

1 SUBJECT: DSM Potential Study - Benchmark

2

3 REFERENCE: Page 19

4

5 QUESTION:

6 For Figure 7, please confirm the basis of the average annual savings potentials
7 comparison. Are they based upon demand (MW) or are they based on energy
8 (GW.h)?

9

10 RESPONSE:

11 The annual savings potentials in Figure 7 refer to energy (GWh).

SUBJECT: DSM Potential Study - Benchmark

REFERENCE: Page 19

PREAMBLE: **Potential studies commonly apply different scopes (e.g. inclusion or exclusion of fuel switching, customer-sited generation, etc.)**

QUESTION:

For the regions identified in Figure 7 please identify what was included within the scope of each of the different potential studies (e.g. which included fuel switching to natural gas, customer-sited generation, demand response etc.).

RESPONSE:

A table indicating whether the study included Fuel Switching Measures, Customer-sited generation, Demand Response and CHP is included below.

Jurisdiction	Energy Efficiency	Customer Generation	Fuel Switching Measures	Combined Heat and Power	Demand Response Measures
Conneticut	Yes	No	No	No	No
Rhode Island	Yes	No	No	No	No
Wisconsin	Yes	Yes	Yes	Yes	Yes
Minnesota	Yes	No	No	No	Yes
Illinois*	Yes	-	-	-	Yes
British Columbia	Yes	No	Yes	No	No
Manitoba	Yes	No	No	No	No
New Hampshire	Yes	No	Yes	Yes	No
California	Yes	No	No	No	No
Florida	Yes	Yes	No	Yes	Yes

17 For Illinois we do not have the appendix which outlines the full list of included measures.

1 SUBJECT: DSM Comparisons

2

3 REFERENCE: Page 19, Page 25

4

5 QUESTION:

6 Please provide updated versions of Figure 7 and Figure 10 including Saskatchewan
7 and Quebec.

8

9 RESPONSE:

10 **Figure 7 is a plot of potential studies for various jurisdictions. For**
11 **the selection criteria see PUB/CAC_GAC-009a. The most recent**
12 **Quebec potential study does not meet our selection criteria as it**
13 **does not include an assessment of achievable potential. For**
14 **Saskatchewan there is no publicly available electric potential study.**
15 **We contacted SaskPower requesting the relevant data but had not**
16 **received it by the time of the writing of this response.**

17 **Figure 10 is a plot of average annual electric saving targets for**
18 **various jurisdictions. The data required to include Saskatchewan is**
19 **not publicly available. We contacted SaskPower requesting the**
20 **relevant data but had not received it by the time of the writing of**
21 **this response. We omitted Quebec because the province is in the**
22 **midst of an energy policy review from which new targets will likely**
23 **emerge. We are barred by confidentiality rules from revealing the**
24 **nature of the targets that are currently under discussion.**

SUBJECT: DSM Comparisons

REFERENCE: Page 25

QUESTION:

For each region presented in Figure 10, please identify program strategies included within the scope of the targets (e.g. energy efficiency, fuel switching and source, load displacement, conservation/time of use rates, etc).

RESPONSE:

For the Canadian provinces the scope of the targets include the following;

- British Columbia targets include savings from DSM programs, Rate structures, and Codes and Standards**
- Nova Scotia targets include savings from DSM programs and, to a limited degree, specific Codes and Standards**
- Manitoba targets include savings from DSM programs as well as Codes and Standards**

The data regarding the American states used for figure 10 is sourced from the 2013 State Energy Efficiency Scorecard published by the ACEEE, table 18 pg 35. While some additional information regarding specific plan components can be found in the report's Appendix B, the information presented is not complete.

That said, as a general rule I would suggest that all plans include energy efficiency, some may include fuel switching, and a smaller number might include conservation rates. While load displacement and time of use rates may be included in the plans per se, they are primarily peak capacity - not energy - saving measures, and as such would be of little relevance for the energy savings targets identified in Figure 10.

SUBJECT: DSM Comparisons

REFERENCE: Page 25

QUESTION:

For each region presented in Figure 10, please identify the timeframes associated with the targets presented where supported by a detailed plan with committed budgets.

RESPONSE:

For U.S. regions, targets are from the the 2013 State Energy Efficiency Scorecard published by the ACEEE. However, it is difficult to identify comparable timeframes as the reporting reflects a broad diversity of target types (incremental annual, cumulative, cumulative over multiple years, average annual over multiple years, etc.). That said, the timeframes themselves range from several years, out to approximately 20 years.

The savings targets for Canadian regions are indicated in the chart. Specifically, Nova Scotia's are from ENSC's proposed 2013-2015 DSM plan (of which 2 years are pre-approved and the third is pending). For British Columbia, savings targets are from BC Hydro's 2013 Intergrated Resource Plan and cover 10 years (2012 - 2021). For Manitoba, we used the 10- and 15-year savings from Manitoba Hydro's most recent Power Smart Plan.

In terms of "detailed plans with committed budgets", these are typically 2-3 years in duration, and are developed primarily for implementation, not resource planning, purposes. Targets, on the other hand, are used for planning purposes, to forecast loads and define associated energy and capacity needs.

1 SUBJECT: Solar

2
3 REFERENCE: Page 36

4
5 PREAMBLE: **Page 36 "... solar PV has begun to achieve "grid Parity" -**
6 **meaning that the cost to produce electricity from solar panels, on a**
7 **cents/kWh basis, is the same or cheaper than the cost of purchasing**
8 **power from the grid (electricity rates..."**

9
10 QUESTION:

11 **Please confirm the definition of grid parity to mean that the cost for**
12 **energy produced by solar panels will be equal to the average rates**
13 **that customers will be charged for electricity purchased from the**
14 **grid.**

15
16 RESPONSE:

17 The grid parity in this exercise means that the levelized cost of energy (LCOE)
18 produced by solar panels (including incentives in this case) is equal to the levelized
19 rates a customer will pay for electricity.

1 SUBJECT: Solar

2

3 REFERENCE: Page 38

4

5 PREAMBLE: **Reference 35, Page 38**

6

7 QUESTION:

8 **Please provide the average residential prices used in the**

9 **determination of grid parity by year from 2013 to 2025 for the**

10 **locations referenced in the evidence on Page 38 (Manitoba, Ontario,**

11 **Saskatchewan, Minnesota and North Dakota).**

12

13 RESPONSE:

14 Please see PUB-CAC_GAC-014a.

SUBJECT: Solar

REFERENCE: Page 38

PREAMBLE: **Reference 35, Page 38**

QUESTION:

Please provide the incentive levels used in the determination of grid parity by year from 2013 to 2025 for the locations referenced in the evidence (Manitoba, Ontario, Saskatchewan, Minnesota and North Dakota).

RESPONSE:

A summary of the incentive levels used in the model is provided in the table below.

2013	Federal tax credit¹	Feed-in tariff (\$/kWh)	Utility or State rebate	Sales tax exemption
<i>Manitoba Hydro</i>				
<i>Sask Power OPA</i>			20%	
<i>Minnesota (Xcel)</i>	30%	0.396	43%	100%
<i>North Dakota (Xcel)</i>	30%			100%

¹ The federal credit is applied to the equipment cost less any utility or state rebates.

17 We have further assumed that all incentives will be progressively phased out,
18 according to the schedule detailed in the table below:

Ye ar	20 13	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	20 22	20 23	20 24	20 25
<i>Multi plier</i>	100 %	100 %	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%	0%

19

1 SUBJECT: Solar

2

3 REFERENCE: Page 39

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5 PREAMBLE: Figure 15, Page 39

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7 QUESTION:

8 **Please provide in tabular form, the information used to determine**
9 **grid parity as presented in Figure 15 (Page 39), with and without**
10 **incentives, using the average residential rates and incentive levels**
11 **identified in questions a) and b).**

12

13 RESPONSE:

14 **Please refer to the Excel file named MH-GAC-005c.**

15

1 SUBJECT: Solar

3 REFERENCE: Page 39

5 PREAMBLE: Reference 36, Page 39

7 QUESTION:

8 **Please provide an estimate of the additional costs (\$/kW) required**
9 **to accommodate the conditions relevant to solar installations in**
10 **Manitoba, including but not limited to the cost of adjusting the tilt**
11 **of solar panels to correct the angle at which the sun hits land in the**
12 **winter, the cost of appropriate solar PV installation designs to**
13 **address snow accumulation, etc.**

15 RESPONSE:

16 **The cost of solar used in the model (\$ 4.50/W) already takes into**
17 **account the costs related to the installation and operation of**
18 **equipment in winter conditions. The recent estimates for the cost of**
19 **an installed solar system in the literature vary greatly from source**
20 **to source, ranging from under \$2.50 to over \$5.00. In order to**
21 **better represent the reality of Manitoba, we have given priority to**
22 **Canadian sources when setting the price point for the installed**
23 **system. For example, Solacity, a solar installer in the Ottawa region,**
24 **quotes an average price of \$ 4.45 for an installed system sized**
25 **between 2 kW and 10 kW, and a recent study on grid parity in**
26 **British Columbia¹ cites a current cost of \$4.67/kW.**

27 **Additionally, we have used regional factors for specifying the**

1 1 Solar PV: Grid Parity in British Columbia, Andrew Pye, April 2013

28 **energy yield of a 5 kW system for each location.**

SUBJECT: Appendix A – Exclusions: Future Technologies

REFERENCE: Page 50

PREAMBLE:

Some of the more recent potential studies have begun accounting for anticipated improvements

QUESTION:

Please provide references for these studies accounting for anticipated improvements.

RESPONSE:

Various regions account for anticipated improvements in different ways.

For example, in California, emerging technologies are attributed an annual cost reduction factor to account for likely technological improvements, and their B/C hurdle rates are further lowered. In Nova Scotia, the same approach was taken in a potential study made public this month; in addition, that study also forecast improvements in performance of certain technologies (eg. LEDs) such that savings also grow over time; other efforts were also made to account for future unknown technology improvements. In Connecticut, meanwhile, identified savings are increased by a factor of 10% to account for unknown future improvements.

We provide references to each of these potential studies below:

- **Nova Scotia:** NAVIGANT, *Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study*, January 2014. I note that Dunsky was involved in developing the methodology for this study.
- **Connecticut:** KEMA. *Connecticut Electric Residential, Commercial, and Industrial Energy Efficiency Potential Study – Final Report*, April 2010. Use of the 10% adder for IRP purposes is also confirmed in CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION, *2012 Integrated Resource Plan for Connecticut, appendix C*, June 2012.

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- **California:** NAVIGANT. *2013 California Energy Efficiency Potential and Goals Study - Revised Draft Report*, November 2013.

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