that, just to make sure we're

21 accurate and don't misspeak.

22   DR. SUMAN GAUTAM: Kathy, I have a --

23 I look at it here in the report.

24   MS. KATHLEEN KELLY: Okay.

25   DR. SUMAN GAUTAM: So -- so -- as

1 mentioned in the load forecast report so -- so trend

2 variable was used to capture increase in electricity

3 use and -- and house size. And to -- to your earlier

4 point, and it's common to use trend variable to

5 capture any -- any time varying effects, meaning

6 things that change over time. So it is okay to use --

7 use trend variable, but at the same time as we discuss

8 later, this trend variable is also introducing

9 multicollinearity issue in the model.

10   BOARD MEMBER GRANT: Sir, I don't want

11 to reiterate this, but you're -- you're trying to

12 forecast load, and we want a reason to know why load

13 is changing. And if all you have is a time trend

14 you're saying, We think that the load is going to go

15 up or down over time, but we don't know why.

16   Is that correct?

17   MS. KATHLEEN KELLY: No, there are a

18 number of other variables in the equation. The time

19 trend is just one (1) of four (4).

20   BOARD MEMBER GRANT: But so -- but I

21 don't understand the -- the economic rationale, the

22 logic for putting that in. I just don't -- I don't

23 get it. And if it's something about a proxy for

24 household patterns then presumably that would be a

25 better estimate. You put in household information or

1 something. But to -- to assume that there's a linear

2 trend or some kind of different trend is unusual.

3   MS. KATHLEEN KELLY: As it was

4 explained to us, it's a proxy to -- as -- as Suman

5 pointed out, it's a proxy for a change in the usage

6 pattern that occurred in the customers but it's --

7 it's unclear. As Suman pointed out, it changes the

8 statistics and whether it makes a sufficient additive

9 to the predictability of the of the model, I'm not

10 sure. Trend variables are used commonly by a lot of

11 utilities. And where you have economic rationale for

12 it you should be using it.

13

14   (BRIEF PAUSE)

15

16   MS. KATHLEEN KELLY: Okay. Suman,

17 let's move on.

18   DR. SUMAN GAUTAM: Good. And just a

19 little bit discuss on the second component of

20 residential sector, which is -- which is our forecast

21 of residential customers. And that is based on -- as

22 -- as we point out earlier, so that's based on

23 population forecast and -- and the ratio that Manitoba

24 Hydro estimates using population -- population to

25 total residential customers. And as we -- we'll

1 discuss later, there -- there are some issues on -- on

2 population forecast that we will discuss in a bit.

3   Let's move to the next slide here. I'm

4 on slide 23. So there are two (2) graphs here. On --

5 on left side this is average usage used from 19 --

6 from 1999/2000, all the way to 2035/'36. This

7 contains both historical actual use and then the

8 forecast. And then on the right-hand side there is a

9 -- a forecast of custom count, both actual and -- and

10 -- so there is a historical and forecast. And then

11 this data was directly taken from -- from Manitoba

12 Hydro -- from the data that Manitoba Hydro provided

13 us.

14   Let's move to slide 24. Is slide 24

15 up, Kathy?

16   MS. KATHLEEN KELLY: Yes, it is.

17   DR. SUMAN GAUTAM: Thank you. So --

18 so here, as we discussed residential in earlier slide,

19 so we would like to discuss a little bit on the

20 Manitoba Hydro's general service mass market

21 methodology. The -- this general service mass market

22 sector was further subdivided into -- into two (2)

23 sectors and then the -- the method -- the -- the

24 method used here is similar to a residential sector.

25 So we can definitely move forward and come back to

1 this one (1) later if there are any questions.

2   Let's move to slide 25. And then here

3 on the next slide 25 and 26, the figures are presented

4 in similar manner as average usage on -- on the left-

5 hand side on -- and -- and customer count of this

6 particular group on -- on the right-hand side. And we

7 can -- it is really speeding up here so we can come

8 back to this figure as -- as -- if there are any

9 questions. Otherwise, we would like to move -- move

10 ahead.

11   MS. KATHLEEN KELLY: Suman, could I

12 just add a comment on slide 24?

13   DR. SUMAN GAUTAM: Sure.

14   MS. KATHLEEN KELLY: As we go forward

15 to address Mr. Grant's question, here is the case

16 where there was a dummy variable used to account for

17 billing reclassifications that -- that Manitoba Hydro

18 used in the small -- small medium GSMM, so. Okay. Go

19 ahead, Suman. Page 26?

20   DR. SUMAN GAUTAM: 26, yes. So here

21 there are similar type of figures, average usage on --

22 on right-hand -- on left-hand side. So -- well, this

23 is -- we would like to mention a trend that we saw in

24 average usage here. There is a particular dip during

25 the same period with this proposed rate increase.

1   And then as we looked at the data, and

2 this is -- this is mainly due to the price elasticity

3 of large customer category, was -- was particularly

4 higher as compared to a small medium category, and

5 that is what's causing that dip in average usage in

6 the period of proposed rate increase.

7   Let's move to next slide, on 27. Here

8 we are discussing little bit in detail about the --

9 the use of population forecast, and -- and how that's

10 affecting -- that may be affecting Manitoba Hydro's

11 load forecast numbers. As we saw earlier in both

12 residential and general service mass market, one (1)

13 of the forecasting component is the -- is the -- the

14 customer count. And then in both residential and

15 general service mass market customer count one (1) of

16 the key predictor being used is -- is population.

17   Under here figure we're seeing a couple

18 of graphs. On this figure is population -- is

19 population. This is the -- the forecast error

20 calculated by Manitoba Hydro itself. This is the

21 average ten (10) year I had forecast. Meaning that,

22 for example, so this -- this is the comparison between

23 actual population versus forecast created. Let's say,

24 if we take an example of five (5) year ahead. So this

25 is the -- the difference between actual population,

1 let's say of 2015 with forecast period in 2010. So --

2 so that is one (1) five (5) year ahead error. And --

3 and this graph is a average of all five (5) year ahead

4 forecast errors. And, similarly, so -- so five (5)

5 year ahead, six (6) year ahead, that's done from --

6 from one (1) year ahead to ten (10) year ahead.

7   And -- and I would like to -- this is a

8 good way to look at the -- look at how your population

9 forecast that you are using compares with actual

10 forecast, and this is done by Manitoba Hydro.

11   And what we're suggesting is to go one

12 (1) step forward or one (1) step deeper to see since

13 there are multiple independent forecasts being used

14 here and try to evaluate the forecast accuracy of each

15 of those independent fore -- forecasts, and see if

16 there is a consistently -- a consistent train for any

17 of those (INDISCERNIBLE) forecasts that are either

18 under forecasting or over forecasting, and -- and then

19 decide whether to use them going forward, or -- or

20 weight them a little bit differently than -- than

21 other forecasts.

22   Kathy, do you have anything to add on

23 slide 27?

24   MS. KATHLEEN KELLY: No. We can go on

25 to slide 28.

1   DR. SUMAN GAUTAM: So on -- on slide

2 28, this is a little bit further discussion on how top

3 consumer sector forecast is developed. We discussed

4 this earlier, is there are two (2) different periods

5 being used, one (1) short-term for -- for the first

6 five (5) year, which is mainly based on customer

7 specific information, talking with those customers on

8 operating plans and short-term expansions or

9 construction business plans, and -- and those that are

10 individually created for ten (10) customers that are

11 on top consumer category.

12   And whereas long-term forecast from six

13 (6) year onward is based on -- so -- so for long-term

14 forecast, all those -- so forecast is created as a

15 single regression model after combining the historical

16 load of the -- the top consumers customers.

17   And then we've been discussing that

18 under this -- the -- the PLIL, the long-term forecast

19 model is -- is mainly function of electricity price

20 and (INDISCERNIBLE) variable and which are the other

21 way of saying that is those are two (2) predictor

22 variables used to estimate long-term forecast.

23   And then we -- we have been discussing

24 the change between 2014 methodology and 2017

25 methodology here and how that affected -- affected

1 load forecast on -- on long-term top consumer

2 forecast.

3   MS. KATHLEEN KELLY: So shall we move

4 on to slide 29?

5   DR. SUMAN GAUTAM: 29, yes. So here

6 this -- this figure looks really busy, and this was

7 our attempt to put everything, all -- all the full

8 historical figures, short-term forecast, long-term

9 forecast together in the -- in one (1) single graph

10 here. So -- so the easier part -- the clear part is

11 the actual graph that shows the historical load of top

12 consumer category from 2007 to 2015/'16. And then

13 there are industry level top consumer forecast below -

14 - below the line that has 2017 forecast short-term.

15   So the -- the 2017 forecast short-term

16 is -- is basically the sum of all industry level

17 forecasts that we see right below it. And then is --

18 is -- but that load is kept constant six (6) year

19 going forward. And then the increase -- the increase

20 that we see with that blue line that's level is 2017

21 forecast long-term. The -- the difference is

22 essentially coming from -- from Manitoba Hydro's PLIL

23 methodology.

24   MS. KATHLEEN KELLY: Okay. Slide 30.

25 Again, Suman has described the method generally that

1 Manitoba Hydro has used. We believe it's a more

2 conservative approach. Then in -- for the 2017,

3 Manitoba Hydro has removed start up load of some of

4 the companies that are in that category that became

5 part of the top consumers category after the 1983/'84

6 time frame when they start the load forecast.

7   In 2014 they considered all the load.

8 They didn't take out and extract any loads. So it --

9 it -- for us it gives the -- it takes away the growth

10 opportunity from customers who are in that category by

11 excluding that information, as opposed to keeping all

12 the possible data within -- within the data category.

13 So it may be under forecasting what would have been

14 forecasted by then, the new regression equation.

15   If we go back to the old regression

16 equation for 2014 and use 2017 forecast, we would get

17 a 523 gigawatt hour more in the twenty (20) year time

18 frame. So it would be a somewhat higher forecast that

19 includes looking at load growth in that area. So it's

20 -- it's an approach issue that we're identifying that

21 that method is much more conservative, maybe over

22 conservative. And we would recommend taking a look at

23 that and putting back the information and taking a

24 look at what the results are with that.

25   I might add that on page 31 Manitoba

1 Hydro in its rebuttal evidence responded to us by

2 indicating that it's reasonable to exclude the startup

3 because four (4) of its current ten (10) would be part

4 of the GS mass market with the change in definition of

5 top consumers.

6   So they've moved a number of customers

7 from top consumers to GSMM. And as part of that move

8 some of those top consumers would've started in GSMM

9 and potentially moved to the top consumer. So it's --

10 it's a transition that's difficult to kind of get your

11 arms around. But it -- it appears to us that there

12 might be a little bit of conservativism in -- in that

13 choice of how they were going to do the forecast.

14   THE CHAIRPERSON: Ms. Kelly, I'm sorry

15 to interrupt, but I'm just wondering, we need to have

16 a mid-morning break. And I -- I sort of went through

17 --

18   MS. KATHLEEN KELLY: That's fine.

19   THE CHAIRPERSON: -- some future

20 pages. I -- I don't see a natural spot to break. So

21 I'm just wondering if this would be an acceptable

22 place to break?

23   MS. KATHLEEN KELLY: Right now is

24 fine.

25   THE CHAIRPERSON: Okay. We'll break

1 for fifteen (15) minutes. Thank you.

2

3 --- Upon recessing at 10:34 a.m.

4 --- Upon resuming at 10:49 a.m.

5

6   THE CHAIRPERSON: Okay, Ms. Kelly.

7 Okay, we're ready to go. I think we're going to have

8 to pick it up a little.

9

10 CONTINUED BY MR. WILLIAM HAIGHT:

11   MR. WILLIAM HAIGHT: Yes, we are. Mr.

12 Chair, we spent some time over the break reviewing the

13 balance of the pub -- presentation, found areas where

14 we can move along, but we would like to actually jump

15 back to slide 22, just to address a little bit further

16 some of the points that were made by Dr. Grant.

17   THE CHAIRPERSON: Certainly.

18   MS. KATHLEEN KELLY: And on slide 22

19 we talked a lot about the residential methodology.

20 And as we go through this entire presentation, when we

21 are speaking to methodology, the methodologies of

22 Manitoba Hydro's and we're reviewing them. We may

23 have rerun some of their regressions, but none of the

24 methodologies here are our methodologies. It's our

25 review of what Manitoba Hydro produced and -- and how

1 they use them.

2   Trend analysis. Using trend in an

3 regression equation is pretty common. A lot of people

4 like it; a lot of people don't. It depends on kind of

5 your education and your trust of things but I would

6 agree with the point that was made, you want some kind

7 of basis that you use to select a trend and why a

8 trend should be used and we would support that and

9 have -- have made that comment in our report as well

10 is that trend analysis sometimes is useful, sometimes

11 it really doesn't help matters at all.

12   And as we tried to move -- move through

13 this a little more quickly, Suman, what page are we

14 starting on?

15   DR. SUMAN GAUTAM: Thirty 31. We

16 discussed 30 -- 30 before the break.

17   MS. KATHLEEN KELLY: All right and...

18 Okay, go ahead.

19   DR. SUMAN GAUTAM: Sure. So on slide

20 30 we discussed about the effect of conservative PILL

21 methodology that -- that Manitoba Hydro is using 2017

22 as compared with the methodology being used on 20 --

23 2014. And then we discussed on our -- Manitoba

24 Hydro's response in rebuttal evidence of mentioning

25 that some of the top consumer customers would be in --

1 in general service mass market; that that would --

2 they would be -- they would be captured -- captured in

3 general -- the group would be captured in general

4 service mass market and there is no need to -- no

5 need to consider them in -- in PLIL methodology. So I

6 think that's where -- that's what Kathy explain a

7 little bit before the break.

8   So, we'd like to go to slide 32 where

9 we -- we discussed this issue earlier and key findings

10 about the effect of this proposed rate increase in the

11 short term. Now where we're really focussing on how

12 this rate increase may impact top consumer customers

13 in next five (5) years.

14   And then here we discussed this

15 earlier. The way that we calculated this 185 gigawatt

16 hour potential reduction in short term is, we used the

17 price elasticity estimated by Manitoba Hydro in their

18 PLIL methodology. And -- and one (1) caution here is

19 this PLIL methodology tends to capture long-term price

20 elasticity so -- so -- but we're using that in short

21 term so this 185 may be on the upper end of -- of --

22 of potential reduction.

23   We use price elasticity and we use the

24 difference in proposed rate between balance proposed

25 earlier of 3.95 with cur -- with the current proposed

1 rate of 7.9. So we used a difference so that if -- if

2 top consumers had some time to respond to earlier

3 price increase, there may be -- so even though - if --

4 if that has already been -- been considered in the

5 short-term plan, this recent proposed rate increase

6 may -- may not happen.

7   So, we're taking the difference between

8 what's currently purposed versus what's previously

9 proposed.

10   And then one (1) last piece of

11 information that we needed to calculate that 185

12 gigawatt hour is annual short-term top consumer load;

13 that's a total load of ten (10) customers in -- in any

14 load of those ten (10) customers in first five (5)

15 years.

16   MS. KATHLEEN KELLY: And if I can move

17 on to slide 33. I think we've spoken a little bit

18 about the fuel searching and how it is treated in the

19 load forecast by Manitoba Hydro. They do include fuel

20 switching analysis in the residential sector

21 regression equation using the natural gas price versus

22 electric price variable that's in -- but for the rest

23 of the sectors, it's not included and that comprises

24 about 68 percent of the consumer sales in 2016/17 so.

25   With that if I could switch to slide

1 34. We've seen this slide before. I just want to add

2 to this that once we have the gross firm energy

3 completed, Manitoba Hydro then adjusts for DSM related

4 energy savings, based on their DSM Smart program plan

5 to get to the financial basis for their revenues. So,

6 they take the DSM projected from their programs, not

7 from the new efficiency Manitoba. At this point in

8 time they take that from their current programs,

9 subtract it from the forecast to get to the final

10 forecasts on which the financial revenues are based.

11   Suman, you want to talk a little bit

12 about how the energy forecast is -- becomes the peak

13 forecast.

14   DR. SUMAN GAUTAM: Yes. So the

15 conversation that we've been having so far is getting

16 this gross from energy number. And there is also a

17 forecast of gross peak demand and Kathy eluded a

18 little bit on the difference between those two (2)

19 earlier in the presentation. So the way --

20   MS. KATHLEEN KELLY: If I could break

21 in, Suman, we need to go to slide 35. Go ahead,,

22 Suman, thank you.

23   DR. SUMAN GAUTAM: Yes, yes. Yeah,

24 thank you. So and then we were discussing this

25 Manitoba Hydro's methodology to forecast peak demand

1 on -- on this slide 35. The way that that's being

2 done is once gross from energy is forecasted then --

3 then that's -- the annual forecast is now broken down

4 to monthly gross -- gross energy forecast that's done

5 by using areas of last five (5) years -- five (5)

6 years monthly common gross load and then -- so once

7 those monthly gross load forecast and then there's a

8 more -- they use -- all of the factors that's being

9 used is monthly load factors and they are -- and then

10 the -- the multiplication of those two (2) groups

11 gross peak demand for each month.

12   And -- and a load factor is the ratio

13 of every hourly energy used to the -- to the peak

14 hourly load within that -- that month.

15   And the one additional thing we did was

16 we compared Manitoba Hydro's, this methodology of

17 estimation of gross peak demand with -- with -- what's

18 -- what other Utilities has been doing and we found

19 this survey done by Itron in 2010 and that survey

20 mentioned that the method that -- that Manitoba Hydro

21 is using is being used by eight (8) percent of the

22 Utilities it surveyed.

23   And then the most common and

24 (INDISCERNIBLE) of the Utilities surveyed were using

25 similar economic modelling as -- as we discussed

1 earlier -- earlier in -- in how Manitoba Hydro uses to

2 forecast its gross firm energy so many of the

3 Utilities were using that method.

4   And one (1) thing we would like to

5 highlight, all the highlight is that all of this --

6 the method used by Manitoba Hydro is not common but --

7 but it -- it is reasonable way of estimating -- it's -

8 - it's more engineering approach of estimating gross

9 peak demand.

10   MS. KATHLEEN KELLY: Thanks, Suman.

11 In the interest of time we've talked about some of the

12 next few slides.

13   On slide 36 we spoke to -- earlier

14 about the fact that Manitoba Hydro's general approach

15 is consistent with industry practice; that we have

16 some suggestions to make relative to some changes that

17 might be made.

18   If we look at slide 37 we spoke a

19 little bit about our concerns around the

20 multicollinearity and -- and I want to make it clear

21 that even though that multicollinearity exists between

22 the variables and -- on the predictor side of the

23 equation, that doesn't put the overall predictive

24 power of the regression equation at risk. It still is

25 typically used in the industry despite the

1 multicollinearity problems but we would suggest that

2 there are other variables that could be used or other

3 techniques that could be used to reduce that issue and

4 then make the coefficients reliable so that they can

5 be used for things, especially since the coefficients

6 include the elasticity coefficient and that's being

7 used as a -- as a reported number that says, here's

8 the price elasticity of electricity for the customers

9 in this sector.

10   So it's something we would like to see

11 a little attention given to them and -- and worked

12 but... We know that Dr. Yatchew's report looked at

13 standards in the industry and the elasticities that

14 were reported by Manitoba Hydro are all within the

15 range of those that are used by others in the electric

16 industry so.

17   We spoke a bit earlier on slide 38

18 about the single view of the future versus alternative

19 views of the future. I think we've spoken enough

20 about that that most of us understand where we're

21 coming from and the fact that looking at alternative

22 futures and using alternative approaches to that would

23 be a useful addition to this forecast.

24   And also skipping over slide 39 and 40,

25 we'd spoke about -- Suman spoke about the -- how the

1 heating degree days and cooling degree days are

2 calculated earlier using this two-step approach that's

3 shown here.

4   If we could look at slide 41.

5 Suman...?

6   DR. SUMAN GAUTAM: Yes, thank you.

7 There are a couple of points made on -- on Manitoba

8 Hydro's rebuttal evidence that we wanted to point out.

9   There was our -- our -- when we looked

10 at the -- reviewed the report, our -- our

11 understanding was that Manitoba Hydro was so --

12 Manitoba Hydro reported that we understood some sort

13 of step-wise regression on weather normalization and

14 there's a couple of references here on this slide and

15 -- and that was not our intention of -- we didn't --

16 we didn't advocate any step-wise regression for

17 weather normalization forces.

18   And there were a couple of points in

19 the -- in the rebuttal evidence. I -- I thought more

20 information or supporting evidence would be helpful in

21 understanding the -- the conclusion made in -- in --

22 or in this two (2) statements that we highlighted

23 here.

24   And if we move to slide 42, that's

25 where a couple of -- a couple of suggestions that we -

1 - we included in our report on weather normalization.

2 Well, we talked about this earlier, about using more

3 than two (2) years of monthly energy and other data to

4 estimate that weather dependent relationship. So

5 primarily because you are using more data would

6 produce robust estimates and -- and it's -- better to

7 use more data as -- if they're available.

8   And -- and also reported out the

9 definition on how normal year weather is esti -- is

10 calculated and -- and maybe there is a -- a -- there

11 may be a way to -- to use a shorter period just given

12 -- given mission or -- or the trends.

13   MS. KATHLEEN KELLY: If -- if I could

14 just add to that, Suman. Normal weather years has

15 been typically a 30 year analysis of -- of the

16 difference between, you know, the kind of temperatures

17 that are happening and -- and the cooling and heating

18 degree it is. Some companies moving to a shorter time

19 frame. Many, many are still relying on the thirty

20 (30) year projection.

21   The -- the real change here that's --

22 that's of interest to us is the -- using the two (2)

23 years to look at the weather dependent relationship by

24 which weather -- load will be adjusted for weather so

25 that that's probably the key change that we find or

1 the key approach that we find might benefit from some

2 -- some greater -- use of greater data points to see

3 if there's a better relationship and just to make sure

4 that by -- by using two (2) years of highly weather

5 dependent -- weather changeable load that it might, in

6 fact, reduce the historic's -- historical data. It

7 might reduce the historical load upon which Manitoba

8 Hydro -- Hydro uses for the dependent variable that

9 they're trying to predict so.

10   On to slide 43, Suman.

11   DR. SUMAN GAUTAM: So here we are

12 discussing the method -- DSM treatment in -- in load

13 forecasting method that that Manitoba Hydro has. So -

14 - so -- so there is DSM savings so that's being -- so

15 the historical data DSM servings are added back to --

16 back to the dependent variable before rounding

17 regressions.

18   And once the forecast is met then --

19 then as we mentioned earlier, program with DSM savings

20 are subtracted before that -- that load is being used

21 for -- for -- for other purposes.

22   And here is -- is -- we have a review

23 of Manitoba Hydro's methodology with other Utilities

24 in the industry, as we show for monthly -- estimating

25 monthly peak demands and we found that 38 percent of

1 the Utilities subtract the DSM savings from their

2 forecast and 22 percent after surveyed Utilities,

3 their estimate model with historical DSM and then

4 subtract -- subtract future DSM savings and this is

5 the method -- this is the method similar to what

6 Manitoba Hydro is employing.

7   And 11 percent of the Utilities that

8 use other load forecasting approaches to capture DSM

9 impact of load for -- on -- on future load.

10   MS. KATHLEEN KELLY: Okay, if we could

11 skip to slide --

12   DR. SUMAN GAUTAM: 45.

13   MS. KATHLEEN KELLY: -- 46 actually.

14 Forty-five (45) basically talks about the differences

15 between 2014 and 2017. And I think that we've spent a

16 lot of time going through the differences and the

17 methodology. It might be good, Suman, to walk through

18 just the two (2) graphics.

19   DR. SUMAN GAUTAM: Sure. On slide 46,

20 we are -- so this is a similar time -- time series

21 graph that we have been -- we have been presenting

22 throughout this -- this discussion.

23   So on -- on -- on Y axis we have gross

24 form energy and then on X axis it's annual -- annual

25 dates. And -- and two (2) graphs -- so there's a

1 actual weather is a certain gross form energy load and

2 there are two (2) graphs on the -- on the right-land

3 side of the figure that are forecasts created by

4 Manitoba Hydro during -- in 2014 and 2017.

5   And then we also report sector level of

6 forecast in our -- well -- well we included those

7 sector level companies in between 2014 and '17 in our

8 report. And then if we look at those sector level

9 figures, the primary difference that's coming here is

10 the -- is from -- from the top consumer category.

11   MS. KATHLEEN KELLY: Thank you. So

12 summary and conclusions. We're on slide 49.

13   Basically we've talked about the sector

14 level forecasting approach and Manitoba Hydro's taken

15 again industry standard, what folks do. They're

16 mainly econometric regression analysis based on the

17 energy side. On the peak side they're using the load

18 factor approach which standard engineering approach to

19 doing things, although many utilities have moved to

20 also using a regression analysis approach on the peak

21 forecast. They're reflective of industry practice.

22   If we move to slide 50, which we'll

23 skip because we've talked about a number of times

24 today.

25   Actually move to slide 51. We have

1 some statistical concerns around the price elasticity

2 and the actual value of the coefficient of price bu,

3 in the end, the forecast, the regression equation will

4 result in a reasonable forecast in spite of that issue

5 going on in -- in between the variables inside. The -

6 - the -- the model itself is a reasonable tool to use

7 to predict the future.

8   The predictive variables we're

9 concerned about. We would like to see more predictive

10 variables and -- and making sure that as the

11 predictive variables are chosen, we're looking at what

12 -- what's happening within that side of the equation

13 to see how much they are interacting with each other

14 and what they're doing to each other.

15   I'm sure that Manitoba Hydro has

16 probably done that because they're -- they're

17 qualified, they're bright individuals.

18 We met many of the team. But the -- the reporting

19 that comes into the load forecast doesn't get to that

20 level of discussion about what they looked at, how

21 they got to the point they're at. It's basically is a

22 results presentation and not -- not a good description

23 of the process to getting there and why the end result

24 is the best that they could do. And I think in -- in

25 today's terms in the way load forecasts are written

1 around North America, there is more attention to that

2 transparency and making it transparent for folks who

3 are trying to review them that they can understand how

4 things are done.

5   Some other -- the use of the

6 conservative PLIL methodology which has a lower price

7 elasticity than 2014 is a concern.

8   And then the process changes that we --

9 we are proposing and suggesting might be considered

10 include making sure that we use this as a planning

11 tool, and that we look at sensitivities; that we look

12 at scenario analysis; that we perhaps use stochastic

13 risk assessments as we go through and do a

14 probabilistic approach.

15   We also suggest that looking at the

16 weather normalization approach. The periods used;

17 that the -- the timeframe used; whether there's

18 another approach to putting the weather into the

19 equations themselves and how that all works is

20 something that we would suggest taking a look at.

21   And then from, again, going back to the

22 reporting perspective, making more of a storyline on

23 how this is done; reporting on the statistics;

24 reporting on the implications; and talking about

25 potential alternative futures I think would make this

1 a better tool.

2   Anything to add, Suman?

3   DR. SUMAN GAUTAM: That's all right,

4 Kathy, thank you.

5   MS. KATHLEEN KELLY: Thank you. That

6 would be the end of our presentation.

7   THE CHAIRPERSON: Thank you.

8   BOARD MEMBER GRANT: I just want to

9 pick up on your last point so we can end run all of

10 the econometrics.

11   If you walked up to somebody on the

12 street and said, What do you think demands for

13 Manitoba Hydro is going to be in five (5) or ten (10),

14 fifteen (15) years, they'll probably talk about

15 electric cars, geothermal, solar panels and stuff.

16   And so we -- we had this discussion the

17 other day. Econometrics is an inherently conservative

18 tool where you're -- you're estimating relationships

19 and historical data and then projecting them into the

20 future. And then if we're sitting here at a time

21 where we anticipate a lot of this disruptive

22 technology, you know, how do we -- it's probably a

23 false precision, you know, worrying about the price

24 elasticity when, you know, a price elasticity based on

25 substitution between natural gas and electricity when

1 future substitutions with solar panels or geothermal,

2 and -- or trends in electric cars and such.

3   So I guess my question is: In terms of

4 when you look at the overall value of load forecast

5 and say, what is going to be in fifteen (15) years, is

6 there something to be done in scenario analysis that

7 is not the scenario around natural gas price as much

8 as it's the -- what's the scenario in terms of

9 electric cars, you know, the uptake, or trend in solar

10 panels?

11   And I know Manitoba Hydro indicated

12 that some of that stuff was embedded in their DSM

13 material or electric cars, but is there a way to make

14 that more explicit, because just on the face of it, it

15 seems like we're almost naively sitting here in a

16 world where we -- we know the world's going to change

17 dramatically in ten (10) years, and we're kind of, in

18 this econometric stuff, assuming the world's not going

19 to change.

20   Is -- is there -- is there any industry

21 thinking on how to address that?

22   MS. KATHLEEN KELLY: Well, I'll start,

23 and them Suman, you can add. It's difficult to

24 predict a disruptive technology and its -- and its

25 impact on the future, and that is -- that is -- the

1 econometrics approach is going to be one where the

2 utilities rely on that to get the basic picture, but I

3 think the recommendation that we've made to look at

4 scenarios and to look at other approaches of looking

5 at alternative futures is the best way to take that

6 into consideration so that you can look at, you know,

7 20, 40, and 60 percent adoption rates and kind of see

8 what that does to the rest -- to your load, to the

9 things that you're looking at.

10   They're approaches to doing that, and -

11 - and they take more work, and they aren't based on

12 econometrics. They are basically building a tool that

13 allows you to say, If this happens, then this looks

14 that way, and what is the implication for our

15 decision-making and our other policies?

16   I will point out that Manitoba Hydro

17 has a section in the load forecast where they put a

18 value or put a number on the gigawatt hour impact of

19 certain policy changes, adoption of electric vehicles,

20 various things like that that were beyond what's

21 included in the DSM. But just by putting the numbers

22 there, it doesn't help us kind of look at what's a

23 realistic approach to the future.

24   It -- there's no -- there's no single -

25 - there's no statistical approach. It's a modelling

1 kind of thing where you have to sit down and say, This

2 is what's going to happen. We're going to add

3 together all of these potential changes, and here are

4 the implications it will have and how we'll address

5 them.

6   BOARD MEMBER GRANT: Okay. I'm just

7 wondering if in a sensitivity analysis, you took your

8 baseline econometric forecast and said, Gee, what if

9 your assumption of the rate of adoption of electric

10 cars is -- is way off, and that's going to happen to -

11 - you know, to do that kind of scenario analysis and -

12 - but then the -- what I don't know is how

13 dramatically that would alter the load forecast.

14 Like, I don't know if that's going to be a -- a game

15 changer, or, you know, a modest marginal change in

16 demand in forecast.

17   And so I realize -- I'm not asking you

18 to predict the future as much as to say, How do I kind

19 of at least try to lessen some the uncertainty around

20 it? That -- and I take your point about the future's

21 analysis.

22   MS. KATHLEEN KELLY: I -- I don't

23 think that, based on the numbers in the current

24 forecasts done by Manitoba Hydro, some sensitivities

25 on, say, electric vehicles is not going to massively

1 change the future. But if -- if, for example, the

2 cost of solar projects changed significantly, or

3 continue to drop, and the rate increase comes fully

4 into play, depending on -- on the efficacy of it here

5 in Manitoba, there could be an -- a very large upswing

6 in introduction of that.

7   That's happened in a number of

8 jurisdictions around -- around North America, and --

9 and folks are dealing with the fact of it goes beyond

10 just the load forecast. It goes back to distribution

11 operations and distribution planning, and is a major

12 concern, so that those kinds of things could make a

13 significant swing.

14   THE CHAIRPERSON: Dr. Williams...?

15

16 CROSS-EXAMINATION BY DR. BYRON WILLIAMS:

17   DR. BYRON WILLIAMS: Yes, thank you,

18 and good morning to members of the panel and to Ms.

19 Kelly and Dr. Gautam. And just -- I -- I did a bit of

20 checking with my colleagues just for the Board's

21 information. I believe our friends from Manitoba

22 Industrial Power Users Group have about fifteen (15)

23 to twenty (20) minutes of cross; General Service Sma -

24 - General Service, zero; and Green Action Centre, zero

25 two five (025), just for the -- the Board's planning

1 purposes. I'll indicate that I'll be longer than

2 that, but I'll stay within my time estimate.

3   I -- I'd just like to introduce two (2)

4 exhibits with the Friends -- with the consent of Our

5 Friends, legal counsel for the -- for Daymark load,

6 Coalition Exhibit 37 by Carvallo, C-A-R-V-A-L-L (sic),

7 et al, load forecasting and electricity utility

8 integrated resource planning and as Coalition Exhibit

9 38, a -- a blog by Frost, 'What are the effects of

10 multicollinearity and when can I ignore them'?

11 Riveting reading, both.

12   And Ms. Kelly, just to start with you,

13 you'll agree that both these documents were referred

14 to in your -- in your evidence?

15   MS. KATHLEEN KELLY: Yes, subject to

16 check, but I -- I recognize both of them.

17   DR. BYRON WILLIAMS: Yes, footnotes 49

18 and 26, if you're -- if you're checking. And you were

19 certainly advised by your legal counsel that the

20 Consumer Coalition might be referring to them. You're

21 nodding your head. Is that a yes?

22   MS. KATHLEEN KELLY: That's correct.

23   DR. BYRON WILLIAMS: And if we could

24 turn to Coalition -- information requested to Daymark

25 number 8.

1   (BRIEF PAUSE)

2

3   DR. BYRON WILLIAMS: You can just stay

4 on the question for a second.

5   MS. KATHLEEN KELLY: May -- may I

6 interrupt for one (1) second? Suman, do you have

7 these documents in front you?

8   DR. SUMAN GAUTAM: I am opening up --

9 I have everything except the -- the Coalition 8, but

10 I'm -- I'm opening it up.

11   MS. KATHLEEN KELLY: Great. Thank

12 you.

13   DR. BYRON WILLIAMS: Okay.

14   DR. SUMAN GAUTAM: Yeah. Thanks.

15   DR. BYRON WILLIAMS: And perhaps be --

16 while -- while Dr. Gautam opens it up, Ms. Kelly, at

17 least as I understood your evidence this morning, you

18 were making the point that load forecasting has imp --

19 important implications for today as we look at our

20 rate-setting exercise? You'll agree with that?

21   MS. KATHLEEN KELLY: I would agree

22 with that.

23   DR. BYRON WILLIAMS: And secondly, you

24 were urging on us a -- a longer-term picture to

25 consider the Utility of load foreca -- forecast in

1 including scenario testing, or stochastic analysis and

2 investigating alternative futures for -- for Manitoba

3 Hydro and its ratepayers, agreed?

4   MS. KATHLEEN KELLY: That's correct.

5   DR. BYRON WILLIAMS: And my questions

6 are generally to either witness. You'll -- you'll

7 decide if I've -- I've got the -- the right one or the

8 wrong one, but Ms. Kelly, in this information request,

9 the Coalition, you'll agree, was asking Manitoba Hydro

10 -- you've got some factors which would the suggest

11 that the load forecast is too low, while others

12 suggest it's too high. Which is it? Generally,

13 you'll agree that was the thrust of the question?

14   MS. KATHLEEN KELLY: That's correct.

15 And I -- I believe as I indicated earlier during the

16 presentation, while we received -- requested and

17 received a significant amount of information from

18 Manitoba Hydro, and they were -- they were quite good

19 at giving us whatever we asked for, we still did not

20 have enough information to be able to adequately go

21 back and -- and reproduce everything from 2014 and

22 2017 perfectly so that we could -- we could put

23 numbers that we would have confidence in into that

24 table, which is why we -- we begged to say, you know,

25 we can't put our -- at -- our exact pen to paper and

1 say, This is that -- this is upper, this is lower. So

2 we don't have numbers for all of it.

3   DR. BYRON WILLIAMS: So while this is

4 not your -- it is not -- you -- you're not able to do

5 a best estimate, generally, based on the big-ticket

6 factors of the proposed top consumer's methodological

7 mode -- modifications, as well as the potential that

8 the population forecast is understated, the general

9 conclusion that Daymark has reached is that the

10 overall load forecast appears to be conservative,

11 agreed?

12   MS. KATHLEEN KELLY: I would say yes.

13 On -- on average, we would say it's a bit

14 conservative.

15   DR. BYRON WILLIAMS: And by

16 conservative, what you suggest is that it tends to

17 underestimate the load in some rather than to

18 overestimate, agreed?

19   MS. KATHLEEN KELLY: Yes.

20   DR. BYRON WILLIAMS: And I -- if we

21 could turn to Coalition --

22   DR. SUMAN GAUTAM: Yes, I would like

23 to make a point there. So -- so when we -- the answer

24 is on -- on evidence number 8, so we specifically --

25 so we -- we were referring to those two (2) methods as

1 conservative PLIL methodology, and population load

2 forecast. Based on two (2), those two (2) methodology

3 we -- we said that the overall load forecast may be

4 contemplated.

5 　　　　　　　　DR. BYRON WILLIAMS: Now -- now if you

6 go back to the question Ms. Kelly, or Dr. Gautam, the

7 question was looking at the countervailing impacts,

8 some pulling the load forecast too high, some pulling

9 it too low, agreed?

10

11 　　　　　　　　(BRIEF PAUSE)

12

13 　　　　　　　　MS. KATHLEEN KELLY: Can you restate

14 that?

15 　　　　　　　　DR. BYRON WILLIAMS: In essence,

16 question (a) was trying to get a sen -- recognizing

17 that there are countervailing impacts, some suggesting

18 the forecast is too low, and some suggesting the

19 forecast is too high, is it too high or too low. So --

20 　　　　　　　　MS. KATHLEEN KELLY: And again,

21 pinning us down to numbers is difficult because of the

22 information that we have.

23 　　　　　　　　DR. BYRON WILLIAMS: I'm trying to pin

24 you down directionally.

25 　　　　　　　　MS. KATHLEEN KELLY: Agreed, and we --

1 as I said earlier, I think it may be a little

2 conservative based on the magnitude of the difference

3 in the top consum -- consumers' PLIL.

4   DR. BYRON WILLIAMS: Thank you.

5   MS. KATHLEEN KELLY: But I can't be

6 completely certain.

7   DR. BYRON WILLIAMS: And Ms. -- Ms.

8 Kelly, I believe you referenced this near the end of

9 your opening statement, and I can take you to

10 references if you require it -- require it. But in

11 terms of price elasticity, the ultimate conclusion of

12 Daymark is that the elasticities proposed by Manitoba

13 Hydro are not unreasonable. Would that be fair?

14   MS. KATHLEEN KELLY: That's correct.

15 Suman, any difference?

16   DR. SUMAN GAUTAM: The magnitude of

17 the elasticities are not -- yeah, I would argue with

18 that about the magnitude of the elasticity report.

19 They are within the range of industry practice.

20   DR. BYRON WILLIAMS: And --

21   MS. KATHLEEN KELLY: Actually, I'm --

22 I -- I want to step back on that, because I think --

23 and Suman, jump in as you wish, but I think the --

24 generally, they appear to be the -- the elasticity

25 values appear to be within the range of reasonableness

1   in the industry. It -- it may be that some of the

2   changes between 2014 and 2017 have reduced the

3   elasticity response a bit, and may need some

4   investigation as to whether that's actually going to

5   occur.

6   Suman, that's the top consumer's piece

7   where the elasticity --

8   DR. SUMAN GAUTAM: Yes.

9   MS. KATHLEEN KELLY: -- has come down

10 between the two (2) years of regression equations?

11   DR. SUMAN GAUTAM: Yes, that's right.

12   DR. BYRON WILLIAMS: And --

13   MS. KATHLEEN KELLY: And the -- the

14 actual num -- the gigawatt hours that are the

15 elasticity response, I'm not sure that we could put

16 our hands on that number and say, That's exactly

17 right. The coefficients are in the range, so if that

18 -- it -- it could be quite on -- quite online.

19   DR. BYRON WILLIAMS: Okay. I'll take

20 that answer, and thank you, Ms. Kelly.

21

22   (BRIEF PAUSE)

23

24   DR. BYRON WILLIAMS: And just for the

25 benefit of the Daymark panel, in a few moments, I'm

1 going to go to some of your concerns in terms of

2 Hydro's estimates of price elasticity. But before we

3 get there, I want to do a little bit just kind of a

4 higher level look at Hydro's load forecasting meth --

5 methodology as it relates to the residential forecast,

6 as well as a high level look at what you mean by a con

7 -- econometric models and regression analysis.

8   So Ms. Kelly, you're with me where I'm

9 going directionally?

10   MS. KATHLEEN KELLY: Yes.

11   DR. BYRON WILLIAMS: Okay. And --

12   MS. KATHLEEN KELLY: And I'm sure

13 Suman is as well.

14   DR. BYRON WILLIAMS: Yes, and many of

15 these --

16   DR. SUMAN GAUTAM: Yes, I am.

17   DR. BYRON WILLIAMS: -- questions

18 probably will be to him. Dr. Gautam, you -- and if

19 I'm mispronouncing your name too terribly, please

20 correct me. You'll agree that in terms of the primary

21 residential forecast methodology for Hydro, the two

22 (2) key components are the number of residential

23 customers or dwellings, and the second is the average

24 usage per residential customer, agreed?

25   DR. SUMAN GAUTAM: Yes, that's right.

 1   DR. BYRON WILLIAMS: And the use per

 2   customer forecast is derived econometrically based

 3   upon projections of 1) annual disposable income per

 4   customer; 2) electricity price; and 3) the annual

 5   ratio of the number of electric heat customers to

 6   total customers? We'll get to the trend variable in a

 7   second. Would that be fair?

 8   DR. SUMAN GAUTAM: Yes, that is right,

 9   (INDISCERNIBLE) trend variable, as you pointed out.

10   DR. BYRON WILLIAMS: And without

11   asking you to elaborate about it right now, you'll

12   confirm that there is also a trend variable with the

13   intention of reflecting changing electric use and

14   house size, agreed?

15   DR. SUMAN GAUTAM: Yes.

16   DR. BYRON WILLIAMS: Just in terms of

17   terms, Dr. Gautam, I'm more comfortable with using the

18   term 'explanatory variable', but you'll understand

19   that the term 'explanatory variable -- variable' is

20   generally synonymous with terms such as 'drivers',

21   'predictors', or 'independent variable'. Would that

22   be fair?

23   DR. SUMAN GAUTAM: Yes. They're used

24   interchangeably, yeah.

25   DR. BYRON WILLIAMS: So if I use the

1 word 'explanatory variable', you'll -- you'll

2 understand what I'm -- what I'm suggesting?

3   DR. SUMAN GAUTAM: Yes, I will.

4   DR. BYRON WILLIAMS: And in the

5 context of an electricity -- electric utility load

6 forecast, an explanatory variable might be price or --

7 or real income. Those are -- are two (2) potential

8 explanatory variables, agreed?

9   DR. SUMAN GAUTAM: They are -- I would

10 say one (1) of the two (2). I didn't -- there --

11 there could be other -- depending on the -- the area

12 or the characteristics of the service area that we're

13 looking, I -- I would argue that those two (2) would

14 be -- so there are other as well, but those two (2)

15 could -- could be the primary ones.

16   DR. BYRON WILLIAMS: Okay. And, sir,

17 if I use the term 'output variable', you'll understand

18 that it's also sometimes used in the literature as

19 'outcome response' or 'dependent variables'. Would

20 that be fair?

21   DR. SUMAN GAUTAM: Yes.

22   DR. BYRON WILLIAMS: And you're

23 generally familiar with that term as well, sir?

24   DR. SUMAN GAUTAM: Yes, I am.

25   DR. BYRON WILLIAMS: And just as an

1 example of an output variable, sir, in the context of

2 a utility forecast, electricity sales or projected

3 demand could be an example of that, agreed?

4   DR. SUMAN GAUTAM: Yes.

5   DR. BYRON WILLIAMS: And what an

6 econometric model tries to do, sir, is to create a

7 mathematical equation that fits the historical data

8 for the explanatory variables and the output variable,

9 agreed?

10   DR. SUMAN GAUTAM: That is right.

11   DR. BYRON WILLIAMS: And, sir, if I

12 were to use the term 'coefficient' in the context of

13 mathematical equations, a coefficient would be a --

14 could be described as a constant by which a variable

15 is multiplied, correct?

16   DR. SUMAN GAUTAM: Can you elaborate

17 on that? Are you talking about coefficient in a

18 regression model, or -- or just mathematical

19 expression between how they are represented in a

20 regression equation?

21   DR. BYRON WILLIAMS: Well -- well,

22 generally, sir, just in general mathematical

23 equations, they're a constant by which a variable is

24 multiplied, agreed?

25   DR. SUMAN GAUTAM: Yes. A regression

1 coefficient multiplied by variable to that.

2   DR. BYRON WILLIAMS: Okay. In

3 essence, they provide the weighting for each

4 explanatory variable in the equation, agreed?

5   MS. KATHLEEN KELLY: I -- I wouldn't

6 agree with the term 'weighting' as you are using it.

7 It -- it represents -- it basically is the number by

8 which every change in the explanatory variable is --

9 contributes to the total.

10   DR. BYRON WILLIAMS: It -- it descri --

11   MS. KATHLEEN KELLY: You couldn't --

12 you couldn't truly get to the weight until you took

13 all of them --

14   DR. BYRON WILLIAMS: Right.

15   MS. KATHLEEN KELLY: -- and used the

16 coefficient and the actual value and added them up,

17 and then you could do a percentage and say, Okay, this

18 contributes so much percent.

19   DR. BYRON WILLIAMS: It describes the

20 relationship. Is that a better word?

21   DR. SUMAN GAUTAM: Yes, that is.

22   MS. KATHLEEN KELLY: Yes.

23   DR. SUMAN GAUTAM: Yes.

24   DR. BYRON WILLIAMS: And essentially,

25 regression analysis is a technique to assess the

1 relationship between an output variable and one (1) or

2 more explanatory variables. Would that be fair?

3   DR. SUMAN GAUTAM: Yes.

4   DR. BYRON WILLIAMS: And correlation

5 examines the relationship between different variables,

6 correct?

7   DR. SUMAN GAUTAM: Yes. Yes.

8   DR. BYRON WILLIAMS: So the

9 correlation between two (2) variables can be positive

10 in the sense that a higher level of one (1) variable

11 is associated with a higher variable of another;

12 agreed?

13   DR. SUMAN GAUTAM: Yes. Yes.

14   DR. BYRON WILLIAMS: And it could be

15 negative in the sense that the higher level of one (1)

16 variable is associated with the lower level of

17 another; correct?

18   DR. SUMAN GAUTAM: Yes.

19   DR. BYRON WILLIAMS: And we -- when we

20 look at correlation coefficients, they can range

21 between negative one (1) and plus one (1); agreed?

22   DR. SUMAN GAUTAM: Yeah, you're --

23 yes, that is right.

24   DR. BYRON WILLIAMS: With the -- the

25 sign, whether positive or negative, indicating the

1 direction of the association or relationship; agreed?

2   DR. SUMAN GAUTAM: Yes.

3   DR. BYRON WILLIAMS: And the magnitude

4 of the correlation coefficient indicating the strength

5 of the association; correct?

6   DR. SUMAN GAUTAM: Yes.

7   DR. BYRON WILLIAMS: And just for one

8 (1) example, if we had a correlation coefficient with

9 R equals zero-point-nine (0.9), that would suggest a

10 strong positive association between two (2) variables;

11 agreed?

12   DR. SUMAN GAUTAM: So there -- so

13 correlation coefficient, so can you explain what R --

14 does that R represent just a random (INDISCERNIBLE) --

15   DR. BYRON WILLIAMS: Yes.

16   DR. SUMAN GAUTAM: -- or is it

17 associated with an (INDISCERNIBLE)?

18   DR. BYRON WILLIAMS: Let's get rid of

19 the "R".

20   DR. SUMAN GAUTAM: Okay.

21   DR. BYRON WILLIAMS: Let's get rid of

22 the "R". If there's a zero-point-nine (0.9), that's a

23 strong positive association between the two (2)

24 variables, sir; agreed?

25   DR. SUMAN GAUTAM: Yes, that is --

1 yeah.

2   DR. BYRON WILLIAMS: And would it be

3 fair to say that often a key goal of regression

4 analysis is to isolate the relationship between each

5 explanatory variable and the output variable?

6   DR. SUMAN GAUTAM: I apologize. Can

7 you repeat that statement again?

8   DR. BYRON WILLIAMS: Would it be fair

9 to say, Dr. Gautam -- Gautam -- excuse me -- that --

10   DR. SUMAN GAUTAM: That is fine. Yes.

11   DR. BYRON WILLIAMS: -- that often a

12 goal of regression analysis is to look at the

13 relationship between each explanatory variable and the

14 output variable; correct?

15   DR. SUMAN GAUTAM: Yes. M-hm.

16   DR. BYRON WILLIAMS: That was a yes?

17   DR. SUMAN GAUTAM: Yes.

18   DR. BYRON WILLIAMS: Okay. And when

19 we look at a regression coefficient, sir, we could

20 interpret that to mean the average change in the

21 output variable for each one (1) unit change

22 explanatory variable when you hold all the other

23 explanatory variables constant.

24   That's what it's estimating?

25   DR. SUMAN GAUTAM: So depending -- so

1 I'd like to make one (1) clarification. Yes. So if

2 we are looking at an ordinary (INDISCERNIBLE)

3 regression on -- on a -- on how they are -- without

4 transformation, then that is correct.

5   DR. BYRON WILLIAMS: And essentially

6 the idea would be that you would change the value of

7 one (1) explanatory vari -- variable and not the

8 others; agreed?

9   DR. SUMAN GAUTAM: Yes. When we are

10 interpreting the coefficient of regression. Yes.

11   DR. BYRON WILLIAMS: Sir, you'd also

12 agree that to the degree that explanatory variables

13 are correlated, that would suggest that changes in one

14 (1) explanatory variable are associated with shifts in

15 another variable; agreed?

16   DR. SUMAN GAUTAM: Can we clarify that

17 statement a little bit further?   Are you asking about

18 now -- so are we talking about the correlation between

19 explanator -- explanatory variables?

20   DR. BYRON WILLIAMS: We are, sir.

21   DR. SUMAN GAUTAM: Okay. And -- and

22 can you -- can you repeat that statement again?

23   DR. BYRON WILLIAMS: So when we're

24 looking at the degree to which explanatory variables

25 are correlated, it indicates that the change in one

1 (1) variable is associated with the shifts in another

2 explanatory variable; agreed?

3   DR. SUMAN GAUTAM: I -- so can we --

4 so -- so we're talking about regr -- can we separate

5 regression coefficient with the -- with the

6 correlation coefficient? Because why I'm saying is

7 that if we are using just one (1) explan --

8 explanatory variable, then the correlation coefficient

9 and regression coefficient would be same.

10   DR. BYRON WILLIAMS: Okay.

11   DR. SUMAN GAUTAM: But when we are

12 talking about correlation coefficients of explanatory

13 variables, then I think a distinction between that

14 and regression coefficient would be -- would be

15 helpful.

16   DR. BYRON WILLIAMS: The challenge,

17 sir, and -- and cutting to the chase --

18   DR. SUMAN GAUTAM: Yes.

19   DR. BYRON WILLIAMS: -- with issues

20 such as multicollinearity is that it becomes difficult

21 for the model to estimate the relationship between

22 each explanatory variable in the output variable

23 independently; agreed?

24   DR. SUMAN GAUTAM: So -- so, sorry I

25 lost you in the -- in the middle of that statement. I

 1 just want to make sure that I -- I hear that

 2 completely. So can you repeat that again?

 3   DR. BYRON WILLIAMS: Yeah, we're --

 4 we're going to go back up one (1) step.

 5   DR. SUMAN GAUTAM: Okay.

 6   DR. BYRON WILLIAMS: What we agreed on

 7 previously -- or what you agreed to, sir, is that in

 8 the context of a regression analysis we're often

 9 trying to isolate the relationship between an

10 explanatory variable and the output variable; correct?

11   DR. SUMAN GAUTAM: Yes, that is right.

12   DR. BYRON WILLIAMS: And we -- we get

13 insight from that when we look at changes in the

14 single explanatory variable when you hold all the

15 other variables constant.

16   We -- we agreed on that?

17   DR. SUMAN GAUTAM: Yes.

18   DR. BYRON WILLIAMS: Okay. And what

19 I'm suggesting to you, sir, as -- the stronger the

20 correlation between the co -- explanatory variables,

21 the more difficult it becomes to estimate the

22 relationship between each explanatory variable and the

23 output variable independently. That's your point

24 about that there's challenges with the coefficients.

25   DR. SUMAN GAUTAM: Okay. Yeah, yes.

1 That is correct, but -- so there is a different method

2 -- so I -- I agree with you about the there can be

3 issues with using explanatory variables that are

4 correlated -- strongly correlated with each other.

5 That doesn't always mean that that would impact the

6 reliability of regression coefficient.

7   DR. BYRON WILLIAMS: Fair enough, sir.

8   DR. SUMAN GAUTAM: And -- and that one

9 (1) is -- so we have presented that a specific

10 statistical border, statistical parameters that we

11 estimated in our report in order to look at where the,

12 you know, highly correlated explanatory variables have

13 any, you know, any -- any issue of multicollinearity

14 or not.

15   DR. BYRON WILLIAMS: And, sir, where -

16 - those you're referring to are captured in table 2

17 and 3, which we'll come to in a few minutes, okay?

18   DR. SUMAN GAUTAM: Okay. Okay. Good.

19   DR. BYRON WILLIAMS: I wonder if, for

20 right now though, we can go to Coalition Exhibit 38.

21   MS. KATHLEEN KELLY: To help out,

22 Suman, Exhibit 38 is the mini-tab blog with what are

23 the effects of multicollinearity and when can I ignore

24 them.

25   DR. SUMAN GAUTAM: Okay. Thank you.

1 Thank you. I have that.

2   DR. BYRON WILLIAMS: Okay. And, Dr.

3 Gautam, may -- in just, again, in ter -- in the

4 interest of clarifying terms, you'll see on the very -

5 - under the first paragraph here, there's a reference

6 to predictors. And you -- you'll understand that I'm

7 using the word "explanatory variable" synonymously

8 with predictors?

9   DR. SUMAN GAUTAM: M-hm. Yes. I

10 understand. Yeah.

11   DR. BYRON WILLIAMS: Okay. And

12 basically, sir, what, what this -- this blog

13 identifies is that multi-canary -- multicollinearity

14 is a challenge that can arise when you're fitting a

15 regression model and -- and it refers to explanatory

16 variables that are correlated with other explanatory

17 variables; agreed?

18   DR. SUMAN GAUTAM: Yes, that is right.

19   DR. BYRON WILLIAMS: And, sir, if we

20 turn to page 2 of this document, the -- the second

21 full paragraph starting with the word "given," using

22 shorthand, a way to test -- we're -- we're looking at

23 the -- for the Board the -- the second full paragraph

24 starting with word "given." A way to test for

25 multicollinearity is using variance -- an assessment

1 of -- a calculation of variance inflation factors,

2 often with the term use -- we use the acronym VIF;

3 agreed?

4   DR. SUMAN GAUTAM: Yes, that is right.

5 Yeah.

6   DR. BYRON WILLIAMS: And the author of

7 this blog concludes that a VIF of five (5) or greater

8 indicates a reason to keep to be concerned about

9 multicollinearity; correct?

10   DR. SUMAN GAUTAM: That is right.

11   DR. BYRON WILLIAMS: And -- and that's

12 kind of the litmus test that you used in your

13 assessment, which we'll come to in a second of table 3

14 of your evidence, over five (5) was a reason to be

15 concerned; agreed?

16   DR. SUMAN GAUTAM: That is right.

17   DR. BYRON WILLIAMS: Either to you or

18 -- or to Ms. Kelly, you'll agree that in some of the

19 literature others might suggest a VIF of ten (10)?

20

21   (BRIEF PAUSE)

22

23   DR. SUMAN GAUTAM: Yes, we have seen

24 that as well.

25   DR. BYRON WILLIAMS: Okay. Back to

1 page 1 of this blog, Dr. Gautam. And in the middle of

2 the page you'll see a question, "Do I have to fix

3 multicollinearity?"

4   DR. SUMAN GAUTAM: M-hm.

5   DR. BYRON WILLIAMS: And would it be

6 fair to say that the author of this blog says that one

7 (1), it can be a problem, or it may -- can pose

8 challenges in choosing the correct predictors; agreed?

9   DR. SUMAN GAUTAM: Yes, I'm reading it

10 here. Can you give me a few -- a few more -- a few

11 minutes?

12   DR. BYRON WILLIAMS: Of course. Yeah.

13   DR. SUMAN GAUTAM: Thank you.

14

15   (BRIEF PAUSE)

16

17   DR. SUMAN GAUTAM: Yes, yes, I agree

18 with you. Thank you.

19   DR. BYRON WILLIAMS: And he also notes

20 -- and -- and thank you for asking for the time.

21 Please feel welcome to do that at any time. He also

22 observes that it may prop -- pose challenges in

23 determining the pro -- precise effect of each

24 explanatory var -- variable; agreed? That's the

25 second bullet?

 1   DR. SUMAN GAUTAM: Yes.

 2   DR. BYRON WILLIAMS: But often it

 3 doesn't affect the overall fit of the model or produce

 4 bad predictions; agreed?

 5   DR. SUMAN GAUTAM: Yes. Given that

 6 your model has high R-Square value.

 7   DR. BYRON WILLIAMS: And when you --

 8 what your -- the last comment you made, sir, is

 9 basically saying if the -- the model has

10 satisfactorily predicted R-Square valued, it would be

11 fair to say that even models with significant

12 multicollinearity issues can pre -- reliable

13 predictions; agreed?

14   DR. SUMAN GAUTAM: Yes.

15   DR. BYRON WILLIAMS: And I'm going to

16 try and put that more colloquially, how we might use

17 it on the farm.

18   DR. SUMAN GAUTAM: Sure.

19   DR. BYRON WILLIAMS: Would it be fair

20 to say that as long as the projections of the drivers

21 themselves are consistent with each other,

22 multicollinearity does not result in a bad model or a

23 bad forecast?

24   MS. KATHLEEN KELLY: Can -- can you

25 restate that?

1   DR. BYRON WILLIAMS: I'm not sure if I

2 can restate it, but I'll try and --

3   MS. KATHLEEN KELLY: Please try.

4   DR. BYRON WILLIAMS: As long as there

5 -- as long as the projections of the drivers

6 themselves -- or of the explanatory variables

7 themselves are consistent with each other,

8 multicollinearity does not result in a bad model or a

9 bad forecast?

10   DR. SUMAN GAUTAM: That is correct.

11 It doesn't -- as we pointed out in our report as well,

12 it -- it -- given that there are no other issues, this

13 multicollinearity doesn't affect the predictability of

14 the model.

15   DR. BYRON WILLIAMS: And it would be

16 fair to say --

17   MS. KATHLEEN KELLY: If I could add to

18 --

19   DR. BYRON WILLIAMS: Go ahead, Ms.

20 Kelly, please.

21   MS. KATHLEEN KELLY: I think -- I

22 think you're -- as you read that, as long -- the --

23 the concern I have is as long as the consistency of

24 the predictors is inherent then that would be the

25 case. I have some concerns about including that.

1 Sometimes they aren't always consistent, but the model

2 is still okay. But I'm not sure I'm -- I'm willing to

3 agree to that consistency point.

4   DR. BYRON WILLIAMS: Fair enough.

5 Would it be fair to say that multicollinearity cannot

6 make a bad model appear to be good?

7   DR. SUMAN GAUTAM: Yeah. Can I

8 restate that, what you said?

9   DR. BYRON WILLIAMS: Yeah.

10   DR. SUMAN GAUTAM: So you're saying

11 whether multicollinearity will improve the -- the

12 model or not.

13   DR. BYRON WILLIAMS: What -- what I

14 was trying to say to say was mul --

15   DR. SUMAN GAUTAM: Okay.

16   DR. BYRON WILLIAMS: -- let me try it

17 a different way.

18   DR. SUMAN GAUTAM: Sure.

19   DR. BYRON WILLIAMS: Multicollinearity

20 cannot result in a false positive model; agreed?

21   MS. KATHLEEN KELLY: Suman, may I

22 point out something on this?

23   DR. SUMAN GAUTAM: Sure.

24   MS. KATHLEEN KELLY: And I know we --

25 we went through this a number of times. But if you

1 look at the multicollinear blocks, one (1) of the

2 points of this article is that multicollinearity

3 actually changed the sign of one (1) explanatory

4 variables. And when it was fixed using the standard

5 approaches available to us in mathematics, that the

6 sign went back to what would have been expected to be.

7 So I just wanted to point that out before you make

8 that response.

9   MR. WILLIAM HAIGHT: And for the

10 purpose of the record, Ms. Kelly is referring to

11 Coalition Exhibit 38.

12   MS. KATHLEEN KELLY: Thank you.

13

14 CONTINUED BY DR. BYRON WILLIAMS:

15   DR. BYRON WILLIAMS: Let me -- if --

16 maybe I'll just try this question (1) one last time.

17   DR. SUMAN GAUTAM: Sure. Thank you.

18   DR. BYRON WILLIAMS: If your primary

19 goal is to make predictions, and you don't need to

20 understand the role of each independent value

21 variable, multicollinearity is much less of an issue?

22   DR. SUMAN GAUTAM: That is correct.

23 So we are assuming -- are assuming that those

24 variables chosen in the model have economic -- a -- a

25 logical reason, right?

1   DR. BYRON WILLIAMS: Agreed.

2   MS. KATHLEEN KELLY: I'd like to add,

3 though. I think that the concern that Daymark has

4 presented here is primarily around and -- and driven

5 by the fact that multicollinearity affects price

6 elasticity coefficient. And that is our concern.

7   DR. BYRON WILLIAMS: Let's turn to the

8 Daymark load evidence, page 33, which is the PDF 41 --

9 or I guess it's PDF 33. Dr. Gautam, previously you

10 provided a def -- definition of price elasticity.

11   Would you accept a definition of price

12 elasticity of demand as a measure of the relationship

13 between a change in the quantity demanded of a

14 particular good and a change in the price?

15   DR. SUMAN GAUTAM: Yes. Yes.

16   DR. BYRON WILLIAMS: And in this

17 hearing in particular, it's important to estimate the

18 impact of electricity price on Hydro customers'

19 electricity demand because the proposed rate increases

20 are quite significant; agreed?

21   DR. SUMAN GAUTAM: Yes.

22   MS. KATHLEEN KELLY: I'd -- I'd like

23 to add to that that whether it was the result --

24 whether there is a proposed rate increase of the

25 magnitude that there is or not, it's important to

1 understand the price elasticity.

2   DR. BYRON WILLIAMS: Fair enough.

3 We're particularly alive to the issue of price

4 elasticity when we're looking at the load forecast for

5 Manitoba Hydro, because we're looking at six (6) years

6 real price increases of -- in the range of 6 percent

7 each year projected in their forecast; agreed?

8   MS. KATHLEEN KELLY: Yes. I would

9 imagine the Board is very interested in that.

10   DR. BYRON WILLIAMS: And --

11   THE CHAIRPERSON: Mr. Will -- Mr.

12 Williams, just a -- just a question. You said 6

13 percent?

14   DR. BYRON WILLIAMS: I -- I used the -

15 - I used the term 6 percent real.

16   THE CHAIRPERSON: Okay.

17   DR. BYRON WILLIAMS: So, Ms. Kelly,

18 just for the benefit of the Board, if we assume that

19 inflation is in the range of 2 percent and we're

20 looking at an annual rate increase of 7.9 percent in

21 terms of real rate increases, you'd agree it would be

22 in the range of 6 percent?

23   MS. KATHLEEN KELLY: Yes.

24   THE CHAIRPERSON: Thank you.

25

 1 CONTINUED BY DR. BYRON WILLIAMS:

 2   DR. BYRON WILLIAMS: And what table 1

 3 presents to us is Manitoba Hydro's ultimate estimate

 4 of price elasticity for gross firm energy of negative

 5 zero-point-two-seven (0.27).

 6   Is that correct, Dr. Gautam?

 7   DR. SUMAN GAUTAM: Yes, that is right.

 8 Yeah.

 9   DR. BYRON WILLIAMS: And put another

10 way, Hydro estimated that a 1 percent increase in

11 electricity prices reduces gross firm energy by 0.27

12 percent; agreed?

13   DR. SUMAN GAUTAM: That is correct.

14   DR. BYRON WILLIAMS: And then the

15 elasticities estimated are used along with estimates

16 of future electricity price income and gross domestic

17 product variables, depending upon the sector, to

18 consider their impact on the load forecast.

19   Would that be fair?

20   DR. SUMAN GAUTAM: To calcu -- to

21 estimate the load forecast.

22   DR. BYRON WILLIAMS: Okay.

23   DR. SUMAN GAUTAM: Are -- are

24 considered the impact. We can say it any way.

25   DR. BYRON WILLIAMS: And if we can

1 just scroll down on this page and keep this great big

2 long paragraph right at the centre. Dr. Gautam, do

3 you see this. It's a paragraph starting "Daymark."

4   DR. SUMAN GAUTAM: Yes. Yes.

5   DR. BYRON WILLIAMS: And what you're

6 summarizing in this paragraph is some of the concerns

7 Daymark reported in terms of multicollinearity. And

8 in particular, you suggest that there are issues,

9 mainly due to the highly correlated explanatory

10 variables, including income saturation and the trend

11 variable; agreed?

12   DR. SUMAN GAUTAM: Yes.

13   DR. BYRON WILLIAMS: And what you say

14 in this paragraph is to test whether multicollinearity

15 was a problem you calculated the variance inflation

16 factor using a threshold of a VIF value of five (5) or

17 greater; agreed?

18   DR. SUMAN GAUTAM: Yes, that is right.

19 As we cited there, the source was the document we

20 referenced earlier.

21   DR. BYRON WILLIAMS: And that -- those

22 results are presented in table 3, which we could turn

23 to, which is at page 35 of your evidence. And scroll

24 down to the middle of the page. And just focusing on

25 this, Dr. Gautam, you -- you looked at -- at four (4)

1 different explanatory variables, including price,

2 income saturation, and trend; correct?

3   DR. SUMAN GAUTAM: That is right. And

4 here we added -- we introduced each of the explanatory

5 variable one (1) at a time to see that -- that VIF

6 value, how that change with the introduction of

7 additional explanatory vari -- variable.

8   DR. BYRON WILLIAMS: And -- and when

9 you say that, this is the -- an example of the

10 stepwise regression model that you employed to test --

11 to test the analysis of Manitoba Hydro; agreed?

12   DR. SUMAN GAUTAM: That -- that that

13 is right. And on table 2, we have that stepwise

14 regression result.

15   DR. BYRON WILLIAMS: And -- and we'll

16 come to that in just a second.

17   DR. SUMAN GAUTAM: Sure.

18   DR. BYRON WILLIAMS: Let's say on

19 table 3 for a moment. And if we go all the way over

20 to model 3, that's when you're looking at the

21 relationship between price, income, and saturation.

22 And there you see both income and saturation well

23 above the -- the five (5) -- five (5) VIF threshold,

24 being an excessive of twenty-five (25); agreed?

25   DR. SUMAN GAUTAM: That is right.

 1 Again, I would like to clear one (1) thing. So these

 2 are VIF values. Not -- we -- we looked at the

 3 correlation coefficient between each of these

 4 variables, but I do not recall right now what those

 5 values were. So the higher this value -- as I said

 6 earlier, the higher values not necessarily mean they

 7 are highly correlated, you know.

 8   DR. BYRON WILLIAMS: Fair enough. And

 9 thank you for that clarification. When we get to

10 model 4, you've introduced the trend variable as well.

11   DR. SUMAN GAUTAM: Yes.

12   DR. BYRON WILLIAMS: And -- and you're

13 pointing to a multicollinearity issue between

14 involving income saturation and trend; correct?

15   DR. SUMAN GAUTAM: That is correct,

16 yes.

17   DR. BYRON WILLIAMS: Sir, staying on

18 this table, the VIF values for electricity price on

19 the first line in all three (3) instances, being model

20 2, 3, and 4 are much less than five (5); agreed?

21   DR. SUMAN GAUTAM: Yes.

22   DR. BYRON WILLIAMS: Indeed, they are

23 less than two (2); correct?

24   DR. SUMAN GAUTAM: Yes, that is right.

25 Yeah. Yes.

 1   DR. BYRON WILLIAMS: Based upon your

 2 analysis in table 3, would it be accurate to suggest

 3 that in the residential average use model the electric

 4 price explanatory variable does not exhibit any multi

 5 -- multicollinearity?

 6   DR. SUMAN GAUTAM: Yes. That is --

 7 that is correct.

 8   DR. BYRON WILLIAMS: Sir, would it be

 9 appropriate to interpret table 3 as suggesting that

10 the impact of the multicollinearity on the price

11 elasticity should be small, but the uncertainry --

12 uncertainty around the coefficients of the correlated

13 variables could be large?

14   DR. SUMAN GAUTAM: Do you mind

15 repeating that statement? Sorry. There were a couple

16 of parts that I just wanted to make sure that I heard

17 them correctly.

18   DR. BYRON WILLIAMS: Sir, would it be

19 appropriate and fair to interpret table 3 as

20 suggesting that the impact of the multicollinearity on

21 the price elasticity should be small, while the

22 uncertainty around the coefficients of the correlated

23 variables could be large?

24   DR. SUMAN GAUTAM: So they are

25 continuing the threshold value of five (5). So -- so

1 we can say that the electricity price variable doesn't

2 have multicollinearity issue as other variables. Does

3 that answer your -- your question?

4   DR. BYRON WILLIAMS: Not quite, but

5 I'll -- I'll take that answer.

6   MS. KATHLEEN KELLY: And -- and I

7 would add that the issue and presence of

8 multicollinearity in the equation itself also

9 generates concern about all of the values --

10   DR. BYRON WILLIAMS: And we'll --

11 we'll come to --

12   MS. KATHLEEN KELLY: -- independently

13 within that equation. But again, going back to your

14 point from earlier, the overall equation has good

15 prediction value.

16   DR. BYRON WILLIAMS: And -- and what

17 you're essentially saying there, Ms. Kelly, is

18 multicollinearity doesn't affect the overall fit of

19 the model and it doesn't result in a bad forecast of

20 the output variable of demand; agreed?

21   MS. KATHLEEN KELLY: It doesn't

22 necessarily, but as an Exhibit 38, as it went through

23 its explanation and used its -- a couple of examples

24 here, it did in -- in this example show the fact that

25 changing the -- and taking -- using different

1 mathematical approaches with the depen -- independent

2 variables actually changed the direction of the sign

3 of the coefficient. So there -- this basically points

4 out some of the concerns that you may not see unless

5 you actually go a bit further in the analysis --

6   DR. BYRON WILLIAMS: Fair enough.

7   MS. KATHLEEN KELLY: -- and so some of

8 that standardization, just -- just shows -- just shows

9 the concern we have that the interrelation amongst it

10 wasn't sufficiently investigated.

11   DR. BYRON WILLIAMS: I hear you on

12 that point. And you might go further, in fact, and

13 say in the future of Manitoba Hydro is -- is moving

14 toward stochastic modelling to look at the risks it

15 faces, the challenges with the coefficients may -- may

16 pose problems if it moves in that direction; agreed?

17   MS. KATHLEEN KELLY: It -- it could.

18   DR. BYRON WILLIAMS: Mr. Chair, I -- I

19 still have some questions. I still -- I still think I

20 have time.

21   THE CHAIRPERSON: You still have

22 fifteen (15) minutes. Is -- is that sufficient time

23 or...

24   DR. BYRON WILLIAMS: Is it sufficient

25 time? Not to make my way through all my questions,

1 but I'm -- I'm prepared to --

2   THE CHAIRPERSON: Okay. What we can

3 do is break for lunch --

4   DR. BYRON WILLIAMS: Yeah.

5   THE CHAIRPERSON: -- if it's -- if

6 it's a suitable place --

7   DR. BYRON WILLIAMS: Yeah.

8   THE CHAIRPERSON: -- and then you can

9 resume after the break.

10   DR. BYRON WILLIAMS: And -- and what

11 I'll suggest, sir, is I'll -- I'll proceed with my

12 examination. If -- if I have to stand down I'll stand

13 down, and if there's time available at the end of the

14 day I'll -- I'll ask for the Board's indulgence. But

15 if not --

16   THE CHAIRPERSON: If your numbers are

17 accurate, I think we should be okay, but we'll check

18 over lunch, okay?

19   DR. BYRON WILLIAMS: Okay.

20   THE CHAIRPERSON: We'll break for an

21 hour. Thank you.

22

23 --- Upon recessing at 12:02 p.m.

24 --- Upon resuming at 1:02 p.m

25

1   THE CHAIRPERSON: Dr. Williams...?

2

3 CONTINUED BY DR. BYRON WILLIAMS:

4   DR. BYRON WILLIAMS: Yes, Good

5 afternoon, members of the panel and Daymark team. Is

6 Dr. Gautam still with us? Is he on line?

7   DR. SUMAN GAUTAM: Yes, I am.

8   DR. BYRON WILLIAMS: And thank you for

9 your patience with me this morning, sir.   I want to

10 go back to the Daymark evidence page 35, table 2. So

11 just a little bit above table 3 that we were looking

12 at previously.

13   DR. SUMAN GAUTAM: Yes.

14   DR. BYRON WILLIAMS: And just bear

15 with us because it's not up on the screen yet, sir

16 here. Kristen, you're doing such a great job. You

17 don't have to... Okay. Yeah, scroll a little bit up

18 the -- towards the top of the page. Thank you.

19   And Dr. Gautam, we'll -- we'll explain

20 this in a second, but without asking you to elaborate,

21 I'll ask you to confirm that Daymark sought to test

22 whether the use of trend and dummy variables in the

23 average usage model may have suppressed the impact of

24 electricity price elasticity; correct?

25   DR. SUMAN GAUTAM: Yes, that is

1 correct.

2   DR. BYRON WILLIAMS: And we are going

3 to focus on residential but you performed -- the

4 Daymark team performed stepwise regressions for both

5 residential and the GSMM sector by adding independent

6 variables inde -- incrementally to the average usage

7 regressions; agreed?

8   DR. SUMAN GAUTAM: Yes, that is right.

9   DR. BYRON WILLIAMS: And what table 2

10 does in the context of residential average use is

11 presents that stepwise regression analysis; agreed?

12   DR. SUMAN GAUTAM: Yes.

13   DR. BYRON WILLIAMS: And in the model

14 1 towards the left of the table, it looks --

15 introduces price only; correct?

16   DR. SUMAN GAUTAM: Yes.

17   DR. BYRON WILLIAMS: And then moving

18 from left to right towards model 2, 3 and 4, it

19 introduces at the second stage income, at the third

20 stage saturation, and at the third -- at the four

21 stage trend;, agreed?

22   DR. SUMAN GAUTAM: Yes, that is

23 correct.

24   DR. BYRON WILLIAMS: And we're going

25 to come back to this table in just a second, sir, but

1 would it be accurate to say, generally, in terms of

2 econometric models that there is model error in that

3 one cannot perfectly explain everything that happens

4 to the output variable based on the explanatory

5 variables; would that be fair?

6   DR. SUMAN GAUTAM: So model -- are you

7 referring to (INDISCERNIBLE) that we see on the

8 regression? That's unexplained portion of the -- of

9 the outcome variable.

10   DR. BYRON WILLIAMS: Yes.

11   DR. SUMAN GAUTAM: Yes, that is --

12   DR. BYRON WILLIAMS: Go ahead, sorry.

13   DR. SUMAN GAUTAM: Yes, so that --

14 that is fair to say that they -- there -- there will

15 be unexplained portion of outcome variable in a -- in

16 an integration model.

17   DR. BYRON WILLIAMS: And, sir, would

18 also be fair to say that, generally, the model seeks

19 to determine simultaneously the coefficients that

20 minimize model error?

21   DR. SUMAN GAUTAM: I -- so let me clar

22 -- try to clarify your -- your question or your

23 statement, so. Are you saying the coefficients that

24 we see in any regression models, the way that -- the

25 error -- the model error term calculated is -- it says

1 that -- says that the coefficients are estimated by

2 minimizing that error?

3   DR. BYRON WILLIAMS: Yes, you've

4 stated the answer better than the question.

5   Can you confirm that, sir?

6   DR. SUMAN GAUTAM: Yes, that is right,

7 yep.

8   DR. BYRON WILLIAMS: And, sir, as --

9 as we turn to the -- the estimate of -- the -- as we

10 turned to the stepwise regression models, would it be

11 fair to say that as we look at them they do not

12 determine the coefficient for one (1) variable and

13 then hold that constant while determining the

14 coefficient for the second variable as you move

15 through the progression of steps.

16   Would that be fair?

17   DR. SUMAN GAUTAM: Can -- can you --

18   DR. BYRON WILLIAMS: I -- I can ask

19 that a better way, sir.

20   DR. SUMAN GAUTAM: Sure, thank you.

21   DR. BYRON WILLIAMS: Would it be

22 accurate to suggest that stepwise regression models

23 are actually separate and distinct models that are not

24 built in any way from the previous step?

25   DR. SUMAN GAUTAM: They are

1 independent of each other but they are using -- so the

2 variable that we use on previous model, the values of

3 that variable stays the same. But there are -- there

4 are estimated independently.

5   DR. BYRON WILLIAMS: In essence, when

6 you kind of go from model 1 to model 2, it doesn't

7 remem -- model 2 does not remember model 1?

8   DR. SUMAN GAUTAM: Yes, yes, we can

9 say that.

10   DR. BYRON WILLIAMS: So when you add a

11 variable to the model, sir, it will determine a new

12 set of coefficients for all the variables in order to

13 minimize the model error; correct?

14   DR. SUMAN GAUTAM: Yes.

15   DR. BYRON WILLIAMS: And so, sir, when

16 you -- in doing this stepwise analysis when comparing

17 the two (2) models, you will generally find that the

18 coefficients will have changed?

19   DR. SUMAN GAUTAM: Most likely, yes.

20   DR. BYRON WILLIAMS: And that's

21 because additional variable will explain a portion of

22 the output value and the original variable will

23 explain the rest; correct?

24   DR. SUMAN GAUTAM: That is correct.

25 So here when we are talking about different variables,

1 we are talking about variables that are -- that have

2 logical -- or economic reasoning, right, not any

3 random variables that we are introducing any -- inn

4 any regression model.

5   DR. BYRON WILLIAMS: Thank you for

6 that. And when we look specifically at table 2,

7 you'll see values outside the parentheses. For

8 example, the negative 0.2 under model 1 for

9 electricity price.

10   Do you see that, sir?

11   DR. SUMAN GAUTAM: Yes, I do.

12   DR. BYRON WILLIAMS: And that would be

13 the estimated coefficient in this case of price

14 elasticity, sir, agreed?

15   DR. SUMAN GAUTAM: Yes, your -- yes,

16 that is correct.

17   DR. BYRON WILLIAMS: And in -- when we

18 look at this model we'll also see figures within the

19 parentheses as well.

20   You see those, sir?

21   DR. SUMAN GAUTAM: Yes, I do.

22   DR. BYRON WILLIAMS: And those are the

23 associated T -- the letter 'T' values; would that be

24 right?

25   DR. SUMAN GAUTAM: Yes.

1   DR. BYRON WILLIAMS: And a 'T' value,

2 sir, measures the extremeness of a statistical

3 estimate; correct?

4   DR. SUMAN GAUTAM: Yes. It has a

5 statistical significance.

6   DR. BYRON WILLIAMS: And the greater

7 the absolute magnitude of the 'T' value from zero, the

8 greater the evidence of statistic -- of statistical

9 significance, correct?

10   DR. SUMAN GAUTAM: Yes. Yes, we can -

11 - we can say that, however, the same point will --

12 there is a general -- general agreement that the

13 values that have -- so they -- that have -- that are

14 greater than certain threshold of 'T' value are

15 generally taken as being statistically significant.

16   DR. BYRON WILLIAMS: Yes and thank you

17 for that clarification. Ultimately, sir, in terms of

18 this table, you interpret it to suggest that the value

19 of the coefficient for electricity price across

20 different models becomes smaller in magnitude after

21 the trend variable is introduced at the model 4 stage.

22   Would that be fair?

23   DR. SUMAN GAUTAM: Yes, that is fair.

24   DR. BYRON WILLIAMS: And in essence,

25 you're looking at in model 3 going from negative 0.46

1 in terms of the price elasticity to negative 0.28;

2 correct?

3   DR. SUMAN GAUTAM: Yes.

4   DR. BYRON WILLIAMS: Sir, let's go

5 just a little bit more to -- back to the left of that

6 column.

7   In examining table 2 you would also

8 agree that elasticity went up from model 2 from

9 negative 0.34 up -- in terms of model 3, up to

10 negative 0.46.

11   Would that be correct?

12   DR. SUMAN GAUTAM: Yes, that is right

13 -- that is correct.

14   DR. BYRON WILLIAMS: And that, sir, is

15 in the presence of potential multicollinearity in

16 model 3, as you demonstrate just below on table 3;

17 agreed?

18   DR. SUMAN GAUTAM: Yes.

19   DR. BYRON WILLIAMS: Sir, would it be

20 accurate to say that you would get a different pattern

21 of changes in going from model 1 through to model 4 if

22 you added the variables in a different order?

23   DR. SUMAN GAUTAM: That could be

24 possible and the way that we are -- we choose

25 variables here. The order is based on -- on -- on the

1 literature and what's been used to do a -- to estimate

2 of electricity users; that was our -- underlining

3 others and of using this variable. But you are -- you

4 are correct in saying that the trend -- we maybe see -

5 - seen a different trend if we use variables in

6 different order.

7   DR. BYRON WILLIAMS: So, sir, for

8 example, in model -- moving from model 1 to model 2,

9 you add the income variable to the electricity

10 variable; agreed?

11   DR. SUMAN GAUTAM: Yes.

12   DR. BYRON WILLIAMS: If instead you

13 have a model 2.1 that added this saturation variable

14 to the price variable, it could produce a different

15 elasticity than model 2 currently presents; agreed?

16   DR. SUMAN GAUTAM: It could. I -- I

17 do not recollect on what value got, if we did that.

18 But -- but it could. It could give a different price

19 elasticity value.

20   DR. BYRON WILLIAMS: And similarly,

21 sir, if you created a new model 3.1 and added trend,

22 you could get another elasticity result; agreed?

23   DR. SUMAN GAUTAM: I was resting --

24 replacing saturation with trend variable in model --

25 when you define 3.1.

1   DR. BYRON WILLIAMS: Sorry, sir, I was

2 imprecise. If you went electricity price to

3 saturation and then added trend in model 3, you could

4 get a different elasticity result; agreed?

5   DR. SUMAN GAUTAM: Well, it -- yeah.

6 Yeah, that could be possible and -- and if that --

7 that -- and we can -- and it's very easy to produce --

8 stick -- integrations in any way that -- that 1-6,

9 that's not an dif -- that is -- that is pretty

10 straightforward but that could be possible. We -- we

11 could get to a different coefficient.

12   DR. BYRON WILLIAMS: Just one -- I'm

13 sure everyone will be relieved. If we can go to --

14 I'm certainly relieved. Daymark, page 2 of your

15 prefiled load evidence towards the bottom of that

16 page. And Dr. Gautam, thank you so much for bearing

17 with me on that.

18   Directing either Dr. Gautam or Ms.

19 Kelly to the last sentence of the second last

20 paragraph. So it's towards the bottom, Kristen, the

21 third -- fourth last line, "although this is..."

22   Ms. Kelly or Dr. Gautam, would it be

23 fair to say that based on the regression parameters,

24 the overall R-square and other statistics, the overall

25 load forecast of each sector is appropriate in total?

 1   MS. KATHLEEN KELLY: Yes.

 2   DR. BYRON WILLIAMS: And again, we

 3 understand the concerns with the elasticity

 4 coefficients.

 5   I was going to ask just a couple of

 6 questions on heterostochasticity, but I don't have the

 7 courage so I'm going to move on to El Nino. That

 8 wasn't a -- just for the record, I inadvertently threw

 9 a pen towards Ms. Kelly and that's not any commentary

10 on the -- on the high quality of evidence that we're

11 getting. I'll be more careful in the future for fear

12 of lawsuits. You've got some very able civil

13 litigators beside you.

14   In terms of the issue of weather

15 normalization, so, we're going to change -- change

16 tacts totally. Our understanding is that Hydro

17 currently uses two (2) years of data to estimate the

18 weather-dependent load relationship; agreed?

19   MS. KATHLEEN KELLY: Yes, they use

20 that to set up a regression that then that regression

21 then gives them the coefficients by which load will be

22 adjusted.

23   DR. BYRON WILLIAMS: And for the

24 purposes of defining in quotation marks "a normal

25 weather year," Manitoba Hydro uses twenty-five (25)

1 years of data; agreed?

2   MS. KATHLEEN KELLY: That's correct.

3   DR. BYRON WILLIAMS: And in breaking

4 down your recommendations on weather normalization, I

5 understand that the priority from Daymark is

6 consideration of whether Hydro shouldn't use more than

7 the twenty-four (24) data points that flow from using

8 two (2) years of data to estimate the weather-

9 dependent load relationship; would that be fair?

10   MS. KATHLEEN KELLY: On weather

11 normalization that would be our priority

12 recommendation, yes.

13   DR. BYRON WILLIAMS: Hydro also

14 suggests that -- excuse me, Daymark also suggests that

15 Hydro could improve its weather normalization method

16 by using a period shorter than the twenty-five (25)

17 year period to calculate the normal year weather

18 variable; agreed?

19   MS. KATHLEEN KELLY: Agreed. We made

20 that rec -- recommendation based on looking at what

21 other Utilities are doing in this area. But, again,

22 the industry standard is twenty (20), twenty-five

23 (25), thirty (30) years.

24   DR. BYRON WILLIAMS: And indeed -- oh,

25 sorry, I didn't mean to interrupt, especially after I

1 threw a pen at you inadvertently.

2   And indeed, many still use thirty (30)

3 years --

4   MS. KATHLEEN KELLY: Yes.

5   DR. BYRON WILLIAMS: -- in the

6 industry.

7   MS. KATHLEEN KELLY: Many do.

8   DR. BYRON WILLIAMS: And we're not

9 going to spend a -- a lot of time on this, but you

10 were generally familiar with the climate phenomenon

11 known as El Nino - Southern oscillation with the acri

12 -- acronym of ENSO?

13   MS. KATHLEEN KELLY: I have heard of

14 it before. I'm not sure which one El Nino and El Nina

15 do but --

16   DR. BYRON WILLIAMS: We had a-

17   MS. KATHLEEN KELLY: -- I don't recall

18 at the moment.

19   DR. BYRON WILLIAMS: We had a heated

20 debate in our office on that yesterday and I don't

21 think we need to -- to go there.

22   Would it also be fair to say that given

23 your many years in -- in terms of load forecasting,

24 and all the work you've done, you're also familiar

25 with the climate phenomena known as the Pacific

 1 decadal oscillation?

 2   MS. KATHLEEN KELLY: Generally, but...

 3 Suman, do you recognize that?

 4   DR. SUMAN GAUTAM: Can you explain in

 5 few and tell us what that is?

 6   DR. BYRON WILLIAMS: I could, although

 7 it would -- it would take a while. Let me see if I

 8 can do this. Well, let me -- let me back up and I

 9 think we can move through this quickly.

10   DR. SUMAN GAUTAM: Okay.

11   DR. BYRON WILLIAMS: Generally in

12 terms of the -- in terms of El Nino and the Southern

13 oscillation or using the acronym ENSO, ENSO events are

14 those in which a southern oscillation extreme and El

15 Nino event act together.

16   You're familiar -- you're aware of

17 that? It's not ringing a bell, okay.

18   MS. KATHLEEN KELLY: I'm -- I'm not.

19   DR. BYRON WILLIAMS: That's fine.

20 Would it -- would it be fair to say -- let's just

21 focus on El Nino then that one (1) of the byproducts

22 of that particular climate phenomena is that in Alaska

23 and the northwestern regions of Canada and the United

24 States, they can be abnormally warm in winter.

25   Are you generally aware of that,

1 whether or not that is the case?

2 MS. KATHLEEN KELLY: I -- I have seen

3 on various parts of the country where there are

4 warming trends and cooling trends. But, I will tell

5 you I'm not a meteorologist.

6 DR. BYRON WILLIAMS: Okay. But as a

7 load forecaster obviously you're concerned with

8 climate patterns that may disrupt or -- or bias our

9 expectations of what normal weather behaviour is;

10 agreed?

11 MS. KATHLEEN KELLY: As a forecaster

12 I'm concerned with ensuring that we have sufficient

13 data to make sure that the regression is -- is useful

14 and making sure that we're taking into account all the

15 various pieces of weather that could occur.

16 DR. BYRON WILLIAMS: And multi-year

17 climate citation -- climate cycles that might unduly

18 lead to undue warmth and thereby lower winter fuel

19 consumption, for example, would be something that as a

20 forecaster one would want to anticipate as a

21 possibility and make sure there's sufficient data to -

22 - to have robust data; agreed?

23 MS. KATHLEEN KELLY: One would want to

24 make sure they address that in the analysis.

25 DR. BYRON WILLIAMS: And if you're not

1 able to answer this, I -- I understand totally.

2   Are you aware whether or not some load

3 more forecasters argue that moving to a shorter year

4 may introduce bias due to -- due to the potential

5 effects of multi-year climate cycles, such as the El

6 Nino Southern oscillation?

7   MS. KATHLEEN KELLY: In some of the

8 literature that I've reviewed and then I'll let Suman

9 jump in after this --

10   DR. SUMAN GAUTAM: Sure.

11   MS. KATHLEEN KELLY: -- but in the --

12 in the literature I've reviewed, I've seen some

13 discussion of that and some arguments that shortening

14 could result in hitting a specific type of weather and

15 that longer term -- use of longer-term data tends to

16 ameliorate that situation.

17   Suman, do you have something to add?

18   DR. SUMAN GAUTAM: So, when we said

19 shorter time period for -- for defining normal

20 weather, we're not saying very short like two (2)

21 years, three (3) years out. And -- and I'm -- we're

22 just suggesting in our report that Man -- that

23 Manitoba Hydro explore those -- those absence of using

24 -- using a shorter time period.

25   I think the point that we were trying

1 to make is -- let's make sure that we are not taking

2 too much or too little out from actual load; that is

3 where they dependent. Make sure that, you know, we

4 are adequately measuring where the related load and we

5 are accounting that so that the weather as a stead

6 load -- load is -- is accurate as possible.

7   DR. BYRON WILLIAMS: Thank you for

8 that and thank you for that answer. I wonder just to

9 finish up our discussion, if we could turn for a

10 couple moments to Coalition Exhibit 37, and Dr.

11 Gautam, just for your information, that's the load

12 forecasting in electricity utility integrated resource

13 planning.

14   And Ms. Kelly or Dr. Gautam, I want to

15 direct your attention to the page Roman Numeral IX,

16 which is a two or -- two (2) or three (3) pages in,

17 and Ms. Kelly, you realize that this is only an

18 excerpt of a -- a much longer article. So you'll

19 forgive me for not putting the entire article before

20 you?

21   MS. KATHLEEN KELLY: And I will also

22 add -- or to that comment, it's been a while since I

23 read this in its totality so.

24   DR. BYRON WILLIAMS: Fair enough.

25 We're on Roman Numeral 8, if we could go one (1) more

1 page. Sorry, I can't -- it should... Yes, that's it.

2 We're on the page that is marked Roman Numeral IX.

3   And Ms. Kelly, I want to direct your

4 attention to the second last paragraph on the page

5 marked Roman Numeral IX of Exhibit 38, and about

6 halfway down that -- that -- that paragraph, you'll

7 see marked in pen a suggestion that Utilities with a

8 larger share of industrial load in their mix generally

9 had larger forecast errors.

10   Do you see that reference?

11   MS. KATHLEEN KELLY: I do.

12   DR. BYRON WILLIAMS: And I'll ask you

13 a question about it in just a second. And -- and you

14 see following that a concern that this may be caused

15 by the highly elastic, in quotation marks, "lumpy

16 nature" of industrial customers, as well as the

17 difficulty in predicting entry and exit of industrial

18 customers from Utility service territory.

19   You see that reference?

20   MS. KATHLEEN KELLY: I do. Can you

21 give Suman and I a minute to just --

22   DR. BYRON WILLIAMS: Yes, for sure --

23   MS. KATHLEEN KELLY: -- breeze through

24 this for a second?

25   DR. BYRON WILLIAMS: -- absolutely.

 1 And -- and please take your time. I'm going to be

 2 taking you to both the last two (2) paragraphs on --

 3   MS. KATHLEEN KELLY: Okay.

 4   DR. BYRON WILLIAMS: -- Roman Number

 5 IX.

 6   MS. KATHLEEN KELLY: Thank you.

 7   DR. SUMAN GAUTAM: Thank you.

 8

 9   (BRIEF PAUSE)

10

11   DR. BYRON WILLIAMS: Ms. Kelly, I see

12 you're raising your head. I don't know if you've had

13 a chance to -- okay.

14   MS. KATHLEEN KELLY: I'm done. Suman,

15 how are you?

16   DR. SUMAN GAUTAM: Yeah, I'm done. We

17 can -- we can proceed.

18   MS. KATHLEEN KELLY: Right.

19   DR. BYRON WILLIAMS: And thank you for

20 your patience.

21   Just, Ms. Kelly, in -- in terms of that

22 -- that suggestion by the officer -- authors of this

23 report, are you in -- in some agreement with the

24 relative elastic -- their characterization of

25 industrial customer load is -- is highly elastic and

1 lumpy?

2   MS. KATHLEEN KELLY: Could you clarify

3 which paragraph?

4   DR. BYRON WILLIAMS: The sec -- the

5 second last paragraph, yes.

6   MS. KATHLEEN KELLY: Thank you. I can

7 certainly see this occurring.

8   DR. BYRON WILLIAMS: And -- and in

9 terms of the -- your observations in terms of load

10 forecast, would be fair to say that in terms of the

11 rate shock level of Hydro's preferred rate path, our

12 words not yours, over the next six (6) years, as well

13 as a significant role that large industrial load plays

14 in Manitoba, there is a -- a risk of declining

15 industrial load or industrial exit?

16   MS. KATHLEEN KELLY: I -- I'll just

17 take some issue with the rate shock --

18   DR. BYRON WILLIAMS: Yep, fair enough.

19   MS. KATHLEEN KELLY: -- but the rate

20 increases that are occurring, there is -- is a

21 potential for industrial loads to reduce their

22 consumption here in Manitoba.

23   DR. BYRON WILLIAMS: And while your

24 overall observations about the load forecast are that

25 it tends to be conservative, the -- the warning that

1 our clients heard from you is that there are some

2 risks in the short-term that the load related to large

3 top consumers may not be realized. So the

4 expectations associated with the price increase might

5 not be realized.

6   Would that be fair?

7   MS. KATHLEEN KELLY: Our

8 recommendation or our observation is that in the short

9 term it may be greater response than is included in

10 the current forecast in the short term.

11   That, of course, would then impact

12 probably the longer-term numbers, but, for the time

13 being, that -- that's the best estimate we could

14 create.

15   DR. BYRON WILLIAMS: And directing

16 your attention to the bottom paragraph, kind of about

17 halfway through, you see an observation by the authors

18 suggesting that in terms of integrated resource

19 planning rather than forecasting for a rate

20 requirement, that large -- you -- or that Utilities

21 often or generally lack an adaptive component that

22 details how they would respond if critical input

23 variables like load turned out differently.

24   Is -- is that how you --

25   MS. KATHLEEN KELLY: Yes.

1   DR. BYRON WILLIAMS: Yes. And

2   certainly you'll see a suggestion in the last sentence

3   -- let me -- let me back up.

4   Generally in terms of your evidence and

5   -- and the focus that you've placed on either scenario

6   analysis or taking the opportunity to look beyond P50

7   through stochastic analysis, that would be a useful

8   tool in -- in helping to anticipate and respond to

9   significant variances from forecast.

10   Is -- is that the thrust of your advice

11   in that regard?

12   MS. KATHLEEN KELLY: Yes, that's --

13   that's -- part of the components of that

14   recommendation is being able to understand what

15   alternatives it would be and then having the time at

16   that point in time to generate ideas for what the

17   response would be or what you would need to do on --

18   to accommodate it.

19   DR. BYRON WILLIAMS: And that goes, in

20   part, to some of the -- the questions that Board

21   Member Grant was asking in terms of disruptive

22   technologies as well.

23   MS. KATHLEEN KELLY: Yes, it does.

24   DR. BYRON WILLIAMS: I wonder if we

25   can turn to page 29, the excerpts, what's marked on

1 the bottom of this page and I'll direct your attention

2 only to the first page of page 29.

3

4

5   (BRIEF PAUSE)

6

7   DR. BYRON WILLIAMS: And perhaps if

8 you -- we could offer both you and Dr. -- this will be

9 my last kind of couple of questions, both you and Dr.

10 Gautam a chance to read that top paragraph as well.

11   MS. KATHLEEN KELLY: That would be

12 helpful. Thank you.

13

14   (BRIEF PAUSE)

15

16   MS. KATHLEEN KELLY: Are you ready,

17 Suman?

18   DR. SUMAN GAUTAM: A few more seconds.

19   MS. KATHLEEN KELLY: Sure.

20   DR. SUMAN GAUTAM: Thank you.

21

22   (BRIEF PAUSE)

23

24   DR. SUMAN GAUTAM: I'm ready, Kathy.

25   DR. BYRON WILLIAMS: And Ms. Kelly, is

1 -- I -- I'll suggest you that in -- in terms of the

2 first couple of sentences of this paragraph, the point

3 has been made that even using stochastic risk analysis

4 is only one (1) step of a -- of an important process,

5 but there's still a need to have follow-up to produce

6 clear strategies that respond to higher or lower

7 realized loads.

8   Would you agree with that

9 characterization of the first two (2) sentences?

10   MS. KATHLEEN KELLY: I think that's a

11 good characterization of this author's point.

12   DR. BYRON WILLIAMS: And -- and in the

13 last two (2) sentences there, I'll suggest to you that

14 they're -- they're pointing to the Utah Commission as

15 one that is -- is attempting to be more adaptive by

16 requiring Pacificorp to produce resource acquisition

17 paths that contemplate uncertainty in terms of various

18 variables in the resource planning process, including

19 load uncertainties. Would that be fair?

20   MS. KATHLEEN KELLY: That's a fair

21 characterization.

22   DR. BYRON WILLIAMS: And again, would

23 it be fair to suggest to Daymark that under -- we

24 underneath some of the advice that you're offering to

25 Manitoba Hydro and to this regulator about the need to

1 do -- move beyond P50 to look at more robust

2 scenarios, is that ability to both contemplate

3 different futures and also contemplate how one might

4 respond to them. Is -- is that an imp -- important

5 part of your advice to this Board as well?

6   MS. KATHLEEN KELLY: I -- I think our

7 recommendation is to not only contemplate them, but

8 understand the implications for a plan and for taking

9 actions. So if it turns out that, for example, there

10 is a wide development of distributed energy resources

11 that suddenly becomes more heavily utilized in this

12 region, then -- that Manitoba Hydro would have already

13 thought about what that may imply for them and have a

14 plan of attack, or at least a plan of how to respond

15 and what the next steps might be. So I think -- I

16 think it's -- I think I'm going the same place you

17 are, probably with a little less rigidity than the

18 Pacificorp Commission.

19   DR. BYRON WILLIAMS: And doe -- does

20 one -- just a -- a last question. Does Daymark see

21 this type of analysis being presented in a load

22 forecast, in an integrated resource plan, how -- how -

23 - where would one expect to see this type of

24 information presented?

25   MS. KATHLEEN KELLY: This -- this

1 information shows up in a number of places. The load

2 forecast is a component of it. Obviously, the

3 resource planning, the IRP, as it's called in many --

4 many jurisdictions is a core place where much of this

5 would occur. But it also occurs in the strategic

6 planning, in the financial planning, and potentially

7 in the boardroom, at least with clients that I've

8 worked with in the past.

9   It may not always occur in front of the

10 regulator, but at least the utilities are thinking and

11 planning behind closed doors to ensure that they have

12 an understanding of what's happening, and where

13 they're going, and -- and what kinds of things might

14 disrupt their business so that they're armed.

15   DR. BYRON WILLIAMS: And --

16   MS. KATHLEEN KELLY: Probably not a

17 good term to use, but.

18   DR. BYRON WILLIAMS: And for a utility

19 to acquire this kind of insight or skill set, is it a

20 -- how intensive in -- in terms of ramping up their

21 abilities, how intensive is that time or resource

22 expectation?

23   MS. KATHLEEN KELLY: It can be pretty

24 intense the first time around, and the second time

25 around to bring everybody to the table and have all of

1 the different figures. That's the preferred way to do

2 it is to make sure you have all the respective experts

3 at the table so that they can represent their -- their

4 area of expertise. And it -- it takes a couple of

5 cycles to get comfortable with it, but once you've got

6 it in place, it's just part of your regular

7 activities.

8   DR. BYRON WILLIAMS: Okay.

9   MS. KATHLEEN KELLY: There are many --

10 we've -- we've done a report for a major association

11 client in the US looking at the current status of

12 IRPs, and there is significant evidence that there are

13 a lot of utilities heading in the direction of using

14 stochastic analysis, of using more scenario analysis,

15 and of embedding the integrated resource planning proc

16 -- planning process more into their corporate decision

17 planning and making it a part of their business

18 decision-making.

19   DR. BYRON WILLIAMS: On behalf of the

20 Consumers Coalition, we certainly want to thank

21 Daymark for the effort and the insight that they've

22 shared, and our clients do express their appreciation

23 to the Board for the bit of additional time that

24 they've been allowed as well. I think it's the first

25 time I've gone over estimate. So thank you very much

1 for that.

2   THE CHAIRPERSON: Thank you, Dr.

3 Williams. Mr. Gange...?

4

5 CROSS-EXAMINATION BY MR. WILLIAM GANGE:

6   MR. WILLIAM GANGE: Thank you. Ms.

7 Kelly, I have your -- I -- I'm way over here. You

8 can't see me because Mr. Williams is, as usual, trying

9 to take the spotlight, but we're used to that around

10 here.

11   So I only have a couple of questions

12 for you, and -- and one (1) of them may be similar to

13 what you were just talking about with -- with the Dr.

14 Williams, and that is the use of -- of the load

15 forecast.

16   You were -- you were -- in your

17 discussion with Professor Grant, you had a -- a bit of

18 a discussion about how the -- the variables that --

19 that sometimes come up are difficult to predict how

20 they're going to affect load, and -- and therefore

21 it's -- it's difficult with emerging technologies.

22 And -- and I think that -- that Professor Grant made

23 reference to the electrification of -- of the car

24 fleet in that discussion.

25   And -- but in your experience, are --

1 are the load forecasts used also to develop policies

2 regularly for utilities?

3   MS. KATHLEEN KELLY: Do you -- do you

4 have an example of a policy?

5   MR. WILLIAM GANGE: Sure, I do have an

6 example. So that -- that dealing with the

7 electrification, for instance, as -- as an example,

8 one (1) of -- and Ms. Morrison from Hydro was -- was

9 very helpful in her testimony talking about the

10 difficulty in predicting how electrification will take

11 place, whether it will be -- be embraced by the

12 consuming public.

13   But, for instance, that's something

14 that could affect load. It -- it seems to me obvious

15 that that could be either a -- a big factor, or a

16 relatively small factor. Would you agree with that?

17   MS. KATHLEEN KELLY: I agree that it

18 could be a major factor --

19   MR. WILLIAM GANGE: Yes.

20   MS. KATHLEEN KELLY: -- it could be a

21 small factor.

22   MR. WILLIAM GANGE: And -- and in

23 terms of that, and -- and it may be in terms of using

24 the load forecast along with -- with the resource

25 planning, but for instance, for electrification, in

1 order for it to take off, one (1) of the things that

2 will be necessary is an expansion of charging

3 stations.

4   So for instance, here, there are very,

5 very few charging stations in the Province of

6 Manitoba. I'm not sure what it would be like in

7 Massachusetts, but we're at the infancy of -- of that

8 -- that process.

9   Would -- so -- so that's sort of the

10 background. Would most utilities that you're aware of

11 be using that kind of a variable to say, Well, we

12 could have -- our decision-making process may well

13 have an effect upon how this usage develops, so that

14 we may have to plan for a rollout of a significant

15 number of -- of charging stations and -- and similar

16 types of assistances for the electrification. That's

17 -- that's the -- the context in which I'd like you to

18 look at that.

19   MS. KATHLEEN KELLY: Okay. With --

20 with that context, I -- most utilities and regulatory

21 jurisdictions will rely on the load forecast combined

22 with the integrated resource plan, like, the resources

23 for the future, and they may use some of that

24 information to inform their policymaking so that they

25 could -- basically, say if -- if we go to a 10 percent

1 -- a policy of having 10 percent of electric vehicles

2 in place by 2030, for example, then the load forecast

3 and the resource plan provide a lot of information

4 about what the implications are on the Utility and

5 what the cost might be, and can also be used to the

6 benefit/cost analysis of that kind of decision so that

7 it's -- it's -- I -- I see that as a tool that helps

8 inform and help decision-makers make decisions,

9 including with policies.

10   MR. WILLIAM GANGE: Good. Thank you.

11 That -- that's helpful to me, as -- as obscure as it

12 may be. But if we could just look at -- if we can

13 look at slide 16. Yes.

14

15   (BRIEF PAUSE)

16

17   MR. WILLIAM GANGE: Ms. Kelly, in

18 slide 16 of your presentation, you talked about price

19 elasticity for all three (3) sectors. Given that the

20 -- the current model that Manitoba Hydro is presenting

21 to this Board is relatively high annual increases for

22 over the next five (5) years or so, does that effect -

23 - does the fact that -- that there's going -- that --

24 that the request is for quite high rate increases on

25 an annual basis, does that affect the -- the

1 elasticity factor that -- that you've talked about

2 here?

3   MS. KATHLEEN KELLY: We -- we

4 addressed that a little bit in our report, indicating

5 that there could be greater response to prices,

6 because this is a large increase that hasn't been seen

7 in the recent past, so it's not included in the data

8 set necessarily that we're using to do the regression

9 analysis.

10   That said, it may not occur because the

11 price elasticity value that Manitoba Hydro has is

12 within the realm of other elasticities in North

13 America which have included large increases, small

14 increases, and the like. So there is insufficient inf

15 -- information for us to say, Yes, it's definitely

16 going to be an issue, but it's -- it's a concern to

17 keep in mind. But it -- we can't say that they will

18 definitely change.

19   Suman, would you like to add to that?

20   DR. SUMAN GAUTAM: Well, I think

21 that's fair, Kathy. As -- as we pointed out from

22 various different iss -- various different, you know,

23 analyses, that we saw that it may not be reliable, and

24 -- but at the same time, it's within the range. So --

25 so it could -- but at the same time, you know, it --

1 yeah, we're -- we are not quite certain whether --

2 whether we will see a different impact than -- than

3 what's presented by Manitoba Hydro.

4   MR. WILLIAM GANGE: Thank you. Mr.

5 Chair, those are all the questions that I have. Thank

6 you very much. Thank you, Ms. Kelly.

7   THE CHAIRPERSON: Thank you, Mr.

8 Gange. Mr. Hac -- Hacault...?

9

10 CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

11   MR. ANTOINE HACAULT: Yes, thank you,

12 Mr. Chair. My name's Antoine Hacault, and I represent

13 Manitoba Industrial Power Users Group in this

14 proceeding, and --

15   DR. SUMAN GAUTAM: Well, I -- I'm

16 sorry, the voice is kind of breaking on my end.

17   MR. ANTOINE HACAULT: Okay. I'll --

18   DR. SUMAN GAUTAM: That's better.

19   MR. ANTOINE HACAULT: -- I'll have to

20 up my voice, here. Thank you very much for letting me

21 know.

22   DR. SUMAN GAUTAM: Thank you.

23   MR. ANTOINE HACAULT: So just for your

24 benefit, I'm the lawyer who represents Manitoba

25 Industrial Power Users Group, a group of industrial

1 users in the Province of Manitoba.

2   I'll be starting with an explanation of

3 something that's at page 1 of your report, if we could

4 go to the last paragraph. I want to get a bit more

5 explanation on the first sentence in the last

6 paragraph. So I'll give each of you an opportunity to

7 read the first sentence, and then I'll begin a series

8 of questions.

9   MS. KATHLEEN KELLY: I will point out

10 to you that there's been an errata sheet that was

11 produced for that, changing that language

12 significantly.

13   MR. ANTOINE HACAULT: Okay. I guess

14 we can go to the errata sheet. I -- I'm not so much

15 focused on the accuracy of this. If -- if you listen

16 to my questions, then I -- I think we'll be able to

17 progress without going to this other sheet, but thank

18 you for bringing that to my attention.

19   As I understood your testimony this

20 morning, you identified at least two (2) uses that

21 could be made of a load forecast, the first being

22 predicting the revenue for rate setting purposes, and

23 the second purpose being allowing for planning, which

24 you've just been discussing for energy needs and

25 demand needs for the system. Is -- am I following

1 this --

2   MS. KATHLEEN KELLY: Yes.

3   MR. ANTOINE HACAULT: -- correctly so

4 far?

5   MS. KATHLEEN KELLY: Yes.

6   MR. ANTOINE HACAULT: And what I

7 wanted you to help me understand, and perhaps re-

8 clarify with the Board is that you might be looking

9 for different levels of certainty depending on the

10 purpose for which the load forecast is being used. So

11 continuing on that, would, for example, if you -- for

12 the purpose of this proceedings, where we're trying to

13 set rates, am I correct in suggesting that we would

14 look more to a P50, so equal chance of probability

15 certainty, for generating a decision on what kind of

16 revenues we might seek. Is that fair?

17   MS. KATHLEEN KELLY: That's clear.

18 Looking at how the P50 forecast is used, that could be

19 used as the basis for setting the rates. My -- my

20 recommendation, in spite of needing a point forecast,

21 which you do need a point forecast in order to be able

22 to do that, that the Board should consider whether

23 there is sufficient uncertainty in the loads at the

24 P50 level for the coming three (3) to five (5) years

25 based on a review of the alternatives, the scenarios,

1 the stochastic approach, that the load could either go

2 higher or go lower, to inform their decision that

3 says, Okay, we're willing to accept the P50 for the

4 use that it's being used for here, and we'll revisit

5 it in two (2) to three (3) years once we understand

6 what's happening.

7   But it's -- it's more understanding how

8 risky the forecast is. And the line, that P50

9 standard -- it -- a standard approach, but is there a

10 greater upside than downside, or is there a greater

11 downside than upside? And by not implementing an

12 increase now, are we making it diffi -- more difficult

13 later?

14   So that gives you more information

15 about the decisions that are being made than just a

16 P50 forecast with discussions of what would happen if

17 this happened, or that happened, which, you know, are

18 pretty much electrification and -- and various key --

19 key changes. So we're -- we're basically recommending

20 a more thoughtful approach to looking at the set of

21 numbers that's being used.

22   MR. ANTOINE HACAULT: And if we're

23 looking out a five (5) year time frame in this

24 jurisdiction, at least the way this Board has sought

25 regulation so far, it's looking to review what's

1 happened in actual fact every two (2) years, and

2 asking this Utility to come back every two (2) years

3 to justify rate increases. Is that something that

4 would be prudent for this Board to do, in your view,

5 keep a close tab on what's happening, and -- and the

6 impacts of this decision?

7   MS. KATHLEEN KELLY: That -- that's

8 not my -- scope of work here is to talk about the

9 approach to looking at the rate increases. I think

10 what is prudent is to ask Manitoba Hydro what that

11 uncertainty looks like.

12   MR. ANTOINE HACAULT: Okay. Thank

13 you. And now I'll move on to the second use of a load

14 forecast, being resource planning. If one were to do

15 resource planning, depending on the types of options

16 you had, am I right in understanding that you might

17 ask for a greater certainty or -- of the possible load

18 and energy requirements to be able to do planning,

19 because you don't want to leave this Province in a

20 situation where you can't turn the lights on.

21   MS. KATHLEEN KELLY: When you say

22 greater certainty, greater certainty than the P50?

23   MR. ANTOINE HACAULT: The P50.

24   MS. KATHLEEN KELLY: I think that my -

25 - the Daymark recommendation is -- is similar in

1 either approach. The Board should want to know what

2 the uncertainty range is, and have a better feel for

3 how much upside or downside there is, so that if there

4 is an investment in a resource, you understand the

5 risks associated with that and have a better

6 understanding.

7   I mean, the Board is made up of folks

8 who are in the business world. They understand is.

9 They do this in their own businesses. We do it all on

10 our own budgets, is make sure we understand kind of

11 where we're going and what the risks are. And I think

12 -- I don't think there's any more certainty necessary,

13 but there's certainly a -- a better understanding of

14 the alternatives that could happen that might derail

15 the forecast going forward in either case.

16   MR. ANTOINE HACAULT: Okay. Thank

17 you. I think that's helpful. I'd like to turn to

18 page 5 of the report, and to the key finding on the

19 issue of electric price elasticity, and specifically,

20 the finding of Daymark under the heading on the

21 extreme right-hand side. The heading is 'Impact on

22 load forecast'. Have you found that key finding, Ms.

23 Kelly?

24   MS. KATHLEEN KELLY: Yes, we see that.

25 Suman, do you see that?

1   MR. ANTOINE HACAULT: So, I'll -- I'll

2   just quote it for the record:

3   "The incorrectly estimated price

4   elasticity will not provide the

5   actual impact of proposed rate

6   increases on each sector's

7   electricity demand."

8   Is that a finding that Daymark

9   continues to stand by, or do you want to qualify it or

10 modify it in any way, Ms. Kelly?

11   MS. KATHLEEN KELLY: I think that

12 today, as we've testified, you've heard that we have

13 concluded that the regression approach may not have

14 exact coefficients, and that -- that the changes made

15 to the PLIL, the elect -- elasticity may not be

16 accurate as well. I might -- I might take the

17 "incorrectly" out of there, but --

18   MR. ANTOINE HACAULT: And would you

19 soften the wording also where it says "will not

20 provide"? Are you putting a more qualified opinion on

21 the record that would read more like, The estimated

22 price elasticity may not provide the actual impact.

23 Is that what your testimony and opinion is today?

24   MS. KATHLEEN KELLY: I think I'm

25 pretty comfortable staying with "will not," because

1 forecasts are never perfectly accurate.

2   MR. ANTOINE HACAULT: Okay. Thank

3 you.

4   MS. KATHLEEN KELLY: Before we move

5 on, Suman, do you have anything to add to that?

6   DR. SUMAN GAUTAM: That is fine,

7 Kathy.

8   MR. ANTOINE HACAULT: Okay. Thank

9 you. Yes, Suman, if there's anything you need to add

10 at any point in time, please ensure you kind of let me

11 know that you want to add something.

12   DR. SUMAN GAUTAM: Definitely. Thank

13 you.

14   MR. ANTOINE HACAULT: My next question

15 is: Does Daymark have any recent experience in

16 dealing with the impact of increases in the magnitude

17 of six (6) consecutive increases of 7.9 percent?

18   MS. KATHLEEN KELLY: Not that I recall

19 off the top of my head.

20   MR. ANTOINE HACAULT: And Mr. -- Dr.

21 Gautam, anything to add on that?

22   DR. SUMAN GAUTAM: No. Yeah.

23   MR. ANTOINE HACAULT: Okay. Along

24 this particular line of price elasticity, I'll deal

25 first with the top consumer sector, and in particular,

1 slide 6 of your presentation this morning.

2

3   (BRIEF PAUSE)

4

5   MR. ANTOINE HACAULT: Sorry. I may

6 have had the wrong slide number, here. Maybe 16.

7

8   (BRIEF PAUSE)

9

10   MR. ANTOINE HACAULT: It's actually

11 15. I incorrectly stated the slide number in my...

12   And I'll focus specifically on the last

13 bullet whereby Daymark is of the view that the short-

14 term impact of rate increase was not considered for

15 top consumers.

16   Are you following me so far?

17   MS. KATHLEEN KELLY: Yes.

18   DR. SUMAN GAUTAM: Okay.

19   MR. ANTOINE HACAULT: As I am able to

20 track this, the source of this discussion is in a PUB

21 Interrogatory 16, if we could bring that up, please,

22 Kristen, at page two of 29 of that PDF. And my

23 questions relate to the table that is shown on that

24 particular page. I'll just provide a little bit of

25 background before I start asking the questions.

1   We started this process with the

2 utility asking for five (5) consecutive increases of

3 7.9 percent. And that evolved by this Board giving an

4 interim rate increase of 3.36 percent, and the utility

5 came back indicating that its future plans would now

6 include six (6) consecutive increases of 7.9 percent

7 going forward as far as its plan goes.

8   Are either of you able to say whether

9 this table was prepared on the basis of the first

10 scenario, which was five (5) expected or proposed rate

11 increases of 7.9 percent starting in 2017 and ending

12 in 2021?

13   MS. KATHLEEN KELLY: Suman, do you

14 have the --

15   DR. SUMAN GAUTAM: Can you -- oh,

16 sorry. Yes, I'll respond to this, Kathy. Can you

17 repeat the last sentence of your question or...

18   MR. ANTOINE HACAULT: Well, what --

19 what I'm trying to do is determine whether this table

20 was based on the first application or assumption that

21 the utility had that it would have proposed increases

22 of 7.9 percent in each of the years 2017 to and

23 including the years 2021. And is that what formed the

24 basis of this analysis?

25   DR. SUMAN GAUTAM: So the -- so this

1 based on -- on first five (5) years impact, so first

2 five (5) years impact on top consumers load. Does

3 that...

4   MR. ANTOINE HACAULT: I'm not so sure

5 your answer --

6   DR. SUMAN GAUTAM: Okay.

7   MR. ANTOINE HACAULT: -- describes

8 particularly -- I'll try and explain it further and --

9   DR. SUMAN GAUTAM: Okay.

10   MR. ANTOINE HACAULT: -- Ms. Kelly may

11 be able to understand. I expected this table to start

12 2017/2018, a 3.36 percent increase, and then the table

13 to analyze the impact of 7.9 increases starting in

14 2018 and going consecutively for the next six (6)

15 years. I don't see that. So I'm asking myself was

16 this table prepared based on the first application

17 that Manitoba Hydro did where it was proposing five

18 (5) consecutive increases of 7.9 percent starting in

19 2017.

20   Does that help understand my question?

21   MS. KATHLEEN KELLY: Yes.

22   DR. SUMAN GAUTAM: Yes, it does.

23 Thank you. Thank you. It does. So the first year

24 2017/'18 we maybe -- so the first year is considering

25 3.6. And the other consecutive four (4) years

1 starting 2018/'19 to 2021/'22 is considering 7.9

2 percent. We may be -- if that is the case then we may

3 be missing -- missing the short-term load impact of

4 one (1) more year here.

5   MS. KATHLEEN KELLY: If -- if I could

6 just add to this, Suman. And correct me, Suman, if

7 I'm misstating --

8   DR. SUMAN GAUTAM: Yes.

9   MS. KATHLEEN KELLY: -- my -- my

10 understanding. I believe that the 2017/'18 year

11 probably should start with 2018/'19, as the first

12 year. This table was intended to say what would

13 happen in five (5) year time from the 7.9 percent

14 proposed rate increase. Because the first five (5)

15 years of the top consumers forecast would be impacted

16 because that was the first five (5) years was the

17 short-term approach, which had no elasticity in the

18 equation. It was done by -- by major customer.

19   So the five (5) years is accurate. It

20 may be a reflection of the first year of that might be

21 2018/'19, depending on when the increase actually

22 starts. This probably would've been a better table if

23 we just put year 1, 2, 3, 4, and 5 in there. So it

24 was -- it was developed after the 7.9 percent proposed

25 rate increase.

 1   MR. ANTOINE HACAULT: Okay. I'm not

 2 so sure I fully understood, but let me continue on

 3 that. So am I understanding that what you're telling

 4 this Board is that if it were to grab the 7.9 percent

 5 increase, in the first year after having awarded that,

 6 so let's assume it would be as of April 1 of 2018,

 7 there would not be any adverse net impact on the load

 8 for the first full year. The top consumers would not

 9 change their load whatsoever in response to a 7.9

10 percent increase.

11   MS. KATHLEEN KELLY: I'm not sure I

12 understand your question.

13   DR. SUMAN GAUTAM: Let me try explain

14 a little bit in a different way. So I -- I think I

15 understand your -- your concern about -- about rate

16 increase being one (1) -- one (1) more year -- one (1)

17 year -- one (1) more -- one (1) further year.

18 However, there's also -- we also need to put -- put

19 the -- put Manitoba Hydro's method for estimating top

20 consumer mode load -- load forecast in context here.

21   So on -- on the method -- so Manitoba

22 Hydro is using for -- for -- in order to forecast

23 short-term, meaning first five (5) year load using --

24 using individual customers specific information. And

25 then moving after five (5) year onward, there is a

1 PLIL methodology that captures. So I think our

2 intention was to see if there is any other impact on

3 short-term with this proposed rate increase, so we

4 should really cover the first five (5) year.

5   MR. ANTOINE HACAULT: Okay. So let's

6 take it in little bites. On the top right-hand corner

7 for 2017/2018, if that was the first year -- the first

8 full year that we had a 7.9 percent increase instead

9 of a 3.95 increase, there would be no negative impact

10 based on this table. In fact, the use of the clients

11 would increase by 12.9 gigawatt hours.

12   Am I reading the table correctly?

13   MS. KATHLEEN KELLY: Yes, you are.

14   MR. ANTOINE HACAULT: Okay. And then

15 in the second year, so assuming an April 1, 2018,

16 increase was the start of the first year, if we go to

17 April 1 of 2019, that would be the second year. In

18 the second year, Daymark's view is that there would be

19 a net impact as a result of the proposed increase of

20 minus 85.5 gigawatt hours.

21   Am I reading that table right?

22   MS. KATHLEEN KELLY: Yes.

23   MR. ANTOINE HACAULT: Okay. And then

24 is that an annual reduction? So as I continue down

25 the table, do I add those numbers for a cumulative

1 impact?

2   MS. KATHLEEN KELLY: Yes.

3   DR. SUMAN GAUTAM: Yeah.

4   MR. ANTOINE HACAULT: Okay. So if I

5 had the twelve-point-nine (12.9), which is not a

6 negative reaction of the top consumers according to

7 Daymark's projection, and then I subtract all of the

8 other numbers, I get to the number in the bottom

9 right-hand corner of a negative impact of 184.9

10 gigawatt hours.

11   Am I understanding the table correctly?

12   MS. KATHLEEN KELLY: Yes.

13   MR. ANTOINE HACAULT: Okay. So what

14 Daymark hasn't done, it hasn't done an analysis of

15 what happens if we have six (6) consecutive increases

16 of 7.9 percent put on rates.

17   Is that correct?

18   MS. KATHLEEN KELLY: That's correct.

19 We have not.

20   MR. ANTOINE HACAULT: And does the

21 model consider the cumulative compounded impact of the

22 7.9 increases, or is it just a linear calculation?

23   MS. KATHLEEN KELLY: When you say "the

24 model," you're referring to the calculation here?

25   MR. ANTOINE HACAULT: To whatever --

1 yeah. Whatever results in -- in the numbers on this

2 table.

3   DR. SUMAN GAUTAM: The -- the -- the

4 main items in creating this table is the use of price

5 elasticity. So the price elasticity is measuring the

6 percent changes in demand with percent change in -- in

7 electricity price. So -- so we're are only

8 considering year to year over percent change. So

9 we're --

10   MR. ANTOINE HACAULT: Okay. That's

11 why -- that's useful. That's why I wanted to clarify.

12 So this is kind of a yearly analysis. This

13 calculation does not say in two (2) -- in the second

14 year shown on this table as two (2) point -- 2018/'19

15 model, please run what it -- what impact there would

16 be with two (2) consecutive increases of 7.9 instead

17 of two (2) consecutive increases of 3.95. The model

18 just says, please tell me for a particular year what

19 you think's going to happen if in that particular year

20 I award 7.9 percent instead of 3.95 percent.

21   Am I getting that right?

22   DR. SUMAN GAUTAM: I -- I apologize.

23 Can you repeat that again?

24   MR. ANTOINE HACAULT: Let me make the

25 example a little bit more extreme. After six (6)

1 years of 7.9 increases the top consumers will have to

2 absorb a number that's compounded. So six (6) times

3 eight (8), rounding it off it'll be a little -- a

4 little bit over 50 percent increase. This model is

5 not analyzing and telling us what happens in the last

6 year where we have six (6) consecutive increases how

7 companies will react to that 50 percent increase

8 overall.

9   It just tells us a snapshot of how

10 companies will react to one (1) increase of 7.95

11 versus 3.95; correct?

12   MS. KATHLEEN KELLY: In -- in each of

13 five (5) years the annual impact. When -- when you're

14 looking at the regression equation it is -- the data

15 that's put into the regression equation is each year's

16 increase in price -- or electricity price. So it sees

17 each year, but it is not -- the variable in Hydro --

18 in Hydro's regression equation is not a cumulative

19 factor. It is annual factor.

20   BOARD MEMBER GRANT: Can I just pick

21 up on this? Because I -- I sympathize that this is a

22 difficult problem. But you've got completely naive

23 consumers, right? So on other words, they have no

24 foresight whatsoever in this model. You -- so you can

25 forget the fact that the price less -- it's -- it's

1 lagged a period.

2   So let's say they responded

3 instantaneously, and you said you're going to get 7.9

4 percent this year. And they noth -- know nothing

5 about the future. And then -- then it happ -- and

6 then a year comes and they get another 7.9 percent and

7 -- and they go, Oh, I'm surprised and know nothing

8 about the future.

9   But, in fact, what we'd be telling them

10 is, You're going to get 7.9 percent this year and the

11 utility is telling you that it thinks over the next --

12 that you're going to get these rate increases over the

13 next five (5) years. And so when I look at this table

14 and if I was a large industrial consumer I'd go, Well,

15 why am I going to wait five (5) years to move my

16 factory? I'll -- I'll move it today, right? You've

17 already told me that it can be the 65 percent

18 increase.

19   So I'm not saying I -- it's a --

20 there's no foresight in the model is there? So

21 ideally we'd need some rational consumers that would -

22 - would forecast future electricity prices and then

23 respond. But I don't know how you'd possibly do that,

24 but it's -- it's an odd model, right? Like --

25   MS. KATHLEEN KELLY: I guess I'm not

1 sure what the question really is.

2   BOARD MEMBER GRANT: How beneficial is

3 it to portray declines in -- in load where you portray

4 that the -- that the consumer is responding to

5 individual increases without any foresight of the

6 future?

7   MS. KATHLEEN KELLY: For -- for

8 Daymark, we were working with the data we had

9 available to try to estimate what it might be. So we

10 -- we had some constraints on us and our ability to

11 use it.

12   BOARD MEMBER GRANT: And I -- I mean

13 from -- from the point of view of -- of Hydro

14 developing a load model that has this sort of analysis

15 built into it. I mean, don't -- don't you think it at

16 least requires a comment on the fact that you've got

17 terribly naive consumers.

18   DR. SUMAN GAUTAM: I mean, that could

19 be the case. And then even though the customers have

20 -- I'm just talking on -- on a general sense here.

21 Even the customers have information that read they

22 will get substantial rate increase in -- in years to

23 come, that they have that information. At the same

24 they are not paying for rate increase that -- that's

25 going to happen five (5) years later in -- on the

1 road. So they may be still using that electricity

2 load or that -- in -- in any quantity until, you know,

3 until the -- they can issue benefit, right? So we --

4 even though there -- there may be information

5 available before, but they are not being charged for

6 everything star -- starting at any time. So -- so

7 there is some mismatch, even though they get their

8 information before.

9   MS. KATHLEEN KELLY: And --

10   BOARD MEMBER GRANT: Okay. So my -- I

11 guess my simple question is: In an ideal world should

12 their model have a good price forecast variable in it?

13 Because in most economics, my -- my behaviour today,

14 my decisions today are directed at a future, not the

15 past.

16   MS. KATHLEEN KELLY: And I think both

17 Suman and I would -- would agree that it would be

18 better to have a model that has a price factor in it

19 for the whole time frame so that you can better

20 ascertain what's going to happen. But again, as we

21 pointed out in the -- in our report, this is a large

22 increase over a number of years that hasn't -- hasn't

23 occurred previously in the recent history. So it's

24 hard to tell exactly what people will do. How soon

25 will the large industrial say, I'm going to vote with

1 my feet.

2   Well, in fact, when they start looking

3 at Manitoba verse somewhere else, perhaps Manitoba is

4 still beneficial to them as a place to do business.

5 So there's a lot riding on those decisions that can't

6 be reflected in the forecast easily. It's -- it's a

7 very difficult job to predict, as pointed out earlier

8 in some of the work that the Consumer Coalition was --

9 was showing us. They are very large consumers. They

10 are very lumpy. They have their own business plans

11 and they -- they are driven by their own business

12 indices. It's very difficult to forecast.

13

14 CONTINUED BY MR. ANTOINE HACAULT:

15   MR. ANTOINE HACAULT: Okay.   Thank

16 you. Thank you ofr those additional clarifications,

17 Ms. Kelly.

18   Following up on that, in your review --

19 and I say "your" -- Daymark's review of the

20 reasonableness of Manitoba Hydro's forecasting of top

21 consumers, did Daymark have the opportunity to speak

22 to top consumers to arrive at its own independent

23 assessment of the reasonableness?

24   MS. KATHLEEN KELLY: No. We spoke

25 with Manitoba Hydro personnel who had either spoken to

1 the top consumers or had communicated with them

2 relative to the forecast -- were provided that

3 information.

4   MR. ANTOINE HACAULT: So -- so trying

5 to better understand that, did you know whether each

6 of those top consumers, prior to being asked the

7 relevant questions, were advised that they would be

8 possibly facing six (6) consecutive increases of 7.9

9 percent?

10   MS. KATHLEEN KELLY: I don't recall

11 that they were. But, Suman, do you recall? I might

12 have to check our notes.

13   DR. SUMAN GAUTAM: Yeah, I do not,

14 Kathy. Yeah, that's something that we can check.

15   MR. ANTOINE HACAULT: Okay. Were you

16 able to get any independent insights on any of the

17 sectors comprising the top consumers in order to be

18 able to assess the reasonableness of the forecasts in

19 Manitoba? And that might be by media or something

20 else. For example -- just by way of example,

21 yesterday CBC announced that the mining company

22 Klondex announced immediate reduction of workers in

23 operations at its Manitoba gold mine.

24   Would that be something that Daymark

25 would be looking at to be able to assess the

1 reasonableness of the forecast?

2   MS. KATHLEEN KELLY: If -- if that

3 kind of information was available to us when we went

4 through the review we would've done a literature

5 search on Manitoba to see what was going on. But we

6 wouldn't -- we wouldn't go out and do any extra

7 search. We were looking at how Manitoba Hydro used

8 the information they had.

9   MR. ANTOINE HACAULT: Okay. So

10 specifically on the mining industry, were you able to

11 get any insights on the Manitoba mining industry and

12 the impacts of six (6) consecutive increases of 7.9

13 percent on load forecast?

14   MS. KATHLEEN KELLY: No.

15   MR. ANTOINE HACAULT: Okay. Thank

16 you.

17   MR. ANTOINE HACAULT: I'm looking at

18 the time. This -- this table took me a lot more time

19 than I thought, and I probably have five (5) minutes

20 left. So I'm not too sure where that leaves me. I --

21   THE CHAIRPERSON: No. Just keep

22 going.

23   MR. ANTOINE HACAULT: And --

24   THE CHAIRPERSON: Do you think you'll

25 be done in ten (10) minutes, Mr. Hacault?

1   MR. ANTOINE HACAULT: Yes.

2   THE CHAIRPERSON: Okay.

3   MR. ANTOINE HACAULT: I -- I don't

4 expect --

5

6 CONTINUED BY MR. ANTOINE HACAULT:

7   MR. ANTOINE HACAULT: I have a couple

8 of questions and to be able to better frame them, it's

9 just going to be asking whether Daymark considered

10 this in assessing the reasonableness of Manitoba Hydro

11 load forecast.

12   There's some statements made by two (2)

13 other experts on load forecast issues. I'm not

14 looking on any other things. But Dr. Yatchew at page

15 V of his report, in paragraph 23 identified the same

16 issue as Dr. Grant on the panel identified, which he

17 describes as "regulatory signalling." And he

18 describes the issue on load forecasting as follows:

19   "The regulatory decision made in

20   this proceeding, which ostensibly

21   deals with rate increases over a two

22   (2) year test period ill have an

23   important impact on the decision

24   making by industry, because it will

25   signal the likely future path of

1   rate increases."

2   Did Daymark consider this aspect in

3   assessing the reasonableness of Manitoba Hydro's load

4   forecast?

5   MS. KATHLEEN KELLY: Generally, yes.

6   MR. ANTOINE HACAULT: Okay. And where

7   is it reflected in your calculations?

8   MS. KATHLEEN KELLY: As I said, the

9   calculations are done by Manitoba Hydro. We did not

10 reproduce the forecast. What we did is review how

11 they did their forecast and say, What makes sense?

12 What's reasonable? What's not? With the information

13 they had, we -- we identified the long -- PLIL issues

14 in the longer term, and the potential that there might

15 be a further reduction in the short-term. But that

16 was about all we were able to do with the amount of

17 information we had.

18   MR. ANTOINE HACAULT: But you see why

19 I asked the question about three (3) or four (4)

20 minutes ago as to what you understand Manitoba Hydro

21 told the top consumers? Were they told that the

22 proposal was for six (6) consecutive increases of 7.9

23 percent? And if you don't know the answer to that,

24 I'm trying to understand how you can then jump to the

25 next step to say that regulatory signalling was

1 considered without the knowledge of what information

2 was given to the consumers on regulatory signalling.

3   Could you help me understand that?

4   MS. KATHLEEN KELLY: From -- from our

5 role and our scope of work we were not asked to look

6 at regulatory signalling. We were asked to look at

7 what they asked. And as I said before, I don't have

8 all of my notes in front of me, so I cannot go back

9 and say with certainty they did is they did not

10 mention the rate increases during those discussions.

11 I can go back and check it.

12   MR. ANTOINE HACAULT: Okay. And if

13 you're able to advise that your answer is different

14 than what it was on your testimony, we'll certainly --

15   MS. KATHLEEN KELLY: It won't.

16   MR. ANTOINE HACAULT: -- you can let

17 us know through your counsel if -- if that's

18 acceptable way to proceed. I'm not asking for an

19 undertaking. But if your testimony needs to be

20 corrected --

21   MS. KATHLEEN KELLY: We will -- we

22 will do that.

23   MR. ANTOINE HACAULT: Okay. Thank

24 you. The next item that I'd like to ask as to whether

25 or not Daymark considered is in a paragraph above

1 there. It's 22 B as in Bob. There's a statement that

2 in some locations, particularly those which are

3 heavily dependent on an industry that is sensitive to

4 electricity prices. And I just want to focus on that,

5 not the next part that talks about the impacts to

6 employment and income.

7   Was Daymark able to determine which of

8 the top consumers, if any, were sensitive to

9 electricity prices in determining its load forecast?

10   MS. KATHLEEN KELLY: Suman, do you

11 want to take that question?

12   DR. SUMAN GAUTAM: Sure. So we did

13 not -- we, as -- as Kathy mentioned earlier, we

14 looked at the -- at Manitoba Hydro's process of

15 generating both short and long-term forecast for top

16 consumers. We didn't look at -- at top -- a specific

17 individual customer level. We didn't look at the

18 impact and what kind of imp -- load impact that they -

19 - they will face with the -- with the proposed rate

20 increase.

21   MR. ANTOINE HACAULT: The reason I was

22 asking the question is from a theoretical perspective,

23 is the analysis in the price elasticity saying for

24 electricity sensitive customers as it is for those

25 customers who were as not sensitive to electricity

1 prices?

2   MS. KATHLEEN KELLY: I -- I would

3 suggest that the elasticity response of both of those

4 customers, one (1) who is highly sensitive and one (1)

5 who is not would be different. But the modelling that

6 Manitoba Hydro has provided is class -- or sector

7 specific and is not by each industry.

8   MR. ANTOINE HACAULT: Okay. Thank --

9   MS. KATHLEEN KELLY: So they're not.

10   MR. ANTOINE HACAULT: Thank you. I

11 just want to understand what you said. I think the

12 documents speak for themselves, but when you say

13 "sector specific," it was a particular class of

14 customers, the top consumer class.

15   Is that correct?

16   MS. KATHLEEN KELLY: Yes. I -- I

17 struggle because I've used class more than I've used

18 sector, so I trip over it every once in a while.

19   MR. ANTOINE HACAULT: Okay. And the

20 last questions relate to Dr. Simpson's page 15, one

21 (1) paragraph at the bottom. There's various items

22 identified by Dr. Simpson which might affect the load

23 forecast, and I want to know which of the items

24 Daymark considered in assessing the reasonableness of

25 the Hydro load forecast.

1   So I gather from your report that the

2 "I," which is identified as readjusting their

3 production method to be less energy intensive was

4 something that you considered in your analysis, or was

5 it not?

6   MS. KATHLEEN KELLY: Not on a specific

7 point. We looked at the elasticity as opposed to each

8 individual industry as we went through this.

9   MR. ANTOINE HACAULT: Okay. So in

10 considering that, for example, if you've got --

11 without identifying a particular industry, but if it's

12 up in northern Manitoba, you're saying in the general

13 concept you would've considered that those companies

14 might have the ability to readjust their produc --

15 production method to be less energy intensive, but not

16 -- it wasn't specifically identified.

17   Is that a fair understanding of what

18 you're saying?

19   MR. WILLIAM HAIGHT: I -- I think that

20 the witness has answered this question that they did

21 not look at specific industries. They looked at

22 sectors or classes. And -- and I don't know how much

23 further we can go with that answer.

24

25 CONTINUED BY MR. ANTOINE HACAULT:

 1   MR. ANTOINE HACAULT: Okay. With

 2 respect to the top consumers, to what extent was the

 3 analysis of Daymark based on the ability of those top

 4 consumers to switch to a different energy source?

 5   MS. KATHLEEN KELLY: I think you'll

 6 find in our report we indicated that that was

 7 something that Manitoba Hydro should add and include

 8 in their assessment, that fuel substitution was not

 9 sufficiently considered in this class in particular.

10 I might also add that the 185 gig -- GWH that we just

11 spent some time going through was our attempt to

12 estimate some of the adjustments that might occur in

13 the top consumer class as a result of some of the

14 increase.

15   So I think the Daymark report, in and

16 of itself, says there's a potential for impact in this

17 industry, particularly in the short-term as a result

18 of price increases, as a result of the -- the

19 opportunity to switch fuels, and that that was not

20 explicitly considered in the Manitoba Hydro forecast.

21   MR. ANTOINE HACAULT: Okay. I've been

22 reminded when I've been referring to the Simpson

23 report. It's the Simpson and Compton report, because

24 there's two (2) reports, and this is the Co --

25 Consumers Coalition Number 18, just for the record.

1   To what extent did Daymark consider in

2   its load estimates, or the reasonableness of Manitoba

3   Hydro load forecasting, the issue of relocating energy

4   intensive production outside the province?

5   MS. KATHLEEN KELLY: Again, that --

6   that was not specifically addressed. It's addressed

7   generally through the elasticity response, but a

8   decision by -- the short-term forecasts that we

9   reviewed for Manitoba Hydro had their short-term plans

10   for investment and perhaps expansion. But there is no

11   -- I don't recall any information that said they were

12   going to reduce load over the time frame for the five

13   (5) years that they were -- they were looking at, that

14   Manitoba Hydro was looking.

15   Suman, do you have anything to add to

16   that? Am I missing a point?

17   DR. SUMAN GAUTAM: No, Kathy. Yeah.

18   MS. KATHLEEN KELLY: Thank you.

19   MR. ANTOINE HACAULT: And my last

20   question relates to part of your response. It's an

21   item that's not listed here, is the change in

22   potential expansion plans.

23   To what extent did Daymark inform

24   itself with respect to consumer -- top consumers of

25   the impact of six (6) consecutive 7.9 percent

1 increases on any potential expansion plans that those

2 consumers might have?

3   MS. KATHLEEN KELLY: As I said before,

4 we did not go to the specific industries here in

5 Manitoba. Our scope of work was to look at the

6 reasonableness of the approach. We didn't go back and

7 say, We're going to redo this entire forecast. That's

8 not what our scope was.

9   MR. ANTOINE HACAULT: Thank you very

10 much for doing your best to answer my questions. I

11 really appreciate your input and advice to us and to

12 the Board. Those are all my questions.

13   THE CHAIRPERSON: Thank you. We'll

14 take a fifteen (15) minute break.

15

16 --- Upon recessing at 2:32 p.m.

17 --- Upon resuming at 2:48 p.m

18

19   THE CHAIRPERSON: Okay, Mr. Bedford.

20

21 CROSS-EXAMINATION BY MR. DOUG BEDFORD:

22   MR. DOUG BEDFORD: Thank you. Good

23 afternoon, Ms. Kelly and Dr. Gautam.

24   MS. KATHLEEN KELLY: Good afternoon.

25   DR. SUMAN GAUTAM: Good afternoon.

1   MR. DOUG BEDFORD: My name is Doug

2 Bedford and today I'm representing Manitoba Hydro at

3 the hearing. I'm sure you'll remember Ms. Morrison to

4 my left and Mr. Laramee to my right who to do much of

5 the load forecasting work at Manitoba Hydro.

6   I would like to confirm with you my

7 conclusion that there was an oversight made by you

8 both when you prepared the errata that's been filed in

9 this proceeding. I'll remind you that on December 1,

10 2017, you provided an answer to a question known as IR

11 MH/Daymark (load) 1-1. And if you'll glance at it in

12 a moment, I'm sure you'll immediately recollect that

13 in the IR answer you clarified a reference that you

14 had made in your report to the use of a 50 percent

15 amount, and you further clarified to a remark you made

16 in your report regarding how to treat a reference to

17 90 percent.

18   You recall the IR?

19   MS. KATHLEEN KELLY: Yes, I do.

20   MR. DOUG BEDFORD: And then a short

21 while later on December 5, 2017 you prepared and filed

22 an errata in this proceeding.

23   Could we go to the first page of that,

24 please. And we can all see, of course, that in the

25 errata you repeated the clarification regarding the 50

1 percent, but you didn't repeat the clarification

2 regarding the use or a reference to 90 percent.

3   Was it an oversight not to have

4 included the clarification regarding the 90 percent?

5   MS. KATHLEEN KELLY: Definitely an

6 oversight. My apologies.

7   MR. DOUG BEDFORD: Thank you.

8   MS. KATHLEEN KELLY: Thanks for

9 picking it up.

10   MR. DOUG BEDFORD: My recollection of

11 your evidence in this proceeding is that you've

12 concluded that my client since 2010 has been over

13 forecasting the population growth in the province of

14 Manitoba.

15   Have I recollected correctly?

16   MS. KATHLEEN KELLY: Suman...?

17   DR. SUMAN GAUTAM: We -- are you or

18 can you -- can you clarify the source that we used for

19 that one?

20   MR. DOUG BEDFORD: Indeed, I -- I can.

21   DR. SUMAN GAUTAM: Thank you.

22   MR. DOUG BEDFORD: So you may want to

23 hesitate for a moment. Could we please look at

24 another IR answer identified as Coalition/IEC (Daymark

25 load) -7.

1   DR. SUMAN GAUTAM: Thank you.

2   MR. DOUG BEDFORD: And I am, in

3   particular, drawing on my understanding that I gather

4   from something you wrote on the second page of this IR

5   answer, clause (b). And the sentence, in particular,

6   and I'm quoting is:

7   "The negative error percentage --

8   percentages denote that actual

9   population is lower than the

10   forecasted population, meaning

11   think this is a typo] that since

12   2010 actual population is lower than

13   the forecasted population used in

14   Manitoba Hydro's analysis."

15   Have I understood correctly?

16   MS. KATHLEEN KELLY: You're reading

17 that correctly but I think we're going to have to

18 check back into that response versus our report and

19 the Manitoba report.

20   Would that be correct, Suman?

21   DR. SUMAN GAUTAM: Yes. Yeah, that --

22 that would be...

23   MS. KATHLEEN KELLY: So, we'll have to

24 back and check our documents to get back to you on

25 that.

1   MR. DOUG BEDFORD: Okay. You need

2 that repeated?

3   THE CHAIRPERSON: Can somebody read

4 the undertaking into the record.

5   MR. WILLIAM HAIGHT: If you would

6 please, Mr. Bedford.

7   MR. DOUG BEDFORD: The undertaking is

8 that our guests from Daymark who are testifying today

9 will review their records and confirm my understanding

10 that they have concluded that since 2010 Manitoba

11 Hydro has been over forecasting population growth in

12 Manitoba.

13   MR. WILLIAM HAIGHT: Thank you.

14

15

16 --- UNDERTAKING NO. 45:   Daymark panel will review

17   their records and confirm

18   that they have concluded

19   that since 2010 Manitoba

20   Hydro has been over

21   forecasting population

22   growth in Manitoba.

23

24 CONTINUED BY MR. DOUG BEDFORD:

25   MR. DOUG BEDFORD: So to assume for a

1 moment that you'll go away and do the work and come

2 back and confirm my understanding. If my

3 understanding is correct, when you have said to us

4 today that my client's forecasting is conservative,

5 that relates solely to forecasting for the potential

6 large industrial load?

7   DR. SUMAN GAUTAM: We were referring

8 to the conservative methodology used to forecast --

9 utilize a methodology used in 2017 versus 2014.

10   MR. DOUG BEDFORD: Thank you. I --

11 just to make sure that we have understood one another.

12   My client's concern in listening to

13 your testimony today was at some point one or both of

14 you have made a reference to having an opinion that my

15 client's forecasting without qualifying that opinion

16 at that time was conservative.

17   So what I'm suggesting to you is there

18 really should be a qualification to that opinion and

19 what you have found to be conservative in your

20 opinion, is the forecasting for that category of load

21 that's known as potential large industrial load;

22 correct?

23   MS. KATHLEEN KELLY: I -- I think we

24 can confirm that what Daymark has said is that the

25 PLIL methodology itself is conservative. I think that

1 we have made it very clear today in the testimony that

2 the methodologies used by Manitoba Hydro could be

3 improved.

4   MR. DOUG BEDFORD: I'm told that part

5 of the reason why my client moved to a more

6 conservative method for this hearing to predict the

7 load for potential large industrial load reflects the

8 effect over a number of years of criticisms made in

9 this room that it was too optimistic in how it

10 forecast potential large industrial load.

11   So, I hear your opinion today that my

12 client is not too optimistic, it is to conservative.

13 I ask you is the lesson to be learned from this topic

14 and this experience that my client's employees ought

15 to toughen up and ignore the criticism that they hear

16 of their work in this room?

17   MS. KATHLEEN KELLY: I'm not quite

18 sure how to answer that but I would say that all of us

19 have different opinions about how load forecasting

20 methodology are done, and I am not privy to all the

21 old ones nor did I go back through all the reports for

22 all the old criticisms.

23   I understand what criticism is like.

24 It's very difficult but I might -- might indicate

25 that, as I have indicated several times today,

1 forecasting is an art, it's not a science and it's a

2 difficult thing to do and we can all find issues

3 around how things are done.

4   But from our perspective, what we've

5 seen in this particular forecast is it's a bit

6 conservative.

7   DR. SUMAN GAUTAM: And to it -- to

8 Kathy's point in regard to 2017 methodology our basis

9 of saying that current PLIL methodology is

10 conservative because it doesn't take into new of new

11 customers joining top consumer category in long term.

12   We -- we just wanted to clarify that.

13

14

15   (BRIEF PAUSE)

16

17   MR. DOUG BEDFORD: Thank you. That's

18 all the questions I have.

19   MS. KATHLEEN KELLY: Thank you.

20   THE CHAIRPERSON: Thank you, Mr.

21 Bedford.   Mr. Peters...?

22

23 CROSS-EXAMINATION BY MR. BOB PETERS:

24   MR. BOB PETERS: Thank you. Good

25 afternoon. Good afternoon, Ms. Kelly, good afternoon,

1 Dr. Gautam.

2   DR. SUMAN GAUTAM: Good after --

3   MR. BOB PETERS: I'll start my

4 questions perhaps picking up where My Friend Mr.

5 Bedford left off on the potential large industrial

6 load.

7   And that it's your understanding, is

8 it, that this is a load that is not assigned to any

9 specific existing customer, but it exists for

10 potential load that may come in -- in the future?

11 It's a hypothetical load.

12   MS. KATHLEEN KELLY: That's correct.

13   MR. DOUG BEDFORD: And we see on that

14 your slide, let's start with slide 15, if we could of

15 your presentation today.

16   And the very first point talks about

17 the conservative potential large industrial load

18 methodology that's being used leads Daymark to suggest

19 that there could be as much is 523 gigawatt hours,

20 less load, than what there would be forecast had the

21 methodology in the same as used by Hydro in 2014?

22   MS. KATHLEEN KELLY: That's correct.

23   MR. BOB PETERS: And when we look at

24 that particular load -- maybe we could ask to go to

25 slide -- let's go to slide 29, I guess we'll start

1 with that one.

2   Slide 29 was in your presentation

3 today, correct, Ms. Kelly?

4   MS. KATHLEEN KELLY: Yes.

5   MR. BOB PETERS: And this is marked as

6 Daymark Energy Advisors Exhibit 5; correct?

7   MS. KATHLEEN KELLY: Yes. Slide 29,

8 and that exhibit is a graphic of the top consumer

9 historical and forecasted load.

10   MR. BOB PETERS: And what I'd like to

11 just review with the panel to make sure they're

12 understanding it, is you've -- this is the segment of

13 the consumers that you've -- you're showing here. You

14 are not including the residential or the general

15 service mass-market; correct?

16   MS. KATHLEEN KELLY: That's correct.

17   MR. DOUG BEDFORD: And so you're

18 trying to show the panel what Manitoba Hydro's load

19 forecast looks like for the general service top

20 consumers, correct?

21   MS. KATHLEEN KELLY: Correct.

22   MR. BOB PETERS: And what we've got on

23 this sheet is the -- the grey line shows that the

24 actual load is somewhere between 5000 and 6000

25 gigawatt hours per year, correct?

 1   MS. KATHLEEN KELLY: And that is the

 2 solid grey line, yes.

 3   MR. BOB PETERS: All right, thank you

 4 for that. And then next to it we have the 2017

 5 forecast short-term?

 6   MS. KATHLEEN KELLY: That's correct.

 7   MR. BOB PETERS: And so the panel

 8 should understa -- and if Dr. Gautam has any comments,

 9 likewise, please, just jump in, sir.

10   But the --

11   DR. SUMAN GAUTAM: Sure, I will.

12   MR. BOB PETERS: -- the 2017 forecast

13 short-term is that portion of this general service top

14 consumer forecast that Manitoba Hydro has -- is

15 telling Daymark that it prepared by Manitoba Hydro

16 having direct interaction with those clients?

17   MS. KATHLEEN KELLY: That's correct.

18   MR. BOB PETERS: This is those top

19 consumer --

20   DR. SUMAN GAUTAM: Inter --

21 interaction, as well as other market information that

22 they could find.

23   MR. BOB PETERS: Okay. Thank you for

24 that. And that other market information, Dr. Gautam,

25 could include things like public media announcements?

 1   DR. SUMAN GAUTAM: Yes.

 2   MR. BOB PETERS: You'd expect Manitoba

 3 Hydro would hear those directly from their customers

 4 if they have communication with their customers,

 5 though, would you not?

 6   DR. SUMAN GAUTAM: Yes.

 7   MR. BOB PETERS: Okay. And after --

 8 this short-term forecast is -- is for five (5) years

 9 for --

10   MS. KATHLEEN KELLY: Correct.

11   MR. BOB PETERS: -- this particular

12 component, correct?

13   MS. KATHLEEN KELLY: Yes.

14   MR. DOUG BEDFORD: And once we get --

15 once Manitoba Hydro gets out after five (5) years they

16 then use what we have been calling the potential large

17 industrial load methodology for future forecasting?

18   MS. KATHLEEN KELLY: Yes.

19   DR. SUMAN GAUTAM: That is correct.

20   MR. BOB PETERS: And what we see on

21 Daymark Exhibit 5, slide 29, is that if there was no

22 potential large industrial loads into the future,

23 Manitoba Hydro would, essentially, flatline the

24 forecast for their general service top consumers.

25   Is that your understanding?

 1   MS. KATHLEEN KELLY: In absence of any

 2 additional information on that, yes, it would've

 3 flatline.

 4   MR. BOB PETERS: However, Manitoba

 5 Hydro then uses the potential large industrial load

 6 methodology to reflect what the increases in the

 7 future after five (5) years will be for the general

 8 service top consumers?

 9   MS. KATHLEEN KELLY: That's correct.

10 Suman, do you have anything to add to that?

11   DR. SUMAN GAUTAM: No, that is

12 correct.

13   MS. KATHLEEN KELLY: Thank you.

14   MR. BOB PETERS: Dr. Gautam, I think

15 for Dr. -- for Mr. Bedford's questions you -- you

16 interjected that the methodology that Manitoba Hydro

17 uses in 2017 for the potential large industrial load

18 is different than the methodology that Manitoba Hydro

19 used in their 2014 load forecast; correct?

20   DR. SUMAN GAUTAM: Yes.

21   MR. BOB PETERS: And in essence, would

22 I be correct that Manitoba Hydro has eliminated the

23 startup load of the new potential large industrial

24 load in the past twenty-five (25) years, and after

25 eliminating that startup load, that's when they start

1 their calculation of the load growth for this customer

2 segment?

3   DR. SUMAN GAUTAM: So let me

4 difference that. So they -- so the conservative

5 method used on 2017 excludes startup load of top

6 consumer customers that became part of the top

7 consumer category any time after 1983/'84.

8   MR. BOB PETERS: And Dr. Gautam, you

9 understand that that means Manitoba Hydro has excluded

10 the startup load of three (3) customers that started

11 after 199 -- 1984?

12   DR. SUMAN GAUTAM: Yeah, that is

13 right. That's -- yep, yes.

14   MR. BOB PETERS: And you understand

15 that Manitoba Hydro excluded those three (3) customers

16 on the assumption that those customers could have

17 started in the general service mass-market category as

18 opposed to the top consumer category?

19   DR. SUMAN GAUTAM: So on -- that --

20 that was our understanding based on our reading of

21 Manitoba Hydro's rebuttal evidence. It was mentioned

22 on -- on that document that four (4) of current ten

23 (10) top customers in top consumer category started in

24 general service mass-market.

25   MR. BOB PETERS: All right. I have

1 your -- I have your point.

2   And in addition to eliminating the

3 startup load of the new potential large industrial

4 load, Manitoba Hydro has also changed the cut-off line

5 or the demarcation line as between top consumers and

6 the mass-market customers.

7   Is that your understanding?

8   DR. SUMAN GAUTAM: Yes. Between 2014

9 and /17.

10   MR. BOB PETERS: Yes, and Manitoba

11 Hydro is now using I believe it's a 25 megawatt

12 threshold to define the customers that would be in the

13 general service top consumers category.

14   Is that your understanding as well?

15   MS. KATHLEEN KELLY: That's correct.

16   DR. SUMAN GAUTAM: Yeah, that is --

17 yeah, right.

18   MR. BOB PETERS: And as a result of

19 Manitoba Hydro making that -- that -- that new

20 demarcation as between top consumers and the mass-

21 market customers, seven (7) former top customers have

22 been put into the mass-market customer group rather

23 than leave them in the top consumer group; correct?

24   DR. SUMAN GAUTAM: Yes.

25   MR. BOB PETERS: And those customers

1 have taken their energy consumption with them and are

2 now part of the generals -- general service mass-

3 market grouping?

4   DR. SUMAN GAUTAM: Yes. And -- and I

5 know in that as well there are two (2) categories so I

6 would guess they would be part of general service

7 mass-market large category.

8   MR. BOB PETERS: Does -- does Daymark

9 Energy Advisors take any issue with the change in

10 methodology that Manitoba Hydro has implemented since

11 2014?

12   DR. SUMAN GAUTAM: Are -- are you

13 talking in terms of moving those seven (7) customers

14 from top consumer to general service mass-market or --

15 or in terms of change in PLIL methodology?

16   MR. BOB PETERS: All right, thank you

17 for the clarification. I'll rephrase the question.

18   Does Daymark Energy Advisors take any

19 issue with Manitoba Hydro having changed the

20 definition of top consumer such that seven (7) former

21 top consumer customers are no longer in that group?

22   DR. SUMAN GAUTAM: No. No, I -- so

23 based on our conversation with Manitoba Hydro and

24 staff and looking at the data so we didn't have any --

25 any concern regarding that.

1   MS. KATHLEEN KELLY: And I might add

2   to that, we did not -- we did not ask for or look at a

3   study by Manitoba Hydro that would show why they were

4   transferring consumers from one to the other.

5   As we went through this, we accepted

6   the fact that they had changed the approach to

7   classifying the consumers and that that was going --

8   we knew that was going to impact the analysis, but we

9   did not investigate whether that was an appropriate

10 thing to do or not.

11   MR. BOB PETERS: The load from those

12 seven (7) customers that were transferred out of the

13 top consumers group, into the mass-market customers,

14 the load for those seven (7) customers is still

15 included in the load forecast, correct?

16   DR. SUMAN GAUTAM: Yes. Yeah, they're

17 still included.

18   MR. BOB PETERS: However, Dr. Gautam

19 and Ms. Kelly, from what I understood of your evidence

20 in the questions of the other Intervenors in the room,

21 Manitoba Hydro uses a different regression model to

22 forecast the load growth between the top consumers

23 group and between the mass-market group, correct?

24   DR. SUMAN GAUTAM: It's -- it's the

25 same regression model but the data that they used, the

1 values that they used is different as -- as we -- as

2 we discussed earlier, but they start of load off three

3 (3) customers that -- that became part of top consumer

4 category were excluded.

5   MS. KATHLEEN KELLY: Can you restate

6 that question, please?

7   MR. BOB PETERS: Okay. Let's start

8 from the premise that the seven (7) customers who were

9 removed from the general service top consumers group

10 have now been put into the general service mass-market

11 group. And you've agreed with that?

12   MS. KATHLEEN KELLY: Yes.

13   MR. BOB PETERS: My question was: Is

14 the future load growth of those seven (7) customers

15 that have been put into the general service mass-

16 market category a different methodology of forecasting

17 their load growth now than what it would've been in

18 2014 methodology?

19   MS. KATHLEEN KELLY: Let be start the

20 answer and Suman you can add.

21   DR. SUMAN GAUTAM: Yeah.

22   MS. KATHLEEN KELLY: The 2014, those

23 seven (7) customers would've been in the top consumer

24 forecast. In the 2017 approach, they would be in the

25 general service mass-market large. The -- the two (2)

1 regressions for those groups are different.

2   So the forecasting basis would be

3 different for those seven (7) customers. Would that

4 be correct, Suman?

5   DR. SUMAN GAUTAM: Yes, that is

6 correct of -- of -- for -- for defining two (2)

7 different groups for forecasting general service mass-

8 market load and -- and top consumer load.

9   MR. BOB PETERS: Let me focus the

10 question going forward and see if this -- if the panel

11 would be correct in understanding it this way.

12   The top consumers use the potential

13 large industrial load in the regression model. Do you

14 accept that?

15   MS. KATHLEEN KELLY: Yes.

16   MR. BOB PETERS: And that's after five

17 (5) years of actual communicated short-term plans?

18   MS. KATHLEEN KELLY: Yes.

19   MR. BOB PETERS: Now, let's go to the

20 general service mass-market customers. I had

21 understood from your evidence that Manitoba Hydro uses

22 an average use regression model for those customers?

23   MS. KATHLEEN KELLY: That's correct.

24   MR. BOB PETERS: So what I'm asking,

25 and perhaps very clumsily, is what's the difference

1 between those two (2) regression models as it pertains

2 to the seven (7) customers that have been, in my

3 words, removed from top consumers and put into mass-

4 market consumers?

5   MS. KATHLEEN KELLY: It's an

6 interesting question. The --

7   MR. BOB PETERS: Thank you. You still

8 have to answer it.

9   MS. KATHLEEN KELLY: I wish it was

10 that easy. The -- the seven (7) cons -- top consumers

11 who have moved back into the GSMM have now gone into

12 that database of history. So they've presumably

13 modified the average use, depending on how big they

14 are compared to the rest. And their historical data

15 has now gone into that regression. So they've now

16 impacted that regression in some way, shape or form.

17 And their forecast is now dependent on that. It's a

18 completely different methodology.

19   MR. BOB PETERS: Thank you for that

20 answer.

21   MS. KATHLEEN KELLY: And before you

22 continue, Suman, do you have something to add?

23   DR. SUMAN GAUTAM: That is correct

24 characterization, Kathy, so those -- the historical

25 load of those customers were moved to general service

1 mass-market and -- and general -- and then that --

2 that uses regression model included historical load of

3 those customers.

4   MR. BOB PETERS: I take from that

5 answer, Ms. Kelly, that you're not able to tell the

6 Board whether those seven (7) consumers that are now

7 in the mass market customer grouping would have higher

8 or lower load growth compared to what it would be if

9 they were in the general service top consumers group?

10   MS. KATHLEEN KELLY: I can't, off the

11 top of my head but we could -- we could calculate

12 that.

13   Suman, do you have anything to add to

14 that response?

15   DR. SUMAN GAUTAM: I'm trying to think

16 here. So the question was -- oh, I think we would

17 have to go back and look into that data to -- to -- to

18 specifically answer how that affects load growth.

19   MR. BOB PETERS: Yes, Mr. Chair, I'm -

20 - I'm going to ask you through Mr. Haight and Mr.

21 Gardner that Daymark Energy Advisors and particularly

22 Ms. Kelly and Dr. Gautam, take an undertaking to

23 advise the Board as to whether the load forecast for

24 those seven (7) former top consumers that have now

25 been put into the general service mass market customer

1 grouping would be greater or less. And if they can

2 quantify it, as a result of the different

3 methodologies that are used for the load forecasting

4 for those two (2) groups.

5   Is that understood, Ms. Kelly?

6   MS. KATHLEEN KELLY: Yes, I think we

7 understand that.

8   MR. BOB PETERS: And as part of that

9 undertaking, Mr. Haight and Mr. Gardner, I would ask

10 your client to revisit PUB/Daymark load question

11 number 20 and determine if any additional information

12 is provided as part of that undertaking.

13   MR. WILLIAM HAIGHT: You're -- you're

14 referring to PUB/Daymark IR number 20?

15   MS. KATHLEEN KELLY: Yes.

16   MR. BOB PETERS: I am, sir, yes.

17   MR. WILLIAM HAIGHT: Yes, we will do

18 so.

19

20 --- UNDERTAKING NO. 46:   Daymark Energy Advisors

21   and particularly Ms.

22   Kelly and Dr. Gautam,

23   advise as to whether the

24   load forecast for those

25   seven (7) former top

 1   consumers that have now

 2   been put into the general

 3   service mass market

 4   customer grouping would be

 5   greater or less. And if

 6   they can quantify it, as a

 7   result of the different

 8   methodologies that are

 9   used for the load

10   forecasting for those two

11   (2) groups. And that the

12   client revisit PUB/Daymark

13   load question number 20

14   and determine if any

15   additional information is

16   provided as part of that

17   undertaking.

18

19   CONTINUED BY MR. BOB PETERS:

20   MR. BOB PETERS: All right. I want to

21   move to the same -- let's go to the presentation

22   slides DEA-5, slide 29. On a different point -- maybe

23   to set this up properly for the panel, I should have

24   started at page -- slide 15, please.

25   Slide 15 of your presentation indicates

1 that Daymark has identified that there could be

2 approximately 523 gigawatt hours less load showing up

3 on the new forecast because of the methodology change;

4 correct?

5   MS. KATHLEEN KELLY: That's correct.

6   MR. BOB PETERS: And I raise that 523

7 gigawatts because it reminded me of something Ms.

8 Morrison told the panel. In my questions I'm -- I'm

9 not looking for Daymark to give the name of any of

10 Manitoba Hydro's customers. So just to be clear, I

11 don't want any customers to be identified.

12   But on slide 29 of your presentation,

13 Exhibit 5, I believe Dr. Gautam brought to the Board's

14 attention that the short-term forecast for the various

15 components of the top consumers was set out also on

16 this chart, and that's with the other coloured dotted

17 lines, correct?

18   DR. SUMAN GAUTAM: Yes.

19   MR. BOB PETERS: And when we talk the

20 short-term forecast, I'm looking at the short-term

21 forecast for the chemical, for the primary metals, for

22 petro, oil, for pulp and paper. Those are all shown

23 on the same page, Dr. Gautam?

24   DR. SUMAN GAUTAM: Yes, that is

25 correct.

 1   MR. BOB PETERS: And when we say the

 2 short-term, this is still that five (5) year forecast

 3 where Manitoba Hydro would be relying on what their

 4 customers told them and what the media has reported

 5 relative to these customers plans?

 6   DR. SUMAN GAUTAM: Yes.

 7   MR. BOB PETERS: And we see the short-

 8 term forecast for the petro, oil and natural gas

 9 sector contains an indication of an -- of an increase,

10 probably around the 1920/'21?

11   DR. SUMAN GAUTAM: Yes.

12   MR. BOB PETERS: I'd like to go then

13 with that in mind to Volume 4 of Board counsels' book

14 of documents, Exhibit PUB-42-4 and I'm going to put

15 page 46 up on the screen.

16   And I'm going to ask the Daymark

17 witnesses to assume that this information was

18 discussed with Manitoba Hydro witnesses, including Ms.

19 Morrison, and for just our purposes of the transcript,

20 it was -- the discussion took place at transcript page

21 1126 and we don't need to go there.

22   But this is a sector forecast for a

23 particular sector of the general service top

24 consumers. Is that your understanding, Ms. Kelly and

25 Dr. Gautam, would you know that?

 1   MS. KATHLEEN KELLY: That's what

 2 you've described it as.

 3   MR. BOB PETERS: So you'll take that

 4 subject to --

 5   MS. KATHLEEN KELLY: Subject to check.

 6   MR. BOB PETERS: -- check. And the

 7 reason I raise it is that in discussions with Manitoba

 8 Hydro it was, I believe, Ms. Morrison and perhaps also

 9 her president who told this panel that one (1) of

10 Manitoba Hydro's customers has cancelled a future

11 project or future load, and that that cancellation

12 would be, according to the transcript, about 530

13 gigawatt hours starting in approximately 2021/'22.

14   Would you accept that as -- as part of

15 my questions as accurate subject to any check or

16 correction?

17   MS. KATHLEEN KELLY: Sure, subject to

18 check.

19   MR. BOB PETERS: All right. Was --

20 was Daymark Energy Advisors made aware that the 2018

21 load forecast that Manitoba Hydro is presumably

22 working on when Mr. Laramie and Ms. Morrison aren't in

23 this room, will contain reflection of a customer

24 cancelling a project or load of about 530 gigawatt

25 hours?

 1   MS. KATHLEEN KELLY: Not that I

 2 recall.

 3   MR. BOB PETERS: Okay and just so that

 4 we're clear. If we look at the line item 2021/'22 on

 5 the screen and follow it across to the far right-hand

 6 side, we see that there is a forecast of about 2007

 7 gigawatt hours for this sector of the general service

 8 top consumers.

 9   You'll accept that?

10   MS. KATHLEEN KELLY: Yes.

11   MR. BOB PETERS: And you'll see that

12 that number has grown over the two (2) preceding years

13 and in the years that are before 2021/'22, and that

14 that growth is approximately the -- and the two-year

15 growth is approximately the 530 gigawatt hours that

16 I've suggested Manitoba Hydro has informed this Board

17 will not be materializing, based on their current

18 knowledge.

19   Do you accept that?

20   MS. KATHLEEN KELLY: Yes.

21   MR. BOB PETERS: So if we take -- if

22 we take Manitoba Hydro's information of customer load

23 being down 530 gigawatt hours and we go back to slide

24 15 where Daymark indicates that Manitoba Hydro under

25 forecasted by about 523 gigawatt hours, would it be

1 appropriate for this Board to say that those two (2),

2 in essence, balance themselves out and cancel

3 themselves out?

4   MS. KATHLEEN KELLY: The 530 from the

5 pipeline is more immediate cancellation.

6   MR. BOB PETERS: And you're saying

7 that because it occurs in about the fourth or fifth

8 year of the forecast?

9   MS. KATHLEEN KELLY: That's correct.

10 In 2021 or so, based on the exhibit you just provided

11 to us. The 523 gigawatt hours less is over the twenty

12 (20) year period ahead. So that would be smaller in

13 the 2021 time frame and get closer to 530 by 2034/'36.

14   MR. BOB PETERS: So is that, Ms.

15 Kelly, another way of saying that the concerns that

16 Daymark might have about the potential large

17 industrial load methodology being conservative, would

18 no longer hold true if Manitoba Hydro's 2018 forecast

19 includes 530 gigawatt hours of less load from a

20 customer project that's not proceeding?

21   MS. KATHLEEN KELLY: We -- we would

22 still maintain our position that the regression used

23 is a change in methodology that may understate load,

24 but, with the data going into it and the specific

25 information about the specific facility being

1 cancelled then, yes, I would agree with you.

2   MR. BOB PETERS: Thank you.

3   MS. KATHLEEN KELLY: Suman, any

4 difference in that?

5   DR. SUMAN GAUTAM: No.

6   MS. KATHLEEN KELLY: Thank you.

7   MR. BOB PETERS: I want to turn back

8 to a topic that Mr. Hacault on behalf of the

9 industrial customers raised, and that's on slide 15 on

10 the screen.

11   There was an indication that the short-

12 term impact of rate increases not considered for top

13 consumers could result in the load being reduced by

14 185 gigawatt hours a year. I'm sorry, cumulatively,

15 correct?

16   MS. KATHLEEN KELLY: Correct.

17   DR. SUMAN GAUTAM: Yeah.

18   MR. BOB PETERS: And -- and we won't

19 talk about what "cumulatively" means because Mr.

20 Hacault took us to that chart.

21   But this, as I understood, Dr. Gautam,

22 your -- your qualifications to Mr. Hacault, this is

23 primarily due to the effects of price elasticity which

24 have not been built into Manitoba Hydro's forecast.

25   Would that be correct?

1   DR. SUMAN GAUTAM: Yes, it is.

2   MS. KATHLEEN KELLY: I might add to

3 that. Not build into the short-term forecast.

4   MR. BOB PETERS: All right. And

5 thank you, Ms. Kelly. It's not built into the short-

6 term forecast which was derived as a result of Ms.

7 Morrissey -- Ms. Morrison and Mr. Laramee or their

8 colleagues sitting across the table from their top

9 consumers or gathering market reconnaissance on them

10 for the first five (5) years?

11   MS. KATHLEEN KELLY: Correct.

12   MR. BOB PETERS: All right. I also

13 understood when Dr. Williams was asked -- asking

14 questions that there was some discussion about

15 multicollinearity issues with the top consumers price

16 elasticity.

17   Did I hear that correctly?

18   DR. SUMAN GAUTAM: The

19 multicollinearity issue we were talking about was for

20 residential sector. For top consumer sector we -- we

21 -- we believe that there may be the price elasticity

22 estimated in 2017 may not be correct based on the

23 companies and the price elasticity between 2017 and

24 then -- and then using the method that was used on

25 2014.

1   MR. BOB PETERS: Dr. Gautam, part of

2 your calculation or forecast of this 185 gigawatt

3 hours of load in the short-term was developed based on

4 Daymark using a price elasticity model; correct?

5   DR. SUMAN GAUTAM: Using a price

6 elasticity -- I would not characterize that as a

7 model. It's just a -- a -- a mathematical

8 multiplication of price elasticity present in -- in

9 price includes and -- and -- and annual short-term

10 load.

11   MR. BOB PETERS: All right. I was

12 going to lighten the load by saying I'm understanding

13 math. I've never done modelling but that could be

14 misinterpreted by Mr. Haight.

15   Dr. Gautam, the price elasticity math

16 that you used -- and if we turn to slide 32, I believe

17 what you've told the Board in the bottom of the page,

18 number 1, is that the price elasticity for these top

19 consumers was estimated using the potential large

20 industrial load methodology; correct?

21   DR. SUMAN GAUTAM: Yes.

22   MR. BOB PETERS: But you've also told

23 the Board that that methodology is for long-term

24 elasticity; correct?

25   DR. SUMAN GAUTAM: That is right.

1   MR. BOB PETERS: So does that mean

2 that there is -- it may potentially overstate the

3 elasticity in the first five (5) years or the short-

4 term, as we've been calling it?

5   DR. SUMAN GAUTAM: That is right. And

6 I think we raised that concern when we were responding

7 to -- to the IR. I can't recall which one was it but

8 we did raise that concern.

9   MR. BOB PETERS: I believe, for the

10 record, it could be PUB/Daymark 16 but that will be

11 subject to check.

12   I'd like to turn to a different topic,

13 and this is one Mr. Bedford was dealing with. On page

14 15 of DEA of Daymark's Exhibit 5, there is an

15 indication under this directional impact of baseload

16 forecast items that the use of historically under

17 forecasted population would result in lower than

18 actual customer account and residential customer

19 forecast and that will result in lower residential and

20 general service mass-market load forecasts; correct?

21   DR. SUMAN GAUTAM: Yes.

22   MS. KATHLEEN KELLY: Correct.

23   MR. BOB PETERS: From your discussion

24 just a few minutes ago with Mr. Bedford from Manitoba

25 Hydro, does that change anything on this slide 15?

1   DR. SUMAN GAUTAM: So the only

2   discussion was -- was focussed on -- I'm -- I'm just

3   looking at one (1) particular pdx of -- and this is of

4   -- of -- of population forecast but here this is --

5   this is based on -- on -- on -- we have to go back to

6   check but -- but -- all historical period from when

7   Manitoba Hydro started analyzing their population

8   forecast errors.

9   So -- so this based on entire period

10 where the discussion already was based on -- on this

11 last six (6) or seven (7) years.

12   MR. BOB PETERS: All right, I'm going

13 to follow that further, Dr. Gautam, and I think --

14   DR. SUMAN GAUTAM: Sure.

15   MR. BOB PETERS: -- the way the panel

16 should see that is in Daymark's report marked as

17 Exhibit 2-1 I believe is the report that was filed

18 November 15th, 2017 with I believe one (1) of the

19 footnotes corrected.

20   Have you that report, Dr. Gautam?

21   DR. SUMAN GAUTAM: Not at --

22   MR. BOB PETERS: This is the report

23 that Daymark authored and I wanted to go to page 31 of

24 the report. And there is a graph at the bottom that

25 I'd like to just take a few minutes with the panel on.

1 And if we can --

2   DR. SUMAN GAUTAM: I have -- I have it

3 open here.

4   MR. BOB PETERS: Okay. And if we

5 could just bring that page down a fraction just to see

6 the -- that's good. The -- this graph tries to do two

7 (2) things at once, does it? One (1) of them is that

8 it plots the percentage error that Daymark found with

9 Manitoba Hydro's forecasting of residential customers,

10 and it also shows Daymark's findings with respect to

11 the errors in forecasting by Manitoba Hydro of the

12 population in Manitoba.

13   DR. SUMAN GAUTAM: That is correct.

14   MR. BOB PETERS: All right. I just

15 want to focus on the population line. And on mine, it

16 appears as the -- the black line. And if I go to year

17 10, and I look to see the -- what happens in year 10,

18 what Daymark's report initially was indicating was

19 that there was -- Manitoba Hydro was making a -- a 2

20 percent error by the time you got to the tenth year of

21 their -- of Manitoba Hydro's forecast.

22   Have I said that correctly?

23   DR. SUMAN GAUTAM: Let me rephrase

24 that. So it's -- so when we are talking about ten

25 (10) year 2 percent forecast error, so that means we

1 are com -- so comparing the -- the population of a

2 particular year, and then the forecast, that was done

3 ten (10) year in advance.

4   MR. BOB PETERS: So what you're

5 saying, Dr. Gautam, is that these are successive ten

6 (10) year forecasts that started in 1989?

7   DR. SUMAN GAUTAM: So -- so for any

8 year. So that -- this is the average number of all

9 ten (10) year ahead forecast.

10   MR. BOB PETERS: All right.

11   DR. SUMAN GAUTAM: Yes.

12   MR. BOB PETERS: I have -- I have your

13 point. I also recall the Vice-Chair asking -- I

14 believe it was Ms. Morrison again -- about this, and

15 Ms. Morrison indicated that there was the provincial

16 nominee program that needed to be factored in and

17 taken into consideration, and Daymark is now aware of

18 that?

19   DR. SUMAN GAUTAM: Yes, that is right.

20 And there is a -- a -- there is a revised figure

21 including the impact of -- of that particular program

22 in -- in Manitoba Hydro's rebuttal evidence.

23   MR. BOB PETERS: Well, thank you, Dr.

24 Gautam. Let's turn, then, to Manitoba Hydro Exhibit

25 83, which is the rebuttal evidence, and turn to page

1 20 of 37 of the document. And the let's see what Dr.

2 Gautam is reminding the Board. So, Dr. Gautam, we now

3 have it on our screen. Have you a copy available to

4 yourself?

5   DR. SUMAN GAUTAM: Yes, I do.

6   MR. BOB PETERS: So this is Manitoba

7 Hydro correcting Daymark because Manitoba Hydro is

8 including the impacts of the Manitoba provincial

9 nominee program that the external forecasters used by

10 Manitoba Hydro may not have been aware of their full

11 potential impact. Is that your understanding, sir?

12   DR. SUMAN GAUTAM: Yes.

13   MR. BOB PETERS: All right. If I go

14 to year 10, and I go up, and I am -- I -- I'm looking

15 at the red line on my copy.

16   DR. SUMAN GAUTAM: Yes.

17

18   (BRIEF PAUSE)

19

20   MR. BOB PETERS: Well, let me

21 backtrack. I'm looking at the blue line, because the

22 blue line shows me on Manitoba Hydro's rebuttal

23 exactly what we saw in Daymark's report on page 31

24 that we looked at just a couple of minutes ago, Dr.

25 Gautam. Is that correct?

1   DR. SUMAN GAUTAM: Yes, that is right.

2   MR. BOB PETERS: And that was the 2

3 percent error at -- at the tenth year out, correct?

4   DR. SUMAN GAUTAM: Yes.

5   MR. BOB PETERS: So Manitoba Hydro has

6 revised it and said, If you factor in the provincial

7 nominee program, the error is reduced, correct?

8   DR. SUMAN GAUTAM: Yes, that is right.

9 Yes.

10   MR. BOB PETERS: And instead of a 2

11 percent error, I'm suggesting it's now approximately a

12 1.5 percent error in the forecast.

13   DR. SUMAN GAUTAM: That -- that seems

14 fair it seems in -- in the middle of -- of one (1) and

15 two (2).

16   MS. KATHLEEN KELLY: That's --

17   MR. BOB PETERS: Sorry, I -- I didn't

18 hear that clearly. Could you repeat your answer?

19   MS. KATHLEEN KELLY: I -- I think what

20 he basically said is, Because that red line is in the

21 middle of one (1) and two (2), that one point five

22 (1.5) is probably a good estimate of what that is

23 coming in at, correct Sum -- Suman?

24   DR. SUMAN GAUTAM: Yes.

25   MR. BOB PETERS: We do math the same

 1 way.

 2   DR. SUMAN GAUTAM: Thank you.

 3   MR. BOB PETERS: Thank you. And so

 4 this denotes as well that Manitoba Hydro is still

 5 underforecasting population. Is that correct?

 6   DR. SUMAN GAUTAM: Yes.

 7   MR. BOB PETERS: But they're not

 8 underforecasting it as much as what it shows without

 9 the provincial nominee correction?

10   MS. KATHLEEN KELLY: Yes.

11   DR. SUMAN GAUTAM: Yes, that is

12 correct.

13   MR. BOB PETERS: All right. Ms.

14 Kelly, back to slide 15 of your presentation today,

15 still under the second point about the historically

16 underforecasted population. The Board reads that if

17 Manitoba Hydro underforecasts the population, that's

18 going to have an impact on the residential customer

19 count, correct?

20   MS. KATHLEEN KELLY: Yes.

21   MR. BOB PETERS: And that's because

22 there's an assumption as to how many people in the

23 population are needed to make a household or a

24 customer for Manitoba Hydro?

25   MS. KATHLEEN KELLY: That's correct.

1 Manitoba Hydro has a ratio that it uses to translate

2 population into customers.

3   MR. BOB PETERS: But you go further

4 than that and say, Not only will it affect the

5 residential forecast, but it will also impact the

6 general service mass market load forecast. Is that

7 correct?

8   MS. KATHLEEN KELLY: That's correct.

9   MR. BOB PETERS: Now, Ms. Kelly, can

10 you explain to the panel how an underforecasting of

11 the population will result in an underforecasting of

12 the energy consumption of the general service mass

13 market load forecast?

14   MS. KATHLEEN KELLY: The general

15 service mass market load forecast also include a

16 customer count variable, so they're directly tied to

17 the number of residential customers in -- in Manitoba.

18   DR. BYRON WILLIAMS: Why would you --

19 why would you tie customer count to the general

20 service mass market?

21   MS. KATHLEEN KELLY: In the general

22 service mus -- mass market, small/medium, much of the

23 businesses there are typically serving the residential

24 area around them, so it's a good variable to put into

25 that. It's the little mom-and-pop shops, the -- all

1 the various small restaurants and things like that

2 that serve the local residents in the area, so it

3 makes sense.

4   MR. BOB PETERS: Okay. I've -- I've

5 got your point. I want to turn to another issue, and

6 it was Daymark's suggestion to the panel, that

7 Manitoba Hydro could use scenario analysis to -- to

8 perhaps develop a high and a low load growth scenario.

9 Have I said that correctly?

10   MS. KATHLEEN KELLY: We recommend that

11 they use scenario analysis, not necessarily only to

12 look at high and low, but to look at potential

13 alternative futures --

14   MR. BOB PETERS: And it just --

15   MS. KATHLEEN KELLY: -- so that one

16 can identify what might happen, and how they might be

17 able to address that within the planning, and also to

18 recognize kind of how -- how much higher things could

19 go and how much lower things could go from the P50

20 forecast.

21   MR. BOB PETERS: Okay. And I'm going

22 to ask for a different document to be put up, and this

23 is -- I believe this is actually the filed load

24 forecast under the Public Utilities Board minimum

25 filing -- filing requirement 65. And I believe there

1 was an updated version. And I'm looking at page 50.

2   And I'm going to think back to the

3 questions that Dr. Grant was asking you, Ms. Kelly,

4 and I'd like to see the chart at the bottom of the

5 page. First of all, Ms. Kelly, why don't you explain

6 to the panel what you understand this to be -- to be

7 saying, this chart?

8   MS. KATHLEEN KELLY: My understanding

9 of this chart is that, essentially, if there are -- is

10 there -- if there's a one-tenth (1/10) of a percent

11 increase or decrease in population, this basically

12 tells us that there will be a change in energy

13 consumed of 293 gigawatt hours, and that goes down

14 through sensitivity to four (4) of those key variables

15 in the forecast, population, income, GDP and electric

16 price.

17   And then in the second half of that

18 table, there's an evaluation of extreme events, in

19 where -- in which Manitoba Hydro has said, What would

20 happen if -- if all natural gas Manitoba was converted

21 to electricity use? There would be an impact on the

22 forecast of 16,000 GWh.

23   MR. BOB PETERS: All right. And Mr.

24 Gange has left. He probably went to plug in his all-

25 electric vehicle. But if we see 100 percent

1 electrical vehicle uptake in Manitoba, that's telling

2 Manitoba Hydro that they're going to need 12,015 more

3 gigawatt hours, or in terms of capacity, another 1,502

4 megawatts?

5   MS. KATHLEEN KELLY: Correct.

6   MR. BOB PETERS: And there's a project

7 that's being done in Manitoba of about 630 megawatts

8 of Keeyask. So you'd need more than two (2) Keeyasks

9 to provide energy and capacity to Manitobans if 100

10 percent of Manitobans went to an electric vehicle.

11 That's what this is telling us?

12   MS. KATHLEEN KELLY: Subject to the

13 size of Keeyask, yes.

14   MR. BOB PETERS: Now, in your

15 discussions with Dr. Grant, and -- and what you've

16 said in your evidence, you're recommending that Hydro

17 run their models with changes in economic variables.

18 Is that -- is that correct?

19   MS. KATHLEEN KELLY: Suman...?

20   DR. SUMAN GAUTAM: Can you clarify

21 what you mean by changes in economic variables?

22   MR. BOB PETERS: Let me -- let me

23 approach it this way, Dr. Gautam --

24   DR. SUMAN GAUTAM: Thank you.

25   MR. BOB PETERS: -- what you see on

1 the screen in front of you, let's -- this is Manitoba

2 Hydro's sensitivity analysis as well as Manitoba

3 Hydro's evaluation of extreme events, correct?

4   DR. SUMAN GAUTAM: Yes.

5   MR. BOB PETERS: Daymark energy is

6 telling the Board, Manitoba Hydro should do more than

7 this, to provide a higher probability ranking to the

8 forecast that they have?

9   MS. KATHLEEN KELLY: I -- I'm going to

10 answer that. We are suggesting that Manitoba Hydro

11 look into more potential futures. We're not

12 necessarily saying to take each of these, and just put

13 the numbers in, and say, Okay, let's assume a 0.1

14 percent increase.

15   We're -- we're suggesting this is good

16 information. It gives us something to know about the

17 magnitude of the change.

18   MR. BOB PETERS: But the bottom, it --

19 to interrupt you --

20   MS. KATHLEEN KELLY: -- but it does

21 cut --

22   MR. BOB PETERS: -- is that the bottom

23 half of this chart, Ms. Kelly, you're saying that's

24 not likely to happen?

25   MS. KATHLEEN KELLY: It's not likely

 1 to happen.

 2   MR. BOB PETERS: So what are you

 3 suggesting, then?

 4   MS. KATHLEEN KELLY: We're suggesting

 5 build an alternative future, or several alternative

 6 futures as scenarios to look at what might happen and

 7 get some sense of the implications for Manitoba Hydro

 8 if there's a two-tenths (2/10) of a percent increase

 9 in population combined with two-tenths (2/10) of

10 increase in GDP, for example, that there would be more

11 significant economic growths, there'd be more

12 immigration in -- into Manitoba Hydro. That's a

13 potential future. Take a look at what that does to

14 the load forecast. According to this, it -- it's not

15 terribly big, but it's big enough that it should be

16 considered.

17   But there are -- what utilities are

18 doing in North America is that they are looking to

19 understand the implications of the forecasts not being

20 right, which is almost guaranteed, so they're looking

21 at alternative futures that include a variety of

22 changes in the key parameters that the forecast is

23 based off of, and putting those together and saying,

24 Here's what could happen.

25   There's another approach, which is to

1 use a stochastic approach, and that would be more

2 along the lines of -- of establishing probabilistic

3 approach to what kind of change could happen in the

4 key variables, again that top table, whereby you could

5 combine all of those probabilities and kind of look at

6 what -- where the load is going to go.

7   Suman, anything to in -- ask -- add to

8 that?

9   DR. SUMAN GAUTAM: In a recent -- so

10 we are -- that -- that's why we -- we use an

11 (INDISCERNIBLE) sensitivity instead of just

12 considering certain percentage and --

13   MS. KATHLEEN KELLY: Suman --

14   DR. SUMAN GAUTAM: -- consider --

15   MS. KATHLEEN KELLY: -- back up.

16 They're having some trouble hearing you, so slow down

17 and start again.

18   DR. SUMAN GAUTAM: Okay. Is it -- is

19 it better now?

20   MS. KATHLEEN KELLY: Yes.

21   DR. SUMAN GAUTAM: Okay. Thank you.

22   MS. KATHLEEN KELLY: Thank you.

23   DR. SUMAN GAUTAM: So in recent I was

24 referring that we -- we said, you know, considering

25 in-firm (phonetic) sensitivity -- sensitiv --

1 sensitivity just to -- to consider potential outcomes,

2 and consider -- so that would thus allow the

3 interaction of different, you know, changes that --

4 that could be considered.

5   MR. BOB PETERS: And Dr. Gautam, you'd

6 run that through a stochastic model?

7   DR. SUMAN GAUTAM: Yes. Yes, where --

8 where we can do that a stochastic --

9   MR. BOB PETERS: Can -- can you

10 briefly --

11   DR. SUMAN GAUTAM: -- model.

12   MR. BOB PETERS: -- explain to the

13 panel what -- what you mean by what -- what you mean

14 by running it through a stochastic model?

15   DR. SUMAN GAUTAM: So -- so we -- once

16 -- so there -- there are multiple steps that goes in

17 getting a -- a stochas -- a stochastic model. So one,

18 first of all, is we need to find the key variables

19 that have -- that, in fact -- you're -- you're -- the

20 outcome. So outcomes here being -- the outcome here

21 being the load, right?

22   And then the second step is once we

23 didn't find those key variables, and then the

24 relationship from either regression equation or other

25 -- other opportunities, then we could consider

1 different inherent uncertainties. We can build key

2 input variables by considering different distributions

3 for those key input variables and then -- and then

4 look at the possible -- the outcome on -- on the

5 output on -- on how change in one (1) -- one (1)

6 variable affects the -- affects the doubt variable.

7   MR. BOB PETERS: All right. Thank you

8 for that. I want to go back, please, if I could to

9 slide 15 from your presentation this morning. That's

10 Daymark Exhibit 5. There's an indication that fuel

11 switching was not fully considered, and that would

12 also bring some uncertainty into the load forecast for

13 Manitoba Hydro. Is that correct?

14   MS. KATHLEEN KELLY: That's correct.

15   MR. BOB PETERS: And just so that

16 we're clear, I'm going to try to see if I can distill

17 what I've heard. The first is Manitoba Hydro does not

18 explicitly include fuel switching in its models for

19 the general service mass market customers or the top

20 consumers?

21   MS. KATHLEEN KELLY: That's correct.

22   MR. BOB PETERS: And Daymark is saying

23 they should?

24   MS. KATHLEEN KELLY: Yes.

25   MR. BOB PETERS: Does Daymark say that

1 they should, recognizing that many of these general

2 service mass media -- sorry -- mass market and top

3 consumers may not be able to switch to natural gas, as

4 an example, due to the nature of their business or

5 their location?

6   MS. KATHLEEN KELLY: Yes, it's

7 recognized that there are many who may not be able to

8 do it, but by not including it at all, we're assuming

9 that nobody will change.

10   MR. BOB PETERS: And Manitoba Hydro

11 does introduce some disruptive technology or fuel

12 switching in the sense of, I think solar and load

13 displacement for -- for this -- for these larger

14 customers and the general service mass market?

15   MS. KATHLEEN KELLY: Through the DSM

16 reduction.

17   MR. BOB PETERS: Yes. All right. So

18 now let's go back to the residential customers. And

19 as I understand, what I've heard from the evidence is

20 that Manitoba Hydro's average use econometric model

21 only considers fuel choice for new buildings and not

22 the switching for existing customers. Have I got that

23 right?

24   MS. KATHLEEN KELLY: Suman...?

25   DR. SUMAN GAUTAM: So -- so you are --

1 you are right in saying that the -- the average users

2 residential model considers some sort of fuel

3 switching, and that is done with the use of our

4 explanatory variable called saturation, which is the

5 ratio of -- the ratio of electric customers to the

6 total customers.

7   I -- and then the reason that we are

8 saying that considers fuel switching, because that

9 particular variable is the outcome of Manitoba Hydro's

10 end use forecasting method. And then in its end use

11 forecasting method, there is a consideration of

12 natural gas prices.

13   MR. BOB PETERS: So this end use

14 forecast model for the residential customers as used

15 by Manitoba Hydro, that acts as a -- a double check on

16 the load forecast?

17   DR. SUMAN GAUTAM: Yes, that is one

18 (1) of the way that Manitoba Hydro is using end use

19 forecasting method in its load forecast process.

20

21   (BRIEF PAUSE)

22

23   DR. SUMAN GAUTAM: So -- so let me --

24 does that clear it -- does that answer your question?

25   MS. KATHLEEN KELLY: There's some

1 discussion going on. Hold on, Suman.

2   DR. SUMAN GAUTAM: Okay.

3

4   (BRIEF PAUSE)

5

6   MR. BOB PETERS: Dr. Gautam, for the

7 residential customer, is fuel switching included in

8 the average use econometric model for Manitoba Hydro's

9 existing customers?

10   DR. SUMAN GAUTAM: Yes, it -- it is --

11 it is considered through the -- through the saturation

12 variable used in -- in the regression model.

13   MR. BOB PETERS: Is that saturation

14 variable in the regression model, or is it in the end

15 use model?

16   DR. SUMAN GAUTAM: The saturation

17 variable is in the -- that is used in the regression

18 model is one of the output of end use forecasting

19 model -- end use forecasting method.

20   MR. BOB PETERS: All right. There's

21 one (1) second-last area that I wanted to get to in my

22 allotted time. And that's a presentation that was

23 made late last week by the Bipole III coalition, and

24 they had a PowerPoint slide presentation.

25 Particularly, slide 4.

1   (BRIEF PAUSE)

2

3   MR. BOB PETERS: This is on the screen

4 in Winnipeg, and the I actually am not aware as to

5 whether I gave My Friends opposite some heads up, and

6 they're saying I didn't. So this may be a shorter

7 area than I thought.

8   MS. KATHLEEN KELLY: Suman, can you

9 see the chart on the screen?

10   DR. SUMAN GAUTAM: Yes, I can see the

11 chart, but there is also -- I'm also opening up here,

12 because there's a certain section that's being blocked

13 by the -- the video that I'm seeing at the same time.

14   Let -- let me open it here as well at

15 my computer.

16

17   (BRIEF PAUSE)

18

19   DR. SUMAN GAUTAM: Thank you for your

20 time. I have it open here.

21   MR. BOB PETERS: All right. I -- I'm

22 going to ask you, just to set up the question, and I -

23 - I think not a lot will turn on this chart, but my

24 recollection -- and I'm not saying this is the panel's

25 recollection -- is that there was a presenter that was

1 critical of Manitoba Hydro's historical performance in

2 their load forecasting, and they tried to demonstrate

3 that on the slide 4 that's in -- in front of us.

4   DR. SUMAN GAUTAM: Yes.

5   MR. BOB PETERS: And I think they are

6 -- the presenter may have also gone so far as to say

7 that the current load forecast is overstated. And

8 that presenter used a projection of a historical trend

9 line of weather-adjusted gross firm energy to compare

10 to Manitoba Hydro's current forecast.

11   We can see that plotted on the chart,

12 but I take it, Dr. Gautam, you haven't had a chance to

13 consider what that presenter was -- had done?

14   DR. SUMAN GAUTAM: I -- I reviewed the

15 -- the report briefly.

16   MR. BOB PETERS: So my question, then,

17 is: Is it appropriate or relevant to use an

18 extrapolation as a gauge or a check on the load

19 forecast?

20   DR. SUMAN GAUTAM: I would say -- so

21 just -- just -- well, so I -- so I am -- it's based on

22 what we're seeing here on this screen, the years of --

23 last ten (10) years of data to linearly predict the

24 future, I would say that's not a -- a quite good

25 representation of -- of comparison.

 1   MR. BOB PETERS: So you're telling

 2 this panel that the use of a historical trend line

 3 isn't the way that Manitoba Hydro's load forecast

 4 should be evaluated?

 5   DR. SUMAN GAUTAM: The historical

 6 trend line, that is just -- that is using ten (10)

 7 years of data. The -- the short historical timeline,

 8 the years of short historical timeline.

 9   MR. BOB PETERS: Would that

10 extrapolation of historical trends be an acceptable

11 load forecasting technique if it was for a longer

12 period of time?

13   DR. SUMAN GAUTAM: So just using the -

14 - the trend, I would not say so. There -- there are

15 so many underlying characteristics that were -- that

16 we need to consider, and -- and things that are

17 happening, you know, or other -- other

18 characteristics, that -- that needs to be considered

19 in order to -- in order to forecast the load

20 appropriately.

21   MS. KATHLEEN KELLY: I -- I'd like to

22 add to Suman's answer, and that is --

23   DR. SUMAN GAUTAM: Yeah.

24   MS. KATHLEEN KELLY: -- this -- this

25 approach of -- of using just a simple trend line, as -

1 - as Suman pointed out, misses a lot of underlying

2 explanatory variables and relationships that -- that

3 change the forecast from time to time.

4   Back in the '50s and '60s, before I

5 went into forecasting, there was the better

6 opportunity to use this kind of approach, because they

7 were building like crazy, everybody was growing. It

8 was -- it was postwar make-up. For a lot of time,

9 that wasn't happening.

10   And I remember talking to my mentors

11 and trainers who talked about the days when they just

12 took a log-linear, a piece of paper, and drew a line,

13 and that was forecast, and it was going to be right,

14 which is not something that you can see today. And

15 simp -- making this simple is crazy.

16   MR. BOB PETERS: Okay. And -- and,

17 Ms. Kelly, thank you, and Dr. Gautam, I think if I

18 could ask to go to page 3 of this slide deck from the

19 presenter. I may have -- I may have left Dr. Gautam,

20 as well as you, Ms. Kelly, with the misinterpretation

21 -- or misimpression that the trendline was developed

22 based on ten (10) year historical data where I believe

23 this shows that it was based on twenty (20) year

24 historical data.

25   Do you see that?

 1   MS. KATHLEEN KELLY: Yes.

 2   DR. SUMAN GAUTAM: Yes, on this one I

 3 believe if I -- if I -- best on my collection on the

 4 next slide, I think that was just based on ten (10)

 5 years data. But this one is -- you're right, this is

 6 based on -- on -- on twenty (20) years.

 7   MR. BOB PETERS: And -- and there's

 8 two (2) different guidelines I think, Dr. Gautam,

 9 you're correct in your review.

10   Does this twenty (20) year trendline

11 change any of your answers in terms of the

12 acceptability of using historical trends as a

13 forecasting technique?

14   MR. WILLIAM HAIGHT: I think he's

15 answered that.

16   MS. KATHLEEN KELLY: It may be less

17 crazy than the ten (10) years but I would -- I would

18 suggest that there's enough data and information

19 around about customer use, customer attitudes and the

20 underlying variables here that is -- there are more

21 sophisticated and better -- better predictive

22 approaches than this.

23

24 CONTINUED BY MR. BOB PETERS:

25   MR. BOB PETERS: My last topic is on

1 the weather normalization and My Friends opposite have

2 covered most of the points. And I just want to focus

3 on the -- well, on the -- on what's the result, on

4 what's the impact if the Daymark Energy Advisors'

5 suggestions were followed by Manitoba Hydro.

6   And on Manitoba Hydro's rebuttal

7 evidence, which is Exhibit Manitoba Hydro 83. I have

8 it on my page 14 of 37. I'm not sure what the PDF

9 number is. And if we go to lines 19 and following,

10 Manitoba Hydro, this was their rebuttal to the Daymark

11 report, correct, Ms. Kelly?

12   MS. KATHLEEN KELLY: Correct.

13   MR. BOB PETERS: And -- and I

14 understand this to be saying to the panel that even if

15 you changed the methodology as suggested by Daymark on

16 either or both of the aspects of weather normalization

17 and including the definition of load dependent on

18 weather, the impact of the change is only in year one

19 of the forecast, because every other year stays the

20 same from that starting point.

21   Have you had a chance to consider

22 whether that's an accurate statement or whether that

23 needs further explanation?

24   MS. KATHLEEN KELLY: I'm -- I'm not

25 sure that -- we've thought about this, but I'm not

1 sure that I'd buy that that is actually what will

2 occur as a result of the -- the two (2) year approach

3 to regression. It could be different than that, as we

4 go forward.

5   The twenty-five (25) versus twenty (20)

6 versus thirty (30), I don't see much change at all;

7 whether they -- whether Manitoba Hydro uses that or

8 uses what they are using now, the twenty-five (25)

9 versus the change. But I think using the -- the past

10 twenty-four (24) months of data versus perhaps forty-

11 eight (48) months of data, there may be more changes

12 in that.

13   So I can't -- I can't agree or disagree

14 because we haven't gone back and looked at doing this.

15 So, I don't know how big it will be.

16   MR. BOB PETERS: Just on that --

17 follow up on that, Ms. Kelly --

18   DR. SUMAN GAUTAM: Can I -- so one

19 more thing. There were -- the solution that we -- we

20 presented in our report of using longer time period to

21 -- to determine -- to estimate weather amuses (sic)

22 relationship, our understanding would -- so that would

23 change -- so -- so that's essentially that may change.

24 Weather dependent load of each year or -- or in other

25 words, that may change. Weather adjusted actual load

1 that goes to -- that -- that -- that goes into -- into

2 regression models.

3   MS. KATHLEEN KELLY: And to add --

4   MR. BOB PETERS: So --

5   MS. KATHLEEN KELLY: -- to add to

6 Suman's note, once you change the weather normalized

7 load -- node that's the basis, that's the dependent

8 variable that you're trying to predict, if the slope

9 of the curve changes much then it's going to change

10 your load forecast going out into the future.

11   MR. BOB PETERS: And so this panel

12 should take from that -- those answers that Manitoba

13 Hydro is using 24 data points in their regre --

14 regression analysis on this weather-dependent load

15 determination?

16   MS. KATHLEEN KELLY: Yes.

17   MR. BOB PETERS: And Daymark is

18 suggesting 120 as opposed to I thought somebody said

19 48 just a few minutes?

20   MS. KATHLEEN KELLY: I was -- I was

21 positing that by using more, as -- as Suman has said a

22 number of times today, using more data points results

23 in a better regression. Twenty-four (24) is kind of

24 short.

25   MR. BOB PETERS: And the last point

1 then to you, Ms. Kelly and to Dr. Gautam, is that

2 whether the use of a ten (10) years in the analysis

3 would result in only a change in the first year of the

4 forecast is something that Daymark wouldn't be

5 prepared to acknowledge unless and until Daymark had

6 actually made the runs with the data to compare them.

7   Have I got that right?

8   MS. KATHLEEN KELLY: I believe so.

9 Suman, do you have to add -- anything to add to that.

10 I'd like to take more time to look at -- at the

11 rebuttal and be able to address it.

12   DR. SUMAN GAUTAM: Yeah, I agree with

13 you, Kathy.

14   MS. KATHLEEN KELLY: Thank you.

15

16   (BRIEF PAUSE)

17

18   MS. KATHLEEN KELLY: May I add

19 something on weather normalization?

20   MR. BOB PETERS: Yes, please.

21   MS. KATHLEEN KELLY: One thing that --

22 that we found in our discussions with Manitoba Hydro

23 is that they have brought in their own consultant to

24 take a look at their forecast approach. And one (1)

25 of the suggestions made by that consultant on weather

1 normalization in particular was to instead of using it

2 to adjust load historically was to incorporate the

3 cooling degree days and heating degree days on the

4 explanatory variable side of the equation, as opposed

5 to going through the adjustment of all the historical

6 load using actual historical consumption and getting

7 it built into the regression equation so.

8   So, it's another approach to dealing

9 with weather normalization.

10   MR. BOB PETERS: Thank you. Mr.

11 Chair, I actually have one (1) more area to address if

12 I might, and thank you.

13   Slide 15 of the Daymark exhibit, the

14 last point, again, is one that My Friend Mr. Hacault

15 belaboured but I thought I could try to understand it

16 a little differently.

17   We're on common ground, Dr. Sodum (sic)

18 and Ms. Kelly that the short-term impact of the rate

19 increase not considered on top consumers relates to

20 the five-year time period; correct?

21   MS. KATHLEEN KELLY: That's correct.

22   MR. BOB PETERS: Everything beyond the

23 five (5) years ends up captured in the potential large

24 industrial load portion of the analysis?

25   MS. KATHLEEN KELLY: Yes.

1   MR. BOB PETERS: So then let's focus

2   on that five-year period in which Mr. Hacault was

3   talking about.

4   And can -- can Daymark agree that the

5   potential large industrial load starts in the year

6   2023/'24 in the 2017 load forecast?

7   DR. SUMAN GAUTAM: Can we look into

8   that figure. I think that was slide 29 on this same.

9   So we have -- I think we have that figure there.

10   MS. KATHLEEN KELLY: Yes, it's up.

11 It's on the screen.

12   DR. SUMAN GAUTAM: So there is some

13 lag between the base screen and -- and the line that

14 we have, yeah.

15   MS. KATHLEEN KELLY: So it looks as

16 though the long-term forecast -- it's hard to tell

17 from that figure as well. It looks like it starts in

18 the 2023 timeframe -- 2021/22 timeframe.

19   MR. BOB PETERS: And Ms. Kelly, I

20 appreciate the effort. I'm not sure that it's

21 correct. We had up on the screen, Manitoba -- sorry,

22 the Public Utilities Board, minimum filing

23 requirements 65 updated which was the load forecast

24 and on page 21 of this document, if we can see the

25 bottom of the page, it appears that if we follow the

1 potential large industrial load, it's shown as a

2 number of zeros for the first five (5) years, correct?

3 You see that on the document?

4   MS. KATHLEEN KELLY: I do.

5   MR. BOB PETERS: And Dr. Gautam, are

6 you with me?

7   DR. SUMAN GAUTAM: Yes, I can see page

8 21. Yeah, I see that graph but...

9   MR. BOB PETERS: And so the potential

10 large industrial load starts substantially in

11 2023/'24; would you accept that?

12

13   (BRIEF PAUSE)

14

15   MS. KATHLEEN KELLY: Yes.

16   MR. BOB PETERS: And if we can then go

17 to the PUB/Daymark Information Request 16, which I

18 believe was the chart that Mr. Hacault was reviewing.

19   If we accept that the potential large

20 industrial load starts substantially in 2023/'24 can

21 this analysis, that's on the screen, then just be

22 transposed one (1) year, so that it starts in

23 2018/'19?

24   MS. KATHLEEN KELLY: Yes, so we'd have

25 to -- we'd have to add '22/'23 to it but the

1 appropriate short-term load.

2   MR. BOB PETERS: But that would drop

3 off then the 2017/'18 year, correct?

4   MS. KATHLEEN KELLY: Yes.

5   DR. SUMAN GAUTAM: If we -- if we go

6 back to -- so if we go back to the earlier on -- on --

7 on NFR 65 updated on page 21. So their PLIR load is

8 starting on -- 2022/'23.

9   MR. BOB PETERS: And that's the 8

10 gigawatt hours that you're referring to?

11   DR. SUMAN GAUTAM: Yes.

12   MR. BOB PETERS: And I -- I have your

13 point. I was suggesting it starts in earnest starting

14 the following year, but I have your point.

15   And my -- my only suggestion was, can

16 this Board rely on that analysis in PUB/Daymark 16 if

17 it was just transposed one (1) additional year, and

18 I'm hearing from Ms. Kelly that that would drop off

19 the first year. You'd have to add a year at the end.

20   Do the numbers in the far right-hand

21 column change then, Ms. Kelly?

22   MS. KATHLEEN KELLY: If you're

23 dropping off '17/'18 and making the first year

24 '18/'19, then you -- the 12.9 would go away and we

25 would have to go back and look at the short-term load

1 in '22/'23 and mult -- do the calculation again to

2 probably get to about a 37 or 38 gigawatt hour figure.

3 So it would increase it a bit. Assuming that's the

4 correct starting period as opposed to '17/'18.

5   MR. BOB PETERS: Mr. Haight, Mr.

6 Gardner, we will ask through you for an undertaking

7 from your clients to recalculate this chart that's

8 shown in PUB/Daymark load Information Request 16 and

9 to start it in the year of 2018/'19 and -- and

10 provide it for the five (5) years that the short-term

11 forecasts are being used by Manitoba Hydro.

12   MR. WILLIAM HAIGHT: Well, looking at

13 the Daymark scope of work and I don't know how that

14 undertaking falls within their scope of work, Mr.

15 Peters.

16   MR. BOB PETERS: Mr. Haight, it's a

17 revision to an Information Request they've already

18 answered, where they've indicated that their answer is

19 possibly in error in terms of the year in which they

20 started the -- the chart.

21   MR. WILLIAM HAIGHT: Okay, we'll

22 provide it. Thank you, sir.

23

24 --- UNDERTAKING NO. 47:   Daymark to recalculate

25   this chart that's shown in

1   PUB/Daymark load

2   Information Request 16 and

3   to start it in the year of

4   2018/'19 and provide it

5   for the five (5) years

6   that the short-term

7   forecasts are being used

8   by Manitoba Hydro.

9

10   MR. BOB PETERS: And, Mr. Chair, with

11   that I'd like to thank Mr. Haight and Mr. Gardner and

12   more so to thank Ms. Kelly and Dr. Gautam for their

13   responses to my questions. I know it's been a long

14   day for them, but I appreciate the information they've

15   been able to provide. Those conclude my questions.

16   THE CHAIRPERSON: Thank you, Mr.

17   Peters. Mr. Haight, is there any re-examination?

18   MR. WILLIAM HAIGHT: There's no re-

19   examination, sir.

20   THE CHAIRPERSON: Is there a request

21   from Manitoba Hydro in relation to any in-camera

22   session?

23   MR. DOUG BEDFORD: No.

24   THE CHAIRPERSON: Thank you, Ms. Kelly

25   and Dr. Gautam. It's been a long day. We appreciate

 1 your attendance and your assistance to the Board and

 2 we thank you. We will adjourn until nine o'clock

 3 tomorrow morning. Thank you.

 4   DR. SUMAN GAUTAM: Thank you.

 5

 6   (PANEL STANDS DOWN)

 7

 8 --- Upon adjourning at 4:13 p.m.

 9

10 Certified Correct,

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15 _____

16 Cheryl Lavigne, Ms.

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