
MH/NCN/TREE RCM -NFAAT III-1

REFERENCE:

TORRIE SMITH ASSOCIATES REPORT ON REVIEW OF THE NEED FOR AND ALTERNATIVES TO THE PROPOSED PROJECTS, SECTION 4, PAGE 8 LINES 2-3:

QUESTION:

Please provide the economic analysis that supports the statement that distributed generation (DG) resources could be put in place that would “**achieve or exceed*** the export revenues that Wuskwatim Advancement is predicted to achieve”.

*Emphasis added

RESPONSE

The question reflects a misreading of the referenced passage. Here is the entire paragraph from “Section 4” from which the quote is taken, with the passage quoted in the interrogatory in italics:

“In the context of the particular focus of TREE and RCM – demand side investment and distributed generation – a consideration of these options as alternatives to Wuskwatim Advancement would have included, as a minimum, a comparative assessment of how much DSM/DG resource could be put in place with the investment that is earmarked for Wuskwatim and/or the alternative of mobilizing sufficient DSM/DG resources to *achieve or exceed the export revenues that that Wuskwatim Advancement is predicted to achieve*, and/or an integrated least cost analysis of the optimum investment strategy for minimizing surplus interconnection capability between now and 2020. The alternatives analysis would include the comparative impacts on cash flow and business risk, quantification of the benefits that results from the ability of the DSM/DG resource to deliver results much sooner than Wuskwatim Advancement, identification and quantification of other DSM/DG benefits including the immediate protection it provides against drought, and in general an assessment of what it would take to deliver with DSM and DG what Wuskwatim Advancement would deliver.”

The point of this paragraph was to describe the types of questions that the proponents (MH/NCN) should have but failed to address in the context of the need for and alternatives to Wuskwatim advancement.

MH/NCN/ TREE RCM -NFAAT III-2**REFERENCE:**

TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 5, PAGE 8, LINES 14-15
“MANITOBA HYDRO HAS NOT SYSTEMATICALLY IDENTIFIED AND ANALYZED ALTERNATIVES TO WUSKWATIM ADVANCEMENT”:

QUESTION:

Manitoba Hydro has performed the economic analyses listed in the table below with corresponding impacts on the Wuskwatim Advancement IRR as indicated. Given that the medium-low load growth sensitivity, representing approximately 5x DSM, resulted in an IRR reduction of only 0.3%, please identify and substantiate the additional amounts of DSM, DG and/or other resource alternatives (separate or combined) that would need to be developed to render Wuskwatim Advancement uneconomic.

RESPONSE:

The reference is to a statement that Manitoba Hydro has not systematically identified and analyzed alternatives to Wuskwatim Advancement, but the question is about something else altogether, namely the position taken by Manitoba Hydro that Wuskwatim Advancement would remain economic under various assumptions about DSM and load growth.

With regard to the referenced statement, arguing that the internal rate of return of advancing the Wuskwatim dam does not significantly change under particular assumptions about load growth or DSM is no substitute for identifying and analyzing alternative ways of achieving the purpose that Manitoba Hydro hopes to achieve by advancing the dam. This goes to the heart of the very concept of the “need for and alternatives to” the undertaking in environmental assessment. Although it is not stated as clearly as it could have been in Manitoba Hydro’s NFAAT evidence, it would appear that the central argument or “need” for Wuskwatim Advancement is to take advantage of the opportunity to export power into the relatively high-priced export market for peak power.

Although Wuskwatim can contribute nothing to this objective until 2010 or later, it is argued that if it could be built by 2010 there would be a ten year window (before it would be needed domestically, according to Manitoba Hydro’s load forecast) when its output could be sold profitably into the peak export market, and that the revenues from those sales would cover the incrementally higher present value of building it for 2010 rather than 2020, and do so with a 10% internal rate of return.

In terms of alternatives to the project, the question that should have been considered in Manitoba Hydro’s evidence is what other strategies might be employed for achieving the same basic objective as Wuskwatim Advancement. For example, various scenarios that combined distributed generation and DSM (which can begin contributing immediately, without waiting to

2010) could have been considered, with and without Wuskwatim coming on at different dates. A thorough analysis of the costs, benefits and risks of such alternatives (under different scenarios of economic growth, export prices, etc.) would have constituted a “systematic identification and analysis of alternatives to Wuskwatim Advancement” and may very well have shown that there are less risky approaches that can equal or surpass Wuskwatim Advancement in meeting the utility’s basic objectives between now and 2020. Instead, Manitoba Hydro does not plan to have an updated DSM strategy, much less an integrated analysis of alternatives to Wuskwatim, until well after it hopes to be building the dam.

On the smaller point raised by the interrogatory, that Wuskwatim Advancement’s IRR is not dramatically affected by increased DSM or lower load growth, this is an interesting curiosity although not of much relevance to the NFAAT question. The internal rate of return of Wuskwatim Advancement is, by definition, determined by the present value of the incremental costs of building it for 2010 instead of for the domestic need date, and the present value of the stream of export revenues it can earn before the domestic need date (at which point it no longer can serve the export market). In Manitoba Hydro’s main case, the domestic need date is 2020 and the economics of Wuskwatim Advancement are determined by the period from now until then. As the demand goes down, either because of more DSM or lower load growth, the domestic need date retreats into the future, which increases the differential present value of advancing it to 2010. At the same time, however, the period of time during which the dam can earn export revenue is also extended from 2010 to whatever the new need date is, and this increases the present value of the export revenues available to offset the incremental cost of advancing the construction. In the case of the Medium Low forecast example cited in the question, the economics of Wuskwatim Advancement cover the period from now until 2035 at which time the calculated rate of return of Wuskwatim Advancement would be in the same range as the case where Advancement only covers the period to 2020.

I also believe that Manitoba Hydro has underestimated the risk that the amount of power available for export will be greater than what can be sold into the high priced peak export market, particularly during the 2010-2020 period, and by an amount that will be significant when compared to the output of Wuskwatim. The Clean Environment Commission should seriously consider such scenarios and the resulting impacts on export revenue from Wuskwatim, the value of DSM, and the domestic price of electricity. The most likely reason for such scenarios to come about is not so much the prospect of low economic growth, but of economic growth that requires much less electricity per dollar of GDP than has been the case in the past in Manitoba. There is a serious weakness in Manitoba Hydro’s load forecasting and analytical capacity in this area, but it should at least be possible to analyze the contingency risk. This is the type of contingency that would have been identified if alternatives to Wuskwatim had been seriously considered by Manitoba Hydro, as one of the great advantages of DSM and distributed generation is their ability to protect utilities against this type of risk (see CNF/TREE/RCM I NFAAT 5).

MH/NCN/ TREE RCM -NFAAT III-3

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 12, PAGE 16:

QUESTION:

Torrie Smith Associates state that there are economic benefits associated with the DSM/DG resource that are not captured in the 6.15 cents/kW.hour evaluation. Please specify which economic benefits are not captured in the 6.15 cents/kW.h evaluation and for each economic benefit identified, specify the associated value in cents/kW.h. Please provide complete supporting documentation and calculations.

RESPONSE:

This issue is addressed in CNF/TREE/RCM I NFAAT – 5. To determine the value of these benefits, many of which are associated with the synergistic impact of a DSM and distributed generation, and not with individual measures and technologies, Manitoba Hydro would need to produce comprehensive and integrated scenarios of the future Manitoba electricity supply and demand balance, and measure the differential costs and benefits of scenarios with differing contributions from end use technology, centralized supply and distributed generation in meeting the underlying demand for end use services.

MH/NCN/ TREE RCM -NFAAT III-4

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 12, PAGE 16, LINES 8-9:

QUESTION:

Torrie Smith Associates state that they believe Manitoba Hydro's consultants have failed to identify DSM technologies that are economic.

- a) Please list all economic technologies by sector (Residential, Commercial, Industrial/Agricultural) that have not been identified in the Manitoba Hydro DSM Market Potential Study 2003, given the 6.15 cents/kW.h threshold. Please include the Cost of Conserved Energy in cents/kW.h and documentation supporting this calculation for each technology identified.
- b) Please specify, in GWh and MW, the impact of these technologies on the forecast of Economic Potential for DSM in Manitoba.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 6 for our review of the DSM Market Potential Study, as well as to CNF/TREE/RCM I NFAAT – 9 for our estimate by sector of DSM potential. CNF/TREE/RCM I NFAAT – 5 provides additional reasons why we believe the CCE approach is too narrowly focused to capture the full economic potential for DSM.

MH/NCN/ TREE RCM -NFAAT III-5**REFERENCE:**

TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO
ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 12, PAGE
16, LINES 11-13:

QUESTION:

- a) Please list all opportunities in Manitoba for “cost-tunneling” by sector.
- b) Please include a list of technologies included within these opportunities and the Cost of Conserved Energy in cents/kW.h for each opportunity/situation and provide full documentation supporting this calculation.
- c) Please specify, in GWh. and MW, the impact of “cost-tunneling” on the forecast of Economic Potential in Manitoba.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 6 for our review of the DSM Market Potential Study, including reference to the “cost tunneling” factor.

MH/NCN/ TREE RCM -NFAAT III-6**REFERENCE:**

TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 13, PAGE 16, LINES 15-19 AND PAGE 17, LINES 1-2:

QUESTION:

a) Please list all economic technologies by sector (Residential, Commercial, Industrial/Agricultural) “that have been identified by the consultants as being economic” that Torrie Smith Associates believe have not been included in the roll-up analysis of the total amount of DSM that is economic. Please provide full supporting documentation.

b) Please specify, in GWh and MW, the impact of these technologies on the forecast of Economic Potential for DSM in Manitoba.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 6 for our review of the DSM Market Potential Study, including reference to the “roll-up” factor.

MH/NCN/ TREE RCM -NFAAT III-7**REFERENCE:**

TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO
ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 13, PAGE
16, LINES 24-26:

QUESTION:

- a) Please detail Torrie Smith Associates' assumptions and methods that differ from those presented in the individual sector DSM reports.
- b) Please detail how Torrie Smith Associates' assumptions differ from those presented in the individual sector DSM reports and provide full documentation supporting the assumptions and methods.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 6 for our review of the DSM Market Potential Study, as well as to CNF/TREE/RCM I NFAAT – 9 for our estimate by sector of DSM potential. CNF/TREE/RCM I NFAAT – 5 provides additional reasons why we believe the CCE approach is too narrowly focused to capture the full economic potential for DSM.

MH/NCN/ TREE RCM -NFAAT III-8**REFERENCE:**

TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO
ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 14, PAGE
17, LINES 8:

QUESTION:

Please provide full details of Torrie Smith Associates' "modified load forecast", including the yearly MW and GWh values as well as the assumptions used in deriving the forecast with specific documentation on all assumptions that differ from Manitoba Hydro's forecast, including the specific impact of each different assumption.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 4 (as revised to reflect the Manitoba Hydro corrections to the industrial sector DSM Market Potential Study provided in Undertaking MH-34) for a description of the adjusted Basic Forecast.

MH/NCN/ TREE RCM -NFAAT III-9

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 14, PAGE 17, LINES 16-17:

QUESTION:

Please provide the detailed scenario of economic DSM and DG potential mentioned, including: a forecast of GWh and MW savings for 2007/08, 2012/13, and 2017/18 excluding the adjustments to the baseline; a list of technologies included and identify which ones were not included by the consultants; and costs and investments.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 9 for a description of our estimate of the economic potential for DSM and how it differs from that presented by Manitoba Hydro.

MH/NCN/ TREE RCM -NFAAT III-10

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 15, PAGE 17, LINES 22-28:

QUESTION:

As Manitoba Hydro's market potential study for DSM does not include any analysis of utility investment, please explain your basis for concluding that Manitoba Hydro is using the Rate Impact Measure Test (RIM) to define an upper limit for Achievable Potential.

RESPONSE

The sentence which is referenced is as follows:

“The Rate Impact Measures (RIM) test is used to define an upper limit to the DSM measures that are admitted to their (MH) program, thus ensuring that the approved program does not even approach 'all economic opportunities', even as underestimated by their own consultants.”

The sentence does not state and it was not intended to imply that the DSM Market Potential Study used the RIM test in any way. Rather the point being made here is that the upper limit to measures that are admitted to Manitoba Hydro's Power Smart DSM programs is for practical purposes determined by the RIM test, and that the RIM test is a more restrictive test than whether or not a measure is economic.

MH/NCN/ TREE RCM -NFAAT III-11

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 19, PAGE 20 LINES 12-16:

QUESTION:

- a) Please describe the aggressive Market Achievable DSM and DG scenario.
- b) Please identify the GWh and MW savings achievable for DSM by sector for 2007/08, 2012/13, and 2017/18 under this scenario, including a detailed outline of the technologies and the investment required to achieve the projected energy savings. Provide full supporting documentation and calculations.
- c) Please identify the GWh and MW to be provided by DG under this scenario, including an outline of the generation sources and technologies and the investment required. Provide full supporting documentation and calculations.
- d) Please provide the rate impacts of the proposed DSM and DG scenario.
- e) Please indicate the expected bill increase impacts for customers who are unable to participate in any of the proposed DSM programs and would not see any benefits from load reduction.

RESPONSE:

Please refer to CNF/TREE/RCM I NFAAT – 13 for a description of a number of possible alternatives to Wuskwatim Advancement.

The scenarios presented in CNF/TREE/RCM I NFAAT – 13 constitute the types of alternatives to Wuskwatim Advancement that should have been, and still should be, identified and analyzed by Manitoba Hydro with respect to their overall rate and financial impacts, risk factors and other costs and benefits. The rate impacts that would result from the DSM and DG components of these scenarios would depend on the export price assumptions and on whether or not the utility was in a position where it had more energy available for export than it could sell into the high priced peak market, a situation which the advancement of Wuskwatim could very well exacerbate.

MH/NCN/ TREE RCM -NFAAT III-12

REFERENCE: TORRIE SMITH ASSOCIATES REPORT ON ALTERNATIVES TO ADVANCEMENT OF THE WUSKWATIM GENERATING STATION, SECTION 21, PAGE 21, LINES 13-15

QUESTION:

Please provide the basis for the statement “Northern and First Nation employment levels achieved by Wuskwatim Advancement could be surpassed in a DSM/DG scenario, and lead to versatile skills that could form the basis of sustainable economic activities in Northern communities”, relative to what can be achieved under the Wuskwatim Advancement Scenario combined with Manitoba Hydro’s commitment to pursue additional DSM GWh and MW savings.

RESPONSE:

Manitoba Hydro estimates that the portion of Wuskwatim spending that remains in Canada will create 9,830 person-years of employment, of which only 58% will be in Manitoba, 11% will be in northern Manitoba and 6% will go to Aboriginal people. In terms of the total investment Manitoba will make in Wuskwatim, this works out to about 15 person-years of employment in Canada per million dollars invested; counting only the jobs created for Manitobans, it works out to about 9 person-years (direct and indirect) per million dollars invested. These are “expensive” jobs. Investments in energy efficiency create from 50% to 500% more employment per dollar than investments in hydroelectric megaprojects, partly due to the extremely low labor intensity of power plant investments compared to investments in energy efficiency, and partly due to the employment multipliers associated with the savings in fuel and electricity bills that result from the DSM activity.¹

Beyond the simple metric of jobs created per dollar invested, there is also a marked difference between DSM and power plants when it comes to the distribution of the generated employment. With power plant investments like Wuskwatim, (or like sodium chlorate plants for that matter), the employment per dollar invested is low and what jobs are created are concentrated over the construction period for the plant and they are concentrated where the power plant will be built and where its major components will be built. Once the plant is complete, the sustained employment level is relatively small. In contrast, the end use orientation of DSM investment means that the jobs get created wherever fuel and electricity get used, and wherever the savings get spent. This results in a wide and even distribution of job creation, not only in geographical

¹ See for example, Mark Jaccard and David Sims, “Employment Effects of Electricity Conservation: The Case of British Columbia”, *Energy Studies Review*, Vol 3:1, pp 35-44, 1991; Howard Geller, J. DeCicco and S. Laitner, *Energy Efficiency and Job Creation: The Employment and Income Benefits from Investing in Energy Conserving Technologies*, ACEEE, Washington D.C., October 1992; Ian Goodman et. al., “Employment Effects of Electricity Provision in Quebec: The Great Whale Hydroelectric Project and the Electricity Efficiency Alternative”, Grand Council of the Cree of Québec, June 1992; Robin Skinner et. al., “Employment Impacts of Energy Efficiency: Literature Review and Implications to Newfoundland”, prepared by Torrie Smith Associates for The Innu Nation, June 1993.

terms but also in terms of the spectrum of semi-skilled, skilled and highly skilled and professional vocations required to deliver the DSM products and services.

In terms of community development, energy conservation and renewable energy were recognized over twenty years ago as effective strategies for sustained community economic development, including in remote and Native communities.² There is now a thriving branch of community economic development that is largely based on the development and implementation of community energy strategies³. DSM/DG oriented strategies are potent catalysts for autonomous local development because of the multitude of economic and social benefits they deliver – local job creation over a diversity of skills, recirculation of dollars that formerly left the community for imported energy, increased local autonomy, and environmental and community improvement. Unlike power plant megaprojects, these strategies have their origins in the needs of the local community for sustained economic and community development.

² See for example the web site of the North American Renewable Energy Education Project (NAREEP) at <http://eetd.lbl.gov/nareep> and the publications available there, including John Busch et. al., Native Power: A Handbook on Renewable Energy and Energy Efficiency for Native American Communities, NAREEP, January 1998.

³ For an entry point into the burgeoning information base on economic renewal strategies that are based on energy and environmental investments, see the web site of the Economic Renewal program of the Rocky Mountain Institute (<http://www.rmi.org/sitepages/pid356.php>) or the web site of the Institute for Local Self-Reliance (www.ilsr.org), or the energy-based economic development strategies of Minnesotans for an Energy Efficiency Economy at <http://www.me3.org>. Also, see R. D. Torrie, "Environmental Improvement Through Urban Energy Management: A Canadian Overview", Canada Mortgage and Housing, Ottawa, August 1994; Mark Roseland, Toward Sustainable Communities: A Resource Book for Municipal and Local Governments, National Round Table on the Environment and the Economy (NRTEE), Ottawa, 1992; Global Cities Project, "Building Sustainable Communities, An Environmental Guide for Local Government", Center for the Study of Law and Politics, May 1993; Rocky Mountain Institute, Community Energy Workbook – A Guide to Building a Sustainable Economy, Alice Hubbard and Clay, 1995.