

WRITTEN SUBMISSIONS OF GENERAL SERVICE SMALL  
AND GENERAL SERVICE MEDIUM CUSTOMER CLASS (“GSS/GSM”)  
ON KEY ISSUES OF MANITOBA HYDRO COST-OF-SERVICE (“COS”)  
METHODOLOGY REVIEW

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## *Introduction*

1. Pursuant to Order No. 84/16, the Public Utilities Board (“PUB”) determined that the following key issues were to be in scope for presentation and cross-examination at the oral hearing phase of the COS proceedings on September 7 – 9, 2016:
  - i. The treatment of export costs, including the number of export classes and the allocation of fixed and variable costs to such classes;
  - ii. The treatment of net export revenue and the allocation thereof;
  - iii. The functionalization, classification and allocation of generation and transmission assets, including the HVDC system and the U.S. interconnection, but excluding wind and coal assets; and,
  - iv. The classification and allocation of demand-side management.
  
2. In addition, the PUB also directed that parties may submit written submissions with respect to the key issues. In that regard, for the purposes of these brief written submissions the GSS/GSM customer class repeats and relies upon the following GSS/GSM filings:
  - i. **Exhibit GSS/GSM 6:** Review of Manitoba Hydro’s Cost of Service Methodology on behalf of Small and Medium General Service Customer Classes prepared by London Economics International
  - ii. **Exhibit GSS/GSM 7:** Presentation by London Economics International on behalf of General Service Small and General Service Medium Customers – June 23, 2016
  - iii. **GSS/GSM 8:** Response to Undertaking #34
  - iv. **GSS/GSM 9:** Response to Undertaking #35

- v. **GSS/GSM 12:** GSS/GSM Rebuttal Evidence – August 8, 2016
- vi. **GSS/GSM 15:** Manitoba Hydro Cost of Service Methodology – LEI Presentation

*GSS/GSM's Positions on the Key Issues*

***Key Issue No. 1: Allocation of Fixed Costs to Export Sales***

- **Manitoba Hydro's Position:** Assigned only to dependable export sales (50% of total exports)
- **GSS/GSM's Recommendation:** Should be assigned to 63.8% of export sales. This share of exports can be viewed as relatively predictable and should therefore attract full embedded costs of generation and transmission – i.e. the fixed costs as well as the variable costs.

**GSS/GSM's Manitoba Hydro Cost of Service Methodology Review Hearing  
Presentation, [Schedule A], pages 5, 7 - 12  
Oral Presentation of AJ Goulding, [Schedule B]  
GSS/GSM Undertaking #34, July 6, 2016 [Schedule C]  
GSS/GSM Undertaking #35, July 6, 2016 [Schedule D]**

3. With respect to this issue, GSS/GSM submits that the following exchanges during cross-examination are of note:
  - i. Mr. David Cormie, on behalf of Manitoba Hydro, acknowledged that opportunity exports were a driver in the advancement of Wuskwatim, Limestone and Keeyask (see pages 180 – 182 of transcripts – September 7, 2016);
  - ii. In particular regard to Keeyask, Mr. Cormie acknowledged that opportunity exports played a role, as the timing of it was necessary to get a new transmission line in place to meet the requirements of the power purchase agreement with Minnesota Power (see pages 180 – 182 of transcripts – September 7, 2016);

- iii. Further, in an exchange with Mr. Bowman, representing MIPUG, it was stated that opportunity sales are indeed reasonably foreseeable and that, conceptually, “*What was put forward by the London Economics team is conceptually correct and that for Cost of Service Purposes opportunity sales cannot be viewed as whimsical, unpredictable, take them are you get them sales. These sales are predictable – are a predictable part of Hydro’s economic reality*”(see pages 626 – 627 of Transcripts, September 9, 2016)

***Key Issue No. 2: Allocation of NER***

- **Manitoba Hydro:** Based on share of allocated costs.
- **GSM/GSM:** The current exclusion of direct costs from the allocation of net export revenue is not consistent with the principle of fairness and should be replaced by a more holistic measure of total costs. Since these costs are an integral part of being able to serve customers, they should therefore be considered when spreading net export revenue among classes to subsidize their rates.

***Key Issue No. 3: Treatment of Generation and Transmission of Assets***

- **Manitoba Hydro:** Classified as energy and allocated via the weighted energy allocator including a capacity adder.
  - **GSM/GSM:** Supports the use of the weighted allocator, but suggests that the use of the capacity adder requires further study.<sup>1</sup>
4. With respect to this issue, GSS/GSM submits that the following exchange on cross-examination is of note:

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<sup>1</sup> GSS/GSM notes that Mr. Harper, on behalf of the Consumers’ Coalition and Mr. Chernick, on behalf of the Green Action Centre, also seem to agree with the Manitoba Hydro’s approach, with the exception of the capacity adder.

- i. At pages 184 – 186 of the Transcript (September 7, 2016) Kelly Derksen, on behalf of Manitoba Hydro, acknowledged GSS/GSM’s position that it was premature to consider the capacity adder at this time. Further, with respect to the following statement provided by LEI, Ms. Derksen confirmed that she did not believe that there was any fundamental disagreement between the GSS/GSM position and Manitoba Hydro’s:

*“LEI questions whether the use of a capacity adder is appropriate at this time, and believes that when such adders are not-market based they should be subject to periodic review. Consequently, this may be an appropriate topic for the forthcoming – forthcoming General Rate Application”.*

*[...] Ms. Kelly Derksen: I don’t believe there’s anything in here that suggests to me that there is a fundamental disagreement, [...]*

***Key Issue No. 4: Treatment of DSM Costs***

- **Manitoba Hydro:** Should be directly allocated to participating classes.
- **GSS/GSM:** The classification of DSM costs as demand and allocation through the COS allocator is appropriate in view of the avoided system peak demand costs. Since DSM provides a public benefit, the associated costs would be better shared by all customers. It is submitted that the customer-specific benefit of DSM does not warrant the direct assignment of these costs to the participating customer classes as this approach fails to acknowledge the wider system benefit of these resources, and undermines the incentive properties of the program.

***Revenue Cost Coverage***

5. Manitoba Hydro defines a Zone or Reasonableness (“ZOR”) for a classes’ revenue cost coverage as being between 95% to 105%. In its cost-of-service methodology review

application to the PUB, Manitoba Hydro recognized that “*a ratio outside of the ZOR as a factor to be considered in the possible differentiation of rate increases*”.

6. In that regard, customer classes with revenue cost coverage above 100% would be effectively paying the cover costs allocated to other customer classes. In a similar manner, revenue cost coverage less than 100% indicates that the customer class may not be charged rates sufficiently high enough to cover its allocated costs.
7. Although not dealt with specifically during these proceedings, GSS/GSM wishes to draw attention to the fact that the past four prospective cost of service studies show that general service small non-demand customers have experiences incrementally higher revenue cost coverage, all above the 105% ceiling target. Likewise, general service large 0-30kV has seen successively lower revenue cost coverage in the past three studies, all below the 95% floor target.
8. In sum, it is respectfully submitted that the revenue cost coverage for GSS customers deviates by too great of a degree from the ZOR. In that regard, the importance of reducing rates and correcting the revenue cost coverage with respect to the GSS/GSM customers must be underscored at the next General Rate Application.

**See: Exhibit GSS/GSM 6, at pages 12 -14**

9. GSS/GSM submits that on this particular issue, that the following exchanges during cross-examination are of note:
  - i. Based on Manitoba Hydro’s calculations, Mr. Chernick agreed that the GSS/GSM customer class pays a disproportionate share based on the revenue cost coverage (See page 628 of the Transcripts, September 9, 2016)

- ii. In a general way, Mr. Bowman accepted the premise that the GSS/GSM customer class pays a disproportionate share based on the revenue cost coverage (See page 629 of the Transcripts, September 9, 2016).

Respectfully submitted this 21<sup>st</sup> day of September, 2016.

## SCHEDULE "A"





LONDON  
ECONOMICS

London Economics International LLC

**\*\*\* Privileged & Confidential \*\*\***

# **Manitoba Hydro Cost of Service Methodology Review Hearing Presentation**

Prepared for GSS/GSM customer class

AJ Goulding, Jarome Leslie  
September 8, 2016

# Agenda

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Introduction

2

Key Issues

**A**

Treatment of export costs

**B**

Treatment of net export revenue

**C**

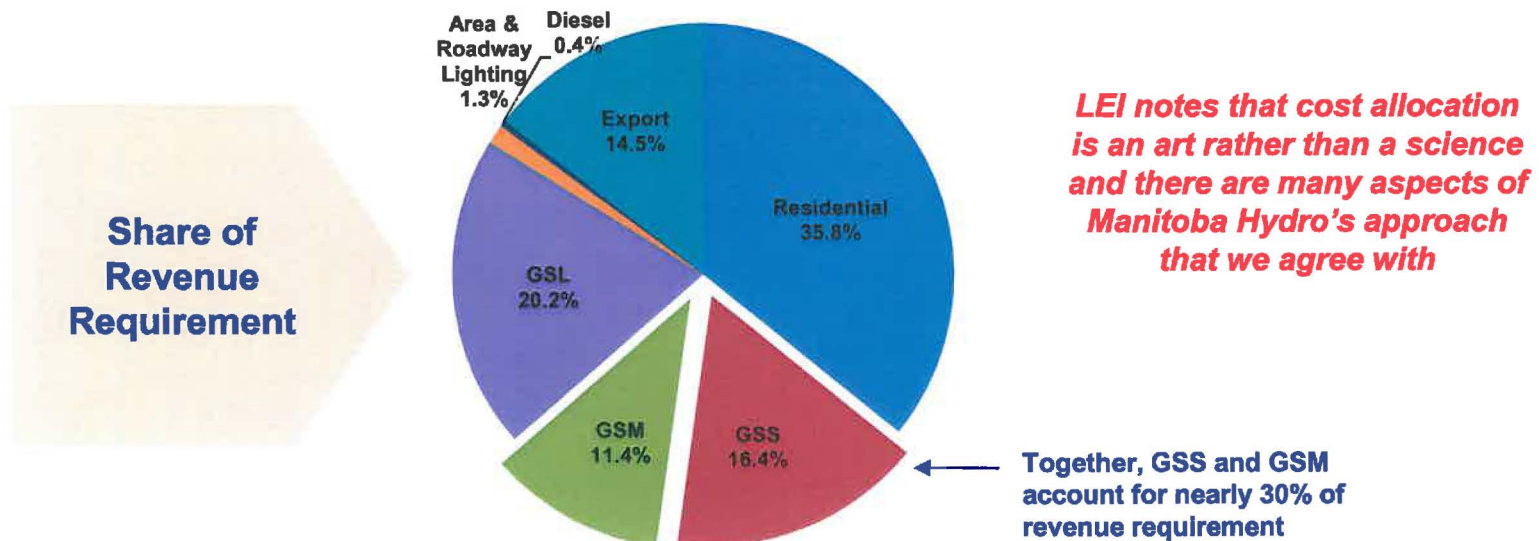
Treatment of generation and transmission assets

**D**

The classification and allocation of DSM

**LEI was retained to represent the interests of Manitoba Hydro’s general service small and medium non-residential customers**

- ▶ **Following Order No. 84/16 and the PUB letter of August 31st, LEI has summarized its perspectives on the following key issues for this oral hearing**
  - The **treatment of export costs**, including the number of export classes and the **allocation of fixed and variable costs** to such classes;
  - The treatment of **net export revenue (“NER”)** and the allocation thereof, including the treatment of the **Uniform Rate Adjustment** and the **Affordable Energy Fund**;
  - The functionalization, classification and allocation of **generation and transmission assets**, including the HVDC system and the US interconnection, but excluding wind and coal assets;
  - The classification and allocation of **demand-side management (“DSM”)**, including the treatment of the Curtailable Rate Program.



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**LEI has summarized its perspective on the four key issues identified by the PUB**

#	Issue	Manitoba Hydro	LEI Recommendation
1	Allocation of fixed costs to export sales	Assigned only to dependable export sales (50% of total exports)	Assign to 63.8% of export sales
2	Allocation of NER	Based on share of allocated costs	Base on share of total costs (allocated and direct)
3	Treatment of generation and transmission assets	Classified as energy and allocated via the weighted energy allocator including a capacity adder	LEI supports the use of the weighted energy allocator but use of the capacity adder requires further study
4	Treatment of DSM costs	Directly allocated to participating classes	Classify as demand and allocate using the D14 average of winter and summer peaks (2CP) allocator, adjusted for losses

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## Fixed costs are currently only assigned to dependable exports which account for 50% of total export sales

- ▶ **Manitoba Hydro assigns full embedded generation and transmission (“G&T”) costs to dependable exports, while opportunity exports only pay variable costs**
  - MH has stated that new capacity is built for domestic load and advanced if firm contracts for dependable exports can be negotiated
- ▶ **Current COS methodology defines the opportunity to dependable export sales split as 50:50 based on forecasted dependable and average water flows**
- ▶ **Sustained opportunity exports play a role in advancing generation investments**
  - *“because you’re building it a little earlier you’re attracting a long-term firm sale, and you’re attracting then some additional revenues from the opportunity market for the surplus that that plant might provide.”*
  - Needs For and Alternatives To (“NFAT”) Manitoba Hydro’s Preferred Development Plan  
Manitoba Hydro assumes that all surplus electricity can be sold either as long-term firm energy or as on-peak and off-peak opportunity sales

Manitoba Public Utilities Board. *Re: Manitoba Hydro COSS Workshops. May 11, 2016. p.264*

Public Utilities Board. *Report on the Needs For and Alternatives To (NFAT) – Review of Manitoba Hydro’s Preferred Development Plan. June 2014.*

## Manitoba Hydro has advanced generation in the past for the purpose of profiting from opportunity export sales

- ▶ In Undertaking 34, LEI identified Limestone and Wuskwatim as two operating facilities where opportunity exports played a role their advancement

**Limestone** - *“Although according to MH the firm export sale could be made with only a one-year advancement of the Limestone station, the Applicant plans a two-year advancement because it believes the **extra year of advancement would allow the profitable sale of additional interruptible energy.**”*

*Source: National Energy Board. Reasons for Decision – The Manitoba Hydro-Electric Board EH-6-84. February 1985.*

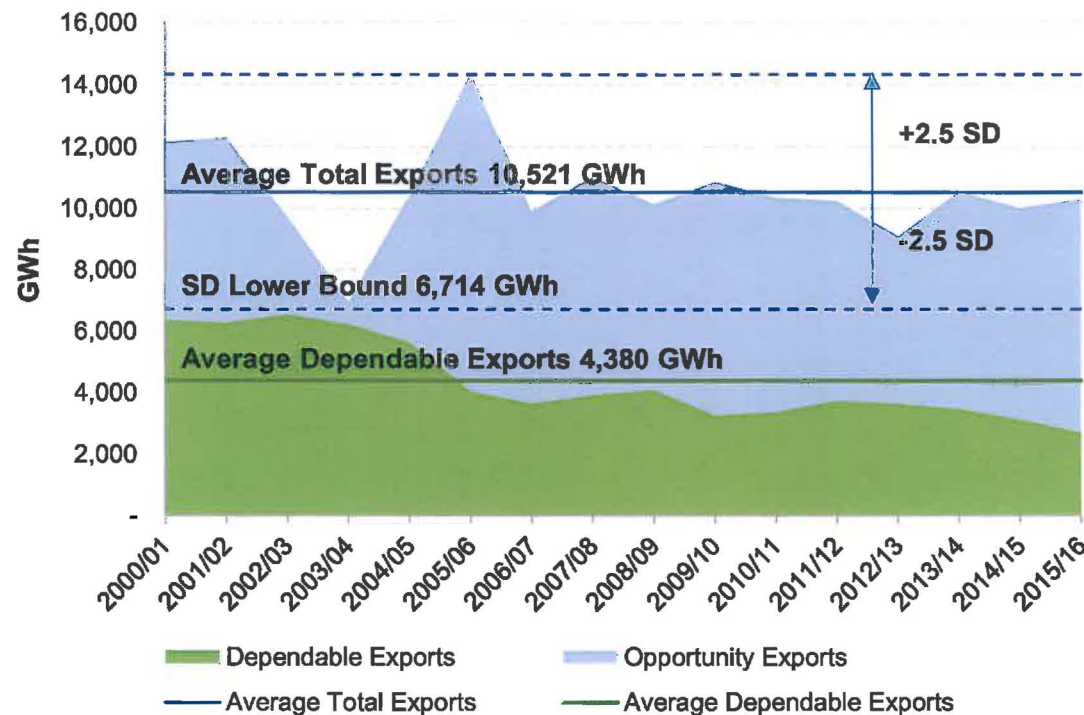
**Wuskwatim** - *“the reason stated for advancing the in-service date of the Project from 2020 to 2009 would be primarily to allow Manitoba Hydro and the Nisichawayasihk Cree Nation (“NCN”) to **obtain additional export revenues and profits.**”*

*Source: Fisheries and Oceans Canada. Canadian Environmental Assessment Act – Comprehensive Study Report: Wuskwatim Generation Project. October 2005.*



LEI believes that a 63.8% share of exports can be viewed as relatively predictable and should therefore attract full embedded G&T costs

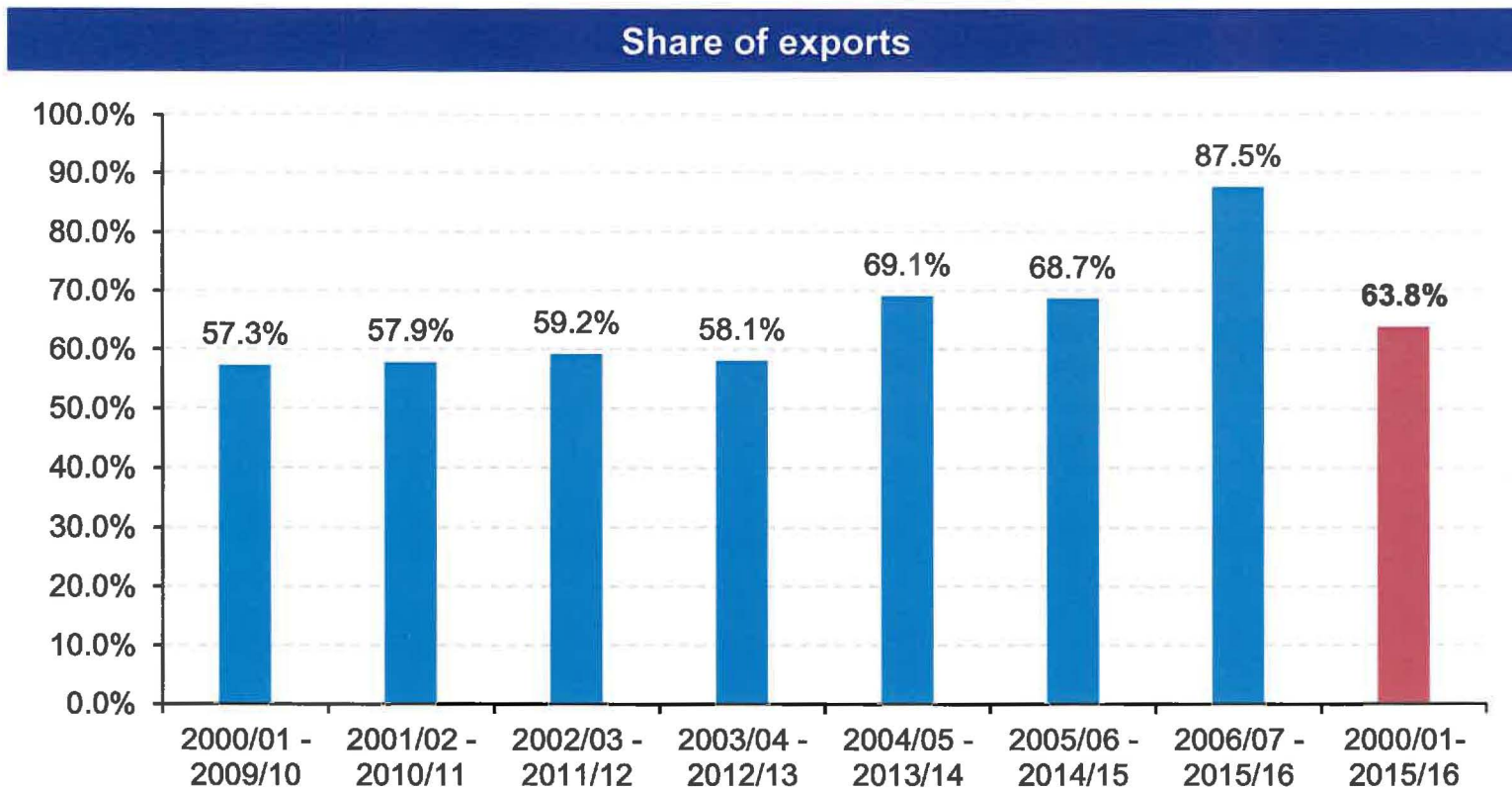
- ▶ In GSS/GSM Undertaking #35, LEI updated its analysis of historical export volumes extending the timeframe from 2000/01 to 2015/16
- ▶ LEI calculates the average total exports for the period as 10,521 GWh and the 2.5 standard deviation lower bound as 6,714 GWh. This 2.5 SD lower bound represents 63.8% of the average total exports over the sixteen year period



Given that 50% of exports are dependable, the incremental 13.8% would come from opportunity exports

## LEI tested the 2000/01 to 2015/16 export data in seven 10-year increments to gauge the sensitivity of results obtained

- ▶ The average share of exports to be assigned fixed costs was calculated at 65.4% and ranged from 57.3% to 87.5% across the seven 10-year increments
- ▶ LEI's recommended 63.8% for the 2000/01 to 2015/16 period falls within the range of results obtained from the analysis of successive 10-year periods



## LEI questions the relevance of data preceding Manitoba Hydro's entry into export markets in determining the allocation of fixed costs to export sales

- ▶ **Manitoba Hydro considers “LEI’s statistical approach to define this split remains too narrow to be relied upon” however more data is not necessarily better data as hydrological patterns may have shifted over the past 100 years**
  - Manitoba Hydro’s development of US interconnections development started in 1970 culminating in 7 major projects to date
  - New hydro came online in 1974 (Kettle 1,220 MW), 1979 (Jenpeg 115 MW and Long Spruce 980 MW), 1990 (Limestone 1,350 MW) and 2012 (Wuskwatim 211 MW) totaling 3,876 MW
  - LEI used the data Manitoba Hydro provided; should data from prior years become available, LEI’s analysis can be extended
- ▶ **LEI believes that an analysis of historical export volumes to determine the fixed costs to be assigned to the export classes is more appropriate**
- ▶ **While Manitoba Hydro disputes the approach in determining the proportion of Opportunity Exports that should carry fixed costs, its July 29th, 2016 rebuttal evidence does not refute the underlying rationale of LEI’s recommendation**
- ▶ **Manitoba Hydro has not provided replicable detail in this proceeding on its methodology on determining the dependable/opportunity export split**

### Manitoba Hydro methodology:

- Dependable/opportunity split based on the Integrated Financial Forecast (“IFF”) 5-year forecast of dependable and average water flows
- Forecast simulates system operation using the entire long term hydraulic flow record of over 100 years, supply mix and 5-year load forecast of the IFF

## There is a difference between dependable from a reliability perspective as compared to the probability of realization

### In terms of *reliability*:

- ▶ Manitoba Hydro intends to supply dependable exports sales under most conditions and allocates embedded cost to these sales on the basis that all resources support these loads
- ▶ Under this view opportunity exports are not supported and are assigned only variable costs
- ▶ Terms should not be confused: “reliability” in an engineering context refers to how “firm” capacity is, whereas what LEI is discussing is the probability that exports of some sort will occur and garner revenues

### With respect to the *probability of realization*:

- ▶ An evaluation of the volume of opportunity exports that are not speculative, but have a high probability of realization, suggests that this percentage of opportunity exports that should be considered “dependable” and attributed fixed costs in addition to variable costs
- ▶ This view accepts the consideration of opportunity export revenues in the planning of generation investment

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**Exclusion of direct costs from the allocation of net export revenue is not consistent with the principle of fairness and should be replaced by a more holistic measure of total costs**

- ▶ **NER are distributed to each customer class based on allocated costs, not total costs**
  - The introduction of the export class and current allocation of NER aimed to address the fairness issue related to export revenue offsetting generation and transmission costs prior to 2005
- ▶ **Net export revenue should be allocated on the basis of total costs, which includes direct costs, due to the principles of fairness, objectivity and equity**
  - Costs such as DSM provide system benefits to all customers
- ▶ **LEI notes that the Uniform Rate Adjustment and Affordable Energy funds are rate related policy decisions and are not caused by the export class**
  - These cost adjustments are more appropriate for the rate design stage

The **Uniform Rate Adjustment** equalizes rates for power supply for customers across **all zones within a customer class** to match the rates in Winnipeg. Passed into law through Bill 21 in 2001, the URA resulted in a **rate reduction for customers in rural and lower density zones**

The **Affordable Energy Fund** was established by the **Winter Heating Cost Control Act** of 2006. The AEF required Manitoba Hydro to set aside **5.5% of 2006/07 export revenues** in order support **energy efficiency and conservation initiatives, encourage alternative energy sources** and facilitate associated **research and development**. Under legislation, AEF programs must be **equally accessible to rural and northern Manitoba customers, including those with low incomes and seniors**

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## LEI agrees with Manitoba Hydro’s treatment of its generation, generation-related transmission and the US Interconnection excluding the use of the capacity adder

- ▶ **The weighted energy allocator uses an opportunity cost approach to classify and allocate generation, GRTA and US Interconnection costs**
- ▶ **As the weighted energy allocator considers the seasonal peak, shoulder and off-peak prices, it incorporates the demand-influenced value of energy**
- ▶ **LEI questions whether the use of a capacity adder is appropriate at this time, and believes that when such adders are not market-based, they should be subject to periodic review**

Manitoba Hydro’s weighted energy allocator multiplies forecasted energy consumption by **Surplus Energy Program price weights** to capture the relative market value of energy in the **peak, shoulder and off-peak periods of spring, summer, fall and winter**. Manitoba Hydro’s proposes a **capacity adder for peak periods** based on MISO’s capacity market clearing price

### MISO capacity market

- ▶ **The MISO’s current Planning Resource Adequacy framework (“PRA”) was created in 2013 with the ambition to correct most shortcomings associated with MISO’s previous market construct, i.e. the **voluntary capacity auctions (“VCAs”)****
- ▶ **The VCAs were operated by MISO at the regional level, with no price separation at the zonal level – one of the key design shortcomings**
- ▶ **The MISO market is separated into nine LRZs and **Manitoba Hydro’s capacity is currently deliverable into LRZ 1****
- ▶ **Auction clearing prices for LZ1 remain below the CAD\$3.16/kW-Mth proposed capacity adder**

Planning Year	LZ1 Auction Clearing Price (US\$/kW-Mth)
2013/14	\$0.032
2014/15	\$0.100
2015/16	\$0.106

It is important to note that the current capacity market design is likely to change further



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## DSM costs should be allocated to customers that contribute to peak demand

- ▶ **Currently, costs of DSM programs are directly attributed to individual participating customer classes**
- ▶ **Peak demand is the primary driver of the need and therefore costs to manage peak demand using DSM**
- ▶ **System-wide benefits from DSM are produced from a reduction in system peak demand costs**
  - *“Reductions in domestic demand have contributed to electricity surpluses, which have been sold on the export market to support lower domestic rates for Manitoba consumers, reduce greenhouse gas emissions, and defer the need for new Manitoba resources.”*
- ▶ **The direct assignment of DSM costs penalizes participating customer classes for providing a system service**
  - Allocation by demand strengthens rather than weakens incentives for DSM
- ▶ **The need for DSM is driven by peak-demand consumption and therefore the costs to provide DSM should be allocated to the set of customers that consume at the peak**
  - Allocate using the existing D14 2CP for Domestic and Dependable Export table

## SCHEDULE "B"

## MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO  
COST OF SERVICE STUDY REVIEW  
HEARING

Before Board Panel:

Marilyn Kapitany - Chairperson  
Larry Ring, Q.C. - Board Member  
Hugh Grant - Board Member

HELD AT:

Public Utilities Board  
400, 330 Portage Avenue  
Winnipeg, Manitoba

September 7, 2016

Pages 263 to 571



“When You Talk - We Listen!”



1 adopt the evidence that's been provided by London  
2 Economics International in these proceedings?

3 MR. A.J. GOULDING: I do.

4 MR. CHRISTIAN MONNIN: Mr. Secretary,  
5 the CV of Mr. A. J. Goulding is Exhibit 10-1. He was  
6 sworn in earlier this year. We also have Mr. Jarome  
7 Leslie, who was sworn in. He'll be here just to give  
8 support to -- to the expert witness. His CV was  
9 Exhibit 10-3. And I believe this -- the presentation  
10 slide deck will be Exhibit 15.

11 MR. KURT SIMONSEN: Thank you very  
12 much.

13

14 --- EXHIBIT NO. GSS/GSM-15: Presentation Slide  
15 deck

16

17 PRESENTATION BY GSS/GSM CLASS:

18 MR. A.J. GOULDING: Thank you. It's a  
19 pleasure to be here today once again in -- in  
20 Winnipeg. As -- as Christian mentioned, we were -- if  
21 we go to slide 3, LEI was retained to represent the  
22 interests of the general service small and medium non-  
23 residential customers. And as -- as you can see on --  
24 on slide 3, if we go back a slide.

25 I apologize that it doesn't show up as

1 elegantly as we would have liked in this -- in this  
2 format, but as -- as you can see our -- the -- the  
3 customer classes that LEI represents account for a  
4 little bit less than 30 percent of the revenue  
5 requirement. And so while our discussion today  
6 focusses on the key issues that have been identified  
7 for this hearing, we do want to continue to emphasize  
8 that the concerns for our customer class also include  
9 the revenue to cost ratios which we hope will be a  
10 focus of in future proceedings.

11                   Now, in our discussions today we cover  
12 the treatment of export costs of the net export  
13 revenue of generation and transmission assets, and of  
14 demand-side management. And we want to echo the  
15 comments of other speakers today that there are a  
16 variety of reasonable approaches that can be  
17 considered, and often on some of these your  
18 perspective depends upon where you sit.

19                   Cost allocation is more of an art than  
20 a science, and there are many aspects of Manitoba  
21 Hydro's approach that -- that we agree with. And so  
22 while we have drawn out some key issues, we do want to  
23 keep the -- the big picture also in mind. And if we  
24 can go to slide 5? Thank you.

25                   So with regards to the four (4) key

1 issues, we wanted to summarize our positions on these  
2 before we proceeding to providing more detail.

3           First, on the issue of the allocation  
4 of fixed costs to export sales, the proposed approach  
5 is to assign these only to dependable export sales, 50  
6 percent of total exports. Our recommendation, as we  
7 will discuss shortly, is that the fixed costs be  
8 allocated to 63.8 percent of export sales.

9           If we turn to the allocation of the net  
10 export revenues, the proposal is that they be based on  
11 a share of allocated costs. We believe that they  
12 should be based on a share of total costs, both  
13 allocated and direct.

14           On treatment of generation and  
15 transmission assets, while LEI generally supports the  
16 use of the weighted energy allocator, we do have  
17 concerns about the capacity adder. And we think that  
18 some further study may be warranted in that regard.

19           Turning to the treatment of DSM costs  
20 which are proposed to be directly allocated to  
21 participating classes, we propose that these be  
22 classified as demand and allocated using the winter  
23 and summer peak allocator adjusted for losses.  
24 Overall, as we'll discuss, we view these as a resource  
25 that should be attributed to peak energy.

1                   If we turn to slide 7, so as we've  
2 said, currently fixed costs are assigned only to what  
3 are referred to as "dependable" exports, and those are  
4 viewed as 50 percent of total export sales.

5                   And this methodology we believe is --  
6 is a bit at odds with the way in which the various  
7 assets have been selected both in terms of the types  
8 of technology and the timing. We believe that  
9 sustained export sales, both opportunity and firm,  
10 have played a role in advancing generation  
11 investments, and potentially in the type of technology  
12 and sizing.

13                   And we've noted that there are -- there  
14 is support for this position both in the Needs For and  
15 Alternatives To that was put forth in 2014 where the  
16 assumption is that all surplus energy can be sold in a  
17 variety of ways. And indeed, over time, the trading  
18 strategies may change with regards to exports.

19                   So we've seen support that investments  
20 have been made a bit earlier, and that that in turn is  
21 attracting additional revenues also from the  
22 opportunity market. And we've seen discussion that  
23 all surplus energy plays into the decision-making  
24 process.

25                   Now, if we go to slide 8, in



1 Undertaking 34, we identified two (2) facilities that  
2 were advanced partially on the basis of opportunity  
3 exports. So we'll look at Limestone, and we'll note  
4 that the

5                                 "...extra year of advancement will  
6                                 allow for the profitable sale of  
7                                 additional interruptible energy."

8                                 And more generally at Wuskwatim. The  
9 advancement was to obtain additional export revenues  
10 and -- and profits.

11                                Now, if -- if we turn to slide 9, we  
12 have augmented our previous analysis of what we  
13 believe should be a reasonable lower bound of expected  
14 exports and with the additional data, we have examined  
15 what the -- relative to the average over the period  
16 for which data was provided to us, what two and a half  
17 (2 1/2) standard deviations would be above and below.

18                                And we've conservatively chosen as the  
19 lower bound a point that is two and a half (2 1/2)  
20 standard deviations below the average as something  
21 that would be reasonably representative of expected  
22 export volumes. And you'll note that this lower bound  
23 remains below the volumes of actual exports within  
24 this particular time horizon.

25                                So what we have suggested is that the

1 view of reasonably expected exports should be expanded  
2 by moving approximately 13.8 percent from opportunity  
3 exports into what we would call reasonably expected.  
4 So whether you want to say that we're adding that to  
5 dependable or we're changing slightly the description  
6 of the classes, either way, we're essentially looking  
7 at this the way a financing party would be.

8           If you were going to a bank and you  
9 were presenting your reasonable worst-case scenario,  
10 this would be the way that a -- a financing party  
11 would -- would think about it. So we've examined that  
12 data from a variety of perspectives within the  
13 constraints of the data that was provided to us.

14           So on slide 10 you'll see that we  
15 performed further analysis looking at the ten (10)  
16 year slices that existed within the data that was  
17 provided and we note that when we look at each of  
18 those ten (10) year slices, the range of 57 to 87.5  
19 percent encompasses our recommended approach.  
20 And that recommended approach, obviously, is taking  
21 into account these sixteen (16) periods.

22           Now, if we move to the next slide,  
23 slide 11, we want to emphasize that we worked with the  
24 data that we were provided. And what we would also  
25 point out is that while we have high regard for

1 Manitoba Hydro's analytic cap -- capabilities, and the  
2 work that they've done, and the data that they have,  
3 we're not convinced that in all cases more data is  
4 better data.

5                   And so we believe that there are  
6 several instances in which it may not, in fact, be  
7 appropriate to use the one hundred (100) year  
8 hydraulic flow and we also believe that given the way  
9 that circumstances have changed over the past twenty  
10 (20) years, in particular, that using a shorter time  
11 period may well be appropriate.

12                   So we've seen, since 1970, seven (7)  
13 major inner connections. Since 1974 we have seen  
14 nearly 4,000 megawatts of additional hydro. And that  
15 suggests that export patterns will have been  
16 significantly different in more recent periods than --  
17 than in the past. And that's why we do believe it's  
18 appropriate to weight the analysis to -- to more  
19 recent periods.

20                   And we would note that it would be  
21 worthwhile to be able to have a more fulsome  
22 discussion of the dependable opportunity split.  
23 Manitoba Hydro has noted that it's based on an  
24 integrated financial forecast incorporating dependable  
25 and average water flows, but it would be helpful for

1 other Intervenors to be able to replicate test that  
2 analysis with further data. We move to the next  
3 slide.

4                   We would also emphasize that it's  
5 important to think about the difference in the  
6 approach with regards to the question of reliability.  
7 What -- what we're focussing on is simply the  
8 probability that a lower bound of exports will exist  
9 because, as we've said, when you think about building  
10 this new facility you are taking into account not just  
11 the firm sales, but also you're assuming that some  
12 degree of opportunity sales will exist.

13                   And so this question of reliability,  
14 from an engineering perspective, is different from the  
15 question of what can reasonably be expected from a  
16 financial perspective. Our focus is on the  
17 probability of realization, it is not on whether a  
18 particular sale embodies within it a one (1) in ten  
19 thousand (10,000) hours loss of load probability or is  
20 backed by firm capacity.

21                   So if we move then from this issue of  
22 the treatment of net export cost to the treatment of  
23 net export revenue and go to slide 14. We share the  
24 concern with regards to the exclusion of direct costs.  
25 And we believe that it is more appropriate to allocate

1 based on total costs rather than allocated costs and  
2 that there are principles of -- of fairness that --  
3 that are involved.

4                   Now, for our customer class there's  
5 less of an issue with distinguishing between the  
6 luminaires and the infrastructure that supports the  
7 luminaires. But, nonetheless, from the perspective of  
8 our customer class, we believe that the direct  
9 assignment is -- is more appropriate.

10                   Now, in addition, there's been  
11 discussion of the treatment of the uniform rate  
12 adjustment and the affordable energy funds. And,  
13 obviously, as witnesses, we -- we have the luxury of -  
14 - of perhaps thinking about the world in a theoretical  
15 way that's less burdened by the statutes. And we  
16 understand that in some ways you may be constrained by  
17 the -- the language within them.

18                   Nonetheless, neither the uniform rate  
19 adjustment nor the affordable energy fund currently  
20 are incorporated into rates in a way that reflects  
21 cost/causation.

22                   And there are some additional concerns  
23 about the way in which these costs are allocated.  
24 Both of these measures are redistributive in nature,  
25 and in -- in that sense the way in which they are

1 implemented bears some similarities to the way in  
2 which you would try to implement a tax.

3                   And it's potentially problematic to the  
4 customers in our customer class, in particular the  
5 Affordable Energy Fund. If I'm a small dry cleaner,  
6 for example, I don't have the ability necessarily to  
7 draw on something like the Affordable Energy Fund, but  
8 I have to pay for it. And if ultimately that pushes  
9 my costs up to the point where I'm no longer  
10 competitive, I go out of business.

11                   If I'm a small residential consumer and  
12 I fall into financial distress, I do have access to  
13 this Affordable Energy Fund. So the Affordable Energy  
14 Fund serves as a form of social insurance for a  
15 particular customer class, and not all customer  
16 classes can benefit from that. So there are concerns  
17 about the way in which that is allocated.

18                   Now, if we turn to the uniform rate  
19 adjustment, arguably some members of the customer  
20 class that -- that we represent in different areas of  
21 the province may well benefit from that. And some  
22 thought may need to go into how the costs and benefits  
23 are attributed.

24                   Again, we note that all of this is in a  
25 perfect world where the Board has complete flexibility

1 to do things based on economic principles, and that  
2 flexibility may not exist within the -- within the  
3 statutes. Nonetheless, we -- we do believe that this  
4 -- both of these public policies are outside of the  
5 realm of cost causation.

6                   Moving to the treatment of generation  
7 and transmission assets, if we go to slide 16, so  
8 there are a number of interesting aspects with regards  
9 to this topic. And we generally agree with the use of  
10 the weighted energy allocator.

11                   However, it's striking how often people  
12 like to use market-based solutions when they produce  
13 the results that they like, and then assume market  
14 failure when the market produces results that they do  
15 not like.

16                   And so there is a concern about a mix-  
17 and-match approach in which we say, Well, we don't  
18 think that the energy market in the Mid-Continent ISO  
19 adequately reflects scarcity rents.

20                   We don't believe that the Mid-Continent  
21 ISO knows what it's doing with regards to establishing  
22 a capacity market to correct that problem. And so  
23 we're going to accept Mid-Continent ISO energy prices,  
24 but we're going to throw out their capacity prices and  
25 we're going to add our own.

## SCHEDULE "C"



# GSS/GSM undertakings from Manitoba Hydro’s 2015 cost of service methodology review proceeding

prepared for Hill Sokalski Walsh Olson LLP

July 6, 2016



*Upon review of the transcripts record from the Manitoba Hydro (“MH”) cost of service (“COS”) workshop on June 23, 2016, London Economics International LLC (“LEI”) has acknowledged and addressed its assigned undertakings.*

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## 1 GSS/GSM Undertaking #34

GSS/GSM to provide an identification of those assets that have been advanced for the purposes of opportunity exports.

### Response:

It is submitted that opportunity exports played a role in advancing the operating Limestone and Wuskwatim generation stations as well as the development of Keeyask which is currently under construction. A summary of these generation stations is presented in Figure 1.

**Figure 1. Summary of recent and upcoming in-service generation facilities**

Plant Name	Installed Capacity	In-service year	Advanced (Yes/No)
Limestone	1,340 MW	1990	Yes
Wuskwatim Hydro Facility	200 MW	2012	Yes
Keeyask Project	695 MW	2019	Yes

Source: Manitoba Hydro.

Regarding Limestone, in a 1985 National Energy Board (“NEB”) decision in the matter of the Manitoba Hydro-Electric Board, Manitoba Hydro submitted a schedule of the planned capacity additions required to meet domestic load and to permit firm exports to the Northern States Power Company.<sup>1</sup> MH however makes an exception in the advancement of Limestone from 1992 to 1990 where the NEB states: *“Although according to MH the firm export sale could be made with only a one-year advancement of the Limestone station, the Applicant plans a two-year advancement because it believes the extra year of advancement would allow the profitable sale of additional interruptible energy.”*

In its response to PUB/MH-I-11, MH acknowledges that the Wuskwatim and Keeyask projects were pursued in advance of the need for new resources. With respect to Wuskwatim, MH states that *“advancement provided the opportunity to take advantage of export sales.”* This is also reflected in the 2005 Canadian Environmental Assessment Act comprehensive study report on the Wuskwatim generating project which states *“the reason stated for advancing the in-service date of the Project from 2020 to 2009 would be primarily to allow Manitoba Hydro and the Nisichawayasihk Cree Nation (“NCN”) to obtain additional export revenues and profits.”*<sup>2</sup> While Wuskwatim construction was completed in 2012 due to environmental licensing and construction delays, this still represents an 8-year advancement. It is worth noting that the distinction between dependable and opportunity exports was not made in qualifying this decision.

In the Needs For and Alternatives To (“NFAT”) of Manitoba Hydro’s Preferred Development Plan, the Public Utilities Board (“PUB”) Panel approved the advancement of the Keeyask project to proceed with an in-service date of 2019 ahead of its need by domestic customers after 2024.<sup>3</sup> MH states in PUB/MH-I-11 that the advancement of the Keeyask project *“facilitates higher value export sales”* and provides the average annual split between firm and opportunity export sales for the 20 years post in-service of Keeyask (2020/21 - 2039/40), as seen in Figure 2 below.

<sup>1</sup> National Energy Board. *Reasons for Decision – The Manitoba Hydro-Electric Board EH-6-84*. February 1985.

<sup>2</sup> Fisheries and Oceans Canada. *Canadian Environmental Assessment Act – Comprehensive Study Report: Wuskwatim Generation Project*. October 2005.

<sup>3</sup> Public Utilities Board. *Needs For And Alternatives To (NFAT) Review of Manitoba Hydro’s Preferred Development Plan – Final Report*. June 20, 2014.

It is worth noting that annual opportunity export revenues for this period account for 66% of total GWh volume of expected exports. It is therefore reasonable to conclude that opportunity exports have in fact played a role in the advancement of this facility.

**Figure 2. Average annual split between firm and opportunity export sales for the 20 years post in-service of Keeyask (2020/21 - 2039/40)**

	<b>Average Annual Firm Exports</b>	<b>Average Annual Opportunity Exports</b>	<b>Average Annual Total</b>
<b>Energy (GWh @ Generation)</b>	2690	5232	7922
<b>Revenue (Millions of Current CDN Dollars)</b>	241	408	648

Source: Manitoba Hydro. PUB/MH-I-11

Regardless of whether the specified generation assets are currently in the rate base, evidence suggests that advancing generation investment for the purpose of dependable and opportunity exports is standard practice in Manitoba. Such advancement means that it is appropriate that exports be assigned more of the fixed costs associated with these investments.

## SCHEDULE "D"

## 2 GSS/GSM Undertaking #35

London Economics to redevelop Figure 3 of its pre-filed evidence based on the appropriate available data including the data provided by Manitoba Hydro in Attachment 31 and reconsider its threshold for treating some portion of opportunity sales as attracting full embedded costs.

### Response:

In its pre-filed evidence, GSS/GSM-6, LEI recommended a 66% fixed cost allocation to the export class is appropriate for cost of service purposes based on a 2.5 standard deviation threshold below the average total export levels. Due to a transcription error, the level of opportunity exports in the 2011/12 fiscal year was inputted as 3,502 GWh instead of 6,502 GWh. Making this adjustment and incorporating only data from 2005/06 to 2015/16, the analysis as presented in GSS/GSM-6 would result in a 70% fixed cost allocation to the export class.

LEI has updated Figure 3 of its pre-filed evidence below using a combination of data provided by Manitoba Hydro in 2016/17 Supplemental Filing Attachment 31 and Undertaking #5. As noted in Attachment 31 and pointed out by Board consultant Mr. Ryall "*subject to Manitoba Hydro correcting otherwise, I believe the final year of the 2015/16 is not a complete year of export sales.*"<sup>4</sup> Accordingly, LEI has replaced the data for 2015/16 in Figure 3 below with the more recent data provided in Manitoba Hydro Undertaking #5, which subject to confirmation from Manitoba Hydro appears to reflect a complete year of export sales.

**Figure 3. Historical exports (2000/01 to 2015/16)**

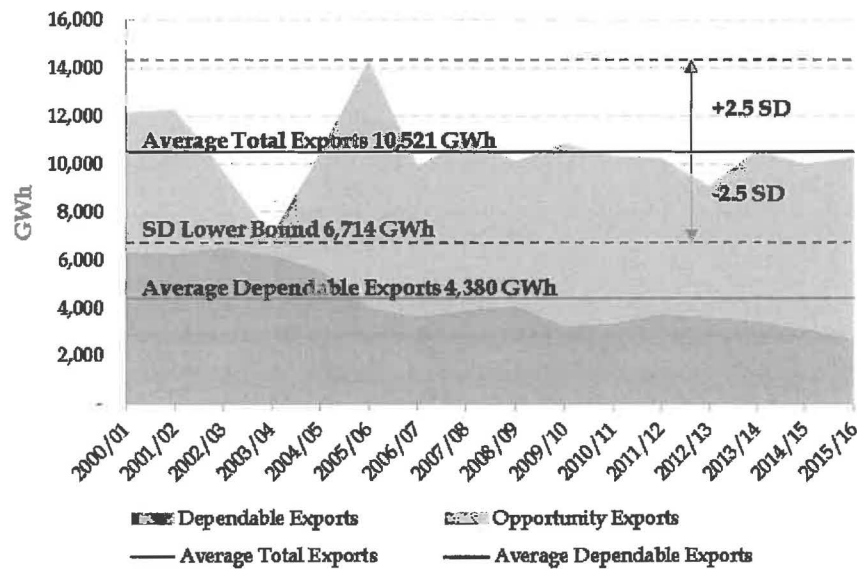
Year	Dependable exports ("GWh")	Opportunity Exports ("GWh")
2000/01	6,352	5,801
2001/02	6,277	6,022
2002/03	6,544	3,191
2003/04	6,231	735
2004/05	5,633	4,798
2005/06	4,044	10,303
2006/07	3,654	6,250
2007/08	3,921	7,099
2008/09	4,087	6,039
2009/10	3,263	7,597
2010/11	3,377	6,967
2011/12	3,742	6,502
2012/13	3,636	5,451
2013/14	3,479	7,058
2014/15	3,132	6,877
2015/16	2,701	7,580

Sources: Manitoba Hydro. *Export and Domestic Revenue MFR 4 – Attachment 31*; Manitoba Hydro. *Undertaking #5*.

<sup>4</sup> Manitoba Public Utilities Board. *Re: Manitoba Hydro COSS Workshops – Page 906*. June 23, 2016.

Figure 4 depicts the 16-year historical breakdown of dependable and opportunity exports. From this data, LEI calculates the average total exports as 10,521 GWh. Using a 2.5 standard deviation ("SD"), LEI calculates the lower bound as 6,714 GWh. This 2.5 SD lower bound represents 63.8% of the average total exports over the sixteen year period. LEI believes that this 63.8% share of exports can be viewed as relatively predictable and should therefore attract full embedded costs of generation and transmission – i.e. the fixed costs as well as the variable costs. Given that 50% of exports are currently dependable, the incremental 13.8% would come from opportunity exports.

**Figure 4. Historical exports by type (2000/01 to 2015/16)**



Sources: Manitoba Hydro. *Export and Domestic Revenue MFR 4 – Attachment 31*; Manitoba Hydro. *Undertaking #5*.

LEI reproduced the above analysis over successive 10-year periods to examine how the result changes over time. This result lies within the range of 57%-88% observed in seven 10-year sensitivities, presented in Figure 5. LEI understands that similar data to Figure 3 is available back to 1992 as stated by Ms. Derksen, "with respect to opportunity sales, we have information going further back than 2000. We likely have data going back to 1992, just subsequent to when Limestone was built." LEI is open to analyzing such data should it become available. However, though useful, data over such as extended period may be less representative of the system which exists today. Based on the 16 years of data available to LEI presently, including a review of the 16-year average and the seven 10-year periods embedded therein, LEI believes attributing full embedded costs to 63.8% of exports is appropriate. The 63.8% share is well within the range of outcomes when average exports minus 2.5 standard deviations is calculated for rolling 10-year

periods within the 16 years of available data. Given the range, LEI believes that the 63.8% estimate is conservative.<sup>5</sup>

**Figure 5. Examination of 10-year sensitivities**

10-year period	Average exports	Average exports less 2.5 SD	Share of exports
2000/01 - 2009/10	10,784	6,179	57.3%
2001/02 - 2010/11	10,603	6,136	57.9%
2002/03 - 2011/12	10,398	6,158	59.2%
2003/04 - 2012/13	10,333	6,003	58.1%
2004/05 - 2013/14	10,690	7,390	69.1%
2005/06 - 2014/15	10,648	7,312	68.7%
2006/07 - 2015/16	10,241	8,966	87.5%
<b>Average</b>	<b>10,528</b>	<b>6,878</b>	<b>65.4%</b>

Source: Manitoba Hydro. *Export and Domestic Revenue MFR 4 – Attachment 31*; Manitoba Hydro. *Undertaking #5*.

<sup>5</sup> LEI notes that the issue in question is not whether the exports are “firm” from a reliability perspective, but rather whether they are reasonably expected as a source of revenue and factored into the decision to advance generation investment.