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 29th, 2018

Pages 6902 to 7148

APPEARANCES

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

LIST OF APPEARANCES (cont'd)

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

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

THE CHAIRPERSON: Good morning, everyone. I hope you had a good weekend. Do we have undertakings or are we moving straight into witnesses? Straight into witnesses.

Mr. Simonsen, can you swear in the witnesses.

COALITION PANEL - METSCO:

THOR HJARTARSON, Sworn
ALEX BAKULEV, Sworn
DMITRY BALASHOV, Sworn

THE CHAIRPERSON: Ms. Dilay...?

MS. KATRINE DILAY: Thank you, Mr. Chair.

EXAMINATION-IN-CHIEF BY MS. KATRINE DILAY

MS. KATRINE DILAY: Good morning. So before we start, we'd like to introduce an exhibit which is the PowerPoint presentation of METSCO. We propose that that be introduced as Exhibit CC-52.

--- EXHIBIT NO. CC-52: PowerPoint presentation of METSCO.

CONTINUED BY MS. KATRINE DILAY:

MS. KATRINE DILAY: So before we go into the presentation, I'd just propose that we highlight some of the qualifications of our witnesses here. And so I'll introduce the witnesses starting directly to my right is Mr. Thor. Hjartarson. Then we have Mr. Dmitry Balashov and finally Mr. Alexander Bakulev.

Mr. Hjartarson, I'll start with you. Would you be able to outline for the Board your education?

MR. THOR HJARTARSON: Yes, thank you. I have a Bachelor of Science degree in Electrical Engineering from the University of Iceland Reykyavik 1988. And then following that, a Master of Applied Science in Electrical Engineering from University of British Columbia in Vancouver in 1990. In both cases there was a specialization in power engineering. I'm also a licensed professional engineer in Ontario. I'm a member of the Icelandic Society of Electrical Engineers and was president of their society for one year in 1993 to '94. I'm a senior member of IEEE and

I'm a member of CIGRE -- CIGRE International.

MS. KATRINE DILAY: And for those last two (2), are you able to explain what they are? IEEE --

MR. THOR HJARTARSON: Yes. IEEE, International Electrical Engineering -- don't remember exactly what it is but it's the -- it's very well known in the engineering side of business.

CIGRE is international, as well as based in France. It focuses on transmission engineering, but also dwells into distribution engineering for Utilities as well.

MS. KATRINE DILAY: Thank you. In terms of your experience, can you confirm that you've been a partner and CEO of METSCO Energy Solutions Inc. since September of 2012?

MR. THOR HJARTARSON: Yes, that's right.

MS. KATRINE DILAY: And in that role, can you explain your experience?

MR. THOR HJARTARSON: Yes, we've -- METSCO is an engineering company. It was -- dwelled a lot into asset management practices. We worked for a number of Utilities around the world, including EPCOR in Edmonton, ENMAX in Calgary, the former utilities of

Alectra in Ontario, Fortis, BC, SaskPower, Toronto Hydro, Portland General Electric, BC Hydro, Guelph Hydro, Hydro Ottawa. We also worked for the Ontario Energy Board and Hydro One Utilities, amongst a -- a number of other utilities as well.

MS. KATRINE DILAY: And prior to your role at METSCO you were manager of system reliability planning at Toronto Hydro from 2007 to 2012?

MR. THOR HJARTARSON: Yes, that's that's correct. This was a department in asset management which focused on looking at reliability of assets; looking at the asset plans; how to put that into justification for rate filings. And we actually over the period I was there we submitted four (4) rate filings to the Ontario Energy Board and -- and defended -- defended them.

We were also responsible for implementing a smart grid type solutions looking at road map for the Utility; how to go forward with new technology. We actually called it Modernizing the Grid rather than -- than Smart Grid.

And lastly, we were involved in looking at -- we're always looking at how to improve our asset management practices. We did a Past 55 evaluation and after that, we implemented a risk-based methodology

which looked at condition, risk, consequence costs and -- and business cases for -- for the sustainment capital.

MS. KATRINE DILAY: Thank you. I'd just like to highlight a few other of your previous experiences which includes principle engineer and asset management lead at Kinectrics Inc.?

MR. THOR HJARTARSON: Yes. At Kinectrics Inc. I was hired there in 2005 and -- and helped develop their asset management practice; help develop how -- how to do asset condition assessment with health indexing; and -- and -- then since I left for Toronto Hydro they've continued to build that up as a quite strong practice.

MS. KATRINE DILAY: You've also been senior supervising engineer for Acres International?

MR. THOR HJARTARSON: Yes, I was there since I moved -- I moved to Canada in 2002, and I was their engineer, supervising engineer to begin with. I did the first health index project that was done in the world at Hydro One; spent about a year. A paper was published with IEEE on health indexing. Health indexing is a condition assessment methodology that since has been -- probably used by hundreds of Utilities around the world.

And previous maybe to that, I was in Iceland I was an engineer at Iceland State Electricity Company. I worked in planning. I worked in direct engineering and then, lastly, I was responsible for operation in the north at Regional Iceland.

MS. KATRINE DILAY: Thank you. And in addition to your experience relating to asset management, can confirm that you also have over thirty (30) publications and presentations in -- in professional magazines and industry conferences, including the facilitation of a Smart Grid Workshop of -- for the World Bank?

MR. THOR HJARTARSON: Yes. So this is -- both at a conference such as IEEE. I'm currently in a working group with CIGRE, the one I mentioned that's based out of Paris. We've done -- did a work -- a Smart Grid Workshop. It was actually in, of all places, Mongolia so that was quite interesting, but I've done presentations in Australia, in Thailand, in -- all over Europe and, of course, in Iceland and Cana -- Canada of course.

MS. KATRINE DILAY: Thank you very much, Mr. Hjartarson.

I'll now move over to Mr. Bakulev. Mr. Bakulev, good morning.

DR. ALEX BAKULEV: Good morning.

MS. KATRINE DILAY: Can you please outline for the Board your education?

DR. ALEX BAKULEV: I have received diplomas degree which is a five year full-time under -- undergrad education, with a specialty in Mathematical Methods of Economics from the St. Petersburg state in Russia -- Russia in 2003.

I have also received the PhD in Economics from the same university in 2007. And I'm also a member of the IEEE which is the Institute of Electrical and Electronics Engineer.

MS. KATRINE DILAY: Thank you. In terms of your experience, you have been vice-president of strategy and assets at METSCO Energy Solutions since 2014?

DR. ALEX BAKULEV: That's correct. In METSCO I have also contributed to the extensive utility asset management preparation optimization experience to a variety of projects in the areas of the asset lifecycle optimization, risk management and business case project justifications.

I must declines (sic) that I have direct oversight of ENMAX from Edmonton -- or ENMAX from Calgary, EPCOR from Edmonton, Toronto Hydro were

one of the client. Hydro One, Portland General Electric, Southern Power in US, SaskPower. Also the clients of mine were the Ontario Energy Board on advising for the asset management best practice performance in Ontario.

MS. KATRINE DILAY: Thank you and prior to joining METSCO, you were also in a variety of positions and assignments with Toronto Hydro?

DR. ALEX BAKULEV: That's correct. So I have been for about seven (7) years with Toronto Hydro leading different departments and groups. I had a direct oversight of the company's asset sustainment portfolio planning and risk-based asset life-time optimization processes.

I have also led the companywide productivity improvement program for few years. I have also acted as a manager of Toronto Hydro's custom incentive rate regulation for the application of the 2015/'19 years. Before that, I was leading the development of the asset management plan for Toronto Hydro in 2011 year, which was filed to the Ontario Energy Board back there.

MS. KATRINE DILAY: Thank you. In terms of some your previous experience, can you speak to that?

DR. ALEX BAKULEV: In my previous experience prior to 2007 when I joined Toronto Hydro, I -- I was working in a management consulting company back in the Russian Federation and in the same field, asset management. I worked with a few clients, one of the clients was the Hydro generation company with a total capacity of 20 gigawatt power.

And I created and developed the risk assessment methodology and asset condition methodology for the Hydro turbines. I worked with the corporate planning department in that year. I have worked with a -- the company that's called Yakutsk Energo. That's a company that serves far east of the Russia that's a vertically integrated company that has the combined heat generation. It has the power generation, it has the transmission across the entire Far East and the distribution services to the clients.

I have also worked with the -- one of the largest European distribution company that has about 65 million distribution costs -- 65 million distribution customers and on the same field of asset management, including condition assessment, risk assessment and the optimal long-term planning decisions.

MS. KATRINE DILAY: Thank you. And

you are also a co-author of several publications and research papers for the Institute of Electrical and Electronics Engineers, the International Council on Large Electric Systems and the Centre for Energy Advancement Through Technological Innovation related to asset management and risk base optimization?

DR. ALEX BAKULEV: That's correct. So I might be author for about maybe five (5) different papers. This also included the different presentations at a variety of conferences across the world. One of them were in the largest distribution and transmission conference in US, Distribute Tech. (phonetic). There were a couple of CI conferences on the -- on the asset management topics.

There were numerous workshops that I presented the asset management material to the attendees. I have also speak to a few international conferences as well.

MS. KATRINE DILAY: Perfect. Thank you, Mr. Bakulev.

I'll now move on to Mr. Balashov. Good morning.

MR. DMITRY BALASHOV: Good morning.

MS. KATRINE DILAY: Could you outline for the Board your education?

MR. DMITRY BALASHOV: Certainly. I received a Bachelor of Political Science from the University of British Columbia in 2005, following which, in 2008 I graduated from Queens University School of Policy Studies with a Masters of Public Administration, specializing in energy policy and trade policy, in particular. And most recently in 2017, I have just completed the requirements for the Executive Master of Business Administration at the Rotman School of Management at the University of Toronto, where my areas of concentration included energy project finance, utility operations productivity and corporate governance, amongst others.

And while at Rotman, I have actually been approached by a faculty to help co-teach and provide instructional advice on the practical capstone course in utility productivity that the school undertook for the full-time MBA program as having been approached by Ontario Ministry of Energy. So I had some experience in instruction as well, just most recently.

MS. KATRINE DILAY: Thank you. In terms of your experience starting in May of 2017 you were senior associate of special projects at METSCO Energy Solutions?

MR. DMITRY BALASHOV: That's correct.

MS. KATRINE DILAY: And since January of 2018 you've been the director of Utility Strategy and Economics Regulation at METSCO?

MR. DMITRY BALASHOV: That's correct. And to -- to add to the practice areas that -- that my colleagues have described, the work that I do at METSCO has more to do with utility regulation and strategy as -- as it is related to -- to asset management in terms of more strategic, more governance aspects of it; as well as specifically performance measurement, creating key performance indicators, economic analysis and also advice to the government bodies on the matters that are more in the policy realm.

MS. KATRINE DILAY: And prior to joining METSCO you spent four (4) years in Toronto Hydro's legal and regulatory affairs division?

MR. DMITRY BALASHOV: That's correct, for the last two (2) years of that four (4) year period I was a lead of regulatory process and analytics where I was responsible developing the Utility's evidence with respect to operations, maintenance, administration and capital planning and execution, as well as implementing at variety of

Ontario Energy Board's directives and new policies with respect to these particular areas within the company. So working quick closely with the asset management experts within Toronto Hydro, as well as looking at both developing for the purposes of regulatory filings, as well as internal implementation of various productively and performance measurement initiatives within the company.

MS. KATRINE DILAY: And in terms of your previous experience, briefly, between 2011 and 2013, you acted as a senior policy advisor in the Ontario Energy Ministry's regulatory affairs and strategic policy division?

MR. DMITRY BALASHOV: That's correct. In that capacity, I oversaw the financial and regulatory affairs of Hydro One and Ontario power generation.

MS. KATRINE DILAY: And between 2008 and 2011, you worked in the Ontario Ministry of Energy Supply, Transmission, and Distribution Policy division?

MR. DMITRY BALASHOV: Correct.

MS. KATRINE DILAY: Can you just describe that role a little bit?

MR. DMITRY BALASHOV: Sounds good. So

in the -- in that role, I was -- was the basically junior policy advisor developing programs and policies related to the integration of renewables into Ontario's grid rates at the time of the feed-in tariff and the Green Energy Act, implementation in there, as well as working with a -- with a variety of First Nations stakeholders on developing programs -- especially for the access to -- to the far -- far North communities, developing the plans in that capacity, among many other policy research assignments.

MS. KATRINE DILAY: And just going back briefly to your experience at Toronto Hydro, that included taking part -- active part in over twenty-five (25) Ontario Energy Board policy consultations and working groups on a variety of subjects related to utility regulation and performance management?

MR. DMITRY BALASHOV: That's correct.

MS. KATRINE DILAY: And just lastly, Mr. Balashov, in terms of the evidence that METSCO has prepared for this proceeding, can you confirm that you were co-author with Mr. Bakulev and Mr. Hjartarson of the report entitled 'Review of Manitoba Hydro's 2017/'18 and 2018/'19 GRA Sustainment Capital', which was filed in this proceeding as Exhibit CC-19?

MR. DMITRY BALASHOV: Absolutely, we confirm that.

MS. KATRINE DILAY: And along with your colleagues from Mexico, you were also -- you were responsible for a number of information request responses regarding this report?

MR. DMITRY BALASHOV: Correct.

MS. KATRINE DILAY: And can you confirm that the written material was prepared under you and your colleagues from METSCO's direction and control, and is accurate to the best of your knowledge and belief?

MR. DMITRY BALASHOV: Confirmed.

MR. KELVIN SHEPHERD: Thank you very much. I will now propose that the witnesses proceed to their presentation.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: And just before we commence, I'll just note that Ms. Desorcy from the Consumers Association is back, once again back in the back rows.

(BRIEF PAUSE)

PRESENTATION BY METSCO PANEL:

MR. THOR HJARTARSON: So we are going to talk tag team a bit through this presentation, and we're starting with the old man, and he'll speak the shortest, too, but then we'll go on like that.

Anyways, we were retained as an independent expert to evaluate Manitoba Hydro's sustainment capital plans as presented here, and we've just talked about our qualification. In conducting our analy -- analysis, we used information provided by way of prefiled materials, MFR and IR responses, and the applicant's presentation during the July 20, 2017 technical conferences. You will see that a certain portion of this direct testimony are also based on the oral hearing record generated since our reports filing, and are clearly identified as such throughout the presentation.

On balance and, you know, subject to further information becoming available, it is our professional opinion that Manitoba Hydro -- Hydro has not provided sufficient evidence to justify the reasonable of proposed sustainment capital asked for the test years. We will further describe that in -- in this presentation. Our conclusion is grounded on the review of the analytical underpinnings of the

plan, the state of the applicant's relevant decision support tools, performance data, and our knowledge of sector best practices around the world.

We may often talk about best practices and the reasoning underpinning our conclusions ultimately reflective of the specific circumstance of the applicant as represented by its evident, and relative what we see as attainable today, and we also provide recommendation to the PUB to potential oversight enhancement to facilitates the applicant's plan for ongoing implementations and improvements in asset management.

So in summary of our -- the -- the major issues -- and like -- like I said, we will explain that in further detail fur -- later in the presentation. We noticed limited evidence of reliance on asset health and risk data in preparing the current plan in this filing. We noticed a longer, on average, asset degradation timeline -- timelines than those of industry peers. We noticed that inconsistent quality of maintenance records underlining systin -- sustainment budgets. We noticed inconsistent cost -- cost estimation practices and a history of cost underestimation. There was no external evidence to support the reasonable of proposed capital costs. And

lastly, Manitoba Hydro's favourable -- favourable reliability performance relative to industry peers. They have a -- in other words, better -- better performance than most of their peers.

DR. ALEX BAKULEV: Thank you, Thor. So the -- the next two (2) slides would be just about some sort of refresher of what good asset management practice this case. And if you have any questions, please -- please interrupt me. We'll discuss.

So the first slide is about the asset management. So the management is a -- is a balance of a few conflicting drivers and how the decisions have been made in the most optimal manner to make the trade-offs between those drivers. The one (1) driver is performance, and the performance can be measured based on the data, data on the asset condition, different failure curves, and the history of asset failing in the past, availability indices, growth needs, some other compliance requirements, and so on.

The cost of the -- of -- of the asset considers all the financial costs throughout the life cycle of the asset, starting from the -- acquiring the asset, planning for it, acquiring the asset, and then upgrading the asset throughout the life cycle, maintaining the asset, and maybe after that, disposing

the asset as well.

The risks usually are those months that the -- the stakeholder's experience when the asset fails. So it could be environmental risks, let's say if the transformer is leaking the oil -- oil into the ground. It could be the availability risk associated with the interruption of the power to the customers, and the customers experiencing some losses due to that fact. It could be the financial losses, so a loss of the revenue, which might be significant in certain cases. And the -- the safety risks associated with either public safe -- safety events, or the employees' safety events. A common denominator of overall good asset plan is the use of the objective and the quantifiable information to enable management and amelioration of those trade-offs.

On the next slide, that's the picture that we usually present to show that the masterpiece of -- of this assessment management analysis is a life cycle analysis of the asset. The inputs to the life cycle analysis are gathered through the field inspections, such as, for example, asset testing and diagnostics data that later are being transformed into the health index of the asset. Based on the condition of the asset or the age, if it's the only information

available, the -- the asset management should be able to estimate the fatal probability of the asset.

Based on the fatal probability in different failure modes that the asset experiences, there is an opportunity to understand the impact that the failure will bring to the customers if it fails. So what happens, how long the outage would be, how quickly the supply can be rerouted to a different source, are there any safety events possible as a result of the failure? And ideally, each of the -- each of the asset in the system could -- could have a risk profile associated with the -- with the condition of the asset and the potential failure modes that this assess it has.

If risks are being monetized, then it's -- it's possible to create the financial life cycle analysis included in the monetized risks in the -- in the calculations. And that the life cycle analysis helps understand what's the right timing to replace the asset than what is the right intervention type of those asset based on the lowest life cycle costs. If this analysis is run across the entire system, then the Company is able to understand the asset needs and thus create their short-term projects based on this analysis, and their long-term plans.

As a result, there is also a possibility to understand the availability of forward costs, and what they say -- say the numbers will be in five (5), ten (10), fifteen (15) years based on the different scenarios that the asset management plans for. This methodology also helps to assess the different alternatives that are possible to mitigate those risks, whether we need to build the new asset, the new substation, or we just need to increase the capacity on the existing substation, or just wait and delay for another five (5) years and to see what's -- what the actually brings the lowest cost of ownership to the customer in the end.

DR. BYRON WILLIAMS: Before you leave this slide, and thank you for this. You used two (2) acronyms, one (1) being SAIDI, S-A-I-D-I, the other being SAIFI, S-A-I-F-I, and I just wonder if you could just very quickly explain what you meant by those acronyms.

DR. ALEX BAKULEV: Yes. Those are the availability indicators that are usually used by the companies to assess the availability performance of the system. SAIDI stands for System Average Interruption Duration Index. SAIFI stands for the System Average Interruption Frequency Index. So

SAIFI, again, says how -- what's the average number of outages a average customer experiences throughout the year. SAIDI stands for -- for how long those outages are being experienced by the average customer, Dr. Williams, that's... Okay.

If you go to the next slide, so the asset health index contains different degradation factors that contribute to the asset failure. They are destructive in nature and result in -- in irreparable damage, and have enough support and data to compute an accurate score for the -- for the -- for the asset. If you just rely the assessment, though the probability different asset failure on the age, we may not be that accurate compared to the state when we have the specific condition information about this asset. So condition information helps us to specify and to quantify the exact probability of failure of this asset, assuming that there is enough data that they -- the asset manager has in hands the statistical availability of the failure of the asset.

On the next slide, if the -- the condition plant that the asset manager -- asset manager manages has the good picture of the health indices of all the assets in the system, there is an option to identify the hot spots in the system and

create -- to create the short-term specific projects to address these hot spots in the system. The assets can be in very good condition, good condition, fair condition, very poor condition, and those assets that are in very poor condition most likely needs to have an immediate attention in the nearest future.

However, if we go to the next slide, so the health index is not the only factor that is required to make the decision. On the right side of the slide, I'm showing the three (3) different cases. On the top, let's say that this green boxes, assume they are just distribution transformers. So one (1) transformer on the top is in -- has a health index score of twenty-four (24) out of one hundred (100), which often means in very poor condition. However, it's -- applies to only three (3) residential houses. So in a way, impact is low in terms of the load lost if this transformer fails.

On the medium amongst those options, we have a transformer which has a higher health index, forty-five (45), which translates to poor, and it serves two (2) residential houses, and let's say, one (1) condominium, one (1) office tower. On the bottom of this slide we have another transformer. Let's say the health index is twenty-eight (28), still very

poor. However, it serves a big customer -- a big industrial client, so the impact is really high.

So if the company or asset management has the funding only to replace one (1) of these transformers, which transformer should be replaced? Whether it's twenty-four (24), very poor that has a very low impact, or it should be, let's say, the transformer that has a better condition, but a very high impact.

If the company has money for two (2) of those transformers, then it's also a choice which transformers needs to be replaced. And maybe the first transformer which serves only residential customers, based on the impact and to ensure that customers receive the best value, although it is serviced, it should be run to failure, right? So, and the other two (2) only should be replaced in a proactive manner, not to wait until the asset fails, but to replace it before it fails.

So the -- the essence of the slide is to show that the assessment of the impact of the asset failure is very important in the condition -- in the decision-making process. And how to do this assessment is through the risk assessment exercise. So here we are showing four (4) different type of

risks: financial, collateral damage/safety, customer reliability risk, and environmental.

So examples of the financial risk would be emergency repair, revenue loss, cost to replace the asset. Examples of the collateral damage would be the public or employee death or injury, damage to the adjacent equipment or the facility by the property damage or some costs that are required to put safety barriers in place.

The rel -- reliability costs are the costs associated with the customer interruption costs, so the customer experience certain inconvenience when they don't have the power. However, the reliability costs can be mitigated by the -- having contingency supply in place or through the different protection devices that can help to quickly sectionalize the feeder and restore the power in a fast manner.

The environmental issues are oftenly (sic) connected to, let's say, the oil leaking to SF-6 gas releases, or to move PCB containment in the oil. Or let's say if the work has being done in a sort of greenbelt area. So those risks, if the -- each asset in the system has a -- has a risk profile, then the map -- and you can see this map on the right-hand, and this map actually filed by Toronto Hydro under my --

in -- in the plan that was developed under my supervision. So this map can show you the red hot spots in terms of the risk assessment, those assets that have a very high impact if they fail.

So having this in mind -- bearing this in mind, let -- let's look at the two (2) bar charts that I'm showing on this slide. The right one (1), let's say it's how the customer perceives the value that they are receiving from the delivery of the electricity by the -- by the company. So the green box on the bottom right is the financial cost that the customer has. So they're just paying rates to the utility.

However, on top of that throughout the year they experience some other costs associated with the -- with the non-perfect, non-idealistic quality of the service delivery. So they experience numerous power interruptions throughout the year. So when they experience power interruptions, they assume certain financial losses in -- in their hands.

There are some other costs that are created by the utility to the society, so with the oil releases. It's not just individ -- individualistic customer costs, but the cost for the entire society. There could be some safety cost associated with the

service delivery, injuries happened, some mortality unfortunately happens when the -- when the people are electrocuted.

So those costs are -- if it's in a competitive marketplace, so customer has an option to choose between the different products with a certain value, financial price and the quality that these products bring to the customer. In the monopoly environment, the customer doesn't have a choice. So that's why the customer always bears in mind not just the financial cost that they have, but also the other costs associated with the service delivery or the -- with the poor product quality.

On -- if you go to the left stacked bar, that's kind of showing the cost of owning the electricity delivery system by the utility, and the financial rates more or less associated with the financial cost of the utility to deliver the services to the customer. However, the bulk of these costs, they're -- they're not that kind of intangible and associated mostly with the customer interruption costs, oftenly are not in mind in the decision-making -- in the written decision rate-making exercise.

So to make appropriate comparison and make appropriate decisions, so those other

interruption costs should be considered in their -- in the life cycle analysis. So if you go to the next slide, if the utility or asset manager assumes and treats those other costs that are beared (sic) by the customer, again, customer interruption costs, environmental costs, safety costs, and takes those costs into account when they look at the cost of owning the electricity delivery system then the decisions are being made to ensure that not just the utility gets the best value from assets, but the customer also gets the best value from the services that have been delivered to the customer.

So full cost of system ownership must include those estimates of all economic costs associated with the system. Maybe just wait on this slide for a few seconds because it's -- in my mind, it's -- it's a bit complicated slide, and I can talk a bit more about it.

And usually the asset manager, whenever they make a decision to replace the asset proactively rather than reactively, so before the asset fails, Usually it's done for the reason to ensure that availability is being maintained. So in his mind, the engineer makes a conscious decision to risk a trade off, reliability versus the costs, right?

Financially, maybe the most optimal decision is run to failure the asset. However, bearing that if it runs to failure, the reliability for the customer would worsen, the engineer makes a decision to replace it proactively.

So somehow this trade-off is being made, and those costs for the customer are being accounted for. However, the key is to be able to create a transparent system for all the engineers in the company, and not just engineers but the financial people and other people in the executive management team, to ensure that those decisions are made from the same ground, with the same risk failures that the company develops and creates in its entire risk management system to make the proper priortization choices comparing apples to apples, right?

So this project should be based on the same principles and assessment. This project should be based on the same principles as the other project that is being created by the other engineering and the other department.

Yeah. On the next slide, I'm trying to show these customer interruption costs as the major driver in making the decisions. So customer interruption costs, in essence, is what are the losses

experienced by the customer if the power is not being delivered. And usually those costs mean in the surveys are being consistent of two (2) elements. One (1) is the event itself. So when it happens, when the power interrupts, the customer already experienced some inconvenience.

So let's -- let's say the lights go out right here. It's kind of a loss of productivity in any rate, right? So then the longer the outage goes, the more costs are being associated with this inconvenience. So it's very specific. Let's say, for commercial industrial customers, let's -- let's think retail, right? So it's a store. When the power goes out, so most likely all the customers leave. So that's the event outage. If the retail shop won't be able to have the power for two (2) hours, that's lost of rev -- revenue for two (2) hours, for four (4) hours, for four (4) hours, for two (2) days, for two (2) days. So the losses per customer -- per -- losses for the customer increases with the dur -- with the increase of duration of the outage.

There a few techniques how those interruption costs are being assessed. And usually for commercial industrial customers it's just a question, how much did you lose. How -- how much

money did you lose?

For residential it's -- it's not that easy, right? And usually the question is how much you're willing to pay to get a better reliability, or to avoid one (1) outage, or to avoid -- more specifically to wait to avoid one (1) outage during this time of the date for two (2) hours. Or to avoid this out -- this outage, let's say in wintertime, at night for five (5) hours. So -- and those are very specific questions. Or how much money you actually would like to receive back, but you'll have two (2) more outages throughout the year.

So -- but the concept is willingness to pay. How much we are willing to pay. And that's more or less a subjective concept, right? And the -- the asset manager and the -- the commissions frequently, they -- they look at it as a subjective cost. However, if those service that -- I know they usually showed that willingness to pay from the residential customer is a relatively small amount compared to their losses per kilowatt hour, non-delivered, from the commercial industrial customers.

So let's say if a residential customer is willing to pay ten dollars ($10) to avoid the outage equivalent to 1 kilowatt power loss, commercial

industrial customers is willing to pay ten (10, twenty (20) times in terms of financial losses to avoid the same outage per kilowatt power non-delivered.

So using this concept in mind, the -- that's a typical utility that is shown here. So let's say, from -- from a number of customers most is being made up from the residential customers, 90 percent. However, if you go to the consumption, then we can say that consumption drops to residential customers to about 50 percent. And the rest 50 is being made by the commercial industrial customers.

And then if you use those values for customer interruption costs, we can see that residentials are really a tiny portion of the entire customer interruption costs of the system. So basically willingness to pay, which is subjective measure, makes only a small portion of the customer interruption costs in terms of the service delivery. The most is being assessed by the actual losses from the service.

It also actually shows a different side that residential is willing actually to pay way less for the better reliability than the commercial industrial customers, right? So this acceptance of higher rates to residential customers is less

prominent as per commercial industrial customers.

If you go to the next slide, and that's just -- this slide is just about the life cycle calculations to show how the decision can be made. And that's one (1) of the things. So let's -- let's say on the -- we have two (2) graphs here for the new assets on the left, and for the existing asset on the right.

So for the new asset we just calculate what's the average annual cost of this asset would be if you replace it right now. And we include the financial costs to replace the asset and to maintain the asset throughout the life cycle. And we also include the risks associated with this cost replacement, including that when we replace the asset we also have some sort of outage -- plant outage to ensure that the asset is put into service.

So by different completions we try to understand what's the -- what's the minimum life cycle cost of this asset is, and then we compare this minimum optimal life cycle cost of the newer asset with the existing costs of the asset. And if we look at the condition of the existing assets, we look at the failure probability of the existing asset, and the impacts that this asset has. If you know that to

maintain this asset currently actually will -- is a higher cost than the cost of the new asset, then the decision is to replace this asset.

However, if you know that, based on the analysis, that the current -- the -- the cost of the current asset is lower than the cost of the new asset in the long term, in the long run, then we would leave this -- this asset until those two (2) curve intersect.

So in this specific example with the existing asset -- and it's a conceptual slide, but we show that, let's say, that the optimal time to replace this existing asset is when it reaches thirty-four (34) years old. So if the asset is younger than thirty-four (34) years old, the decision is not to replace it. If it's older than thirty-four (34) years old, the decision is to replace it. And for each asset in the system, this timing would be different, because each asset has a different condition and has a different impact of failure.

If we go to the next slide, I'm just showing different options, how to intervene with the asset. So let's take their buried underground cable as an example. Their buried underground cable is a cable that runs beneath the earth without any duct

around it. So basically if the asset fails, somebody has to go there, dig it up, splice the cable because there is no duct around, so you just -- you splice the cable and you re -- you restore the power. So that's one (1) option for the cable. Just to -- let's wait until it fails, and then we dig it up, splice it, and the restoration is done. And usually it may take up to ten (10), twelve (12) hours to restore the power.

The next intervention could be cable injection. So we are not replacing this cable, but we rather inject -- if the cable is injectable, we would rather inject a specific fluid in the cable to prolong the life of the asset for another twenty (20) years. It doesn't make it perfect. You still have a chance to fail, and higher chance than the new cable, but that's another option that could be economically viable for this cable.

The third option is, let's replace the cable with a new one, and with a new standard. Let's put the duct around this cable. And when the cable is in duct it's easier to replace in the way that if it fails you would just pull the cable and bring in a new cable in.

So those three (3) options have to be analyzed for -- for any cable seg -- segment to ensure

that the most optimal option is being chosen. This example is underground cable, but any asset has this different type of options.

On the next slides, that's kind of an example of the -- of the assessment. So if you look at the right side of the slide, we can see that the -- that the blue bar that shows number of assets. And again, not related to Manitoba Hydro at all. It's' not Manitoba Hydro's data. So it's just one (1) example of the utility that we worked with.

So it shows the backlog of assets that if all of them have gone through this life cycle analysis, it shows those assets most likely for the -- to bring the best value to the customer should have been had -- should have had been replaced earlier than right now. So this backlog should be mitigated in a way in the next few years, ten (10) years maybe to ensure that the system is brought back to the -- to the balance.

The red bar here shows the historical replacements that the utility has made, so we can see that for some assets the historical replacements were pretty low compared to the backlog. And the green bar, is the planned future replacements to ensure that the backlog is being mitigated. Some assets could

have a -- have a backlog. Some assets actually may not have a backlog.

And this calculation is being made on the -- if you look at the left graph is being made on the decision, what's -- what's the best timing and the best intervention option for the asset to ensure that the total cost of ownership of this asset is being brought down. So we can see the existing amount and that -- that's a higher chart -- bar chart and the new one (1), if intervention is being done -- done at the right time, we can actually bring the total cost of ownership of the system down.

And the last slide on the -- on the asset management principles. So using this technique life cycle costs -- calculations and total cost of ownership, is just an example of one (1) of the project that has -- so I think this was done -- so let's say there is a feeder in downtown area of the -- of the city that is more or less in bad condition and it doesn't have too many protections. So if any asset fails on this feeder, what happens that the customer will lost power for a long period of time because there is no other routes to resupply those customers on this feeder.

So the question that they had to answer

was: What's the best option, right? Leave it as it is, wait until the asset fails, and just replace it as they fail. So no reconfiguration, just wait for the future, right? So if cable fails or a specific segment on this feeder fails, let's splice it. If transformer fails, let's splice it and go on and on.

And we can say that for this option, which is option number 1, status quo, the risk is rising. Not significantly, not abruptly, but slowly is rising in the future. So -- and we can try to calculate those cost -- cost streams for the next one hundred (100) years, two hundred (200) years, discounted back to the present time and discern what's the cost of ownership for this option.

The next option, which is option 2, was let's try to install some protection devices on the feeder. So meaning if they -- if they some asset on the feeder fails, we can actually isolate this asset and restore the rest of the customers on the feeder. So a little bit better design of the feeder, right? So none sig -- no significant investments in the beginning, and we can see this higher bar chart in the beginning.

However, let's wait for another, in this case, ten (10) years and all we have -- so do

better protection now, let's wait for another ten (10) years and then maybe do a full replacement of the feeder on the year 10. Actually ran not just year ten (10), so what if you replace the full feeder in year 20, in year 15, so different options.

And option 3 is still let's rebuild this feeder right now, with a better design, with the better protection, and we can see that it -- it is a significant cost in the beginning, this green bar. But very low risk costs in the future. So -- and the question is: What's the best option? Whether just go with the status quo, or whether we just do some alternative solution right now, a quick fix, wait for another ten (10) years, and extend or delay the significant investments for another ten (10) years. Or just do a full investment right now. Same issue with different alternatives to think what's the best.

In this case, the best was option 2, but different circumstances can derive different signals.

DR. BYRON WILLIAMS: Mr. Chair, just before we -- we move on to the next section, which will -- in terms of a break for the Board, I think we're right on schedule with recognizing that we put in a bit more time on qualifications. Would --would

the Board -- I -- I think we'll be -- we'll certainly be done before 11:00, but is the Board looking for a break at 10:30, or what would be your guidance, sir?

THE CHAIRPERSON: I'd -- I'd suggest sometime between 10:15 and 10:30, but just at a natural break spot.

DR. BYRON WILLIAMS: Thank you.

THE CHAIRPERSON: We won't be driven by the time. We'll be driven by the presentation.

DR. BYRON WILLIAMS: Okay. Thank you.

MR. BRENT CZARNECKI: Mr. Chair, it's Brent Czarnecki. I'm the lawyer for Hydro -- for METSCO. I didn't want to introduce myself at this juncture of the hearing in this way, but I feel compelled to do so. Slides 7 to 19, I just note for the record, are entirely new slides. They are not contained in any of the evidence of METSCO as far as I've seen and looked at.

Now, perhaps I would -- and I do appreciate Mr. (sic) Bakulev's genuine interest here to educate the Board in terms of providing a refresher on asset management policies and general -- general principles, which probably saves me from what I would otherwise ask you to do, to say to strike these slides but I'm not going to do so.

I would just request that you weigh them accordingly in your decision-making because obviously I'm at the disadvantage having seen this report yesterday for the first time to come up with any meaningful cross or subject IRs on this matter, but it's more or less a procedural issue. So we'll let it proceed, but I just wanted to make that note clear for the record that this is brand-new information.

DR. BYRON WILLIAMS: Our -- our clients would disagree with that strenuously, and simply note figure 1 of this -- of this evidence at page 11 introduces these concepts. There's a lot of -- - there's a good discussion in the report, and there's also an extensive rel -- linking to good practice documents from all sorts of jurisdictions. So -- so our client -- we appreciate the comments by -- by Manitoba Hydro, but we -- we don't agree with their conclusions.

THE CHAIRPERSON: Well, the ques -- sorry. The question I had is whether these are just used as an examples, or these are Manitoba Hydro numbers?

DR. BYRON WILLIAMS: And I should have made that clear. These are examples.

THE CHAIRPERSON: Well, if they're examples and just as background information, I mean, we'll -- we'll take it for that, not in relation to this as any -- any reflection on what Manitoba Hydro is actually doing, just simply here's the sort of factors you look at. That -- I -- I assumed these were just simply examples and -- and nothing, you know, --

DR. BYRON WILLIAMS: Exactly. And -- and --

THE CHAIRPERSON: -- it from an analysis of what Manitoba does.

DR. BYRON WILLIAMS: Exactly, but it's also -- it -- it is these principles that are being applied --

THE CHAIRPERSON: Correct. Yeah. No, I understand that.

DR. BYRON WILLIAMS: -- in the rest. And we appreciate that.

THE CHAIRPERSON: Okay.

MR. BRENT CZARNECKI: And, Mr. Chair, just to be clear, I don't think that Hydro takes any issue with the general examples. And I think Mr. Wortley's testimony is consistent with these types of principles, but...

THE CHAIRPERSON: Thank you.

THE VICE-CHAIRPERSON: So I just have one (1) question before we move on. So, Mr. Bakulev, on this slide 19. I believe I heard you say that option 2 is the best option out of these three (3).

Is that based on cost, or would that be based on the number of factors that you spoke of before in previous slides?

DR. ALEX BAKULEV: So this slide, when I say option 2, it was related to the specific work that we did. It -- and in other circumstances there could be different alternatives. It could option 1 or option 3. But in the specific work that we did then that's -- that's example of this work. So the costs that -- that we included in this calculation were the -- the cost streams for the next one hundred (100) years. And those cost streams included the financial costs to replace the infrastructure. It included cost to maintain the infrastructure. And it included the risk costs that I talked about in terms of the customer interruption costs, safety costs, environmental costs, and financial costs associated with the failure of the assets.

THE CHAIRPERSON: Okay. Please proceed.

MR. DMITRY BALASHOV: Thank you, Mr. Chair. So as Dr. Bakulev has walked us through what is essentially an asset management process that shows how the different types of quantitative evidence put together can lead to a meaningful evaluation of various planning options on the basis of particular asset class or the entire program. And so this was essentially the main vein of analysis in which we have a approached Manitoba Hydro's evidence.

And as we move to the next slide, just for context, as we started, having not done any work in Manitoba for quite some time, we tried to position ourselves to contextualize the -- the subject matter that was asked for us to provide the testimony. And really the sustainment capital and what you see here is a pie chart based on the 2017 plan in particular, just shown as an example. The sustainment is a fairly small cost driver in relative terms to Manitoba Hydro's application, about 10 percent.

However, given the fact that sustainment capital is what really determines and drives the performance of the system that the customer's experience on a daily basis, it is a very important one (1). And given the fact that it -- it -- for -- represents only 10 percent is a function of

large greenfield projects that Manitoba Hydro is undertaking. There's obviously limitations in terms of the relative dollar allocation they could put in there.

And the point here is that that means that the optimal regular needs to be put into deciding the manner of intervention, the timing of intervention, the types of assets that are being intervened upon in this way. And, whereas, greenfield work, such as new generation and transmission projects that comprise the bulk of the ask for funding, there is generally a higher tolerance for unpredictable events that could potentially change forecasts.

The utilities, as a rule, do sustainment work on a constant regular annual basis, and as such, we would expect them to have a better command and control in terms of the things that -- that they do. So that was just our orientation for how we went to -- a little too far? Too close? Okay. I'm -- I'm being eager. I apologize. Is that good? Wonderful.

So our starting point as we looked at the evidence was other external work that has been done in recent past that related to asset management. We did not want to duplicate the work that we had done

that -- that was done before us. And so the Boston Consulting Group reports relating to the Keeyask and the Bipole, as well as the UMS study of asset management maturities were good starting points for us to look at the current status of Manitoba Hydro's asset management with relation to sustainment of capital, in particular, and -- and more generally.

And so what you see in front of you on the screen is a -- is essent -- is essentially a take away, a graphic from the UMS report. And I believe this panel has heard quite a bit about the UMS report and the fact that they have ranked Manitoba Hydro as one and a half (1 1/2) on a scale of zero to four (4), so one and a half (1 1/2) out of five (5) potential, which indicates less than maturity by quite a bit. But as UMS had stated it compares quite favourably to a lot of other Canadian utilities.

And as we read the UMS report we realized that this was largely a function -- and there's -- there's a quote on the screen of the new initiative that Manitoba Hydro has currently implemented: the capital investment optimization tool, the Copperleaf, the asset health indices, reliability centred maintenance, and things like that.

And so what we set out to do is, among

other things that we'll talk about as we move to the next slide, we set out to explore whether and how these tools that particularly led to this assessment were reflected in the plan that was presented to the PUB for their evaluation.

DR. BYRON WILLIAMS: Could we go just back to slide 22 for a second.

MR. DMITRY BALASHOV: Sure.

DR. BYRON WILLIAMS: Can you situate for us where Manitoba Hydro is? Are -- are they the star?

MR. DMITRY BALASHOV: I -- I -- that is -- that is correct. Hydro current state. So right between one (1) and two (2), at about one and a half (1 1/2).

DR. BYRON WILLIAMS: Okay. And SaskPower is a bit to their left on that?

MR. DMITRY BALASHOV: That's correct.

DR. BYRON WILLIAMS: And if we look to the right under "competent," you would see BC Hydro, for example, and Hydro One kind of on the border?

MR. DMITRY BALASHOV: That is correct.

DR. BYRON WILLIAMS: Okay. Thank you.

MR. DMITRY BALASHOV: All right. So looking forward, having been --

THE CHAIRPERSON: Sorry to interrupt for a second.

MR. DMITRY BALASHOV: Yes.

THE CHAIRPERSON: Where would -- I'm just looking. Where would Quebec Hydro be in this?

MR. DMITRY BALASHOV: I'm not sure that were in a position to answer this question, given that this is the UMS assessment, based on their criteria. We -- we've put it in there just as a -- as a backgrounder for -- for ourselves as we looked at it. It's a framework that is used fairly extensively, and they -- they have done and refined it over the years. So they're a very reputable consultant but we're not in a position to say where anyone would fall.

THE CHAIRPERSON: Yeah. Thank you.

MR. DMITRY BALASHOV: So moving forward to the next slide. We've asked seventy-four (74) discrete IRs made up of a number of separate sub-point numbering probably in several hundred. And having been engaged as a technical expert, what we were really hoping to see is an ability to validate the technical underpinnings that the applicant has claimed that underlie all of the sustainment work that they've put on -- on record in the plans.

So we've asked for spreadsheets, failure curves, diagrams, and other types of quantitative information, in addition to access and/or clarifications of various reports or functions within Manitoba Hydro that have been disclosed either in pre-filed information or elsewhere on the record.

And finally, as -- as mentioned already, we were hoping to see whether and how the recommendations or the findings of UMS and BCG in particular have been incorporated in whether there has been any -- any improvement, any further advancement on those.

And moving to what we have observed on the basis of information that has been prov -- provided to us. The key inference is on the record. So the first area that we'll speak to, and we tried to break them down into several components, is the data collection and utilization practice. So as Mr. Bakulev has spoken to it, so just going to the next light. Thank you. In 26, obviously, prudent and consistent asset management is grounded in good data governance, good data collection, and utilization.

Given that utilities normally and increasingly associates budgetary constraints as things start to age and fail, we were trying to look

for, you know, the -- the areas that Mr. Bakulev spoke to is condition, health in other words, as well as the risk data. So looking for condition data availability, we do commend Manitoba Hydro for taking significant steps in the last couple of years, as evidenced even by the information that has been supplanted and supplemented through this proceeding in the form of various Kinectrics reports that have enhanced the health index availability data that they have had on hand now.

However, there is -- there are still substantial gaps in terms of the information related to Manitoba Hydro's specific failure curves, for example, or in terms of health index of the twenty-three (23) core distribution asset classes. There was about nine (9) that had only 50 percent of what Kinectrics in their reports refers to as "average data availability index." So basically how much actual health data do we have to base our conclusions about the asset class's health on.

And another seven (7) had no actual condition based data from Manitoba Hydro's field. And to us this was concerning for a number of reasons, specifically with such classic losses under -- underground. High-voltage oilfield cables, for

example, were -- there was effectively no condition data available. Duct line and overhead switches were others where there was very limited.

And so to us, this is an indication of a potential limiting factor in terms of the ability for the utility to claim that health index and asset condition was taken into account in a significant way when it came to preparing this plan. And we heard in reviewing the transcript that Manitoba Hydro witnesses have argued that in a lot of cases where the data is missing, it's the assets that they replaced reactively as they fail, because they're cheaper.

And we don't necessarily agree with that, respectfully, partially because when it comes to the context of planning and approving the plan, having the actual condition data allows a higher precision in terms of how many things are expected to fail. So not having this information challenges the -- the rigour of the plan at hand.

So moving to the next slide, speaking a little bit more about the practice through which health and condition of assets is actually collected, which is largely through various maintenance activities being inspection, being various minor work that is actually done on the assets, like insulator

washing and things of that nature. It's really a key element of sustainment planning, because this is how the utility gets the information that it needs to then assess the health of the data.

And on the record Manitoba Hydro, as part of responses to some of our IRs, has put some documents that are essentially internal reports written by Manitoba Hydro staff that note quite a few significant gaps in terms of how maintenance practices vary across the company between the various business groups, or even within the same business group. I believe the specific report that I'm reference to spoke of different ways that generation projects south versus generation project north categorizes, labels, and collects data identifying a number of other practices that needed substantial improvement based on their language.

That said, there -- there has also been examples of good maintenance practices, such as, for example, the pole maintenance reference materials that have been failed and others. But generally speaking, to us, absent clear and consistent maintenance execution work of which we saw some evidence through these internal reports that are fairly recent, it is difficult for us to see the quality and completeness

of data available as something that could present a consistent and compelling way to really have a consistent way of what is the condition of the plant all across.

And we completely understand that the introduction of new tools and processes of which Manitoba Hydro spoken about take significant time. A core activity like maintenance is something that a utility of Manitoba Hydro's maturity, size, and sophistication should perhaps have a slightly better handle on than some of this information indicated.

So moving forward and sticking to maintenance and talking about advanced maintenance analytics, in the UMS reports we note that the consultant had talked about the fact that Manitoba Hydro does not necessarily have a very good grasp on the financial trade-offs between the value of doing capital work versus maintenance work. Like, for example, as a utility replaces an aging piece of equipment they could expect over time to realize some financial maintenance savings when it comes to reactive work that happens if the newer asset fails, which is a lower probability obviously.

UMS noted that Manitoba Hydro hasn't done a lot of quantification work. We've explored

that through IRs a little bit and essentially received the same answer, that this is still something that they are to look to in the future. But also Manitoba Hydro noted that largely given the fact that the volumes of replacements are fairly small, they perhaps did not necessarily see -- see substantial value of doing so, as we understood their response anyway.

Similarly, the reliability centred maintenance, which was one (1) of the -- as you'll recall from the previous slide one (1) of the specific items that UMS had put behind their higher ranking, it's -- it's a fairly advanced practice that has been around for quite a while. In fact, Manitoba Hydro evaluated it back in 2001 and found a significantly positive net present value for implementing it.

We've explored the degree and the extent to which savings have been realized, or the extent to which it's being deployed. And we -- we saw some gaps. For example, the applicant has responded to one (1) of the IRs saying it is not being deployed on the distribution system, despite there being in 2001 a business case that quantified the value for distribution and transmission as being quite positive. And this is something Manitoba Hydro has disputed through their rebuttal evidence, but it appears to

contradict this particular IR where they had previously noted that there was really no distribution RCM work being done.

So moving on to the next slide, and this relates once again to asset condition, and whether the fact that as Manitoba Hydro advance its data gathering capabilities and -- and the data that it has on hand for its analysis, it is moving from what they used in preparation of this plan, among other inputs, which is the failure curves of assets, which essentially is a relationship between an asset's age and its probability to fail over time. So obviously, as it ages, there is -- there is a higher probability based on some other conditions.

And so in the past, with -- with a few exceptions of several asset classes, Manitoba Hydro largely relied on the industry curves derived -- provided to them by Kinectrics from other utilities. And most recently the July 20 of 2017 Kinectrics report that was put on record later in the proceeding has actually compared some of those industry based curves to Manitoba Hydro assets as this data became available.

And with respect to seven (7) asset classes that you see in front of you -- this is

basically a table that we have gathered from that newer Kinectrics report -- it suggests that Manitoba Hydro assets tend to live much longer, or longer, or kind of like on -- on the outer edge of length than -- than the industry curves that have -- have been used before.

So to the extent that the industry derived curves have been an input into Manitoba Hydro's asset management plans for sustainment purposes, it may have led to understate the duration of time that Manitoba Hydro's assets tend to live on average. So thinking that they -- they fail a little sooner, to the extent that this was an input, as has been indicated.

DR. BYRON WILLIAMS: Before you leave this slide, would this July 20th, 2017, Kinectrics study have been available for the purposes of the capital expenditure forecast 16?

MR. DMITRY BALASHOV: Given the date of when it's published, I -- I don't think so. I think it was a brand-new study that was helpfully provided by Manitoba Hydro right at the time of the IRs.

DR. BYRON WILLIAMS: Thank you.

MR. DMITRY BALASHOV: So moving to

slide 30, just to essentially conclude this section. We've already noted that, you know, as recently as in the oral hearing, the applicant has stated that sustainment plans are ground both in risk condition and analysis work presented by Manitoba Hydro. And what we have tried to do throughout the proceeding is really request this -- this quantitative data to do two (2) things. To validate the methodologies that Manitoba Hydro has employed, and also to verify the types of computations that they have underlined.

And in most cases we have not been able to receive any responses. Manitoba Hydro has either stated that the spreadsheet software, like Excel, was -- was not being used for this analysis or that information was unavailable. So it was very little in terms of this rigourous quantitative work that we were hoping to -- to help this Board understand.

However, the -- we -- we did establish that the -- for example, when it comes to asset health risk acceptance Manitoba Hydro does not currently employ defined quantitative thresholds. And generally, when Manitoba Hydro, in our experience, has -- has responded to questions for specific information, quite often they -- what it had invoked in its answers was the technical expertise of its

staff that are located throughout the province and really know the system.

And by no means are we questioning that expertise, or wish to come off as such. However, the problem is one (1), the utility is providing a plan that consists of three (3) subsystems: generation, transmission, and distribution, and discrete assets located throughout the province. The lack of consistent and quantitatively verifiable evidentiary basis, it's -- it's something that makes it a little difficult to confirm the -- the rigour and the consistency of analysis and assumptions that went into it.

So the plan, as Mr. Bakulev has described, has to be more than a sum of individual sub plants that come together and are tabled together in the same presentation or application.

DR. BYRON WILLIAMS: This might be a convenient --

MR. DMITRY BALASHOV: Shall we take -- take a break? Sure.

DR. BYRON WILLIAMS: -- point, subject to the Board's direction to take a break.

THE CHAIRPERSON: We'll take a break for fifteen (15) minutes. Thank you.

--- Upon recessing at 10:18 a.m.

--- Upon resuming at 10:35 a.m.

THE CHAIRPERSON: Please continue.

MR. DMITRY BALASHOV: Thank you. So to pick up on slide 31, the next issue area that we're going to address is the progress of the corporate asset management initiatives, which again as we've noted, formed the basis of UMS's ranking and I have been described in a fair amount of detail by Manitoba Hydro on its -- in its -- throughout its evidence, so.

I'm sure this -- this Panel has heard enough about the capital portfolio management program and the enterprise asset management initiatives, the corporate value framework. So, all of these are fantastic initiatives for which we commend Manitoba Hydro for pursuing and -- and kicking off.

What we did note is that a lot of this work, especially when it comes to the corporate asset management initiative, it's still in fairly early stages and has been -- so for -- for some time. There -- there's been some progress noted throughout this hearing but we know, for example, that the asset management roadmap, which is something that the

applicant has referred to as the real gauge of their progress for this initiative, it's still something that remains to be developed. And to us, absence this roadmap -- it's difficult for us to see that -- that project, in particular, being meaningfully underway and that is, notwithstanding the fact that there is -- there's been progress on other things like the completion of the enterprise asset management for the generation unit work that I believe has been mentioned in the oral hearing, among a few others.

But until the -- the roadmap and -- and -- and other major quantitative aspects of this initiatives are -- are put in place, it's -- it's difficult to -- for -- for the Board in -- in our opinion to see whether and how the Manitoba Hydro's proceeding towards these.

And speaking of quantification, the one (1) issue that we certainly flagged is the fact that the value proposition of a lot of these major initiatives remains unquantified. And when we asked Manitoba Hydro as to why that is the case, we have been told that these are largely corporate priorities and as such do not necessarily need to be quantified. And while that may very well be the case, the issue with that is that it makes it a lot more difficult to

gauge the progress and/or the success of these initiatives inter -- internally corporately for Manitoba Hydro or for -- for this Panel in this or the future hearings.

So generally speaking, just to conclude, we have also established that by and large all of these new initiatives have not been reflected in -- in the CF16, which is the plan that is before the Board for approval in this hearing.

Moving to the next slide to speak a little bit about how -- what -- what -- what are kind of the mechanics, the nuts and bolts of -- of these asset management initiatives. A lot of them have to do with IT capabilities. And while we've seen some evidence of new capabilities being deployed, for example, the Copperleaf, the C55, the implementation is proceeding. Some of the technical reports associated with implementation that Manitoba Hydro has put on record would suggest that's it is yet to meaningfully leverage these capabilities that are already in the rate base and that have been implemented.

So, for example, you will see a quote in front of yourself saying that the investment decision optimization part of the C55 framework is not

-- you know, will -- will require data process and refinement, which are future steps. So our understanding of how CopperLeaf technology works and that's something that we've dealt with in other jurisdictions is that it's -- it's effectively an investment optimization function. And if -- if the inven -- investment optimization functionality is not enabled, it is difficult for us to see the value that the applicant currently derives.

Moving on, the Meridian generation performance management -- sorry, we're still on the same slide actually -- is something Manitoba Hydro has implemented for the purposes of tracking how the generation business, in particular, is doing on the basis of various quantitative metrics. And the reports associated with it also indicate that things like RCM, again, the reliability centre of maintenance that we talked about a little bit earlier, and other modules still remain to be activated.

And for clarity, METSCO fully understands and endorses the fact that implementation of new corporate IT management initiatives is a significant change management activity that takes a lot of time, however, what I think -- what we think, rather, would -- would -- would be useful perhaps for

the Board is to monitor in future proceedings or further in this proceeding, whether and how these tools are actually being used to showcase how they're providing value, because the implementation of the IT tools in themselves is -- is the relatively easy part of asset management improvements, is whether and how they're actually being utilized consistently and across is -- is the difficult part.

So moving on to speak a little bit more about the C55, the Copperleaf tool. We do commend that this is the approach that Manitoba Hydro has taken in terms of prioritizing its assets management system and how they're going to decide between the various types of investments on the basis of a number of various criteria that are all quantified.

We note that CF16 as Manitoba Hydro has noted has not benefited from -- from this framework, and we want to talk about two (2) specific aspects of it; one that we very much endorse and this is the customer interruption costs, which Dr. Bakulev spoke to to some degree, right. So, what are -- what is the impact of outages on customers' economic welfare, depending on the length, depending on their occurrences and things like that. So, we think it's terrific that Manitoba Hydro is incorporating this

into their process.

There is a bit of an issue which is not uncommon to other Utilities is that a lot of the quantitative data backing up the customer interruption costs is quite dated, and most of the studies are from before year 2000 and only two (2) of them out of ten (10) that are used are sort of from the geographic area of the United States that is geographically and economically similar to Manitoba; basically just south of the border, most of them are from either the east coast or the west coast of the United States.

So we understand that CIC's are quite costly studies because they involve especially with residential customers brought queries and a lot of work. So, to the extent possible, we would encourage Manitoba Hydro to explore possibilities of doing them jointly with other Utilities, members of the CA and so on, as may be available just to bring it a little bit more current and relevant to Manitoba Hydro.

One (1) area where we do -- do see a shortfall that we explored through interrogatories is the fact that the corporal -- corporate value framework, as currently designed, does not specifically have a decision category related to customer rate impact. So more so acceptance of what

customers may see as -- as an acceptable rate impact economically. So, Manitoba Hydro argues that the sole purpose of the tool is to effectively minimize the total cost of the plan, or optimize it so as such it -- - in -- essentially incorporates this but to us this -- - there's -- there's a bit of a difference between looking at it intrinsically versus extrinsically.

And, essentially, we understand that there are circumstances when a Utility needs to go above what may be seen as acceptable, but what integrating this particular element into the framework would do is at least create another quantifiable threshold beyond which the Utility would have to explain and even have an easier time to explain -- explain the value of the investments that they're putting on for customer welfare.

So this is something that is common in other jurisdictions that we work in, Ontario for example, but this -- this -- this was something that stood out to us when it came to the corporate value framework as it is being developed.

Moving on to the next slide --

THE CHAIRPERSON: Excuse me, can I -- can I ask you a couple questions on this screen.

MR. DMITRY BALASHOV: Absolutely.

THE CHAIRPERSON: Your third bullet you refer to:

> "The quantification of interruption costs are not optimally positioned to reflect the preferences of Manitoba's residences -- residences as businesses."

MR. DMITRY BALASHOV: That is a typo hold. We apologize. It should be "residents and businesses."

THE CHAIRPERSON: And businesses, okay, thank you. I was just wondering --

MR. DMITRY BALASHOV: That is -- that is entirely on us.

THE CHAIRPERSON: No, that's fine. That's fine. The other thing is this customer rate impact that you -- of which you just spoke and you said they have it in Ontario.

Can -- can you go into it, you know what sort of, for example, what sort of questions would you ask to try and -- to get -- try and solicit the information?

MR. DMITRY BALASHOV: Sure. So -- so there are many different ways of looking at it. Typically, it comes -- comes down to acceptance and

engagement of customer. So it's the variety of customer engagement initiatives that, you know, would either put different scenarios as Utilities, especially the larger utilities in Ontario, are required to do a fair bit of customer engagement initiatives that go in support of their distribution or transmission system plans, where they're either presented with various scenarios that say -- say, this is the dollar impact of what we're proposing. This is an alternative A and alternative B and these are the costs associated with them.

And then there is a variety of one -- essentially, survey type questions that -- that look at this, right. So, there's many different ways to -- to put this, but to us, this is something that is a little separate just from looking at the efficiency and also trying to establish an external constraint.

And by no means is this a heart cap or anything like that. All it does is just brings in the thinking from the broad economic environment more directly to what are the considerations that drive the utility planning.

THE CHAIRPERSON: And would I be correct that the way you approach it may vary depending on the Utility?

MR. DMITRY BALASHOV: Absolutely.

THE CHAIRPERSON: Okay. So would the question -- would one of the areas in Ontario for this talk about time of use?

MR. DMITRY BALASHOV: Generally speaking, I think it could be, but I will honestly tell you that this is a little bit out of my area of expertise, in particular, both the surveys and the time of use.

THE CHAIRPERSON: Okay, thank you.

MR. DMITRY BALASHOV: Wonderful. So, to continue on slide 35. Responding to continued implementation and put -- of -- of the corporate asset management initiatives. Manitoba Hydro has noted that they've also put in place some interim governance tools to review and approve the investments that are being proposed and one of them was the corporates AM executive council, AM being asset management, that is effectively tasked with reviewing and approving all of the projects costing over 15 million and investment portfolios of all individual operating groups.

And we do see that as potentially an effective way of doing things in the interim, however, that usually works well when a Utility has consistent terms of reference in terms of what are the underlying

data inputs for the purposes of the analysis that underlies the investment in front of them.

When we see the variability that we've seen, for example, through the maintenance records, and lacked -- lack of consistent health index, it become -- it could potentially become actually a bottleneck if every time the corporate counsel would have to dig in to figure out exactly what the assumptions that have been used. So, to us, it could potentially be a bit of a danger so -- but we understand that this is an interim tool, that's that.

Manitoba Hydro also noted in the IRs that they've established a strategic business integration division to address some areas of duplication, functionally, between various organizations involved in asset management planning, which was something that UMS group, for example, noted very clearly. We tried to establish what the mandate or the deliverables of that group have been. Manitoba Hydro has argued that this was out of scope of the current proceeding. So we did not pursue that issue even further, but I think it would probably be of interest to the Board in the future proceedings to see how this go -- goes forward.

One (1) thing that we found somewhat

concerning is the fact that as of September 2017 when we were asking IRs, Manitoba Hydro was yet to establish the 2017 and '18 corporate dashboard typed-in targets. So the corporate key performance indicators, you know, more than midway through the year were ostensibly not -- not established. And we understand that sometimes when there's a lot of change management initiatives going on things are in flux, but it does not mean that the -- the Utility should not rate itself how -- how it's doing. In fact, it -- it would probably be great if some of these KPIs reflected to -- the progress on some of these initiatives.

Moving on to conclude this section. Through BCG and UMS work that we have referred to, Manitoba Hydro has obtained substantial insights in terms of some of the potential gaps and improvement opportunities that they had in front of them, and we wanted to explore whether and to what extent the Utility is -- is utilizing these things. So we've asked them a series of questions on that, one of them being, what formal sort of lessons learned postmortem type activities or anything like that has the Utility done based on the findings related to the methodology of Bipole and Keeyask approvals that had some issues,

that some significant findings, has Manitoba Hydro taken any steps. And the response was that they could not point to any specific lesson learned activities, but that they were, you know, always trying to improve.

And, similarly, when it comes to the IR responses to the UMS recommendations, it does not appear that Manitoba Hydro has developed a formal stance on the series of, I believe, twenty (20) recommendations, nor has it requested the detailed information that underlies the assessments. So to us this -- both of these issues are potentially concern because, effectively, these are learning opportunities for which Manitoba Hydro has already paid for and, you know, this is information available and that is just something that we flagged in our report and wanted to flag in this presentation.

Moving on to cost estimation and validation issues, slide 38, please. And I will spend some time on this table, just to make sure that it's entirely clear. So, what we have done is we've asked Manitoba Hydro to provide us a sample of representative projects, estimation of costs as they mature from what was filed to more detailed -- as -- we left it open to Manitoba Hydro in terms of how it

category -- categorizes the various stages, and then finally, the actual cost of project.

So what Manitoba Hydro has provided is forty-nine (49) projects generation, transmission, marketing, customer service, which we understand was the name of the distribution division and HR and corporate services. Ad there are three (3) categories, one being, the original estimate which I guess is when -- when the project is just being prepared; the second one being completion estimate, which is when the more detailed engineering work has been done; and then the actual cost.

So as we were asking other questions in the area of estimation, Manitoba Hydro has noted to us that -- once -- once we found out about these three (3) stages, our natural question was: What does Manitoba Hydro put on record for the purposes of their applications? And the response was that it is usually whatever is the latest estimate available for any project.

So to us this was somewhat concerning, because that essentially means that there is projects of various vintages with various levels of rigour applied to it. And then we -- we sought to explore what the cost variances were. So, as you can see

through this table and, again, the first column -- the first column with the numbers from the left is the completion estimate versus the original estimates. So positive numbers indicate a much higher estimate -- indicate higher estimate than the original estimates. So you'll see that the combined mathematical average is about 40 percent as the project matures.

Moving on to the second column to the -- to the right from the previous one is the actual cost completion. So, as -- as the projects matures, so obviously, the delta, the change between the completion estimate and the actual cost is significantly smaller.

And then we took the third column where we compared the first and the last, so the original estimate and the actual cost, showing what the differences. And effectively what this shows is that on average there is about -- approaching 50 percent difference between the original estimates and the actual cost of work. So it's actually 50 percent higher that is being assessed in the original estimates and that increases to over 100 percent if we actually weigh the sample of forty-nine (49) projects on the basis of their relative cost.

So cost reiteration is certainly to be

expected with Utilities and as projects mature, the precision has to become better, and does become better, but on average in a sample about this size and for clarity, this is in no way statistically validated by ourselves, we would expect to see the average variability to approach zero as some projects are overestimated some are underestimated. This does not appear to be the case in -- in this particular sample. So the averages are quite high.

And that is certainly a concern when it comes to the ability of this Board to hold Manitoba Hydro accountable for its project delivery costs.

And as we move to slide 39, while we see under estimation in terms of the cost of individual projects, we see some evidence of overestimation of the cost of in-service addition. So Manitoba Hydro in the last three (3) plans being '14/''15 through '16/''17 has overestimated its in-service additions forecasts by 11 percent within the maj -- major generation and transmission category and by over 14 -- 18 percent, pardon me, for the business operations capital projects.

And as we noted earlier, variability certainly a part of Utility work as conditions change, but we would expect to see more rigour with respect to

business operations projects which is something that is -- as more of a due course the Utility does year in and year out.

And what this indicates to us is that the estimates of ISAs, in-service additions, that go into the rates are -- are higher than the actual work that the Utility can do. So on one hand we have underestimation in terms of project costs and then we have some evidence of overestimation in terms of how much work Manitoba Hydro can actually do.

We haven't been able to validate what -- what the rational there is. There -- there isn't enough information available to us. We did note that during the oral hearing Manitoba Hydro spoke -- Manitoba Hydro's witnesses spoke to unallocated target adjustment, which was the older planning approach that they have used to even now it's the spending profile across the year. So perhaps that could be one of the reasons, but this is entirely speculative from our perspective. Generally speaking, though, we would encouraged the PUB to explore the issue of cost estimation in -- in greater detail, including -- especially the feasibility of introducing standard expectations in terms of what it sees in front of itself, so it could be comparable.

Moving on to another part of the issue related to cost estimation is the fact that the evidence of such did not include any capital cost benchmarking information. And regulators in -- in many provinces use capital cost benchmark -- marking comparing the Utility's cost to itself over time or to other Utilities as a gauge of reasonableness of forecast because Utilities inherently have more information than do the regulators. It's the information asymmetry that normally exists.

We did not find any capital cost benchmarking evidence ourselves, and we do note that this was not an explicit requirement. However, we think that this type of information would probably be useful operationally to the Utility as well. There is, however, OM&A cost benchmarking that Boston Consulting has performed for Manitoba Hydro that is on record. And we can draw some inferences from -- from it insofar as between 15 and 70 percent of Manitoba Hydro's capital cost based on the information that's available to us; generally made up of capitalized labour, which is a key component of OM&A spending.

And, essentially, what we see there is that the generation units are quite good. If we were to extrapolate this whereas there are substantial

improvement opportunities within transmission and distribution unit and -- insofar as most benchmarked categories are in the fourth quartile of the sample.

We tried to help the Board a little bit by looking at other publicly available benchmarking. The one that we found that was somewhat relevant is a Navigant study done for Hydro One in Ontario quite recently that looked at pole replacement costs. And we do note that based on the evidence that we have, the average of that study, which is about 700 -- $7,100 is significantly higher than the average that Manitoba Hydro has told us they use for the planning purposes in the distribution system, which is about half of, 3500 plus/minus I believe 30 percent.

We do note that as -- as a helpful example. We cannot comment on comparability of those things because we do not have any insight in terms of what exactly is included and there's various costs that can be included and excluded in this thing, but we -- we bring up this example to note that these type of studies could be very helpful for the Board and for the applicant themselves in terms of figuring out what could be next.

And the next slide, I'll just go over very briefly and just mention that this is one way

where you could do the benchmark. We've asked Manitoba Hydro to provide representative breakdowns for transmission and generation projects. We're not going to go on the numbers too long because it -- you know, it's just two (2) projects so we cannot make a lot of -- there were -- there were some small areas of overlap that we noted between various categories, like, activity charges which based on the descriptions would include travel and vehicle cost. And yet these show up as separate items. Consulting charges versus study costs, things of that nature.

All we say is that there are opportunities to be explored further in this -- this potentially being one (1) of the -- one (1) of the ways to do is breaking down projects into their components and looking like that.

Moving to reliability. This panel has heard that Manitoba Hydro's reliability as benchmarked against the CEA peers has been quite good; consistently for the past ten (10) years. We're not going to spend too much time on that. We do acknowledge that reliability is a lagging statistic, which essentially means that the performance that you see is -- in many ways a function of the state of -- of the asset base couple of years ahead. So if you

replace things you will not necessarily see stark improvements right away. So there's always a little bit of a lag.

So, we've acknowledged that and as such we requested that Manitoba Hydro provide us more detailed data. And what the penalties in front of themselves are, the inputs into both the SAIDI and SAIFI that Dr. Bakulev referred to in his presentation, that are related to contributions and total indices specifically from the defective equipment. So, the outages that are caused by things that fail in the field.

And generally, we -- we did not see a consistently increasing trend. And the numbers that we saw particularly with frequency, you know, when the plant starts aging you, generally, see increase in frequency. We did not necessarily see this as -- as -- as you can see by the trend columns that we have added to the numbers provided by Manitoba Hydro, and specifically, with -- with relation to distribution, the average of about 30 percent in the frequency in the SAIFI safety is about comparable to what -- what we see with many Utilities that are sort of in a similar life cycle cost. So, we did not necessarily see -- see any -- anything that would definitively

point to it.

And to Manitoba Hydro's credit, on the next slide, slide 44, they've also provided us with some very detailed information in terms of the number of distribution equipment by type that has failed in the field and we do see some increasing trends. They are not consistent across the asset base and our general observation of this is that the increasing trends are for items that -- the clearly increasing trends like cutouts and a few separators and connectors which are generally smaller parts of the distribution system and are cheaper to replace; whereas with some other we don't necessarily see clear trends.

Although this -- this -- we -- we do note that this is likely a function of Manitoba Hydro replacing their assets before they fail which, depending on their -- on their policy on a particular asset classes is -- is a good thing.

So while we do see higher rates we don't see them across the major parts of the system that really affect the large -- larger numbers of consumers based on information that we have.

Moving out to slide 45. We've asked Manitoba Hydro whether it does any forecasting of

reliability as an input into its planning. So to see what investments they're proposing whether or not it's going to affect reliability.

Part of our evidence that we have provided showed some examples, such as EPCOR or Toronto Hydro studies, for example. Manitoba Hydro responded to us that they do not currently forecast reliability, which is generally -- it's -- it's a little bit behind but it's not inconsistent with where a lot of other Utilities are in terms of reliability forecasting. For -- for the most part, Utilities are still in an assess stage, although they're taking meaningful steps to improve this and our recommendation to Manitoba Hydro on this, in particular, is given the introduction of the C55 framework, the corporate value framework, is the -- and given some of the detail reliability data that they had been able to provide us, we think that they're not that far ahead from being able to establish some rudimentary capabilities that would provide helpful and -- both to the Utility and to this Board in terms of forecasting what type of changes, if any, they may foresee on the basis of the outcomes of the improvements. So not just the dollar spent but what do the consumers expect from this.

And we agree with Manitoba Hydro experts that have spoken in this Panel that reliability alone is not sufficient to be a driver of the program, but it's a helpful and fairly easy to understand and to our -- to our understanding, a fairly easy or relatively simple error, Manitoba Hydro can improve their capabilities going forward.

Finally, the concluding observations. We do appreciate Manitoba Hydro's rebuttal evidence that they have provided to our reports and we certainly appreciate a lot of clarifications to what they described, and I quote:

> "as erroneous statements and assumptions that have been made by METSCO throughout the report."

We do note, however, that Manitoba Hydro presents a lot of standalone evidence of projects where the health indices or the risk assessment has been done; while they are very compelling examples they are nevertheless examples of separate projects and what we had been trying to validate throughout this hearing and what are observations have been in our report is that we do not see a systematic and consistent way of doing this organizationally that would allow Manitoba Hydro to

really plan and prioritize across the different business lines, across the different geographical area.

So to us, while the examples of what Manitoba Hydro is actually doing have been somewhat instructive and informative, they still fell short of giving us that overall sense, especially given the fact that we have not been given the quantitative evidence, that the claims of the rigour generally implied.

In terms of the cost variances, you will recall our discussion of original versus other later stages. Manitoba Hydro explained to us that the gr -- the largest gap which is between the original and the next stage of estimate, original estimates do not necessarily include a lot of engineering rigour, whereas, the next one is where the engineers really get to work on the asset.

So to us, this is a little problematic because given the fact that the original estimates are the ones that are being put in front of Manitoba Hydro's C suite and potentially the Board and also are partially included into this proceeding. So again, if anything to us this is an argument in favour of structure estimate and completion work governance.

And as far as generally our -- our inferences where they have been corrected like, for example, on -- on the issue of cable replacement ratios, to us, this is probably an example of some clarity and comprehensiveness of the evidence on record.

Moving forwards, we did see some evidence of the areas of reduction that Manitoba Hydro has already practically made by way of IRs on this plan and we just wanted to comment on those a little bit.

DR. BYRON WILLIAMS: Could we go back to slide 48 just for second or slide 49 which do you prefer?

MR. DMITRY BALASHOV: I'm on 49 now.

DR. BYRON WILLIAMS: Okay, my mistake.

MR. DMITRY BALASHOV: Sorry. So we've -- we've seen some changes in terms of the revisions of project scopes, cancellation of certain projects and/or deferral of particular projects that Manitoba Hydro has already done practically. So in terms of project scope, there was the Bipole II valve hall bushing, change of the scope, as well as the most recently this -- this panel has heard about the Gillam townsite improvements where the scope of the project

has been revised down materially, I believe so. So these are the examples where it's been done. Some cancellation of work on the spillway of Slave Falls and/or deferral of the thyristor valves in Bipole II.

So the observation that we wanted to make in this particular area is that, given the fact that between the two (2) test -- test years, I believe it's approaching 70 percent of the system renewal budgets on which there's very limited visibility to this Panel in terms of the information that's available. There may be similar opportunities to revise project scopes or defer certain investments because systems are dynamic and conditions do change all the time.

So, given the fact there's very little information we do believe that there might be other opportunities that the applicant, through its internal experts, could explore to do so and some of the areas are the civil components of projects such as the Gillam, for example. There was a fair bit of voltage area upgrades that Manitoba Hydro was planning to implement.

So these are notoriously dynamic and the system load that you may anticipate two (2), three (3) years in the future very well changes. Sometimes

in a way that allows deferral; sometimes the other way. So it really depends. And then the procurements of noncritical spares. The example, and I will just highlight this, we've seen the porcelain valve hall bushing so, basically, a transmission equipment that isolates the current from the civil parts of the asset, and Manitoba Hydro proposed to replace an entire population of spares that we understand were usable, but were based on the older standard. They wanted to replace them at once, which we -- we -- we did not necessarily understand why even though the porcelain technology that these spares represented, you know, was fully functional. It was not the preferred technology and so, for example, other discretionary elements like -- like this one could potentially be explored whether there where. We obviously don't have the visibility into it, but we just wanted to highlight these potential areas.

And finally on the slide 50 to conclude, we do acknowledge and commend Manitoba Hydro for the complex path of implementing and entrenching the new asset management tools and the experts that preceded us, the Manitoba Hydro's expert put the timeline at about three (3) to five (5) years of doing this work. To us, this timeline is not unreasonable.

However, what we have seen through evidence is that in -- in a number of cases, Manitoba Hydro is effectively assuring this Board and the ratepayers that -- that it represents that the work is ongoing. And then that takes substantially longer time before any progress is seen.

And to us, this is not necessarily what can be expected from a Utility of Manitoba Hydro's size and sophistication and we thought that we would include in our report some of the oversight tools that the Board could consider to elicit a little bit more of accountability and clarity from Manitoba Hydro's plans when it comes to -- to this work because it does take time and it is problematic. But absent quantified targets, absent some milestones, it is quite difficult to keep track of the progress as well as the value that it ultimately delivers to Manitoba's ratepayers.

We don't have to go into details as -- as to what they are, we described them at length in our report and, again, these are the tools that other jurisdictions have used extensively to, if nothing else, improve the quality and the completeness of the dialogue between the Utility and the regulator.

And that concludes our presentation.

DR. BYRON WILLIAMS: That -- I just note that the witnesses are now available for examination.

THE CHAIRPERSON: Yes, thank you very much. Thank you to the panel. Ms. Monnin...?

MR. CHRISTIAN MONNIN: Thank you, Mr. Chair, on behalf of General Service Small and General Service Medium customer classes and Keystone Agriculture Producers, I can advise that we have no questions for this panel. Thank you.

THE CHAIRPERSON: Thank you. The racing back Mr. Hacault.

CROSS-EXAMINATION BY MR. ANTOINE HACAULT:

MR. ANTOINE HACAULT: Yes, I'll have a couple questions with respect to your slide 49, I believe it was and, more specifically, what could be expected of this Corporation as far as reporting on alternatives.

And to bring it down I'm going to -- some people have been using "in the weeds." You've identified the Gillam redevelopment project, and I'd just like to look at that quickly to understand what kind of reports or alternatives might be expected with respect to one of -- a project like this one.

So in order to get us into that, if we could firstly look at PUB-Manitoba Hydro round 2, 43(c), as in Charlie. Perhaps we could look at the question first to --

MR. DMITRY BALASHOV: Yeah, we would appreciate if you could maybe summarize to us because I'm not -- I'm not sure I'm directly familiar and --

MR. ANTOINE HACAULT: Yeah, so the question --

MR. DMITRY BALASHOV: -- my colleagues have indicated to me.

MR. ANTOINE HACAULT: Yeah, the asked please -- this was of Manitoba Hydro, a question being asked:

> "Please explain why the Gillam redevelopment was -- was justified on the basis of developing new generation which is nonrecurring expenditure does not meet Manitoba Hydro's criteria for exclusion."

But -- and then if we go to response. (c) --

MR. DMITRY BALASHOV: Sir, before you take us there, would you mind clarifying what the criteria for exclusion means? We're -- I'm not

familiar with this.

MR. ANTOINE HACAULT: I'm not going to be asking you any questions with respect to that criteria.

MR. DMITRY BALASHOV: Okay that's -- that's fine. I just wanted to clarify that, thank you.

MR. ANTOINE HACAULT: There's -- and this is just to put my questions into context. So response (c) describes a project a bit. This is Manitoba Hydro doing that -- that the:

> "Gillam redevelopment and expansion program work to date has been to repair and maintain existing townsite infrastructure. This work is expected to be completed by March 13 -- or 31, 2018 period. Then the scope -- and there's an acronym for this project -- is anticipated to be reduced due to modified operational requirements at Keeyask generating -- - generating station..."

I'm going to mess this up.

> "Keewatinohk CS resulting in lower projected growth in Gillam, and then

any future townsite maintenance or expansion requirements will be justified as projects on their own are brought forward for approval."

This is the general explanation of where we are at right now, and Manitoba Hydro has produced a number of documents in this proceeding which are called capital justification -- project justification sheets.

And I'd like to turn to the most recent one, which gave us an update, and that's in minimum filing requirement 115, at page 274.

(BRIEF PAUSE)

MR. ANTOINE HACAULT: There was an updated document in 2014 with respect to this project, and if we go to the top right-hand side, we see that the project was a -- a $366 million project, and it was reduced down to about $266 million dollars for this twelve hundred (1,200) --

MR. DMITRY BALASHOV: I see that, yes. Thank you.

MR. ANTOINE HACAULT: Now, I'd like to go to page 276 to understand, then, what you might

expect of a utility. And I'll bring your attention to two (2) things on this particular page. Firstly, the total budget, which we see is reduced from the time period 2014 to 2015, up to 2016 to 2017, by amounts which are pretty consistent.

MR. DMITRY BALASHOV: M-hm.

MR. ANTOINE HACAULT: And then going up higher in the page, where we talked about alternatives, and there'd the heading 'No other alternatives were considered'. What type of analysis might be expected of a utility on alternatives and options in other jurisdictions, in your experience?

DR. ALEX BAKULEV: I'll take a stab of answering this question. So this specific project is related to civil infrastructure, so not related to the great electric infrastructure. So usually the same asset management principles can be applied for the civil infrastructure as well, and the key would be to understand what's the condition assessment of those variety of, I guess, civil structures that are in place with Gillam town, what's the current state of the condition of those structures' age.

For infrastructure, it's usually requires the -- to maintain the minimum service levels associated with the different type of infrastructures.

Let's say roads, or buildings, or something else. To be able to answer on the alternative, we need to understand what are the alternatives for those service levels that are being chosen by the asset manager to be maintained in the long run? There could be few options, whether the infrastructure requires just to be repaired, rehabilitated, or rebuilt.

And then based on the analysis of the cost of ownership of this infrastructure, assuming the current condition of the -- of it, assuming the potential options how to maintain the service levels, assuming the options for the selected service levels that the manager make, based on that, there -- there could be meaningful discussion what those options are, and what's the best option to bring the value to the customer and to the Company.

Based on the information that we've seen on the evidence in -- in those few -- or documents that have just been presented, there is no discussion about that at all. So in the end, we can't make a meaningful discussion to decide what's the best alternative unless we see the analysis underlying this business case.

MR. DMITRY BALASHOV: Would you mind if I just added to what Mr. Bakulev had said, if

that's okay with you? First of all, Gillam, by and large, is -- is an expansion project that was partially outside of our scope, so we're -- we're familiar to it to -- to some degree, but it -- it is not something that we reviewed in-depth, so we would like to qualify our statements with that.

But generally speaking, to your question of -- of what would be expected, as a -- as a is a project management principle or as an evidentiary principle, and I'll speak to utility that I know quite intimately, like in Ontario, for example, which is Toronto Hydro, where I've worked. You would expect at a minimum to address all alternatives, which is the alternative of doing nothing and illustrating what are the consequences, preferably quantitatively, but, you know, at -- at a -- at a minimum, qualitatively, and then showcasing the benefits of an improvement, and again, preferably as quantitatively as possible in a way of net present value or any -- any other analytical tools that are generally accepted and are used by Manitoba Hydro.

But even if the ultimate conclusion is that this work must proceed because there is nothing else that you can do, and absent this work, you cannot perform your duties, we -- we'd expect to see at least

consideration of these two (2) options. If not, other options in terms of deferral of some parts of investment and -- and things like that.

But in -- in many ways, it's also a function of the corporate policies, as well as the expectations when it comes to the evidence of what is expected by the regulator.

MR. ANTOINE HACAULT: Thank you. Those are all my questions.

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

CROSS-EXAMINATION BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: Thank you, Mr. Chair, and good morning. And good morning, panel members. For the record, it's Czarnecki, C-Z-A-R-N-E-C-K-I, and my first name is Brent. Good morning, gentlemen.

I'll start with what may be the most difficult question for you in terms of credibility. I was reviewing this material over the weekend. My eight (8) year old daughter asked me what I was working on, and I told her that, Well, I get to ask some gentlemen from Ontario about the amount of money it takes and the reasonableness of that for -- to

spend to keep the lights and heat on in Manitoba.

And she gave a very puzzled look, and it's usually the one that precedes one (1) of her questions that I don't have the answer to, and I was right. So I put your counsel on notice that he can object, but her question was, Are you Leaf fans?

DR. BYRON WILLIAMS: We have no objection to that question.

MR. THOR HJARTARSON: I'm very passionate about ice hockey. Calgary Flames are actually my -- my hockey team, because that's where I went to high school, so.

THE CHAIRPERSON: I -- I would just put...

(BRIEF PAUSE)

CONTINUED BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: Agreed, Mr. Chairman. It's a credibility-buster from an eight (8) year old. She also wanted me to tell you that she's a diehard Jets fan, and that has something to do with the guy named Patrik Laine. But Mr. Chairman, thank you for the -- the opportunity of slight digression.

To more serious issues, gentlemen, you

would agree that the obligation and responsibility for the safe and reliable operation of the entire electrical system for the supply of power to Manitobans rests exclusively with Manitoba Hydro?

(BRIEF PAUSE)

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And in other words, in terms of the overall service obligation, the proverbial buck stops with Manitoba Hydro?

MR. DMITRY BALASHOV: Would you -- would you mind explaining exactly the context of your questions of where -- we just -- we just wanted to understand where -- where you're headed with this.

MR. BRENT CZARNECKI: Well, I'm -- I'm trying to understand your understanding of who's responsible for the operation of the entire electrical system and the reliability thereof in Manitoba.

MR. DMITRY BALASHOV: Absolutely. So -- so being a -- a utility being -- being the only utility as we understand in Manitoba, it -- it -- Manitoba Hydro has the responsibility for the operation of the system, subject to the oversight of various oversight bodies, including this Board, as

well as other safety, reliability -- both provincial, federal, and continental bodies, such as the National Energy Board, and whatever else may be acceptable for a particular project. So being a utility, being a monopoly, it is certainly subject to this oversight, but other than that, the operational responsibility, we would agree.

MR. BRENT CZARNECKI: Thank you, Mr. Balashov. And I take it that you're the person most familiar on the panel with governance-related issues?

MR. DMITRY BALASHOV: From the academic perspective, being the youngest, I would say, but I would say that -- that my two (2) colleagues are quite familiar with -- with the practical aspects of it --

MR. BRENT CZARNECKI: Okay.

MR. DMITRY BALASHOV: -- because they have worked in utilities.

MR. BRENT CZARNECKI: And in Manitoba, the appointed Board of Manitoba Hydro, the Manitoba Hydro Electric Board, is responsible for ensuring that the essential obligation of providing electricity is fulfilled? Do you agree?

MR. DMITRY BALASHOV: I'm not familiar with -- with the specialty they've -- the -- the with

practical language, but I'll take it, subject to check.

MR. BRENT CZARNECKI: And trickling downward from the Manitoba Hydro Electric Board, the fulfilment of this obligation is overseen and performed by the executive and the directors of Manitoba Hydro, agreed?

MR. DMITRY BALASHOV: Again, we'll -- we'll take it subject to check, sir.

MR. BRENT CZARNECKI: Thank you. And trickling down from that layer at Manitoba Hydro to the field level, the obligation is also performed by employees of Manitoba Hydro with the boots on the ground?

MR. DMITRY BALASHOV: Correct.

MR. BRENT CZARNECKI: And I take it that you don't dispute that many employees of Hydro are professional engineers?

MR. DMITRY BALASHOV: As -- as we have noted in our evidence, we do not dispute at any point the professionalism and experience of Manitoba Hydro's individual engineers and staff members. Our comments are generally related to the fundamental planning processes and tools that are used to produce complex, costly, and consequential plans.

MR. THOR HJARTARSON: And I -- I may add to that. I've -- I worked with many professionals from Manitoba Hydro, and -- and they are very knowledgeable in their field. So that's -- we absolutely did not contest that.

MR. BRENT CZARNECKI: Thank you gentlemen. I do appreciate the candour in your response. Back to the engineers, though, just quickly, the snappers, some of the engineers specialize in electrical engineering?

MR. THOR HJARTARSON: Yes, they do.

MR. BRENT CZARNECKI: Some in mechanical engineering?

MR. THOR HJARTARSON: In -- in different aspects of engineering, for sure.

MR. BRENT CZARNECKI: Civil engineering, sir?

MR. THOR HJARTARSON: Absolutely.

MR. BRENT CZARNECKI: And that Manitoba Hydro employs field staff with technical expertise in areas including the inspection and maintenance of electrical assets and equipment?

MR. THOR HJARTARSON: I would certainly assume so, yes.

MR. BRENT CZARNECKI: And naturally,

some of those engineers and staff would specialize in the generation of electricity?

MR. THOR HJARTARSON: Yes, they would.

MR. BRENT CZARNECKI: And as a basic example, generating stations and turbines?

MR. THOR HJARTARSON: Yes, sir.

MR. BRENT CZARNECKI: And some of the engineers and staff would specialize in the transmission of electricity?

MR. THOR HJARTARSON: Yes, transmission, distribution, customer service.

MR. BRENT CZARNECKI: And similarly, they would have specialized expertise in the construction, operation, and maintenance of high-voltage transmission lines, or the distribution system using the distribution example?

MR. THOR HJARTARSON: Yes, and there would be some that have specific knowledge of specific assets, such as transformers, transmission lines, and so on.

MR. BRENT CZARNECKI: Thank you, sir. And many of these employees would have long-standing careers with Manitoba Hydro?

MR. THOR HJARTARSON: Yes, and they're very well-respected internationally, many of them.

MR. BRENT CZARNECKI: And I -- I think for Mr. Balashov this morning -- I'm paraphrasing, but I think he recognized that these employees do have technical expertise and specialized knowledge, in -- in knowing their assets?

MR. DMITRY BALASHOV: That's correct.

MR. BRENT CZARNECKI: And in fact, in the reliability references you have in your report, and I think it was at page 40 of your PowerPoint. I don't think we need to turn it up, but you would agree that in terms of reliability, Manitoba Hydro is managing the capital assets well in terms of reliability, and that would be longer effective service lives than that of their comparable peers?

MR. DMITRY BALASHOV: From the perspective of reliability, certainly. What the implications of that is in terms of the cost-effectiveness of the plan, that is one (1) of the areas that we sought to investigate, because those are different questions, because at times, the -- the two (2) are not the same, and sometimes it's an indication of overinvestment.

MR. BRENT CZARNECKI: Fair enough, Mr. Balashov. And would you -- would you agree that collectively, those engineers and staff have decades

of actual and continuous years of experience in operating and maintaining all component parts of the electrical system to fulfil the obligation to operate the overall electrical system in a safe and reliable manner?

MR. THOR HJARTARSON: We would certainly assume so with Manitoba Hydro. I don't know exactly each different department, but I would certainly assume so.

MR. BRENT CZARNECKI: You have no reason to doubt, any of you?

MR. THOR HJARTARSON: I would not have any reason to doubt the qualification of the engineers and the staff of Manitoba Hydro.

MR. BRENT CZARNECKI: And would it be fair to say that Manitoba Hydro has been successfully performing this essential obligation for decades?

MR. THOR HJARTARSON: They have certainly kept the lights on, for sure.

MR. BRENT CZARNECKI: You knew my next question. It prevented catastrophic events, such as brown or blackouts?

MR. THOR HJARTARSON: I -- I don't -- don't recall any specific brownouts or blackouts that have happened over the years, but I'll -- subject to

check, I trust your words.

MR. BRENT CZARNECKI: And gentlemen, in writing your report and carefully reaching your conclusions, you would agree that you are without the luxury of the vast, extensive, and long-standing practical and technical expertise that resides with the Manitoba Hydro staff in operating the system in Manitoba?

MR. DMITRY BALASHOV: We were certainly brought in specifically as an external party to assess this from the perspective as external parties would. So, yes, no one in this room has worked for Manitoba Hydro specifically. However, I believe as the qualifications, particularly of my two (2) colleagues indicate, that they have been in this in this profession for quite a long time and have done work in a lot of different jurisdictions.

MR. BRENT CZARNECKI: Thank you. We'll -- we'll get to your qualifications in a moment. I -- I first wanted to turn up your report, and it was on -- actually on page 1, the cover page. And this is more just for clarification. I -- I see the experts listed as -- you, Mr. Bakulev -- Dr. Bakulev, pardon me, and yourself, Mr. Balashov, and then I see an "approved by Mr. Hjartarson." Am I saying that

correctly?

MR. THOR HJARTARSON: Yeah, that's -- that's close enough.

MR. BRENT CZARNECKI: So can you give me a little bit more information as to who were the primary authors of the report, and did the -- the grunt work, I'll call it?

MR. DMITRY BALASHOV: That would be Mr. Bakulev and I in terms of the actual preparation and planning, in close consultation with Mr. Hjartarson and a team of other engineers at METSCO. We're a company of about fifty (50) people, so as -- as we were reviewing various parts, we consulted with specific individuals responsible for certain parts to validate the work, the understanding, and the assumptions.

MR. BRENT CZARNECKI: Fair enough. That -- that's what I thought, based on perhaps Mr. Hjartarson's reference to an old man. And I'm not going there, other than to say Mr. Neil Young has quoted that once before, and it's one (1) of my favourites.

So turning up your statement and qualifications, and before today, I was only going with what was in the report. And I saw, you know, a

page worth for each of you, Dr. Bakulev, and you've added to that this morning in direct testimony to My Learned Friend Ms. Dilay? You have to respond, sir, so the transcriber can --

DR. ALEX BAKULEV: Yeah.

MR. BRENT CZARNECKI: And to be clear, you are not an engineer?

DR. ALEX BAKULEV: I'm not an engineer.

MR. BRENT CZARNECKI: You're not an accountant?

DR. ALEX BAKULEV: I'm not an accountant.

MR. BRENT CZARNECKI: Do you have field experience inspecting or assessing the actual assets?

DR. ALEX BAKULEV: I don't have this experience in the field.

MR. BRENT CZARNECKI: And would I be correct, sir, that your entire post-university work career is approximately ten (10) years in duration?

DR. ALEX BAKULEV: Can you please repeat the question?

MR. BRENT CZARNECKI: Your entire post-university work career is approximately ten (10)

years in duration?

DR. ALEX BAKULEV: I believe it's more than ten (10) years.

MR. BRENT CZARNECKI: How many years, sir?

DR. ALEX BAKULEV: Based on my resume, I have started to work in the management consulting company in the asset management field starting 2003.

MR. BRENT CZARNECKI: So fifteen (15) years is a better --

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And would I be correct that it's your first time providing a publicly available report or evidence in any regulatory form?

DR. ALEX BAKULEV: It's not the first time I have provided the report that is signed by myself to the Public Board. The previous report that were provided to the -- in other hearings would be the report that was brought to the site here. That was EPCOR's report that was submitted to the Alberta Utility Commission last year.

MR. BRENT CZARNECKI: And did you testify in that proceeding on the report?

DR. ALEX BAKULEV: Not yet, but will be testifying.

MR. BRENT CZARNECKI: Thank you for that. And Mr. Balashov, you are not an engineer?

MR. DMITRY BALASHOV: That is correct, sir.

MR. BRENT CZARNECKI: You're not an accountant?

MR. DMITRY BALASHOV: I have taken a number of accounting classes through my education. I do not have any certification as an accountant.

MR. BRENT CZARNECKI: Do you have any field experience inspecting or assessing utility assets?

MR. DMITRY BALASHOV: I do not.

MR. BRENT CZARNECKI: So -- and I estimated as well, your entire post-university work career is approximately ten (10) years in duration?

MR. DMITRY BALASHOV: In my case, that's correct.

MR. BRENT CZARNECKI: And for you, is this the first time providing a publicly available report or evidence in a regulatory forum?

MR. DMITRY BALASHOV: On the side of a consulting company, correct. On the side of the Utility, I have provided a number of reports and submissions to the Ontario Energy Board.

MR. BRENT CZARNECKI: And I understand because we asked that those reports are not publicly available, they were provided in confidence to the regulator?

MR. DMITRY BALASHOV: That is not correct. A lot of them were publicly available. They are not, perhaps, signed by me as an author, but I -- as -- as they have been developed on behalf of Toronto Hydro, for example.

MR. BRENT CZARNECKI: So you've assisted in the preparation, and those reports were --

MR. DMITRY BALASHOV: I -- I have been directly involved and led to the preparation of many of them, including the significant regulatory application that included a 3,000 pages distribution system plan.

MR. BRENT CZARNECKI: But they were filed on behalf of Toronto Hydro --

MR. DMITRY BALASHOV: Correct, sir.

MR. BRENT CZARNECKI: -- not on you personally, sir?

MR. DMITRY BALASHOV: That's correct.

MR. BRENT CZARNECKI: And is this your first time testifying in front of any regulatory proceeding or body?

MR. DMITRY BALASHOV: Yes, sir, it is.

MR. BRENT CZARNECKI: And gentlemen, one (1) of the common threads I observed from your qualifications was your work experience at Toronto Hydro. Are -- you all worked for Toronto Hydro?

(BRIEF PAUSE)

MR. THOR HJARTARSON: Yes, that's correct.

MR. BRENT CZARNECKI: And is Toronto Hydro primarily a distribution company?

MR. THOR HJARTARSON: It is a distribution company, yes.

MR. BRENT CZARNECKI: Does it own any or -- own or operate any transmission infrastructure?

MR. THOR HJARTARSON: It operate some transform -- transmission stations, and it's building a big transmission station at this time..

MR. BRENT CZARNECKI: What about generation infrastructure?

MR. THOR HJARTARSON: Yeah. They don't -- that -- well, they connected to a system, but they're -- they're not -- they do not have a generation themselves.

MR. BRENT CZARNECKI: And Toronto Hydro has little, if any, rural infrastructure?

MR. THOR HJARTARSON: It's a municipal Hydro, a municipal utility.

MR. BRENT CZARNECKI: And would I be correct that Toronto Hydro operates within the deregulated electricity market in Ontario?

MR. DMITRY BALASHOV: The regulated entity of Toronto Hydro -- Hydro-Electric System Limited that we had all worked for is a fully regulated company, so we have only worked for the regulated company.

MR. BRENT CZARNECKI: But it participates in the deregulated environment in Ontario, does it not?

MR. DMITRY BALASHOV: Insofar as activities like conservation and demand management, correct, if you can call them deregulated, as there -- there's also significant oversight rules.

MR. BRENT CZARNECKI: Now turning back to the essential obligation to operate the electrical system in a safe and reliable manner, do you agree that significant costs are incurred in fulfilling this important obligation?

MR. THOR HJARTARSON: Yes, there are

significant costs, and they're both in operation and in -- and in sustainment.

MR. BRENT CZARNECKI: And are you aware that the Manitoba Hydro Electric Board ultimately approves an annual capital expenditure forecast for Manitoba Hydro?

MR. THOR HJARTARSON: Yes.

MR. BRENT CZARNECKI: And Mr. Balashov, I just wanted to make sure I heard you correctly this morning. I think you said that this Board, the Public Utilities Board, would approve the capital expenditure forecast for Manitoba Hydro?

MR. DMITRY BALASHOV: Could -- could you restate the question? You mean in terms of its role?

MR. BRENT CZARNECKI: Yes, sir.

MR. DMITRY BALASHOV: Okay. In terms of its role, I believe that the capital expenditure forecast gets approved, subject to check, of my understanding of the regulatory context here in Manitoba.

DR. ALEX BAKULEV: May I add to that? So I think that the PUB does not approve the specific plans, but rather, the year rate increases, and it's up to the Manitoba Hydro to decide what exactly is

being executed.

MR. DMITRY BALASHOV: I stand corrected.

DR. ALEX BAKULEV: Or maybe -- maybe some big projects, like in the recent NFAT proceedings are being approved, but not the specific projects as related to CEF16, if that's what you're asking.

MR. BRENT CZARNECKI: I am, and thank you for your answer. I prefer your answer to your colleagues'. I think it's more accurate.

MR. DMITRY BALASHOV: I stand corrected. I apologize.

MR. BRENT CZARNECKI: And the Manitoba Hydro Electric Board has approved the capital expenditure forecast for the two (2) test years that form part of this application?

DR. ALEX BAKULEV: Sir, can you repeat the question again?

MR. BRENT CZARNECKI: Certainly. And the Manitoba Hydro Electric Board has approved the capital expenditure forecast for the two (2) test years that form part of this application?

DR. ALEX BAKULEV: I guess not, subject to check --

MR. BRENT CZARNECKI: You -- I'm

sorry, I didn't --

DR. ALEX BAKULEV: -- check; it's not -- they have not approved it.

DR. BYRON WILLIAMS: There might be some confusion, but I -- I think if the question is, Is the -- is it our -- the understanding of the Consumers Coalition that the Manitoba Hydro Electric Board has approved CEF15 and CEF16? I think, subject to check, our -- our witnesses can accept that, if that helps Manitoba Hydro.

CONTINUED BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: It does. Thank you, Dr. Williams. And subject to the Coalition checking that, in approving the CEF, and more specifically for our purposes today, the sustainment capital of that forecast, the Manitoba Hydro Electric Board relies upon the technical -- technical expert -- expertise and experience of its professional engineers, accountants, auditors, and the executive of Manitoba Hydro, would you agree?

DR. ALEX BAKULEV: I agree, so.

MR. BRENT CZARNECKI: And if the obligation to provide safe and reliable service is not fulfilled, severe consequences to Manitobans and

liability to Manitoba Hydro could result?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: Now turning to your specific assignment in this application as dictated by Dr. Williams on behalf of the Coalition. Your focus was on Manitoba Hydro sustaining capital expenditures, right?

MR. THOR HJARTARSON: That's correct.

MR. BRENT CZARNECKI: And you were conducting a detailed review of the processes, data, asset risks, failure rates, business cases, and unit costs in Manitoba Hydro's application relating to sustaining capital expenditures?

MR. THOR HJARTARSON: That's correct.

MR. BRENT CZARNECKI: And in fulfilling your assignment as dictated by Dr. Williams, you attended and participated in Manitoba Hydro's technical conference on July 20th, 2017?

DR. ALEX BAKULEV: That's correct. That was me who participated in this conference.

MR. BRENT CZARNECKI: And was that your first?

DR. ALEX BAKULEV: Yes, I will -- I participated in this conference, Alexander Bakulev.

MR. BRENT CZARNECKI: So just you,

sir? Was that your first involvement with Mr. Williams -- or Dr. Williams in this particular application on sustainment capital?

DR. ALEX BAKULEV: Can you clarify the first involvement meaning in this -- in this particular case?

MR. BRENT CZARNECKI: Maybe I'll ask it this way. When did your engagement with Dr. Williams commence as part of this application?

DR. ALEX BAKULEV: As part of this application, it was back in the last winter. When we started this conversation, I believe it was January time frame.

MR. BRENT CZARNECKI: Okay. Of 2017, sir?

DR. ALEX BAKULEV: 2017, yes.

MR. BRENT CZARNECKI: And also as part of your role in this application, you, of course, reviewed the application and you reviewed the MFRs or what we call minimum filing requirements?

DR. ALEX BAKULEV: That's correct.

MR. BRENT CZARNECKI: And you reviewed the UMS report which was filed as Appendix 5-1 of the prefiled evidence?

DR. ALEX BAKULEV: That's correct.

MR. BRENT CZARNECKI: And I think we can all agree in using Mr. Wortley's words that was a Gap analysis that was procured by Manitoba Hydro in its asset management capabilities?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And you assisted Dr. Williams with asking first round of information requests?

DR. ALEX BAKULEV: On the sustainment capital, yes.

MR. BRENT CZARNECKI: Reviewed the answers to those information requests?

DR. ALEX BAKULEV: Well, for those requests that we assisted to ask for, yes.

MR. BRENT CZARNECKI: And assisted Dr. Williams in asking follow-up questions by way of a second round of information requests?

DR. ALEX BAKULEV: That were related to the first-round requests, yes.

MR. BRENT CZARNECKI: And you reviewed those answers?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And gentlemen, do you understand that as part of this regulatory process, if you believe that the answers to those

information requests are insufficient -- insufficient, pardon me, it is open your counsel to advance a motion to this Board to compel better or more sufficient answers for Manitoba Hydro?

DR. ALEX BAKULEV: Subject to check, a -- our -- the counsel thinks that the information is, in front, insufficient, they can ask clarification questions, yes.

MR. BRENT CZARNECKI: And in making that determination, your counsel would rely upon your expertise to advise him whether or not that information was sufficient for the intended purpose of the question?

DR. ALEX BAKULEV: I cannot speak for the counsel, I believe.

MR. BRENT CZARNECKI: And such a motion was not advanced for sustaining capital issues or disclosures as part of this proceeding, was it?

DR. ALEX BAKULEV: Again, I cannot speak for the counsel.

MR. BRENT CZARNECKI: And your next -- next task was to prepare your report dated October 30th, 2017?

DR. ALEX BAKULEV: That was part of the initial engagement that we discussed that we would

prepare the report.

MR. BRENT CZARNECKI: And after your report was prepared, METSCO answered information requests for Manitoba Hydro and the PUB on your report?

DR. ALEX BAKULEV: Yes, we did.

MR. BRENT CZARNECKI: And then Manitoba Hydro filed rebuttal evidence, and specific to the METSCO report, pages 40 to 55 of 78?

DR. ALEX BAKULEV: Subject to check, yes.

MR. BRENT CZARNECKI: And I take it from your additional evidence this morning that you read pages 40 to 55 of Manitoba Hydro's rebuttal evidence?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And, Mr. Wortley, Mr. Neufeld, Mr. Turner, Mr. Steele, and to a lesser extent, Ms. Bauerlein, and Ms. Carriere provided direct oral testimony to this Board on the subject matter?

DR. ALEX BAKULEV: Subject to check, yes.

MR. BRENT CZARNECKI: And you listened to or read the transcript of Hydro's direct oral

evidence on sustaining capital and asset management?

DR. ALEX BAKULEV: We read some of the testimony that was on the records, but I cannot say that we read all the previous two (2) months transcripts that were developed.

MR. BRENT CZARNECKI: But your focus was on sustaining capital issues, correct?

DR. ALEX BAKULEV: On the sustaining capital issues, we read the transcript that was related to sustaining capital on December 11th, 2017.

MR. BRENT CZARNECKI: Okay.

DR. ALEX BAKULEV: That, I can assure.

MR. BRENT CZARNECKI: And Mr. Wortley, Mr. Neufeld, Mr. Turner, and Mr. Steele were subject to cross-examination by Dr. Williams and Board counsel?

DR. ALEX BAKULEV: By Mr. Peters and Dr. Williams, yes.

MR. BRENT CZARNECKI: And did you assist Dr. Williams in preparing his cross-examination on sustaining capital and asset management issues?

DR. ALEX BAKULEV: I cannot confirm that, no.

MR. BRENT CZARNECKI: The answer -- no?

DR. ALEX BAKULEV: No.

MR. BRENT CZARNECKI: Now turning to your report, gentlemen -- and it's page 4, and it's the small 4.

DR. ALEX BAKULEV: On the -- on the presentation? Yeah.

MR. BRENT CZARNECKI: Not -- sorry, not the presentation. Your -- the evidence which is on the screen, page 4. If you can scroll to the last page of the last paragraph of page 4, that's the one. And I'll read it aloud. It says:

> "Finally, we encourage the Manitoba Public Utilities Board and intervenors reviewing this report to treat our observations as identification of areas of opportunity rather than specific recommendations for programs or projects that warrant reduction, deferral, or other forms of modification."

Did I read that correctly?

MR. DMITRY BALASHOV: Sir, you have read this correctly, but with respect, would you mind scrolling up to show the entire context of the

statement? And as you have seen, that this is effectively a qualifier, that -- that we note that the ability of the conclusions that we have drawn was constrained by what Manitoba Hydro has provided to ourselves. And we note here, and I'm not going to quote it verbatim, that as the information will -- as -- as the proceeding will proceed, more information will become available.

So the part that you read was our acknowledgment of the fact that we are, in fact, dealing with the limited information based solely on the discretion of the applicant's responses to our questions. And as such, at that point, we wanted to show that our observations are effectively the areas that we encouraged the Intervenor community as well as the Board counsel to explore further. So that is what the context of that statement is.

MR. BRENT CZARNECKI: Fair enough. And if I'm ever reading a certain paragraph, feel free to scroll up or down and add what you want.

MR. DMITRY BALASHOV: Thank you, sir.

MR. BRENT CZARNECKI: But returning back to the finally -- paragraph, so your observations are simply food for future thought, aren't they?

MR. DMITRY BALASHOV: I wouldn't say

that they're -- well, in -- in the context when this was written, in October of 20 -- 2017, I guess, last -- - last year, we effectively stated that there are areas for improvement. Again, I'll take you back to your statements in terms of how the Utility operates, and who the obligation is with.

So we -- we're certainly not in a position to recommend specific reductions and things like that. So yes, we -- we saw that as areas of opportunity relative to what we see across the work that we do in various jurisdictions, in terms of where other utilities are. And as we noted in our presentation today, we did make some further conclusions, or at least further observations on the basis of the oral hearing record that we disclosed specifically in writing, and I sure hope so in -- in my presentation as well.

MR. BRENT CZARNECKI: Understood, and I will address and turn to the future state, as I like to call it, but I'm particularly interested in focusing on the two (2) test years that are before this Board at this moment.

MR. DMITRY BALASHOV: Sure.

MR. BRENT CZARNECKI: So METSCO is not and has not made any specific recommendations to any

party to this proceeding to reduce, defer, or modify the programs or projects planned by the technical and professional experts at Manitoba Hydro for the test years of this application as approved by the Manitoba Hydro Electric Board. Is that correct?

MR. DMITRY BALASHOV: If you wouldn't mind repeating the first two (2) lines, approximately, just -- just the beginning of the sentence, because that -- that contained -- I -- I understand the latter part, but could you just --

MR. BRENT CZARNECKI: METSCO is not and has not made any specific recommendations to any party to this proceeding to reduce, defer, or modify the programs or projects planned by the technical and professional experts at Hydro.

MR. DMITRY BALASHOV: Thank you, sir. We would agree with that statement in terms of specific projects or specific reductions.

MR. BRENT CZARNECKI: So even though you have not recommended any specific projects to be deferred, you raised an example related to what you call opportunities to reduce planned expenditures in your report. And do you remember that?

MR. DMITRY BALASHOV: Correct, yes.

MR. BRENT CZARNECKI: And while you

refer to opportunities, the sole item you identify is the Bipole II valve bushing replacement units. Do you recall that?

MR. DMITRY BALASHOV: As far as examples go, I believe that's the one (1) example that we've identified.

MR. BRENT CZARNECKI: So if we could turn up page 44 of your report, as it's -- your concern is specifically stated in there. It's the paragraph that starts with, "Finally," the concluding paragraph.

MR. DMITRY BALASHOV: M-hm.

MR. BRENT CZARNECKI: And I want to drop everyone's eyes to about the seventh line in where it says, "METSCO" in the middle of it. And this is considering the porcelain bushings?

MR. DMITRY BALASHOV: M-hm.

MR. BRENT CZARNECKI: It says:

> "METSCO sees no reason why the applicant could not defer the spare units hurt -- or pardon me -- defer the complete conversion to the new technology until such time as the existing inventory of spare units has been used up."

Do you recall that?

MR. DMITRY BALASHOV: Yes.

MR. BRENT CZARNECKI: So according to you at that time, in fairness, this particular project of replacing porcelain bushing units could be deferred?

MR. DMITRY BALASHOV: Replacing what we understand to be the spares that are currently available to Manitoba Hydro. And -- just -- just for clarity, not -- not the units that are already upgraded.

MR. BRENT CZARNECKI: Correct.

MR. DMITRY BALASHOV: Yes. So that's -- that's the example of -- of the type of discretionary nature that we have seen in -- in the evidence, and we drew the specific attention to that particular one (1).

MR. BRENT CZARNECKI: You -- an inference you drew? Is that what I --

MR. DMITRY BALASHOV: Sorry. Did I say "inference"?

MR. BRENT CZARNECKI: I don't --

MR. DMITRY BALASHOV: I don't believe so, sir.

MR. BRENT CZARNECKI: Okay.

MR. DMITRY BALASHOV: But we -- as -- as we noted and as -- as you and I have discussed several minutes ago, at the beginning of this report which we did note the -- the attempts that have been made and the information that we had to rely upon. So we were operating much, much like the Board does, with a certain degree of assymet -- asymmetry in terms of the information.

MR. BRENT CZARNECKI: So can we turn up page 54 of 78 of Manitoba Hydro's rebuttal evidence, please.

(BRIEF PAUSE)

MR. BRENT CZARNECKI: And we don't need to read everything on the screen, but I think maybe lines 9 to 17 is key. Manitoba Hydro explained the specific reasons why employing a run to failure strategy, as METSCO suggests, is unacceptable and imprudent due to the associated reliability and loss of generation risk.

Is that a fair summarization of what this page in the rebuttal does?

DR. ALEX BAKULEV: That's what it's reading here.

MR. BRENT CZARNECKI: And did you read that response in the rebuttal?

DR. ALEX BAKULEV: I don't --

MR. DMITRY BALASHOV: I -- I certainly did, sir. It does appear to me that Manitoba Hydro and ourselves, based on the information that it has disclosed on record related to this particular project, we may be talking about slightly different things. Our understanding on the basis of the evidence was that Manitoba Hydro proposed to replace the full inventory of spares that had been available to it that have not been used, that utilize the older technology. And that they had proposed to replace this because this technology was no longer the preferred technology.

Our suggestions were merely that the fact that the technology is no longer preferred was not that the -- the assets are no longer not functional. And if that understanding was correct, our suggestions were simply to phase-in the newer technology of the particular items gradually, as opposed to replacing the entire inventory, which to our understanding based on the IRs that we have asked, there was nothing to indicate that it was not operable.

MR. THOR HJARTARSON: I'd like to maybe just add a bit to this. The purpose of the -- the comment that we made and the rebuttal of this, we're not saying this is what they should do. We're saying that we're lacking the options to be able to evaluate the risk and the benefits from doing it A, B, or C.

MR. BRENT CZARNECKI: Thank you for the clarification. I just want to confirm that -- whether or not you would agree that, as Hydro stated in their evidence, the existing sparable bushings can and have failed catastrophically, resulting in fire, risking serious injury to staff, and collateral damage to adja -- adjacent equipment, and will result in the loss of 1,000 megawatts?

MR. DMITRY BALASHOV: Where -- could you -- could you just point to -- to the specific lines that you were --

DR. ALEX BAKULEV: 11 and 12.

MR. DMITRY BALASHOV: 11 and 12? So -- so the one (1) thing that, does -- does it -- I -- I believe, sir, that you have said the existing sparable bushings. And I -- we do not see the way that sparable bushings could catch on fire, if they're not actually installed in the assets.

Is that correct, Mr. Hjartarson?

MR. THOR HJARTARSON: Yeah.

MR. DMITRY BALASHOV: So I'm not sure that -- that I see the word "spare" in there somewhere.

MR. BRENT CZARNECKI: If -- if the spare bushings were actually installed they could result to those consequences.

MR. THOR HJARTARSON: I would assume that before they -- regularly if they're kept on spare that they are being tested and kept in -- kept in pristine condition.

MR. BRENT CZARNECKI: Okay. My understanding, and based on the rebuttal evidence, is that if they're tested they could catastrophically fail. So that's a -- it's an issue in terms of the actual testing too.

MR. THOR HJARTARSON: Yeah, but you -- if they're spares you can test them off-line, so they're not connected.

DR. ALEX BAKULEV: And maybe just to add to that, they've never been put in place for the last thirty (30) years, right? So it's never happened before. So whenever we say that there is a potential, we're just saying that there should be some sort of

risk evaluation. What's the probability of this event happening, based on the history, which it looks like never happened, right? And what is the portability of this for a cost of this event happening in the future? Whether the consequence -- one (1) of the consequence -- one (1) of the failure modes, I guess, is the loss of 1,000 megawatt.

Then the question is: Are there any other failure modes which do not involve a loss of 1,000 megawatt. What's the probability of this failure mode happening when the asset reaches end of life and it may be only 1 percent of this is catastrophic failure. For some assets, that's what we see. It could be 1 percent. It would be 01 percent that there is a catastrophic failure associated with the asset reaching the end of life.

Then on top of that there is an impact assessment. What happens if a catastrophic failure occurs indeed, right? So what are the potential options to mitigate this risk? One (1) of the option is to have a -- spare unit, whether it's a old one or a new one as you suggested. But there could be some other options how to mitigate this risk. And maybe if the restoration of this 1,000 megawatts can be done through other means, it might be a cheaper solution or

a cheaper alternative.

So it's not always looking at one (1) option. We would love to see, and hopefully it has been done, but we have not seen it on the record, that there are different alternatives to these risks, or the issue that you're trying to -- to mitigate it here.

MR. BRENT CZARNECKI: So, Dr. Bakulev, thank you for the response.

So am I -- am I correct that you're not saying that that type of work hasn't been completed at Manitoba Hydro. You're just saying that you haven't seen all the detailed information such that you could confirm that one (1) way or the other.

Is that correct?

DR. ALEX BAKULEV: That's correct.

MR. BRENT CZARNECKI: And so now reading the rebuttal, and again in fairness to you not having seen all of the detailed calculations that I'm told, and I think Hydro's testified to the fact that those types of things are done.

DR. BYRON WILLIAMS: I'm not sure we would accept that as a fair characterization of the record.

MR. BRENT CZARNECKI: Sure.

DR. BYRON WILLIAMS: So -- so --

CONTINUED BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: I'll -- I'll move on.

So would you agree that Hydro's decision to proceed with that project is reasonable and necessary?

DR. ALEX BAKULEV: We can say the opportunity to explore further alternatives and options to this decision that you've made. Obviously it's being accepted by the professional engineers that -- employed in the company. However, from my economic perspective, there are always some alternatives that can be done. And if these alternatives deliver the same service obligations as are being delivered in this solution, or maybe slightly lesser, slightly higher but still acceptable than those solutions, different solutions should be reviewed and analyzed. And the best solution should be delivered.

MR. BRENT CZARNECKI: So, gentlemen, after your review of all of the evidence on the record, there is actually not even one (1) project that you would recommend for potential deferral, is there?

MR. DMITRY BALASHOV: I would not characterize our conclusion this way, sir. We have not been -- we do -- we do not see our engagement as recommending specific reductions. We have been retained by our clients to provide assistance to this Board in terms of showing what type of information is typically available to utilities in other jurisdictions where we have done work, in terms of justifying both internally and certainly externally to the regulator the reasonableness, the economic efficiency, the safety, and other points of the asset management program.

So we do not see our scope of engagement at any point as recommending particular reductions. We do, however, see a number of areas where there are gaps in terms of what has been put on the record, which is what led us to our conclusion that the Board does not see in front of it sufficient evidence to be confident that Manitoba Hydro has applied the rigour that they had stated on record they have done. And that is how we would see it, so.

MR. THOR HJARTARSON: Maybe I -- well, I would like to add a little bit to that. What we have not seen is the consistency of methodology, how to prioritize and pick and choose projects between

different areas. We don't see that methodology. We don't see evidence of it. We don't see evidence that this is the right amount of project. There may be more project that need to be done because reliability needs it. Then you may be doing the wrong project. So that's what we're basically trying to say. We don't see that justification for why these projects or these programs.

MR. BRENT CZARNECKI: So just --

DR. ALEX BAKULEV: Maybe have a -- sorry. I'd just add to that -- we work as a team. So to make specific recommendations on reduction on specific program -- programs and projects, I guess we will need to have access to the same detail information that your engineers have, and maybe use a slightly different team that I experienced in the equipment that you're recommended to replace or to -- to upgrade. So, however, it was not within the scope of our engagement.

MR. BRENT CZARNECKI: So thank you, gentlemen. I have just a few more questions to sum up on this, and then, Mr. Chair, I would suggest we take our break.

The -- the gaps that you're speaking of, those were identified by UMS in its report;

correct?

DR. ALEX BAKULEV: Some of the gaps that we are speaking were obviously based on the record of the evidence that we have in the record. One (1) of this evidence was the UMS report that was delivered two (2) years ago.

MR. BRENT CZARNECKI: And to your point, Dr. Bakulev, that for you to come in and do the work that the capable Hydro folks are doing, that would be a duplication of efforts.

Would it not?

DR. ALEX BAKULEV: Meaning that we would go to Manitoba Hydro, start the interviewing process, and going through the same procedure UMS, the -- to be able to do the gap assessment then? Yes, it would be duplicative work. However, it was not the scope of our engagement with Consumer Coalition.

MR. BRENT CZARNECKI: Now that, and also then going into the detailed records that may or may not exist at Hydro to make specific decisions about deferring or replacing assets?

DR. ALEX BAKULEV: Okay. Now, the way I understand your question is regards to the investment needs that you identified in your financial planning process in CF16? To be able to understand

how much money you need from the system perspective, I guess we just need to be in your shoes and going through all the studies that you have, going through all the details that you have for all the condition information that you have detailed condition information, and basically re-create those project scopes that you have.

Or going through every project scope that is in the financial plan and trying to see whether from the engineering perspective there are some other options that still deliver safe and reliable power to the customers in the province.

MR. BRENT CZARNECKI: Thank you, Dr. Bakulev. I -- I think, Mr. Chairman, now would be an appropriate time to break.

THE CHAIRPERSON: Oh, thank you. We'll -- we'll adjourn until one o'clock. Thank you.

--- Upon recessing at 12:04 p.m.

--- Upon resuming at 1:02 p.m.

THE CHAIRPERSON: Mr. Czarnecki...?

MR. BRENT CZARNECKI: Thank you, Mr. Chairman.

CONTINUED BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: Good afternoon, gentlemen. I'm going to switch gears to try and address what I'm going to call the future state of Manitoba Hydro's corporate asset management initiative. So beyond the -- moving beyond the two (2) test years.

And my starting point will be the UMS report that was procured by Manitoba Hydro; agree?

MR. DMITRY BALASHOV: Sure.

MR. BRENT CZARNECKI: And I think earlier I characterized that report as a Gap analysis that was performed by UMS of Manitoba Hydro's state of affairs?

MR. DMITRY BALASHOV: That's a fair characterization.

MR. BRENT CZARNECKI: And Mr. Balashov, I think I heard you this morning say that UMS was a very reputable firm in this regard?

MR. DMITRY BALASHOV: Absolutely.

MR. BRENT CZARNECKI: And we've heard of the company called Kinectrics as well?

MR. DMITRY BALASHOV: I have indeed.

MR. BRENT CZARNECKI: Are you familiar with them?

MR. DMITRY BALASHOV: Yes.

MR. BRENT CZARNECKI: I hope so, your boss used to work for them.

MR. DMITRY BALASHOV: Sure has.

MR. BRENT CZARNECKI: And likewise would they be, in your view, a very reputable firm in the subject matter?

MR. DMITRY BALASHOV: Yes.

MR. BRENT CZARNECKI: And I take it that you would agree that UMS did extensive analytical work when performing its Gap analysis of Manitoba Hydro?

MR. DMITRY BALASHOV: Based on our reading of the reports, it would appear to be so. We had requested Manitoba Hydro to procure -- or requested whether Manitoba Hydro had an -- in an attempt to see what some of the more detailed analysis has been, they had not provided this analysis, nor did they say that they requested that from UMS. But based on what we've seen, it seems like there was a lot of interviews that took place and other assessment.

So I generally agree, subject to reservations.

MR. BRENT CZARNECKI: Thank you. That was what I was focusing on was more or less the

fieldwork of UMS and if we could turn up page 3 of the report. I think it outlines the paragraph that reads:

"To perform the assessment, in particular, --

MR. DMITRY BALASHOV: Right, I -- I recall this.

MR. BRENT CZARNECKI: And so I'm just going to highlight some of the field activities they did. They collected and reviewed asset management related process and practice documentation, as well as current plans to monitor and maintain asset performance, asset condition and risk levels.

Do you to see that?

MR. DMITRY BALASHOV: I do.

MR. BRENT CZARNECKI: And then I think as you've just fairly said, they had interviews were held with the executive team to understand their views on asset management.

And would your understanding be the executive team, being the one at Manitoba Hydro?

MR. DMITRY BALASHOV: Yes, that's fair.

MR. BRENT CZARNECKI: And they looked at objectives for the assessment and perceived issues and gaps?

MR. DMITRY BALASHOV: Correct.

MR. BRENT CZARNECKI: And then following those interviews, individual interviews were held with the personnel involved with asset management from across the Hydro generation operations, transmission and customer service and distribution business units?

MR. DMITRY BALASHOV: That is what the report says.

MR. BRENT CZARNECKI: Which sometimes are referred to GT and D?

MR. DMITRY BALASHOV: Yep, that is a common industry reference.

MR. BRENT CZARNECKI: And the focus of those interviews was to understand the current and planned asset management roles and responsibilities, practices, processes and tools; agreed?

MR. DMITRY BALASHOV: Absolutely.

MR. BRENT CZARNECKI: And I could go on but in appendix B there's a more detailed list of personnel that were involved and interviewed and some workshops that occurred?

MR. DMITRY BALASHOV: I recall that, yes.

MR. BRENT CZARNECKI: So UMS had a

fairly informed dialogue with Manitoba Hydro staff and representatives responsible for asset management?

MR. DMITRY BALASHOV: Not to put words in -- in the mouth of UMS report, it would appear that they've done an extensive work. How they perceived the information that they have received, we cannot judge other than what is written in the report.

MR. BRENT CZARNECKI: Fair enough, sir. No question they performed a more extensive review and involvement than METSCO's review in this proceeding?

MR. DMITRY BALASHOV: I would argue that the two (2) scopes of the review are quite incomparable. We have been asked to look at the evidence for particular test years in terms of the evidentiary rigour in justifying the expenditures. UMS has done a very detailed analysis of the Company's capabilities, which, as we have noted in our presentation, we have relied upon to establish the starting point of the context of where we're at. So I -- I wouldn't say that they're comparable. I -- I understand the point that you're trying to make but I -- I cannot agree that it's more extensive because we were doing different things.

They have certainly had exposure to

Manitoba Hydro staff that we had not and that we could not establish by way of asking the interrogatories for some technical materials that Manitoba Hydro refused to provide.

MR. BRENT CZARNECKI: And fair enough. I think I'm hearing you say that you had different objectives and by no means was your retainer meant to be a UMS 2.0?

MR. DMITRY BALASHOV: Which would probably not make sense, considering that they have done a good job.

MR. BRENT CZARNECKI: And do you recall the testimony of Mr. Wortley referring to Manitoba Hydro's corporate asset management initiative as a journey?

MR. DMITRY BALASHOV: I do.

MR. BRENT CZARNECKI: And I think from your presentation today you're aware of some recent progress that Manitoba Hydro has made on this journey?

MR. DMITRY BALASHOV: Based on the commentary of Mr. Wortley and -- and his colleagues, during the panels we've certainly read of some instances of progress across.

MR. BRENT CZARNECKI: And one (1) of those instances of progress is the development of a

corporate value framework to provide a common basis for valuing projects?

MR. DMITRY BALASHOV: What I understand to be an ongoing development that is proceeding, but has not informed as I believe either Mr. Wortley or one of his colleagues has said, has not informed the current plan.

MR. BRENT CZARNECKI: Correct.

MR. DMITRY BALASHOV: Thank you.

MR. BRENT CZARNECKI: And in questions posed by Dr. Williams, Mr. Wortley testified that Hydro's commencing phase 2 of the journey, being the development of asset management policies and strategies?

MR. ALEX BAKULEV: Yes. However, our belief then on page 15 of our report, we mentioned that this pol -- this policy and strategy were planned to be developed for a certain timeframe, and I think it was last year. And based on our IR which was -- sorry, I'll just repeat which was the Coalition/MH, I-149(a).

So the -- your answer was that those documents while they were planned to be developed last year have not been developed. So, meaning that we honestly don't see the confidence that the Company

while competing to the plans actually is able to follow these plans on the asset management journey and that's one of the concern that we mentioned in the report.

MR. BRENT CZARNECKI: Dr. Bakulev, you're knowledgeable of the fact that Manitoba Hydro as a corporation has recently gone through a major restructuring process?

DR. ALEX BAKULEV: That's what you put on the record, yep.

MR. BRENT CZARNECKI: And that restructuring involves the loss of approximately nine hundred (900) employees.

DR. ALEX BAKULEV: I believe you mentioned that it was nine hundred (900) employees; on some other records it was -- the actual departure is less, yes.

MR. BRENT CZARNECKI: Approximately I think. It's probably closer to eight hundred and fifty (850), but no need to quibble.

DR. ALEX BAKULEV: While it's -- so I still don't think that's a major hurdle to implement this at management or continue to implement the best asset management principles in the Company because, first of all, we don't know what type of personal has

being leaving the Company, whether it's an asset management's sphere or not. And you even if it's there, I think still it's a quite available task to continue to implement based on the plans the best principles of the asset management.

MR. BRENT CZARNECKI: And in questioning posed by Dr. Williams, Mr. Wortley testified that Hydro's commencing phase 2 of the -- of the journey and is cautiously optimistic that that will be completed in a year's time.

You're aware of that?

DR. ALEX BAKULEV: Sub -- subject to check, yes.

MR. BRENT CZARNECKI: And you would agree that asset management is a journey and not an end point?

DR. ALEX BAKULEV: I think that can be answered to any continuous improvement initiative, whether it's asset management, so some other continuous improvement initiatives. You can always be better than the current state.

MR. BRENT CZARNECKI: So it is always evolving and improving; is that what you're saying?

DR. ALEX BAKULEV: Of course.

MR. THOR HJARTARSON: And -- and I'd

like maybe to add to it that it is not a binary thing. You're not either/or. Everybody's on some kind of a journey and it -- it's obvious that Manitoba is on their journey. The importance I think we're trying to look out is that they have a journey and that -- that there are some goals that they planned to accomplish. There are some milestones. Are they going to be met? How is the Board in some ways going to be following up having them show how they're meeting those and -- and standing -- staying to their plan basically.

MR. BRENT CZARNECKI: Thank you, Mr. Hjartarson. So following that answer, it's important for Mr. Wortley within the next year to gather data, analyse if that data is useful to you in terms of measuring performance and making predictions with that information?

DR. ALEX BAKULEV: Sorry, I believe that based on the projects that they put forward, you have gathered the data and you have these data to be able to make the decisions. So I'm not sure if there is any need to gather additional data and if it's so it would be real great to see what kind of additional data you're thinking to gather to make those decisions.

And our particular concern would be not

to make the engineering decisions but rather the investment prioritization decisions and locate the options analysis in the future. What if Company spends that money? That's the outcome that would be given to the -- to the customers.

I honestly believe based on the depth of some of the analysis that we have, you have all the data to be able to develop those tools and to be able to predict, let's say, availability for your distribution systems.

MR. THOR HJARTARSON: Maybe just to add to that, the processes and the tools and the implementation, they should help with driving the data. Don't fall in the mistake of collecting data first and then implement because you get less quality data. It is really important to have that process drive so that the correct information is being collected.

MR. BRENT CZARNECKI: Whatever stage of the journey that proceeds, if -- if it doesn't -- if it's not useful or doesn't add value to decision-making then another approach would be developed or should be developed. Would you agree with that?

DR. ALEX BAKULEV: Can you please restate your question in different terms?

MR. BRENT CZARNECKI: I'll try it again. Perhaps whichever asset management journey one Utility may choose, it should add value to decision-making; correct?

DR. ALEX BAKULEV: It should value to -- it should add value to the overall value statement of the Company, whether it's to the stakeholders that could be the Utility or the customers then, yes, correct.

MR. BRENT CZARNECKI: And you will recall that Mr. Wortley cautiously estimated a three (3) to five (5) year time frame of concerted efforts to complete the capital portfolio management portion of Hydro's asset management journey?

DR. ALEX BAKULEV: As I mentioned before, it's a journey so it's never been completed. So it's always evolving. And I think you would agree with that.

So -- and then for the, I guess, if the question is: When the Company starts making their conscious decision to implement asset management practices, let's say, based on the standards like PAS 55 on the new standard ISO 55000, and after this decision is made with concentrated efforts, it is possible within three (3) to five (5) years to be on

the frontier line of the -- of the asset management. I think you have a (INDISCERNIBLE), so to achieve three (3) or four (4) out of four (4), that -- that's quite possible.

MR. BRENT CZARNECKI: And -- and I think I heard you this morning in your direct testimony say that the three (3) to five (5) year timeframe was a reasonable estimate; correct?

MR. DMITRY BALASHOV: That's correct that -- that was part of my testimony, sir, and I -- I confirm that. The one (1) thing that I do want to add to this is that we have throughout our evidence, both written and today's presentation, given Manitoba Hydro a, you know, a number of applauses in terms of the type of work that they're doing. We've shown evidence of significant improvement.

However, as we understand the issue of this proceeding is specifically the '16 and '17 capital forecast -- or '17 and '18, pardon me, and what we do understand to be the case is that a lot, if not most, of these new initiatives insofar as they are proceeding, they have not been reflected in the current plan; that rigour that is being established is not in the plan that is currently before the Board, and that is -- that is something that drove our

conclusions.

We completely endorse the direction where the Company is going, subject to some concerns in terms of the accountability and -- and -- and delivering on the milestones and in getting there and making sure that it's implemented, but that is just the distinction that -- that I wanted to make in terms of the scope of this proceeding.

MR. BRENT CZARNECKI: Mr. Balashov, I think Mr. Wortley's testimony was quite candid in that regard, saying that we are attempting to fill the gaps that were identified as UMS when it studied this initiative.

Would you agree?

MR. DMITRY BALASHOV: I have no reason to question that whatsoever, absolutely.

MR. BRENT CZARNECKI: And moving from the three (3) to five (5) year timeframe, a broader asset management maturity would be a much larger endeavour taking more time to complete.

Would you agree?

MR. THOR HJARTARSON: Yes, yes, absolutely. And also there's always new technology that comes in. There is -- there is various new find -- findings that people see and different types

of resources that start working for the Utility. So it's -- it's really a never-ending journey as such.

MR. BRENT CZARNECKI: And based on all of your information and evidence, I take it you would agree that it is important for Mr. Wortley to continue on with this journey and focus his efforts on phase 2 in the immediate and near term?

DR. ALEX BAKULEV: I would say that it is very important for Manitoba Hydro not just Mr. Wortley to continue to assemble a management practice together.

However, we, as a consultant in this case, we do want to say that those plans that have been established should be unfold and, as an example, asset management roadmap have been in one of your document. I believe it was called 2015 Engineering Services Division Strategic Plan and their road map as management -- development of the asset management roadmap was mentioned there, back in February 2015. And right now we are in 2018. So a three (3) year gap without having the roadmap developed, that's quite concerning. And if those three (3) to five (5) years will, again, go to seven (7) to ten (10) years as a continuing journey that -- that -- that that would be something that might be a recommendation to the -- to

the Board to ensure that those milestones have been followed and embedded in the decision-making.

MR. BRENT CZARNECKI: Thank you, Dr. Bakulev. Back to Mr. Wortley's work, is it important that he report the fruits of his and his team's labour to Manitoba Hydro's executive and the Manitoba Hydro Electric Board to further and approve -- further approve and direct his asset management journey?

MR. DMITRY BALASHOV: As a casual observer using common sense, absolutely. As -- as experts, I'm not sure that we're in a -- in a position to provide a statement as to the governance aspects of Manitoba Hydro.

MR. BRENT CZARNECKI: Presumably Mr. Balashov, on the governance he would do that before coming back to this Board to provide whatever his plan may be --

MR. DMITRY BALASHOV: Would you remind me of what Mr. Wortley's title is?

MR. BRENT CZARNECKI: He is the Director of Strategic Business Integration.

MR. DMITRY BALASHOV: Okay, fair enough so.

DR. ALEX BAKULEV: I would add to that that I would not put the development of asset

management just on Mr. Wortley's shoulders. It's quite a big task and the asset management itself described the Companywide involvement that is being supported and that's the key statement in the standard as well, that it should be supported with the key leaders in the organization, starting from the CEO of the Company, right?

MR. BRENT CZARNECKI: Rest assured, Mr. Wortley has a -- a cast of team members below him from generation, transmission and distribution and it is by way of the guidance from the CEO of Manitoba Hydro.

You have no reason to dispute that?

DR. ALEX BAKULEV: No.

MR. DMITRY BALASHOV: No, we don't.

MR. BRENT CZARNECKI: Now, I'm going to switch gears from the journey to benchmarking and I'm going to try to hit it at a highly -- at a pretty high general level, so bear with me here.

Would you agree that every Utility is structured differently?

DR. ALEX BAKULEV: I'm -- I'm not sure what you mean when you say "structured."

MR. BRENT CZARNECKI: Okay. I'll focus more on Manitoba Hydro. You agree that Manitoba

Hydro is vertically integrated with generation, transmission and distribution business groups?

DR. ALEX BAKULEV: That's the Company's description, yes.

MR. BRENT CZARNECKI: And that would be different from Toronto Hydro, for example?

DR. ALEX BAKULEV: If you just mention from Toronto Hydro, yes.

MR. BRENT CZARNECKI: And I could --

DR. ALEX BAKULEV: However, if you would mention other companies I don't think it would be different from some other vertically integrated companies.

MR. BRENT CZARNECKI: Bear with me, I'll try to get to the other examples that were in your report.

You would agree that the age of assets of a particular Utility is different?

DR. ALEX BAKULEV: The age distribution of the assets in different asset classes, obviously, will be different.

MR. BRENT CZARNECKI: And likewise the condition of those assets would be different?

DR. ALEX BAKULEV: Of course.

MR. BRENT CZARNECKI: The location of

those assets would be different?

MR. BRENT CZARNECKI: Yep.

MR. BRENT CZARNECKI: Such as some would be located in northern parts of a province, southern parts, urban, rural.

Agree with that?

DR. ALEX BAKULEV: Yes, like in any other companies, yes.

MR. BRENT CZARNECKI: And the geography of the asset location can be very different?

DR. ALEX BAKULEV: Yes. And that's, let's say, based on our example of working with the SaskPower, we can see that, and that -- that might be a challenging environment to work with.

MR. BRENT CZARNECKI: And for example, in Manitoba, I'm not sure if you're aware, but there's a large portion of Canadian Shield?

DR. ALEX BAKULEV: There is the same issue in -- in Ontario province, large portion is Canadian Shield.

MR. BRENT CZARNECKI: And another just general example is there's bogs in Manitoba; assets would be located in boggy conditions?

DR. ALEX BAKULEV: The same issue we've seen in SaskPower case.

MR. BRENT CZARNECKI: And the ability to access facilities would vary greatly from province to province or location to location of assets?

DR. ALEX BAKULEV: Environment might be different for different companies, yes.

MR. BRENT CZARNECKI: And seasonal roads may be used for some Utilities and not others, for example?

DR. ALEX BAKULEV: In some Utilities the work can be done only during the winter time on icy roads, yes.

MR. BRENT CZARNECKI: And the Utility's regulation and the regulatory models or compacts would be different from jurisdiction to jurisdiction?

DR. ALEX BAKULEV: That's evident, yes.

MR. BRENT CZARNECKI: And the regulatory bodies themselves will be different?

DR. ALEX BAKULEV: And the Board members would be different too, yes.

MR. BRENT CZARNECKI: So I take it you wouldn't disagree that every Utility has its own unique set of circumstances to those of other Utilities?

DR. ALEX BAKULEV: Yes, as any other company can argue that they have their own specific circumstances.

MR. BRENT CZARNECKI: And agree that a particular set of practices should fit the particular set of circumstances?

DR. ALEX BAKULEV: They have brought -- there are some generic principles that can be fitted to any company but specific details on how those principles are being within the company might be different depending on the circumstances and environment that this company is working on.

And it's not just environment, it could be even a knowledge retention issues that this company has.

MR. BRENT CZARNECKI: Fair enough and --

DR. ALEX BAKULEV: A whole gap of any knowledge database that the company has.

MR. BRENT CZARNECKI: Fair enough, Dr. Bakulev. And I think those general conditions you've reviewed this morning on your refresher on asset management with the Board, those were intended to be general conditions that would apply?

DR. ALEX BAKULEV: When I spoke about

the general principles, yes.

MR. BRENT CZARNECKI: Back to the circumstances in -- in other words, what may work very well for one set of circumstances may not work as well or at all for another set of circumstances?

MR. DMITRY BALASHOV: That is precisely why benchmarking and -- I'm going back to benchmarking because this is how you started the section, Mr. Czarnecki.

MR. BRENT CZARNECKI: M-hm.

MR. DMITRY BALASHOV: This is precisely why benchmarking studies that are well done have a set of adjustment factors that account for the particular conditions that you have outlined and/or other conditions that might be unique, for example, strategic choices that utilities make in terms of letting equipment run to failure or replacing it in advance of certain times in large urban utilities, things of that nature.

So yes, absolutely conditions are different everywhere, but as was evidenced by the fact that BCG has done what looks to us like a fairly extensive benchmarking study on the OM&A studies, this does not make the feasibility of benchmarking any less. It could econometric. It could be done in

other ways.

MR. BRENT CZARNECKI: Thank you. Would you agree that we should be cautious with benchmarking studies when comparing apples to oranges, and possibly grapes?

DR. ALEX BAKULEV: And I guess you're raising the same issue that was raised in the Ontario environment when the OEB introduced the total -- closed benchmarking model for the -- for about seventy (70) different distributors in the province.

And this model actually try to account for specific circumstances that each company has, and at the same time trying to understand -- account for those factors, business conditions each of the assets; specific environment, including Canadian Shield, not all the companies are on Canadian Shield and some other conditions; split between overhead and underground; whether it's rural or urban environment, and accounting for those factors, the benchmarking model was created, right.

Some companies can argue where they shows the specific circumstances of this company. However, they said from -- for about ten (10) years for seventy (70) companies was developed and created, and based on the set, the benchmarking model --

statistically significant benchmarking model was introduced.

And it is being used in the rate proceedings to understand what's the predicted cost of the Utility should be versus the actual costs. And even the predicted costs are higher than the -- then the actual cost, it -- it's a good thing for the company. If the actual costs are actually higher than the predicted by the model costs, it meaning that the company is more expensive than the average in the province.

MR. BRENT CZARNECKI: Benchmarking studies and analysis would be one (1) of many potential measures or drivers that would be considered into an asset management portfolio; agree?

DR. ALEX BAKULEV: Agree, benchmarking is a quite valuable input in the decision-making process.

MR. BRENT CZARNECKI: And I don't want to spend too much time treading into SAIDI and SAIFI because I think you've covered off nicely, but that's another -- those indices would be yet another driver -- potential driver towards making actual asset investment decisions?

DR. ALEX BAKULEV: Yes, it's one (1)

of the input.

MR. BRENT CZARNECKI: And as you testified this morning, there -- SAIDI and SAIFI are limited as they are lagging limited performance measures?

DR. ALEX BAKULEV: They are oftenly viewed as lagging indicators because they show the historical stats that have happened already.

MR. BRENT CZARNECKI: In -- in my words, meaning that significant performance changes may not be typically seen for several years following changes in asset intervention practices?

DR. ALEX BAKULEV: Based on our experience working with different Utilities we did not see abr -- abrupt changes of SAIDI and SAIFI indicators.

MR. THOR HJARTARSON: The short term.

DR. ALEX BAKULEV: In short time, yeah. Long term, yes, but the short term there is no reason to say that.

MR. BRENT CZARNECKI: And we --

MR. THOR HJARTARSON: And another thing that it's important to note that SAIDI and SAIFI are average indicator and often used for the whole Utility. There are other indicators you could look at

to see specific performance in certain areas of improvement, whether it's in a city or in a rural area far away. I could look at specific feeders, how they're improved. How many outliers are there that are really causing a lot of the -- a lot of outages.

SAIDI and SAIFI are average ones. They are lagging ones. They're kind of first what everybody compares but within a utility, you may want to go further on that.

MR. BRENT CZARNECKI: And, Mr. Hjartarson, on that point, I think we heard evidence from Mr. Neufeld from a transmission perspective that for his purposes, SAIDI and SAIFI have a very limited use because if there's a major line outage, there's a major line outage.

MR. THOR HJARTARSON: In transmission specifically, yes.

MR. BRENT CZARNECKI: And do you understand that one (1) of the indicators that Mr. Neufeld is now using is a different model or predictive tool, the RCI I think it's called?

MR. DMITRY BALASHOV: Sir, as -- as I recall from the record, I wouldn't characterize SAIDI and SAIFI and the rel -- RCI or whatever the name of the tool that has been in place for some years as

somewhat of replacements for each other.

I believe that that tool is something that has been developed in Manitoba Hydro to simulate various scenarios. So it's -- it's not that SAIDI and SAIFI are not useful per se, it's just that, you know, with a transmission system, generally speaking, an outage on a particular part of the system, whether it's bulk, whether it's a radio connection, the system can still -- can still operate because of our system operator, subject to major larger outages, obviously.

So yes, SAIDI and SAIFI -- and we have even seen it when we looked at defective equipment that it affects the system -- the transmission system a lot less because, generally, the supply to consumers -- gen consumers is -- is rarely or not as frequently affected as in distribution.

So I wouldn't say that SAIDI AND SAIFI are precisely not useful. I -- I don't remember exactly the way Mr. Neufeld has characterized this, but I -- but I am not sure that that -- that's what he was saying.

MR. BRENT CZARNECKI: Well, if I can help you, Mr. Balashov, he used an example of the east side of Lake Winnipeg where there's 1 feet in --

MR. DMITRY BALASHOV: Correct.

MR. BRENT CZARNECKI: -- and his point was that if that feeder goes down, SAIDI AND SAIFI are completely irrelevant because there's obvious -- and there'd be widespread outages for lasting durations and no communication.

So I think that's the context of what he was speaking of in terms of measuring his reliability performance from a transmission perspective, so.

MR. THOR HJARTARSON: I think that kind of follows up on what I just said about outliers and so on. Probably there -- if -- if a SAIDI/SAIFI, is for all Manitoba Hydro, all its customers, that line -- I not particularly know about it but if we're talking about a northern -- northern part of -- around Lake -- Lake Winnipeg, then there probably are not that many customers, but still those customers can be severely affected when an outage occurs.

MR. BRENT CZARNECKI: And another example that comes to mind is the Quebec ice storm in terms of the general example that SAIDI AND SAIFI, there's limited value in an event such as that.

MR. THOR HJARTARSON: Yeah, it's a major event. It did produce high SAIDI AND SAIFI because that affected the city of Montreal.

DR. ALEX BAKULEV: And maybe I would just add to Mr. Hjartarson. So those some major events, there is some standards that are trying to exclude the major event days from the statistics and the most known one I think Mr. Wortley will obviously knows this standard, it's IEEE 2.AB standard 1336 that is used in best SAIDI AND SAIFI and trying to normalize it across the major event days to ensure that they're not being counted or viewed as the major driver for the -- for the investments.

MR. BRENT CZARNECKI: Switching gears now back to your report. And I'm returning to the informative examples of advanced asset management documents prepared by other Utilities which you filed as appendix A and it's at page 49.

And, gentlemen, you have no reason to doubt that Mr. Wortley and others at Manitoba Hydro will consider or reconsider, as the case may be, the informative examples from other jurisdictions specific to the circumstances in Manitoba?

DR. ALEX BAKULEV: No.

MR. BRENT CZARNECKI: And again, you would agree that Manitoba Hydro is a vertically integrated Utility with GT and D?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And you would agree that being a vertically integrated Utility that this adds additional complexities and nuances to its asset management that are not applicable to many other Utilities?

DR. ALEX BAKULEV: That may not applicable to many other Utilities, but will be applicable to many other Utilities.

MR. BRENT CZARNECKI: And by way of example, some Utilities that only have a distribution role in a small urban geographical area that is densely populated?

DR. ALEX BAKULEV: Those Utilities would have their own things that they would be complaining about, however, it shouldn't restrict from moving along the journey on asset management.

MR. THOR HJARTARSON: Maybe to add to that, one (1) of the foundation standards on this ISO 55000 applies not only to Utilities, it applies to anybody who manages assets, and that's about that -- that's talked about details of best practices.

So, not only different type of Utilities; it could be gas utility; it could be transportation; anybody who owns assets. So that whether Utility has -- is vertically integrated or

not, it has its own challenges, but still, the overall asset management philosophy and how -- how you would get -- how you would look at executing that is pretty much similar.

DR. BYRON WILLIAMS: And I'm just -- excuse me one second. I'm just going to ask Dr. Bakulev to speak up just a little bit. I know you have a cold. Just to make sure everyone in the room can hear you.

DR. ALEX BAKULEV: Okay.

CONTINUED BY MR. BRENT CZARNECKI:

MR. BRENT CZARNECKI: And on ISO 5500 (sic) from your evidence I understood there's only one (1) company that has obtained this status and that's a gas company in the United States?

MR. THOR HJARTARSON: That's been certified. There's a lot of them have gone through it and actually implemented a lot -- lot of the recommendations. But it's a tactical decision for any Utility whether they want to go through certification, and that's a -- but takes its own risks for a Utility and we are not recommending necessarily for Manitoba Hydro to get certified.

MR. BRENT CZARNECKI: And, sir, that

tactical recommendation would rest with the Manitoba Hydro Electric Board or the executive of Manitoba Hydro?

MR. THOR HJARTARSON: Probably a combination of those two (2), yeah.

MR. BRENT CZARNECKI: Now quickly reviewing the examples in your appendix A and I -- I don't want to spend much time in the weeds or the details.

Can you confirm that UK Power Networks, Toronto Hydro and EPCOR are primarily urban utilities?

DR. ALEX BAKULEV: EPCOR as a holding is actually's across Canada and the US. They have companies that they own in Ontario, in Calgary, on the US territory. They own water. They us -- they have transmission, they have distribution so it's quite a big company. Toronto Hydro, primary distribution. UK Power Networks, it's a company that has actually -- is part of a bigger company as well. They have around I believe six (6) different dissolution networks in -- in the United Kingdom that they operate.

MR. BRENT CZARNECKI: Distribution networks?

DR. ALEX BAKULEV: Yeah, distribution networks.

MR. BRENT CZARNECKI: And the EPCOR I was referring to is in Alberta primarily in Edmonton-based is my understanding.

DR. ALEX BAKULEV: If you referring to the distribution department of Edmonton's -- or they call it EDTI, then, yes, it would be just distribution of the city of Edmonton. However, they do own other assets as well.

MR. THOR HJARTARSON: They -- they do have some transmission also. And EPCOR does have some transmission.

MR. BRENT CZARNECKI: And they serve a high customer base within those urban cities?

DR. ALEX BAKULEV: Customer base for, let's say, for Toronto Hydro?

MR. BRENT CZARNECKI: Yes.

DR. ALEX BAKULEV: That's around 700,000 customers.

MR. BRENT CZARNECKI: And in Edmonton, do you know?

DR. ALEX BAKULEV: And Edmonton, that should be about 400,000 customers.

For UK Power Networks I believe it's in millions total.

MR. BRENT CZARNECKI: And although

they may own limited or some transmission infrastructure, they are primarily distribution companies; is that correct?

DR. ALEX BAKULEV: If you're referring to the electrical part of EPCOR's business in Alberta, they would be primarily distribution. However, they still have significant portion of transmission. Toronto Hydro would be a distribution. Hydro One mentioned here would be a transmission province wise having one million plus customers.

MR. BRENT CZARNECKI: Would it be correct in saying there is no generation infrastructure owned by those Utilities, being UK, Toronto Hydro and EPCOR in Alberta?

DR. ALEX BAKULEV: Those ones that at listed in appendix A, you're correct.

MR. BRENT CZARNECKI: Now moving to Horizon Energy and UK Power Networks, those are located in different countries?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: And different --

DR. ALEX BAKULEV: It says New Zealand.

MR. BRENT CZARNECKI: Sorry, go ahead.

DR. ALEX BAKULEV: It says New

Zealand.

MR. BRENT CZARNECKI: And different expectations with respect asset management and the associated maturity levels occur country to country?

DR. ALEX BAKULEV: I'm not sure that it's fair to say different expectations from asset management perspective, right. So obviously, if they have different Utility boards that trying to regulate those companies and even in Canada, there are different Utility boards that regulate the companies -- the companies.

In Alberta it's quite different practice compared to Ontario and Ontario is quite different from the Manitoba province. The same you can say about New Zealand.

MR. BRENT CZARNECKI: And lastly, Hydro One is a transmission and distribution company; correct?

DR. ALEX BAKULEV: It is transmission and distribution.

MR. BRENT CZARNECKI: And Hydro One supplies many individual distribution companies across the province of Ontario?

DR. ALEX BAKULEV: Yes.

MR. BRENT CZARNECKI: Now switching

gears to regulatory models. I take it you're aware that Ontario Utilities regulatory environment and model from the Ontario Energy Board grants part of rate increases on an acceptable rate of return on capital investments?

MR. DMITRY BALASHOV: That's correct, sir.

MR. BRENT CZARNECKI: Some will call it rate-based rate of return regulation?

MR. DMITRY BALASHOV: Right.

MR. BRENT CZARNECKI: And a component of that could be incentive-based or performance-based regulation, PVR?

MR. DMITRY BALASHOV: Exactly where a Utility is regulated within -- within a certain funding envelope over time, that is based on a regular test year and then inflationary adjustments, less the productivity offset for several years intervening between the re-basing as many as five (5) years currently.

MR. BRENT CZARNECKI: And are you aware that Manitoba Hydro is not regulated on a rate-based rate of return basis?

MR. DMITRY BALASHOV: That has been explained to us early on in our engagement on this

proceeding, yes, we are.

MR. BRENT CZARNECKI: And equally perhaps aware now that it's not performance-based regulation or incentive-based regulation?

MR. DMITRY BALASHOV: Correct. We are.

MR. DMITRY BALASHOV: And it's regulated on a different model, known as cost of service?

MR. DMITRY BALASHOV: We are aware that it's regulated based on the cost of service model, though, I would not necessarily characterize cost of service as being incompatible with the model that is incentive based.

Effectively what happens in Ontario is the re-basing years, as they're called, when a Utility comes in for, you know, providing forecast for five (5) years, for example, or shorter periods of time. It's effectively a cost of service proceeding, followed by two (2) or three (3) years where the rates not even the rate base is adjusted by inflation, minus the productivity offset which is informed by benchmarking.

So the two (2) are not completely different. One is a component of the other but you

point a stake and -- and we agree that it's a different model here currently.

MR. BRENT CZARNECKI: Gentlemen, you -- you agree that after UMS completed its extensive analytical work that UMS, ultimately, concluded that Manitoba Hydro compares favourably against North American -- North American utilities in terms of its asset management maturity level?

MR. DMITRY BALASHOV: That was part of UMS conclusion, along with other elements of it.

MR. BRENT CZARNECKI: And -- and --

MR. DMITRY BALASHOV: Such as the fact that one and a half out of four or out of five, depending on how you view zero, indicates some maturity relative to others, but it is far from three (3) which I believe they indicator as competence. So, that is another part of the conclusion that, on balance, UMS has provided along with detailed recommendations.

DR. ALEX BAKULEV: And actually, I believe that in the report we mentioned that we think it may be overstated by UMS, just due to the fact that they greatly rely on the tools and frameworks to be considered implemented by Manitoba Hydro, such as C55 to incorporate value framework and RCM.

And as we've heard, that corporate value framework was not used in the ACF-16 and C55 priortization details, also we have not seen that on the -- on the record. And the project might have been accomplished by now, but certainly was not completed at the time of engagement with UMS.

MR. BRENT CZARNECKI: So despite your differing opinion from UMS and hearing on the actual scorecard of 1.5 or maybe a little less, you'd agree that UMS concluded that Manitoba Hydro compares favourably against North American Utilities in terms of its asset management maturity level, correct?

MR. DMITRY BALASHOV: That is -- that is what the report says, subject to other reservations that we've put on record. But too maybe try to add to Dr. Bakulev's point, the conclusion has been made and I -- I believe in our presentation and we'd be happy to go back there. It's one of -- one of our first slides of the -- our initial approach. I don't have it in front of me, but UMS had stated that this assessment has been largely granted on the basis of the analytical tools and frameworks that have being implemented.

And the point that we think is important in the context of this proceeding, looking

at the two (2) test years is that the Utility that has been granted one and a half out of five (5) is not the same Utility that prepare -- has those plans. We believe that that Utility is less mature, given the weight that UMS has placed on these particular initiatives and where the Company is.

As we've stated, we endorse all of the initiatives, but I think as far as it comes to the plan before the Board it -- they are -- they are two (2) different companies when it comes to asset management maturity. And we make this conclusion based on it's -- it's slide 22 of our -- of our presentation from this morning. And it is a direct quote from UMS that says:

> "Overall, Manitoba Hydro compares favourably against North American utilities."

We have omitted part of the sentence, but it continues:

> "...largely as a result of recent progress made."

Perhaps it's better to go to the original report. It's on page 11. And then it lists these initiatives which we have not found and, in several cases, Manitoba Hydro has confirm explicitly

have not been used in relation to this plan.

(BRIEF PAUSE)

THE CHAIRPERSON: Sorry, Mr. Czarnecki, how much longer do you have?

MR. BRENT CZARNECKI: That concludes my questions, Mr. Chairman. And thank you, gentlemen, for your --

THE CHAIRPERSON: I hope I didn't scare you off.

MR. BRENT CZARNECKI: You didn't. Mr. or Dr. Williams may scare me sometimes but you -- you haven't yet.

Thank you, gentlemen, for your candid answers and appreciate you coming to Winnipeg and sharing your experiences.

THE CHAIRPERSON: Thank you.

MR. DMITRY BALASHOV: Thank you.

DR. BYRON WILLIAMS: Mr. Chair, this is -- it's not the proper time, but I wonder if we could step down for like three (3) minutes, just for a health break.

THE CHAIRPERSON: Certainly. Sure.

--- Upon recessing at 1:46 p.m.

--- Upon resuming at 1:52 p.m.

THE CHAIRPERSON: Okay. Mr. Peters...?

MR. BOB PETERS: Yes, thank you.

CROSS-EXAMINATION BY MR. BOB PETERS?

MR. BOB PETERS: Good afternoon. I'd like to start with slide 21 of Consumers Coalition Exhibit 52. And this slide, when I think you spoke to it, was it you, Mr. Balashov?

DR. ALEX BAKULEV: Correct.

MR. BOB PETERS: You're -- you're showing this Board that of Manitoba Hydro's total capital expenditure budget a small percentage is related to the sustainment funding that -- that METSCO examined?

MR. DMITRY BALASHOV: Correct.

MR. BOB PETERS: And on this slide, you show the major new generation and transmission expenditures and -- and those would be for things like the Keeyask, the Bipole III projects, the Manitoba/Minnesota transmission line, correct?

MR. DMITRY BALASHOV: That's correct,

Mr. Peters. As -- as noted underneath the pie chart, we've essentially reproduced the table that includes these various projects; having grouped things into the broader categories that -- then then what's broken down on the table.

MR. BOB PETERS: And in your notes beside the pie chart one (1) of the comments that METSCO makes is that Manitoba's -- Manitoba Hydro's sustainment funding access is significantly constrained by the major capacity expansion project funding that it needs.

Do you see that?

MR. DMITRY BALASHOV: We do.

MR. BOB PETERS: And on what basis do you conclude that Manitoba Hydro's sustainment funding is constrained?

MR. DMITRY BALASHOV: Purely on the basis of our observations of the total expenditures that are -- as we understand associated with the -- with the larger new projects particularly Bipole and Keeyask, which was to convey that the funding that would otherwise be available for other purposes, including sustainment, is -- is -- is obviously now competing with other purposes.

MR. BOB PETERS: Is METSCO saying that

Manitoba Hydro's spending on sustainment capital should be higher than what it is?

MR. DMITRY BALASHOV: No, we are not saying -- saying that directly. All -- all this is meant to say is that there are other significant priorities that com -- comprise a larger part of the budget which would automatically, in our standing, in our position -- and this is where we spoke -- speak about them in -- in the second bullet just below the one that you were referencing, sir, we say that it -- it just makes it that much more important to get the sustainment right, especially given the fact that this is the type of work that the Utility does year in and year out.

But we're -- we're not suggesting that more or less is, in particular, necessary. Like, we said, we did not get to see sufficient evidence from the applicant to make those types of inferences nor was that necessarily our scope.

MR. BOB PETERS: Would you agree, Mr. Balashov, and of course it's open to anybody else on the witness panel if you have comments that will bring value to the Board, is it METSCO's view that the maximum analytical rigour should be expended whether there's lots of money available, or its constrained?

Is there -- is there a different standard, based on the amount of money available?

MR. DMITRY BALASHOV: I would not say that it's different standards. The standard is obviously what -- what is maximum in one (1) Utility is relative to -- to what is maximum in somewhere else. But certainly, rigour -- analytical rigour is -- is something that is expected of -- of a Utility or any business for that matter.

MR. BOB PETERS: So when Manitoba Hydro is finished building Keeyask and Bipole III and the Manitoba/Minnesota transmission lines, the analytical rigour should be just as high for the sustainment capital then as it is now?

MR. THOR HJARTARSON: Yes, it should be. It -- really always should be. It's not a question of that. It also -- you would probably pay notice at that time if it all of a sudden increases a lot that there was a constraint now but that's -- that's another story.

When we -- we have no -- we -- we don't really see it happening. We're -- we're just flagging this that this could possibly be a constraint.

MR. BOB PETERS: Mr. Hjartarson, wouldn't it follow that Manitoba Hydro has known for

some time that it's going to be spending a lot of money on major new generation and transmission such that they should have got their sustaining capital expenditures in order in advance of this major projects?

MR. THOR HJARTARSON: It's -- it's always hard because the -- sustainment funding is a year-to-year thing. You cannot really just skip it for some time. Your assets do age and you'll have -- you'll be in real problem.

And reason why we say this also, we've seen it som -- somewhere else where a Utility had a big generation project, for instance, in one case they had a nuclear project they were building. They actually did no sustainment for several years while there was being funded. After that they were having real problems getting back to -- back to their state. The reliability was going down and so on. So we're really pointing that out from that perspective.

MR. BOB PETERS: If we could --

DR. ALEX BAKULEV: Sorry, Mr. Peters.

MR. BOB PETERS: Yes? Dr. Bakulev?

DR. ALEX BAKULEV: Just add some points to that. So if all the projects have a positive value and let's say there is unlimited

funding, unlimited labour constrains and obviously it's -- it might be good for the company to implement that all assuming that they add value to the customers.

However, if there are some constraints, either labour constraints, or funding constraints more rigour should be applied to priortization of those projects and understanding which projects can be delayed or which projects cannot be delayed or maybe different alternative solutions.

So -- and I guess this portion, what we meant as well, that right now with those other big capital commitments that they have, they do have -- hopefully do have funding constraints and hopefully do have labour constraints. So the more rigour should be applied on the priortization and what-if scenario planning which we have not seen in this evidence.

One that -- I think it's even mentioned on the rebuttal evidence by Manitoba Hydro, on page 49, where they confirm that the past investments for system renewal budgets are being used for CF-16. Don't remember where exactly it is. Until then, past renewal investment requirements that, role number 24, are the best indicator available for future investment requirements. And I used for budgeting

purposes outside the test years.

So it's kind of -- it shows that there is lack of analytical rigour to be able to understand what need -- what are the needs, specific needs in the future are for system renewal budgets.

MR. BOB PETERS: Before we leave this page, and I had it perhaps later. It's the position of METSCO, is it, that the past expenditures should not be an indicator of what the future expenditures should be?

DR. ALEX BAKULEV: Our position is that the -- the goodness of management should be able to predict based on the numbers and the data how much money and how many units of -- let's say, how many poles have to be replaced in the next few years, five (5) years, based on the failing occurs that are available to the company based on the condition assessment formation that they and based on their risk assessment that we discussed before.

MR. BOB PETERS: All right, I have your point. I'd like to turn to Board counsels' book of documents number 4, page 589. And here's some information from Manitoba Hydro on their business operations capital by investment category in the chart.

And would this Board be correct, gentlemen, in understanding that the focus of your evidence is in the -- in the box in the middle under Sustainment and specifically towards the system renewal expenditures?

MR. DMITRY BALASHOV: That's correct, sir.

MR. BOB PETERS: Now, did METSCO spend much energy looking at the capacity and growth expenditures of Manitoba Hydro?

MR. DMITRY BALASHOV: In so far as asking clarifying interrogatories related to issues like, for example, voltage area upgrades and things, things of that nature, where we were trying to establish a better sense of -- of the applicant's answers and information.

But anything -- if you're talking about capacity and growth in terms of Keeyask, Bipole, if -- or some of the larger new greenfield projects, we have certainly apprised yourselves of the context, but we did not do any -- any deeper dives.

MR. BOB PETERS: And then does that same answer hold true, Mr. Balashov, related to the business operation support in the -- in the -- the bottom large box --

MR. DMITRY BALASHOV: Again, we explored what -- to -- to a significant degree some of those questions through interrogatories. We asked questions about IT, fleet, corporate facilities, not so much downside infrastructure. We ultimately did not pursue those areas because we needed to scope down our report to -- to a manageable size and because we were ultimately procured to deal with asset management in particular.

MR. BOB PETERS: All right. So if we look at the -- at the chart and we'll go over to the 2019 test year, the sustainment expenditures are shown there at $284 million, correct?

MR. DMITRY BALASHOV: I see that, yes.

MR. BOB PETERS: And that was the focus primarily of -- of the METSCO investigations?

MR. DMITRY BALASHOV: The -- primarily the 2017 outlook and the 2018, which we understand to be the -- the test years.

MR. BOB PETERS: And in looking at the sustainment capital, does all of METSCO's comments related to system renewal apply equally to the mandated compliance system efficiency and decommissioning aspects?

DR. ALEX BAKULEV: In the -- the scope

of our review we looked at the asset management process in general, how they've been implied. So even though the focus was on system renewal, I would say that some of those principles or lack thereof can be expended to the other areas of the business, not just the system renewal.

MR. BOB PETERS: Did METSCO form an opinion, Dr. Bakulev, that -- that the comments made by METSCO related to system renewal could apply to these other areas as well?

DR. ALEX BAKULEV: I don't specifically remember if we made this in writing in the report. I don't remember.

MR. BOB PETERS: Okay, thank you. If we look at that sustainment box I believe, Mr. Balashov, you were saying that the system renewal line was the primary focus of the METSCO investigation?

MR. DMITRY BALASHOV: That would be fair to say, sir.

MR. BOB PETERS: And if we scroll a little bit to the bottom and look at figure 12, of the -- of the business operations capital that Manitoba Hydro intends to invest, 64 percent relates to that sustainment category in general and of that, the

majority relates to the system renewal.

Do you accept that?

MR. DMITRY BALASHOV: Yes, sir.

MR. BOB PETERS: And maybe I should -- before I left figure 511 at the top of this same page, we see at the bottom of the chart, on the right-hand side, that over the next ten (10) years Manitoba Hydro's forecasting spending $5.549 billion on sustainment --

MR. DMITRY BALASHOV: Correct.

MR. BOB PETERS: -- sorry, on business operations capital, correct?

MR. DMITRY BALASHOV: That's correct, sir.

MR. BOB PETERS: And then in terms of the sustainment portion that's $3.5 billion approximately?

MR. DMITRY BALASHOV: Yes.

MR. BOB PETERS: Is it in METSCO's view possible for Manitoba Hydro to decrease its sustainment capital spending without jeopardizing reliability?

MR. THOR HJARTARSON: We -- we do not have evidence to support for decreasing it or increasing it. I -- I would say that -- that kind of

-- if those asset management processes were in place, you could have more a basis on determining that.

Intuitionally -- I don't know if you want to hear my intuition -- is that they're probably not spending enough on system renewal.

MR. BOB PETERS: If Manitoba Hydro was to decrease its capital sustaining spending, what would that do to the reliability of the system?

MR. THOR HJARTARSON: If -- if it's just done with, cuts on all programs equally, it -- it will affect the reliability of the system. If there was an analysis done so that you would be actually looking at which projects can be deferred, you potentially could do that in such a way without causing large disde -- disturbances.

MR. BOB PETERS: Maybe we could ask to bring up the copy of the Consumer Coalition Information Request of Manitoba Hydro, first round, question 148(g).

Here's some information we see at the bottom. We see the -- the graphs, Dr. Bakulev, that spoke to and clarified for Dr. Williams. The system average interruption frequency index is the one that's shown on the screen now, sir?

DR. ALEX BAKULEV: Okay.

MR. BOB PETERS: And you've seen that before?

DR. ALEX BAKULEV: Yes.

MR. BOB PETERS: And you see where Manitoba Hydro is the solid blue line near the bottom?

DR. ALEX BAKULEV: Yes.

MR. BOB PETERS: Maybe it's black. Is that a good news story or a bad news story for the ratepayers in Manitoba?

DR. ALEX BAKULEV: Again, it's a balancing act if Manitobans are ready to pay for this reliability and feeling that there is a value there, yes, it's a good story.

However, if this survey would show that actually Manitobans are paying too much for having the -- one of the best reliability in Canada, it may be a bad story.

MR. BOB PETERS: Mr. Hjartarson, did -- did you say it was your intuition that Manitoba Hydro was not spending enough on its system renewal?

MR. THOR HJARTARSON: It -- it's mostly based on that -- with -- from other Utilities that I worked with once they started looking at it more precisely, and the aging assets. Assets are aging at Manitoba Hydro as -- as in other places. I -

- I would not be surprised if that was the story.

MR. BOB PETERS: And does METSCO have sufficient data on which to come to a conclusion one way or the other on that?

MR. THOR HJARTARSON: Not for Manitoba Hydro.

MR. BOB PETERS: To come to that conclusion, what additional information would METSCO need?

MR. THOR HJARTARSON: The full -- full condition assessments of -- of the assets, risk analysis, looking at the consequence costs and, basically, the things that were Alex's -- Mr. Bakulev in his presentation earlier today.

DR. ALEX BAKULEV: I --

MR. BOB PETERS: All right, we'll just scroll to the next page of this Information Request. And before I put it away, Dr. Bakulev --

DR. BYRON WILLIAMS: Mr. Peters, I do believe Dr. Bakulev had -- had something he wanted to add. I'm not trying to --

MR. BOB PETERS: I apologize. I didn't notice that but, Dr. Bakulev, please jump in when you have something -- something to add.

DR. ALEX BAKULEV: Yeah, sorry there

are -- there are a few things that Mr. Hjartarson mentioned. So data condition always leads a key factor. Each profile of the -- of all the major processes would be very helpful. Fail mode assessment. So what type of failure modes do exist when there is -- reaches span of life. And the impact assessment on four (4) different risk categories that were mentioned before, at least: availability, environmental, safety, and financial losses.

All that combined together, there should be some sort of analytical framework to be able to do the life cycle cost calculations, and to -- to be able to understand what's -- what's the best strategy for the assets.

And based on this information, yes, it might be possible to understand whether they're overspending or underspending. Obviously now we know what's the average unit costs are for each major asset class. However, looking at those SAIFI and SAIDI slides it -- might be a bit cautious as well.

It also depends on how those data are being collected and if -- Manitoba is a -- a big province, right, so and it might happen that the manual practices had been used to record those outages then actually -- and we've seen it in some other

places that SAIFI and SAIDI are overstated. So just many outages are not being recorded at all in the systems, right.

And what -- what -- what happens that if smart meters are being implemented across the -- the Company and those smart meters start to put in the actual outage information, all of a sudden there could be a spike in SAIFI and SAIDI. So the real number of outages are higher than being recorded in the systems.

MR. BOB PETERS: Do I take from those answers, Dr. Bakulev and Mr. Hjartarson, that Manitoba Hydro, from your perspective, does not have the tools to know whether and what the impacts would be of reduced spending on sustainment capital?

DR. ALEX BAKULEV: In terms of the tools, yes, there was no evidence on the record that would show that they have tools to understand the impact on availability based on the different scenarios that they -- they could have analysed on the sustainment capital and system renewal.

MR. THOR HJARTARSON: And maybe just to add to that, it's not just about whether they should have increased -- increased their spending or decrease it, it's also that spending -- their suggestion that they are the actual right spending;

that they're not missing -- missing some very high risk assets that are -- not been identified or they're over -- overemphasizing a special -- specific portfolio, but we don't have evidence of that. But that that kind of a -- with those kind of tools you would be more able to judge that.

MR. BOB PETERS: From what --

DR. ALEX BAKULEV: Sorry, Mr. Peters. Just another thought that --

MR. BOB PETERS: It's okay.

DR. ALEX BAKULEV: -- popped up in my mind in regard to those metrics. So I'm not sure whether they exclude or include MEDs (phonetic). I'm just looking at this once they may actually include MEDs which is not a fair comparison. So some parts of the province may experience a very large major event. So let's say, I think on the border of 2015, and '14, for example, there was a -- a ice storm in Ontario. They actually showed the numbers that are pretty close to the ones that we see here, right. And just based on that, we can say that ice storm didn't happened in Manitoba, right, but it doesn't mean that the Manitoba's performance was actually in the first quartile this year.

So we live -- with a grain of salt, we

need to look at this numbers in a certain way and if the data is available for Manitoba Hydro that -- that is based on the used -- reliability report and standards and there are a couple of standards that are out in the rural, that might be very helpful. But again, we have not seen it on the record.

MR. DMITRY BALASHOV: And if you don't mine, Mr. Peters, I don't want to be left out.

MR. BOB PETERS: Please.

MR. DMITRY BALASHOV: We do really work as a team. One -- one thing to note and -- well, I -- I would take you to slide. Just give me one seconds. It's slide 43 of our presentation today, and one thing that I just really quickly wanted to clarify that when we look at reliability, equipment performance is just one (1) of about nine (9) or ten (10) indicators that make up the total SAIDI AND SAIFI. So there are various cost codes. So, for example, what you see in the table here is the transmission and distribution equipment outages, the defective equipment cost codes.

There was other things and other factors that are not directly related to the state of the plans. Things like, you know, weather events, external interference which to a certain extent, like

with animal guards and things like that could be affected but what we just want to say is -- is reliable equipment and sustainment we're talking about is just one (1) part of the issue that includes other things, include -- including human element where Manitoba Hydro's control may be to -- to a lower estab -- when our analysis will look specifically, for example, here, as you can see on the slide, to the defective equipment which only makes out about a third of distribution outages.

MR. BOB PETERS: All right, thank you for that, gentlemen. According to METSCO, what is the likely earliest date by which Manitoba Hydro would have information available to make those reliability decisions in its spending of sustainment capital?

DR. ALEX BAKULEV: I hope that they already have this information; that would be my honest opinion. The basic information that they -- they can use to try to predict the -- asset needs in the future on the sustainment capital, it could be just asset condition, age profile and the failure curves. Those elements are in hands of Manitoba Hydro.

And maybe they have done this analysis, maybe not. We just have not seen it on the record.

MR. BOB PETERS: If --

DR. ALEX BAKULEV: And then -- sorry. And we mentioned that -- that's as a journey. So the more information they add to the database or they have in hands, the better decisions that they can make. But basic decisions can be done right now and, hopefully, Manitoba Hydro is doing those decisions.

MR. BOB PETERS: Does METSCO understand how Manitoba Hydro is currently using that data?

DR. ALEX BAKULEV: Based on what we've seen on the records, and it just related to CEF-16 we were not convinced and I think it -- that was one of the slide that this data process have been used to the full extension by Manitoba Hydro.

MR. BOB PETERS: Is it your view that Manitoba Hydro should be able to estimate the risk associated with deferring a portion of their sustaining investments?

DR. ALEX BAKULEV: They at least talking about the risk -- potential risk that may arise if they don't do this investments so. And I think they might be able to, at least at a high level, or the scenario planning level to try to estimate those risks. It might take some time to -- to create or to think about the methodology and tools, let's

say, how to for cost reliability on the distribution side, or transmission side. They have the model on the transmission side. So the scenario planning is possible in the -- in the near future. I believe so.

MR. BOB PETERS: Well, we'll come to that as well. Is it correct that METSCO's advice is that Hydro shouldn't use historical expenditure trends to forecast the sustaining spending?

DR. ALEX BAKULEV: Using the -- those data elements, that I mentioned before, in my response, it is entire possible to forecast the -- at least system renewal or system replacement needs for their -- for the next five (5) to ten (10) years. In absence of this information, it might be the best choice to use the historical data.

MR. BOB PETERS: Do I take from that answer that rather than use historical data, Manitoba Hydro should accelerate the incorporation of asset health information and asset management tools into its decision-making?

MR. DMITRY BALASHOV: Well, according to Manitoba Hydro's evidence, they -- they are already incorporating that and that was very clear in their rebuttal.

However, we do not see the evidence of

them necessarily using this on a consistent basis which was the -- the conclusion in our report. So acceleration, again, is -- is -- is a relative term because we have not been able to establish where they are in terms of actually using it across the entire capital portfolio.

So we certainly would like to see more at -- have evidence of this -- of this actually being used on the basis of health indices, at risk assessment. Whether it warrants acceleration is just like any other decision is best made if it is based on quantitative objective information of which we have not seen a lot with regard to this particular issue.

(BRIEF PAUSE)

MR. THOR HJARTARSON: And maybe just to add to that, since everybody's quiet. And another thing is that there was a talk about an asset management roadmap. I think that's very important that Manitoba Hydro develops that shows that. And that's -- that is really where you would see the schedule when the milestones are, and so on. And at the end of the day, they're probably the best fit to develop that because they know their -- what their

experts -- experts are, where the tools are sitting, what the data is, how to get there. But then it's a matter of making sure that they're held to it and that it -- that it is to done according to that schedule.

MR. BOB PETERS: Mr. Hjartarson, I want to go back to your intuition and --

MR. THOR HJARTARSON: I opened up a can of worms.

MR. BOB PETERS: Well, I suppose we should start from a premise that your intuition isn't -- isn't based -- it's not your expert opinion, it's -- it's less than that.

MR. THOR HJARTARSON: It's -- it's based on my experience with all the Utilities over the last twenty-five (25), thirty (30) years.

MR. BOB PETERS: And does that intuition extend to a specific area of sustainment spending by Manitoba Hydro that may be, at this point, under spent or not enough has been spent in that area? I'm specifically thinking transmission, generation or distribution.

MR. THOR HJARTARSON: I would be thinking distribution.

MR. BOB PETERS: Why do you say that?

MR. THOR HJARTARSON: Just from

experience from working with other Utilities that's turned out often to be quite the case. There's a long list often of aging assets that are getting close to their -- closer to the end of life and there hasn't been enough investment. A lot of -- a lot of them are put in place thirty -- maybe 20 -- in the 1970s, so they're coming up -- up in -- towards their end of life. And so that's really what I base it on.

I don't have any data from Manitoba Hydro but I also don't -- I bel -- I don't believe they are very much different than other Utilities nor them here in Canada.

MR. BOB PETERS: For clarity, did METSCO find that Manitoba Hydro provided evidence demonstrating that the qualitative and objective asset condition assessment and risk analysis methodologies used to quantify the overall sustainment capital budget?

MR. DMITRY BALASHOV: Would you mind repeating --

MR. BOB PETERS: Let me ask it this way. Did METSCO find evidence as to how Manitoba Hydro quantified the overall sustainment capital budget that we had reviewed when we started questioning this afternoon?

MR. DMITRY BALASHOV: If by how they quantified you mean what -- what the quantitative tools and processes and analysis that it had applied to it then, no.

MR. BOB PETERS: Was -- was there evidence provided for METSCO to form an opinion as to whether or not the allocation as between generation, distribution and transmission was supported by objective risk assessment analysis methodologies?

MR. DMITRY BALASHOV: Within the scope of the portfolio that we have been reviewing which is sustainment capital with a focus on renewal as we have discussed, we did not see such evidence.

MR. BOB PETERS: You did say, a few minutes ago, a scenario analysis could be performed.

Was it you, Dr. Bakulev, that was suggesting that?

DR. ALEX BAKULEV: It was me.

MR. BOB PETERS: And should this Board understand that METSCO recommends scenario analysis be done in order to evaluate the varying performance outcomes for varying levels of investment?

DR. ALEX BAKULEV: That would be our basic hope and the recommendation, yes, that finding investment there should be some scenario analysis on

the project level, on the portfolio level, on system-level.

MR. BOB PETERS: Do you understand if Manitoba Hydro does this currently?

DR. ALEX BAKULEV: That's not that has been shown on the -- on the record.

MR. BOB PETERS: How should Manitoba Hydro do that?

DR. ALEX BAKULEV: One -- one example that was we linked to, and I think that was brought up by Dr. Williams was the EPCOR evidence on the reliability forecasting tool where they analyzed eight (8) scenarios what they can be done with the -- with the future SAIFI/SAIDI targets.

And the other example was Toronto Hydro case.

DR. BYRON WILLIAMS: And, Mr. Peters, I believe that was Coalition 32-1-1. And I think EPCOR starts at page 5. I don't know if you want that or not but that's where it is.

MR. BOB PETERS: We've got the -- we've got the site, Dr. Williams, thank you.

CONTINUED BY MR. BOB PETERS:

MR. BOB PETERS: In METSCO's evidence it stated that the system renewal budgets aren't adequately supported.

Do you recall that?

MR. DMITRY BALASHOV: I do.

MR. BOB PETERS: Is there a portion, either a percentage or a dollar amount, that METSCO views as being adequately supported at this time?

MR. DMITRY BALASHOV: I don't think that we would wish to separate anything this way. We were reviewing the -- the envelope as a whole. And we're -- we're not really in a position to say that this -- this has been justified better or worse.

Have we seen evidence that shows rigour that is higher or, so to speak, a sophistication that is higher within certain business units or certain parts of the system? Yes, definitely. Does that give us sufficient information to credibly suggest that this ought to go forward as opposed to this, that is not the case. We are not -- would not be comfortable making those assessments, sir.

MR. BOB PETERS: So METSCO doesn't have enough detail as to what portions of the system renewal budget aren't totally supported?

MR. DMITRY BALASHOV: We generally

found the specific information with -- with regards to what capital projects constitute to be fairly limited even for the larger projects where some description is proposed in terms of what it is that they represent, but, to perform this sort of analysis that you're suggesting, Mr. Peters, there would need to be significantly more evidence in the form of, for example, looking, if nothing else, at the -- at the impact, at the outcome so to speak of this work and not just the fact that Manitoba Hydro based on the risks that they perceive or the health index analysis that they claim to have done are going to do this work or proposing to this work.

We would like to see things like the outcomes. You know, you -- you -- you spoke to reliability; that's certainly not the only one. It could be management of safety risks, both public safety and employee safety, a number other drivers, and this -- this is the type of work that we believe would be required amongst the multitude of instances where we have specifically requested spreadsheet software reliability, failure curves and other quantitative evidence that has not been provided to us by the applicant.

MR. BOB PETERS: In Board counsels'

book of documents number 4 on page 652, Manitoba Hydro provided the Board with some evidence as to certain categories of sustaining capital expenditures that could not be deferred in the 2018/'19 fiscal year that starts in a few months.

Do you recall reviewing or seeing this table?

DR. ALEX BAKULEV: Yes.

MR. BOB PETERS: Is METSCO in a position to indicate whether Manitoba Hydro's percentages are reasonable or not reasonable in this material?

DR. ALEX BAKULEV: No, I can't -- I can't say that we can do or seen some meaningful analysis of this table. So, we are not sure what -- what's the assumptions, let's say, when they say the system renewal cannot be deferred at the proportion of 58 percent. What's in there? So there -- there are a few options as with any project that can be done if it's not has been completed as of now, meaning that it has been delayed or deferred. So what -- what are the assumptions for those 58 percent, we're not sure. And we're also not sure about the ma -- compliance. So whether those compliance are due by 2018 or any other year. So to be able to do a meaningful analysis of

those deferred numbers, I think we -- we would need to go to every project that has been analysed and try to look at the data that would -- that underline this project.

MR. BOB PETERS: METSCO hasn't had the opportunity to do that?

DR. ALEX BAKULEV: Not within the capacity of the study.

MR. BOB PETERS: In terms of risk assessment, did METSCO determine whether Manitoba Hydro had a consistent definition of risk across the three (3) divisions of generation, transmission and distribution?

DR. ALEX BAKULEV: No, we have not seen it on the record.

MR. BOB PETERS: You -- you haven't seen a consistent definition of risk?

DR. ALEX BAKULEV: No, we haven't seen a consistent definition of risk on the record. And when you say "risk," you mean the risk categories and the risk -- let's say, risk metrics across all the three (3) divisions? If that's what you mean then I think that we haven't seen it.

MR. BOB PETERS: And it's METSCO's view that Manitoba Hydro should be monetizing those

risks by attaching a dollar consequence and probability to the -- to the risk score?

DR. ALEX BAKULEV: I think it's -- because it's a journey, it's entirely possible to start with the scoring system. So it does mean that it has to be monetized as long as there is some sort of indication what the score means.

However, in our advocacy would be to go to the monetization of the risks that actually provide -- can provide apple-to-apple comparison because let's say for -- for those system renewal project, it's always a trade-off between whether they need to spend money, dollars, right now to replace the asset versus -- versus reliability improvements.

So if reliability improvements are not being monetized when comparing apples to oranges, if reliability improvements are being monetized we're comparing dollars to dollars and, in this case, we can use our regular financial tools to -- to understand what's the net present value, not that, as we've seen in many current project justifications provided by Toronto Hydro (sic). It's always negative net present value because it just considers the cost site, the apples, but it doesn't consider the -- the oranges, and because oranges are not being monetized that's

understandable. But if they can monetize oranges reliability improvements, we would be able to see the positive value that is being brought -- brought in by every project.

Sorry, Dmitry corrects me, if I mentioned Toronto Hydro, I meant Manitoba Hydro.

MR. BOB PETERS: Thank you. Does METSCO know for how long Manitoba Hydro has had access to and has been using the Copperleaf software?

DR. ALEX BAKULEV: I'm not sure I remember on the record how long they have been using Copperleaf, but I believe that they are using their software on the generation side for quite a long time, and they were one (1) of the first ones to implement it on the generation side, and they -- I believe they were quite successful in introducing the condition assessment on the -- the generation site back there.

MR. BOB PETERS: And when you say "for a long time," since back in 2010?

DR. ALEX BAKULEV: I -- I can't say. I would say it's earlier than that, but I would leave it up to Manitoba Hydro representatives to -- to say for -- to say it firmly.

MR. BOB PETERS: And it's METSCO's view that -- and -- and when -- when we say

Copperleaf, just so I'm clear, that's the company name, correct?

DR. ALEX BAKULEV: Copperleaf is a company's name, and they have a few tools, and one (1) tool that I was referring to, it was developed, actually, with CEATI, and it's called hydro -- hydroAMP, I believe, and Copperleaf was behind this tool. And now -- and then they expended the -- this tool to C55, the current software that they -- they market.

(BRIEF PAUSE)

MR. BOB PETERS: And it's METSCO's view that Manitoba Hydro has to do some more work before it can deliver the benefits throughout the Company from this C55 software?

DR. ALEX BAKULEV: Our strong belief is that before implementing any tool, there should be a clear understanding of what's -- what's the end of this tool implementation, what actually they are trying to achieve. Any tool, it's -- it's not a solution if you just -- a mean to automate the processes that are being implement in the Company.

And our concern and worry was that the

tool is being implemented companywide even prior to the roadmap being developed. And we try to test, in a few IRs, understanding of the terminology that is being used in the tool, or the corporate value framework that comes along the too -- the -- the tool. And we were not sure that the understanding was there. That's a concern that basically, the tool is being implemented prior to the -- to the clear vision of what are the benefits and what of -- of the future tool implementation, how the tool we will keep actually the asset management principles selected by the Company in the future.

MR. BOB PETERS: Who in Manitoba Hydro was supposed to come up with the clear definition of the purpose of using Copperleaf?

DR. ALEX BAKULEV: We are not in a position to respond to this question. We are not sure about their hierarchy.

(BRIEF PAUSE)

MR. BOB PETERS: Is it METSCO's view that Manitoba Hydro has introduced the Copperleaf software too early, before it sets out a -- a clear understanding of the purpose?

DR. ALEX BAKULEV: We have not seen the requirements -- documents for -- that they used to introduce the -- the Copperleaf, and we have not seen what type of the requirements were sent out to -- to a variety of vendors. So I am -- I'm -- I would say that I'm not in a position to comment on that, but I feel be right to know not.

Generally speaking, we would love to see the roadmap first, clear understanding of the -- of the future state, and only after that, the tool would help to automate the -- the process within the Company.

MR. THOR HJARTARSON: Maybe just to add to that, that this -- the software C55 is being used by or has been introduced at many utilities, so it is cert -- certainly seems to be a very good practice.

DR. ALEX BAKULEV: And I would add to that that actually, I've seen things on the record that are being produced by the companies using this tool on the -- mostly on the investment prioritization side, and including -- including the -- the public proceedings as well. So -- and C55 is one (1) of the most recognizable tool that is used for investment prioritization.

MR. BOB PETERS: What -- what steps does Manitoba Hydro need to implement to derive the full value from C55?

MR. DMITRY BALASHOV: We cannot comment on -- on all the steps, but to -- to add to what Mr. -- Mr. Bakulev had said, and to take you to slide 33 of our presentation from this morning, based on the reference from Coalition-I-201 (a) through (c), where I believe Manitoba Hydro has provided some of the technical documents, internal studies that are associated with C55, recognizing that these documents are all snapshots in time, and that some time has passed since then, it -- it would indicate that there is full -- full utilization of the tool is not yet in place.

And for example, investment decision optimization will require data and process refinement, which are future steps, as I'm reading a quote from the response. This -- this would suggest that they are not yet utilizing it in the way that it is intended to be utilized to -- to drive the full value.

MR. BOB PETERS: Can Manitoba Hydro implement C55 without having Manitoba Hydro's executive input into the risk tolerances?

DR. ALEX BAKULEV: I'm not sure what

the process Manitoba Hydro is following to implement the software.

(BRIEF PAUSE)

MR. BOB PETERS: From your previous experience, who in the Utility, or which -- whi -- at what level in the Utility is the risk tolerance set?

DR. ALEX BAKULEV: I think it might be specific to -- to the company to decide how those things have been set in stone. There are some companies where the Board of Directors actually identifies the risk tolerances at a high level, that they've been accepted by the -- by the risk management.

MR. BOB PETERS: And in other utilities, it doesn't go up to the Board of Directors? Does it go up, at least, to the executive of the utility?

DR. ALEX BAKULEV: There might be the cases, yeah, when -- when it might have stopped at the executive level.

MR. BOB PETERS: Can you tell this Board whether METSCO believes that each of Manitoba Hydro's three (3) divisions, being generation,

transmission, and distribution, have a consistent risk definition?

DR. ALEX BAKULEV: I think you asked this question before, and -- and we answered no, not that -- not that we've seen it on the record.

MR. BOB PETERS: Is there a consistent definition of reliability?

DR. ALEX BAKULEV: If -- if it's about SAIFI/SAIDI that you're asking about, that is mostly applicable to the distribution side of the business, and there is -- while there is a definition of System Average Interruption Duration Index or Frequency Index, usually, they're subcategories on the SAIFI/SAIDI, whether they cost codes, and whether they are sub cost codes, and there are a few standards that can regulate those assignments where each of the outage shall be put in place.

And I'm not sure if Manitoba Hydro follows any of the standards. And they've seen that many utilities, while they are following the standards, they may use it only as a guide, not fully following the standard, or try to be completely adhering to the standard. So there are some choices, and I'm not sure what choice is being made by Manitoba Hydro.

MR. BOB PETERS: All right. Thank you. From METSCO's perspective, do the Keeyask, and Bipole III, and Manitoba-Minnesota Transmission Line projects provide an increase in system reliability for Manitoba Hydro?

DR. ALEX BAKULEV: It was not within the scope of our assignment. While we asked a few questions about that, however, we had not seen the risk assessment analysis that is being done for those projects.

MR. BOB PETERS: Does it appear to METSCO that Manitoba Hydro takes into account significant increases in reliability provided by those new major projects of Keeyask and Bipole III?

DR. ALEX BAKULEV: I'm not sure that we can comment on this question. It might be outside of our scope of expertise.

(BRIEF PAUSE)

MR. BOB PETERS: Is it METSCO's opinion that the new Keeyask, and Bipole III, and Manitoba-Minnesota Transmission Line do not change the probability of failure of existing assets?

MR. THOR HJARTARSON: Well, if you're

talking about existing assets in transmission and -- and distribution, other assets, I don't think it changes the probability of failure, certainly not of distribution. It may change the consequence of failure, because now you have an additional line that -- an additional, basically, connection.

DR. ALEX BAKULEV: Maybe I can use some sort of analogy. So if there are -- if there is one (1) feeder that goes to the customer, and this feeder has the old assets, and there is relatively high chance that one (1) of those assets will fail and the customer will experience the outage until the asset has been replaced.

So one (1) of the solution could be to -- to be able to tie to another feeder, and if there is an asset failure on the first one, there could be a quick switch and done to restore the majority of the customers to be supplied from the other feeder. So we are reducing the consequences of the asset failure significantly.

In terms of the choice now that we have, if we have only one (1) feeder, you would be inclined to replace this equipment earlier than later. However, having an additional supply that reduces the consequences, we may decide for this equipment on the

first feeder to be run to failure in this case.

So that's kind of a choice that we can make. How -- how is it applied for the Bipole III and the other two (2) transmission lines that the -- Manitoba Hydro has, we don't know.

(BRIEF PAUSE)

MR. BOB PETERS: On page 46 of the METSCO report that I think was Consumer Coalition Exhibit 19, there were some recommendations. And I take it these were METSCO's recommendations to this Board? Have I got that right?

MR. DMITRY BALASHOV: That's correct, sir.

MR. BOB PETERS: Maybe we can scroll down.

(BRIEF PAUSE)

MR. BOB PETERS: Here we go, on the next page, on page 47, can you briefly explain what the proactive expenditure reductions recommendation is?

MR. DMITRY BALASHOV: I believe the

recommendation is not for proactive expenditure reduction, sir, but if you scroll up, its recommendation to explore a range of tools, including these.

"Can entail a combination of the following." So this is just one (1) of the potential tools that we have listed, and this -- this would effectively amount to approving, subject to the limits of -- of the statutory and regulatory authority that the PUB has over Manitoba Hydro's expenditures.

Reducing the expenditures, then, by way of using the variance and/or deferral accounts, allowing the applicant to track any spending that may be incurred in excess of that, subject to a later ex pos (phonetic) proceeding, where they would come back and justify the regular, the necessity, or whatever test the Board may find sufficient to employ to determine that, and then having that approved retroactively, so -- so to speak.

The -- the point that I'm trying to make, sir, is that we did not necessarily recommend proactive expenditure reductions. We recommended a range of tools that the Board can explore, subject to its discretion.

MR. BOB PETERS: A lot of METSCO's

work is in jurisdictions where the regulator has approval or disallowance appro -- authority over the capital expenditures?

MR. DMITRY BALASHOV: Correct.

MR. BOB PETERS: And then when project-specific implementation milestones -- is that just another way of having Manitoba Hydro keep their feet to the fire to -- to meet the deadlines on certain projects?

MR. DMITRY BALASHOV: That could be one (1) metaphor that could be used, but yes, certainly, it's an accountability tool in terms of establishing a clear and transparent way of proceeding with certain projects, and being able to measure the progress and the success rate, be it's by way of headings, or in milestones on a certain date versus the date required, or attaining certain financial benefits, for example, that would be targeted, had they been quantified going forward.

So yes, it's effectually an accountability tool that -- which, as we say, may or may not involve at-risk funding. It's something that is -- some regulators have also used.

MR. BOB PETERS: At the bottom of the page, you mentioned key performance indicators. What

would be two (2) examples applicable to Manitoba Hydro?

MR. DMITRY BALASHOV: So the choice of key performance indicators really depends on use -- usually the executive team. There -- or there -- there could be an -- an entire hierarchy of them, starting from something very detailed within each department, and then going all the way up. But in the case, for example, of -- of the current transition that Manitoba Hydro's asset management team is undergoing, key performance indicators could be, again, the -- the scale of achieving certain -- or -- or rather, the pace, sorry, not the scale of achieving certain milestones, certain standards.

The reduction of risk, for example, had it been calculated, it could be, you know, risk reduced, or average age -- average condition, rather, for example, on -- of -- of a certain high-risk asset classes being reduced by being replaced. There is -- there is really a variety, to -- to say -- name a few we have noted throughout, and Manitoba Hydro has spoken extensively about the scope of work in front of them.

We do believe the key performance indicators are important, and should potentially form

a framework of reporting between the Utility and the Board. What they are exactly really depends. But having looked at Manitoba Hydro's previous scorecard, which we noted has not been updated. You know, there are things like SAIDI and SAIFI on it, for example. Similar indicators or others that relate to various facets of asset management performance could also be considered.

MR. BOB PETERS: On slide 50 of your PowerPoint presentation this afternoon, Exhibit Consumers-52. I took from that that you recommend that Manitoba Hydro establish an implementation reporting framework for all strategic asset management initiatives, correct?

MR. DMITRY BALASHOV: Could you point to specific language, sir, that says that we recommend that for all of the initiatives?

MR. BOB PETERS: I'm not sure it's going to say that on the slide, but you can tell me if you agree or disagree with that.

MR. DMITRY BALASHOV: We absolutely think that it would be helpful. Whether or not this is practicable and the extent of compromise or what -- what may be sufficient, whether there was some prioritization within it, I think that -- that is

something that would be better left to the -- to the Board, its staff, and the Utility itself.

Would -- would the Board, in our opinion, find it beneficial to track the progress even where, you know, there have been delays, but having certain accountability tools to explore why there had been delays and potentially have consequences? We believe so.

DR. ALEX BAKULEV: Mr. Peters, I'll -- I'll add to this question. So they're -- I'm not -- I'm not sure if it's practical to basically ask Manitoba Hydro to report on all the milestones, all -- all their journeying asset management. However, there are a few options that can be explored, and one (1) of the options could be, let's say if they do periodic Gap assessments to see where they are as of compared to the previous state. There are some self-assessment tools available as well on the asset management practice. So basically, if we can trust Manitoba Hydro to do their self-assessment where they are in asset management.

It can be the case that Manitoba -- Manitoba Hydro would be asked to be certified within a certain time period, ten (10) years, five (5) years, whatever this period is to be, and whether it's by

business units or the Company as a whole. All these choices -- choices are up to -- to the Board to make. But because it's a long-standing item in asset management, it might be useful to implement something to control the progress that the Company's making on the -- on the asset management.

MR. BOB PETERS: Does METSCO believe that Manitoba Hydro is able to quantify the financial or operational benefits at their current level of asset management maturity?

DR. ALEX BAKULEV: I take your question whether they are able to quantify the benefits that they will achieve when they would be, let's say, certified to the -- to ISO55000 standard or at least to be at the level three (3) compared to one point five (1.5), what they are. I think certainly there -- there are some ways how to show those benefits in general.

MR. BOB PETERS: I want to take perhaps no more than ten 10 minutes to just conclude with some questions on your slides, starting on slide 12. One (1) of the areas we haven't talked about in terms of going beyond reliability, METSCO was pointing out that things such as safety have to be considered, correct?

DR. ALEX BAKULEV: Correct.

MR. BOB PETERS: And does it follow that in assessing safety, that Manitoba Hydro has to affix a value on human life?

DR. ALEX BAKULEV: There is such option, as well, that the Company or the government body will put some value on the -- on the life. And it's been done in the real world. So by the -- by the insurance companies, they actually put some value on the -- on the human life. There are some US government bodies that have put in the value on the -- value life.

I think for one (1) of the client they compiled about ten (10) different reports that have this numbers, and it's on the public records. That could be used. However, we see that there is a -- there might be big resistance to put any value on the -- on the life, and many companies just don't do that, right? And obviously, the ultimate goal is to have zero fatalities, which might be achievable. It may -- may not be achievable. But ultimately, we need to do whatever we can to ensure that there are no fatalities associated with our system.

MR. BOB PETERS: And does that mean at -- at whatever cost?

DR. ALEX BAKULEV: That's the choice that should be made by the Utility and by the oversight agency. To add to that, I guess, any activity has some sort of probability of fatality, and ultimately, we cannot really say that the -- the goal is zero probability. Whenever we walk on the street, there is a probability that we -- we can be hit by a car, right? And this permeability is not zero.

So there should be some -- when you say risk tolerance, so there should be some risk tolerance established by the Company to ensure what exactly we mean when -- when we are concerned about safety.

MR. THOR HJARTARSON: And maybe just to add to it, I -- generally, when we are consulting to companies about this, we do not recommend that they choose a value, or they said it. It's more that they refer to a value that's -- would be somewhere out in the industry set by, like Alex said, insurance companies, or your -- or the government body.

MR. BOB PETERS: On slide 5 of your materials this -- this morning, the third bullet related to inconsistent quality of maintenance records underlying the sustainment capital budgets, correct?

MR. DMITRY BALASHOV: Yes, sir.

MR. BOB PETERS: Is METSCO saying that

Manitoba Hydro is not maintaining the assets properly, or are they saying that Manitoba Hydro is not keeping accurate records of its maintenance?

MR. DMITRY BALASHOV: I -- I think in specific reference to the subject matter referred to in this bullet, it's the letter, sir. It's the records. And the reason that that was of concern to us, and I believe that we have referenced a particular study from the generation unit of Manitoba Hydro's that -- that's -- details in some length the variety of approaches within and/or across the divisions that showcases how the data is collected, or tracked, or measured.

And the reason this is a concern to us, with respect to our particular portfolio, is that it's usually through maintenance practices that a utility collects a complete picture of how it does, or what -- what state its plant is in. And as such, if your maintenance activities -- the procedures, as well as the ultimate records generated by them of collecting the information are not necessarily consistent, as this internal report would indicate.

It is difficult to place full confidence in the fact that the information has been collected under consistent principles, assumptions,

and things like that, which then is problematic when one tries to make decisions on larger portfolios across the different business lines and geographic locations.

MR. BOB PETERS: On page 29 of your slides, gentlemen, you provided some information from Kinect -- Kinectric's report in July of 2017, correct?

MR. DMITRY BALASHOV: That's correct.

MR. BOB PETERS: And is this telling the Board that Manitoba Hydro may be taking assets out of service too soon?

MR. DMITRY BALASHOV: Not at all, sir. It does not say that they're actually taking the assets out of service. What it does refer to is the fact that until this particular report has been published, fairly recently, just this past summer, Manitoba Hydro has relied to some extent, as they've indicated, not solely by any means, but they have relied to the failure curves that have been derived largely from the performance data of other utilities.

And what this report in particular has shown is that within these asset classes, Kinectrics has been able to establish that Manitoba Hydro's assets live significantly longer before they fail. In no way does this indicate that they're actually taking

the assets. We brought this up as an evidence that potentially questions the assumptions that they used when they prepare the plan.

So if, for example, and this is purely a hypothetical example, if something lives for twenty (20) years on the basis of these industry curves, but in Manitoba Hydro case, it lives for thirty (30) years, and if you plan for a certain percentage of this asset class to fail in year X, but it lives longer, perhaps you might be overestimating your plans and -- and putting in more money than you would need to.

So that -- that is simply -- and this is actually a good example of continuous improvement. They started out with industry curves, and then they've started adding information that showcases their specific performance, and they're finding out more about their plant, and this in -- in the way this was a -- this was a good example, but as far as informing the CEF16, which was developed without the benefit of this information.

MR. THOR HJARTARSON: Maybe I can just add to that -- that. And we talked before when we were -- we were questioned by Manitoba Hydro counsel about different locations where utilities are. So

industry curves are averages across many utilities. Often, there could be different things -- things happening there. For instance, they mention transmission, transformers. They're -- they're in a colder climate. They're not going to overheat as much as much as, for example, transformers in Florida, or even Ontario, and same -- same with distribution transformers, and generation transformers.

It could also be the way that loading is managed on them. If there's -- they don't -- they have many high load -- high load episodes, they would -- they will last longer.

MR. BOB PETERS: Does the data indicate that Manitoba Hydro's reliability risk may not be significantly increased if a substantial portion of the sustainment spending is deferred on these asset classes?

DR. ALEX BAKULEV: This table definitely doesn't indicate so, if you refer just to this table.

MR. BOB PETERS: Thank you.

MR. DMITRY BALASHOV: Mr. Peters, I would add that that was a -- in -- in my assessment, a fairly broad question, and in the context of the proceeding discussion, I -- I don't think that we have

seen enough information with respect to this particular report, or more generally to make such a -- a -- such a conclusion when it comes to looking at these specific asset classes and the specific information.

Mr. Bakulev is -- is correct, but it's -- beyond that, I -- I just -- I'm just a little careful about how your question was phrased, and I -- we just wanted to add some clarity to that, because it sounded like it was a little, perhaps, broader than what I interpreted Mr. Bakulev's answer to be.

MR. BOB PETERS: All right. I've got both your points. Slide 35. It appears that METSCO was critical of the $15 million investment level over which project has to -- has to be estimated before it goes to the executive council.

MR. DMITRY BALASHOV: I believe we addressed this line of questions in our responses to the Board staff's interrogatories to ourselves, to METSCO. We're not critical of any particular threshold, per se. The point that we are, again, we're trying to make there is whichever threshold one does establish, and -- and und -- under these corporate circumstances, where there are different divisions that are reporting into the same corporate

centre, the important thing is to have a consistent understanding corporately throughout the organization of what the inputs into those plans are.

And where the inputs are not consistent, as on the basis of some of the evidence that we have seen in this proceeding may be the case in Manitoba Hydro in terms of a different level of sophistication, which I believe some of Hydro's witnesses have also agreed, it becomes difficult for a central body to control this, because the -- if anything else, they probably spend more time figuring out what are the actual inputs and implications.

So it's not a dollar figure, per se. It's -- it's just the -- the utility of it when the state of underlying data processes and governance processes is inconsistent across the functions.

MR. BOB PETERS: On slide 38, METSCO examined 49 projects, and prepared a chart to indicate how those projects stacked up between their original estimate, their completion estimate, and their actual costs?

MR. DMITRY BALASHOV: Correct, sir.

MR. BOB PETERS: And in these projects, did Manitoba Hydro develop their cost into a probability level, a P50 level?

MR. DMITRY BALASHOV: Are you asking specific -- you know what --

MR. BOB PETERS: Are you aware of whether they did?

MR. DMITRY BALASHOV: We are not actually aware of the specific probability level related to any of these investments. Generally speaking, as a project appro -- approaches completion in construction the precision of investments -- sorry, the precision of the estimate improves.

What we wanted to point out here, obviously, is that a mix of projects of various vintages and maturities, in terms of estimation, appear to be put into the same forecast and presented to this Board for approval and that there is a general significant history of overestimation but, no, we're not aware of specific percentages, the values.

MR. BOB PETERS: Why can't the project cost be accurate in the original estimate?

MR. DMITRY BALASHOV: That is perhaps a question to Manitoba Hydro or any other Utility, but there's obviously a number of specific circumstances related to -- to each project, and the level of rigour and things that may or may not be expected certainly happen. And it does vary across the various

portfolios in terms of the variances. It varies or it should perhaps vary between the work that is greenfield, the new projects, versus the work that is sustainment. So it -- it really depends, like everything else on the assumptions that you're putting in there.

MR. BOB PETERS: METSCO hasn't been able to identify why projects are continuously showing up as cost overruns?

MR. DMITRY BALASHOV: Well, I believe that Manitoba Hydro has actually responded to that in their rebuttal to us. Is it page 51 of the rebuttal?

MR. BOB PETERS: That's where Manitoba Hydro indicates they've changed the way they -- they provide their estimates; correct?

MR. DMITRY BALASHOV: That's correct. And then they -- page 53 of Manitoba Hydro's rebuttal. I cannot recall the reference for example. So what this -- this says here as the project progressed, and I'm reading from line 18 onwards, and the scope flushed out, the estimates were updated and an addendum was approved, which is the basis of the completion estimate.

And if you look on the paragraph above. Sorry, I'm just trying to get my bearings here.

MR. BOB PETERS: Well, let me just interrupt you and maybe let you -- you can get your bearings.

MR. DMITRY BALASHOV: Sure.

MR. BOB PETERS: You're referring to how Manitoba Hydro is saying they used to do their estimates, correct?

MR. DMITRY BALASHOV: Correct.

MR. BOB PETERS: And then Manitoba Hydro goes on to say that -- on line 24 that, the past process has been replaced with the scope development and approval that's described in their -- in their application in section 5.

MR. DMITRY BALASHOV: Sure.

MR. BOB PETERS: Did you -- did you form any opinion as to whether Manitoba Hydro's new methodology will provide a more accurate cost at an earlier stage?

MR. DMITRY BALASHOV: I cannot recall the -- reviewing anything that would provide a sufficient depth of information in terms of what the scoping entails for us to form an opinion, which is why we have asked the IRs that we've asked and --

MR. BOB PETERS: All right.

MR. DMITRY BALASHOV: -- presented the

findings that we did.

MR. BOB PETERS: Thank you. In turning to slide 39, the essence of this slide from METSCO is telling this Board that even though Manitoba Hydro establishes a budget for their sustaining capital, it appears that in 18.4 percent of that budget is unspent at the end of the year.

Have I summarized that correctly?

MR. DMITRY BALASHOV: Based on the information related to -- to the three (3) particular plan years as indicated in bullet 10 that is the degree of average variance across those three (3) years between the estimated ISAs by Manitoba Hydro and the actual ISAs.

MR. BOB PETERS: And is that in-service additions is the ISAs that you're referring to?

MR. DMITRY BALASHOV: Correct.

MR. BOB PETERS: Is the 18.4 percent variance between what is budgeted and what is actually spent indicate whether or not the budgeting is -- is at fault or is it labour or is it other factors?

MR. DMITRY BALASHOV: There's -- there's not -- not enough information nor I would suspect that Manitoba Hydro would be able to point to

want one -- one particular driver. I mean, with -- with all work there is -- there's various things that happen. It could be anything from suppliers not delivering to weather-related delays or electrical related delay, so to speak, if there is, for example, the system conditions do not permit to do certain work to establish schedule outages.

We don't have this information. It's hard to speculate. This point was made, in particular, also in reference to the slide prior where you and I just spoke Mr. Peters in terms of the underestimation of project costs which, you know, is paired with overestimation of -- of the ISAs which, you know, on balance between those two (2) would suggest to us that perhaps there are issues with estimation, rigour as things are being presented to the Board and approved for ratesetting.

MR. BOB PETERS: All right. I think my last question's on slide 40 and on this slide METSCO is suggesting to this Board that Manitoba Hydro could benchmark its capital spending with some industry peers; correct?

MR. DMITRY BALASHOV: Yes, sir.

MR. BOB PETERS: Has Manitoba Hydro provided adequate capital information, that is, cost

of capital information to enable a third party to perform that benchmarking?

MR. DMITRY BALASHOV: Just to clarify, when you say "cost of capital" are you talking about the finance --

MR. BOB PETERS: No, let me --

MR. DMITRY BALASHOV: -- or specific about cost of capital projects?

MR. BOB PETERS: Let me start over again. From what you -- from what METSCO has seen on the record, has Manitoba Hydro provided sufficient capital costing information to enable a third party to perform a meaningful benchmarking evaluate -- evaluation of Manitoba Hydro relative to its peers?

MR. DMITRY BALASHOV: On the whole -- on the size of the program, we -- we would probably like to see a lot more information, but as for example evidenced by -- and I'm just trying to find a reference in our presentation, sir. Towards the end when we talk about estimation, for example. I take you to slide 41.

If this type of breakdown is available for a substantial portion of the projects that would be seen as either statistically significant or otherwise satisfactory to the methodology that the

party would find sufficient would be available. These are the types of examples that could be used to break down the projects and compare them to other peers, depending on the methodology.

Having said that, and to answer your question, these are the only two (2) projects where this type of rigour and the step of depth has been provided. And again, it really depends on the type of methodology. Overall, all we have seen on the sustainment capital, for the most part, is somewhat perhaps more superficial then what would be needed. But of course, as you work with a external party or consultant to -- to validate the assumptions and find more data, more data is required.

In terms of what is currently on record could anyone credibly establish benchmarking work? Perhaps I would let Mr. Bakulev as a PG in economics weight in on that.

DR. ALEX BAKULEV: If you're asking about the capital unit costs, then I think that Manitoba Hydro transition to IFRS and IFRS accounts should be able like, I believe, to show the -- take the cost of capital per major asset class and if it so, it -- my view, it might be entire -- entirely possible to be able to benchmark their own estimate

cost versus the other similar, different companies in Canada and North America or across the world.

MR. BOB PETERS: All right with that answer, Mr. Chair, I'd like to thank the witnesses for their responses to my questions. Those conclude my questions.

THE CHAIRPERSON: Thank you. I'm going to ask the Panel if they have any questions. No?

Ms. Dilay, any re -- Dr. Williams...?

DR. BYRON WILLIAMS: Just to follow-up to one question by Mr. Czarnecki.

RE-EXAMINATION BY DR. BYRON WILLIAMS:

DR. BYRON WILLIAMS: If we can go to Coalition -- the prefiled evidence of METSCO Exhibit Consumer Coalition 19 and then Roman Numeral I.

Mr. Hjartarson, you recall being directed by legal counsel from Manitoba Hydro to a statement on Roman Numeral I that this report was approved by you?

MR. THOR HJARTARSON: Yes, that's correct.

DR. BYRON WILLIAMS: Just in the context of your professional designation as an

engineer, when you put your name to something that says you've approved it, what does that mean, sir?

MR. THOR HJARTARSON: It means that I have reviewed it, I have made comments on it and participated in any -- any -- any such a way that refers to technical or an engineering part of it.

DR. BYRON WILLIAMS: Thank you, I have no further questions.

THE CHAIRPERSON: I'd like to thank the panel for attending today and assisting the Board in this matter. Your -- your participation was important to us. Thank you very much.

We're going to adjourn now until nine o'clock tomorrow morning. Thank you.

DR. ALEX BAKULEV: Thank you.

(PANEL STANDS DOWN)

--- Upon adjourning at 3:13 p.m.

Certified Correct,

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Cheryl Lavigne, Ms.