

**Closing Statement from TREE and RCM Regarding the  
Need for and Alternatives to Wuskwatim Advancement**

June 8, 2004

**The purpose of our intervention**

Time to Respect Earth's Ecosystems (TREE) and Resource Conservation Manitoba (RCM) are non-government organizations committed to the advancement of a more sustainable society in which our planet's natural endowments of living and non-living systems and resources are valued, respected and conserved. Recognizing that this natural legacy is finite and subject to degradation and depletion, we promote eco-efficiency – improving the ratio of social benefits to environmental harms and resource depletion – as an essential pillar of a sustainable society.

In our presentation on May 13<sup>th</sup>, we argued that concern for the environment and long-run sustainability generate a social imperative *first* for energy conservation and efficiency measures and *second* for least-impact generation options.

We also noted that Canada's standing, relative to other OECD countries, in per capita energy consumption (27<sup>th</sup> out of 29, ranked from lowest to highest) and energy efficiency (28<sup>th</sup> out of 29, ranked from least to most energy used per dollar of GDP) indicates that we are global energy hogs. Canada's energy use is 50% higher than countries with similar climates, namely Sweden.<sup>1</sup> These figures intensify the conservation imperative and pose the question: To what extent is our socio-economic climate well-adapted to promote energy conservation?

High energy usage should provide a powerful incentive and opportunity for energy conservation, but we concluded on the basis of our experience in the 2002 Manitoba Hydro rate hearing before the PUB that Manitoba's poor showing is *not* simply owing to our physical climate and geography. Rather it is attributable in part to perverse economic incentives, inadequate conservation investments and regulations, and policy failures. To simplify somewhat, as a society, instead of looking at our high usage and asking, How can we achieve the same social benefits more efficiently, with less energy consumption?, we have asked instead, How can we keep rates low? To do this, we have been prepared to divert great sums of Manitoba's wealth in the form of foregone taxes and allocation of export earnings to subsidize domestic energy rates. Indeed, part of the Wuskwatim justification is to be able to maintain that subsidy in order to keep rates low.<sup>2</sup> Because low rates to consumers have trumped and, to some extent, replaced energy efficiency goals, it is no wonder that Canada's energy profile has continued to worsen relative to other OECD countries.

Despite the above shortcomings in application, we note more optimistically that in Manitoba the social imperative to conserve is enshrined in the Manitoba Hydro Act and the Sustainable Development Act, as we discuss in the next section. Thus TREE and RCM have intervened in these hearings in response to the social imperative and legal requirement to prioritize

<sup>1</sup> Peter Miller's May 13, 2004 testimony, p. 2, and <http://www.environmentalindicators.com/htdocs/>.

<sup>2</sup> MH NFAAT Vol. 1, Overview, p. 5, l. 5 ff.

conservation and least impact generation alternatives. Our determination to intervene was strengthened by consideration of Canada and Manitoba's poor showing in global comparisons and the failures in resource pricing and energy policies to promote conservation.

### **A legal framework for our intervention**<sup>3</sup>

Section 2 of *The Manitoba Hydro Act*, which provides the legal foundation for Manitoba Hydro, declares that:

The purposes and objects of this Act are to provide for the continuance of a supply of power adequate for the needs of the province, and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power . . . . [*underlining added*]

And Section 2 of *The Sustainable Development Act* states that:

The purpose of this Act is to create a framework through which sustainable development will be implemented in the provincial public sector and promoted in private industry and in society generally. [*underlining added*]

Section 1 of the Act specifies that a “**provincial public sector organization**” means . . .

a board, commission, association, or similar body whether incorporated or unincorporated, all the members of which, or all the members of the board of management, board of directors or other governing boards, of which are appointed by an Act of the Legislature or by the Lieutenant Governor in Council, to which this Act has been made applicable by regulation; [*underlining added*]

*The Sustainable Development Act*, therefore, clearly applies not only to Manitoba Hydro, but also to the Public Utilities Board and the Clean Environment Commission.

Appended to *The Sustainable Development Act* are principles and guidelines of sustainable development (Schedules A and B of the *Act*). Particularly relevant to the examination of alternatives to Wuskwatim in the current hearing is the first of the guidelines:

- 1 **Efficient Use of Resources** - which means
  - (a) encouraging and facilitating development and application of systems for proper resource pricing, demand management and resource allocation together with incentives to encourage efficient use of resources; and
  - (b) employing full-cost accounting to provide better information for decision makers.<sup>4</sup>

<sup>3</sup> Adapted from the legal arguments in TREE/RCM's Final Argument for the 2002 MH rate hearing before the PUB.

<sup>4</sup> Section 1 of *The Sustainable Development Act* defines some of these terms as follows:

“**demand management**” means measures implemented to influence the amount of resources consumers use, as well as how and when the resources are used;

The **Stewardship** principle expresses the notion of planning for the long run and promoting intergenerational equity:

- 2(1) The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations.
- 2(2) Manitobans are caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations.
- 2(3) Today's decisions are to be balanced with tomorrow's effects.

The principle of **Global Responsibility** directs that

- 7 Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision-making while developing comprehensive and equitable solutions to problems.

Together, these three principles imply that Manitoba Hydro's energy planning should be developed against a backdrop of *global long-run energy scenarios* that include analyses of resource availability, limits and constraints; environmental loadings and impacts; and socio-economic consequences of alternative paths that can be taken. Planning should identify the preferred sustainable futures to which the utility can contribute. Efficiency improvements will be a primary component of any preferred path.

Because ever-rising trends in energy consumption and production cause incremental harms and face global limits, a sustainable scenario must contemplate the leveling of and possible decline in available energy and thus in aggregate customer consumption. Hence we argued in our May 13 testimony that it is not too soon for Manitoba Hydro to sketch an end-game for the province once the hydro-electric potential of the Nelson is fully installed. Indeed 3,700 MW of the existing Nelson River capacity came on line in the short space of 16 years from 1974 to 1990<sup>5</sup>. A similar building binge, such as is currently contemplated by Manitoba Hydro and the provincial government, could come close to completing the job in a comparably short time.

For these reasons, alternative resource plans are to be assessed for their sustainability and eco-efficiency, i.e. achieving the greatest long-run human benefits with the least degradation of resources and the environment, both locally and globally. We also believe that conservation alternatives hold the best prospects for long-run economic stimulation and jobs and the improvement of Manitobans' homes, institutions and businesses.

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**“full-cost accounting”** means accounting for the economic, environmental, land use, human health, social and heritage costs and benefits of a particular decision or action to ensure no costs associated with the decision or action, including externalized costs, are left unaccounted for.

<sup>5</sup> Dates and capacities taken from [http://www.hydro.mb.ca/about\\_us/hydraulic\\_stations.shtml](http://www.hydro.mb.ca/about_us/hydraulic_stations.shtml)

## **Summary of TREE/RCM evidence, observations and conclusions**

To develop our intervention, we engaged Torrie Smith Associates (TSA) to help us with the analysis of Manitoba Hydro's case for advancing Wuskwatim through a consideration of the need for and alternatives to the project (NFAAT). In particular we wondered if a case could be made that more aggressive DSM programs and policies combined with distributed generation, including non-utility generation, might provide a viable alternative to Nisichawayasihk and Manitoba Hydro's Wuskwatim advancement project that would better satisfy the principles of sustainability. We also provided evidence from our 2002 intervention before the PUB on Manitoba Hydro rates.

Below, under several headings, we summarize our evidence, further observations, comments and conclusions in point form. We examine in turn: (1) NFAAT analysis and sustainability, (2) Load forecasting, (3) DSM and NUG analysis and programming, (4) Alternatives to Wuskwatim, and (5) Perverse incentives and subsidies.

### **NFAAT analysis and sustainability**

- Regardless of possible future energy requirements of Manitobans, Wuskwatim advancement is not needed at this time for domestic power supply, as indeed MH acknowledges.
- The "Need" for Wuskwatim advancement (as defined by MH and NCN) is to maintain, in the face of rising domestic consumption, sufficient electricity surplus to domestic use to supply the "estimated on-peak export market" of 10,500 GW.hours.
- Thus an NFAAT analysis of Wuskwatim advancement should examine, compare, and evaluate in some depth alternative portfolios containing conservation and generation options capable of meeting this need, some of which include Wuskwatim and some not.
- "Manitoba Hydro interprets 'alternatives to' to involve a demonstration that the project is more beneficial than other projects either similar in nature or significantly different but in all cases serving to meet the same need...."<sup>6</sup>
- Yet Manitoba Hydro has neither defined nor analyzed alternatives to Wuskwatim Advancement in its NFAAT filing and subsequent responses.<sup>7</sup>
- Sensitivity analyses to show that Wuskwatim is still viable under a range of assumptions is not a substitute for an NFAAT analysis that shows it is a preferred option or part of a preferred portfolio (TSA Feb. 10, p. 7).
- In the most recent Manitoba Hydro Rebuttal of TREE/RCM's interrogatory responses, there is considerable new information and analysis, but there is nothing new in the thinking or approach to the NFAAT question. No alternative strategies for meeting the objective of Wuskwatim Advancement are identified or analyzed, except to the extent the Rebuttal does contain comments on the one alternative to Wuskwatim that was put before the CEC, namely the TREE/RCM illustrative scenario.
- The identification and comparative analysis (including risk analysis) of such alternatives should be an important element of Manitoba Hydro's investment planning strategy, as well as the basis for the analysis of the need for and alternatives to Wuskwatim Advancement. What

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<sup>6</sup> CEC/MH/NCN I – NFAAT – 1a.

<sup>7</sup> TSA Feb. 10, p. 10

is needed is a proactive and thoughtful approach to the market, focused on the horizon, driven by the principles of sustainable development, and informed by a deep understanding of the business and technological possibilities on the demand side.

**Comment:**

We believe that this critique is essentially correct and is confirmed by the Econalysis testimony that MH failed to conduct an analysis of alternative portfolios, as described by the BC Utilities Commission. To these points we would add the importance of linking NFAAT analysis to principles of sustainability.

- Manitoba Hydro's planning, investments, and operations are, by law, subject to the principles and guidelines of conservation and sustainability, as elaborated above, so the NFAAT analysis should be well-grounded in these principles and guidelines.
  - In particular, an NFAAT analysis accompanied by a sustainability analysis should include longer range energy scenarios that address limits to global energy supplies, limits to Manitoba's hydroelectric capacity, and transitions from increasing energy consumption and production trends to a more sustainable containment of consumption within long-run sustainable supplies.
  - Manitoba Hydro conceives of Wuskwatim as the first in a series of dams to provide a succession of construction employment opportunities, which could rapidly use up remaining sites with hydroelectric potential on the Burntwood and Nelson rivers. Thus it is not too soon to ask Hydro to provide an end-game analysis for energy supply and demand when the feasible and economic potential is exhausted. The continuous growth in energy production and consumption is not a sustainable trajectory.
- Likewise the CEC review of Manitoba's planning and investment proposals are, by law, subject to the same principles and guidelines of sustainability.
- Hence, while the export of power is contemplated in the Manitoba Hydro Act, provision of power for export must adhere to the principles of sustainability.
  - The case for export would be stronger if the power were to be sold into jurisdictions likewise committed to sustainability, including adherence to the Kyoto protocol for GHG reduction. Otherwise there is a concern that the exported power might be incremental to unsustainable fossil fuel generation rather than displacing it.
  - Likewise the case for export would be stronger if Manitoba Hydro's increased export capacity was to be used to firm wind generation. Otherwise there is a concern that the exported power might displace wind generation in export markets rather than supporting this relatively low-impact technology. However the operational design of Wuskwatim precludes significant storage, and thus firming capacity, at this site.
  - In addition, the case for providing socio-economic benefits to Manitoba through export earnings would be stronger were the export earnings not to be used to subsidize the wastage of energy in Manitoba, which the current rate design and cost allocation methods encourage. For example, the largest customers pay only 1.975 cents/kw.h for incremental energy consumed as long as it does not add to demand ([http://www.hydro.mb.ca/your\\_service/er\\_monthly\\_rates.shtml#generallarge](http://www.hydro.mb.ca/your_service/er_monthly_rates.shtml#generallarge)). This is far from the marginal cost of new generation and transmission and of export earnings foregone and less than a third of the 6.15 cents/kw.h at which Manitoba Hydro values DSM savings.

## Load forecasting

- Manitoba Hydro adopts a forecasting approach to planning, which extrapolates the future on the basis of high level econometric trends, as opposed to a scenario approach based on end-use analyses under varying assumptions about changing relationships between trends and end-use variables. The very term “load forecasting” reflects the passive approach to electricity demand (something to be forecast, like the weather) that characterizes the traditional utility business culture.
- Ideally, load forecasting should be based upon scenario analyses with an end-use model. The electricity market is in a very dynamic state, and once stable relations between demographic and economic activity and electricity demand are changing rapidly. Business planning for sustainable development requires thinking about alternative futures -- backcasting rather than forecasting -- as a central element of investment planning strategies.
- The latter approach is to be preferred because it is less deterministic, provides a richer understanding of the factors affecting energy consumption and can guide energy service opportunities and DSM interventions.
- When Manitoba Hydro produces variations in the Load Forecast (e.g. Medium Low, Medium High), they do so by varying the underlying demographic and economic inputs to the forecast. They do not look at variations in the relationship between those inputs and the demand for electricity, even though these variations are of equal or greater importance to the economic input variables in determining the final demand for electricity.
- A basic prerequisite for improved electricity demand analysis at Manitoba Hydro is the development of a fully calibrated end use model of energy demand in Manitoba. It should be comprehensive, including all sectors and all fuels and electricity. It should be designed to support both strategic planning and scenario analysis and the development of integrated customer-focused marketing strategies.
- When one tries to create and calibrate an electricity end-use model to Manitoba Hydro’s forecast demand, unrealistic usage or activity assumptions are required to link forecast demand to the population and economic growth rates that Hydro employs. An adjusted forecast or “business-as-usual” scenario can be achieved by adjusting these linkages.
- The Rebuttal contains, for the first time from Manitoba Hydro, a detailed subsector breakdown of the 2002 Load Forecast. While this is the first step toward an end use analysis of the Load Forecast, and to the development of alternative scenarios of future electricity demand, Manitoba Hydro has not taken those next steps. Instead the subsector disaggregation is used only for a defense of the status quo – the same old approach to Load Forecasting and the same old assumptions about indefinite growth.
- There is nothing in Manitoba Hydro’s Rebuttal that refutes our conclusion that the 2002 General Service Mass Market Forecast (i.e. all commercial and industrial customers, except the Top Customer group) is relatively high, given the Economic Forecast that is driving it. Manitoba Hydro would have conceded this point if they had tried to do a complete end use calibration of this Forecast. They would have found, as we did, that the Load Forecast is high for the level of activity in the Economic Forecast. Unless commercial and institutional floor area suddenly starts growing faster than output, combined with a simultaneous reversal in the long term trend to higher electricity productivity in general manufacturing, the level of electricity demand in the 2002 Basic Forecast does not correspond to the demographic and economic growth assumptions that are driving it.

- One of the central reasons for presenting the adjusted load forecast was to illustrate the sensitivity of the final demand for electricity to changes in the assumed relationships between economic activity and electricity demand. While Manitoba Hydro's "Medium Low" forecast is driven by a fairly strongly negative economic projection, an equally low future demand for electricity could come about without assuming an economic slowdown, but by making a few modest (and we would argue justifiable) changes in the activity and energy intensities of the commercial and general manufacturing sectors. The point is not whether the particular assumptions made in our illustrative scenarios are precisely correct. The point is that any attempt to produce an end use calibration of Manitoba Hydro's Load Forecast will lead to the conclusion that the 2002 Load Forecast is relatively high for the level of economic activity assumed. This in turn leads to the conclusion that the size of the projected "export gap" that Manitoba Hydro has put forward as the underlying justification for Wuskwatim Advancement has been overstated.
- In the TREE/RCM analysis, quantification of DSM potential is done by adjusting a "business-as-usual" scenario of electricity demand disaggregated at both the subsector and end use level. This ensures that the DSM scenarios and the base case are mutually consistent, but it requires that the base case start from physically credible assumptions about the rate of building floor area growth relative to economic growth, and about the rate of output growth in general manufacturing industries as compared with overall output growth in manufacturing and industrial GDP.
- In this approach, the "adjustment in the load forecast" that results from the end use calibration is one of the contributors to scenarios of future electricity demand in which the "export gap" can be closed, without Wuskwatim Advancement. It is not the credibility of the precise numbers used in the TSA adjustment to the load forecast that are at issue here, but the more general conclusion that an end use calibration of the forecast indicates the need for a downward adjustment in the forecast so that it can provide a credible basis for DSM assessment, which is necessarily done at the end use level. The DSM Market Potential Study is not consistent with the 2002 Load Forecast, as acknowledged by Manitoba Hydro in their Rebuttal to the TREE/RCM Interrogatory Responses, and this is because the DSM Market Potential reference case is not tuned to the 2002 Load Forecast.
- The size of the adjustment can be debated but it is significant relative to "the export gap", as defined by Manitoba Hydro, under median water conditions. It is also important to note that any changes that result in a smaller adjustment to the forecast (i.e. a widening of the "export gap") also result in an increase in the economic DSM potential that offsets a significant portion of the assumed new electricity demand. A precise quantification of this important feedback would require a repeat of the TREE/RCM analysis, but the estimate of the overall DSM potential indicates that, at marginal demand, growth would be reduced by 25% or more after the application of economic DSM potential.
- Manitoba Hydro's "export gap" grows to about 1,500 GW.hour/year before the earliest date by which Wuskwatim could be brought on line, and grows to more than 3,500 GW.hour per year toward the end of the advancement period (2020). In the TREE/RCM illustrative scenarios, the load forecast adjustment reduces this gap by as much as two thirds or 2,400 GW.hours by 2020. A smaller adjustment might be appropriate and certainly should be investigated further, but the unadjusted 2002 Load Forecast is too high by hundreds of GW.hours per year.

**Comment:**

The load forecast is the most contentious and technical point of divergence between MH and TSA. Unfortunately we have been unable to resolve these difficulties. Mr. Torrie notes that MH's second rebuttal brings to bear new data subsequent to the integration of Winnipeg Hydro, and there also dubious mathematical methods and assumptions in the new material that are untested in the CEC process and which we are not in a position to thoroughly analyze.

**DSM analysis and programming**

- There are more technically feasible economic opportunities than MH has captured in its analysis of DSM economic potential, because (a) a higher threshold price than 6.15 cents/kW.h for conservation measures is warranted because of the ancillary benefits of DSM and (b) additional savings are cost-effective even at the 6.15 cents price.
- The large gap between the economic DSM potential and what MH deems to be achievable reflects a large pent-up opportunity for more aggressive state-of-the art DSM programming that could achieve several times the energy savings projected in the current resource plan (TSA Feb. 10, 18).
- Contrary to the implication in Manitoba Hydro's Rebuttal to TREE/RCM Interrogatories, the TREE/RCM analysis takes full account of the impact on DSM potential of adjustments to the "business as usual" or reference projection (the adjusted load forecast). Higher demand in the reference projection also means higher DSM potential, providing a dampening effect of load forecast adjustments.
- State-of-the-art or "third generation" DSM programming has the following features and is elaborated in CNF/RCM/TREE I NFAAT 10. Manitoba Hydro's DSM commitment is compared to leading North American utilities in CEC/TREE/RCM I NFAAT – 9. In their Rebuttal Manitoba Hydro argues that recent and projected increases in their DSM programming should be compared with the commitments made by other utilities in 2000 and earlier, but clearly comparisons will be more meaningful when data for the same years are compared, as we have done in /TREE/RCM I NFAAT – 9. The spending on DSM in the leading North American utilities has been steadily increasing, but the year 2000 was the most recent for which comprehensive comparative statistics were available.
- In the context of the "export gap" that grows to about 1500 GW.hour per year by 2010 and to 3,500 GW.hours per year by 2018, a 2X DSM scenario would reduce the gap by 500 GW.hours by 2010 and by nearly 700 GW.hours by 2018. A 3X DSM scenario would double these impacts to 1,000 GW.hours and 1,400 GW.hours in 2010 and 2018, respectively, and a 4X DSM scenario (still less than the economic potential) would contribute up to 1,500 GW.hours by 2010 and 2,000 GW.hours by 2018.
- The deployment of the maximum economic potential for electricity efficiency improvement is a fundamental prerequisite for any sustainable energy future. Yet Manitoba Hydro is seeking permits to expand on the supply side without committing to development of the full economic potential for DSM in Manitoba and without offering any formal assurances or convincing arguments that there could not be another ebb in the utility's commitment to DSM after the dam is under construction and more is known about the timelines of other developments in the power market. Even the incremental updating of the Power Smart plan is not scheduled for completion until later this summer.



- At the same time, the announcement of Efficiency Manitoba has introduced significant uncertainty with respect to the future structure of public investment, business organization, and delivery channels for DSM in Manitoba. For example, Efficiency Manitoba has a mandate to deliver an integrated program resource conservation and efficiency, and there are strong arguments for folding at least some aspects of the current Power Smart DSM program into this new approach. While this may be a desirable structure for public investment in DSM, the transition from Manitoba Hydro to Efficiency Manitoba holds the potential to be disruptive of DSM delivery capacity in the short term. In addition, long term business planning at Manitoba Hydro will be (or should be) profoundly influenced by the definition of the relationship between the utility and Efficiency Manitoba, and until that definition is made clear it represents an impediment to business planning for Manitoba Hydro.
- One approach to the problem of Manitoba Hydro's failure to specify the level of contribution of DSM or to explore scenarios for maintaining export capability with increased reliance on DSM would be simply to wait for that analysis to be done. If the update Power Smart program is on schedule for completion in August (itself a test of the seriousness of Manitoba Hydro's commitment), then it will soon be possible for the CEC to assess the quantitative role of DSM on the need for and alternatives to Wuskwatim Advancement. The DSM resource option could be protected from the downgrading it has received in the past from Manitoba Hydro by making Wuskwatim advancement conditional on a binding commitment to specified DSM investment and performance targets and timetables.
- In addition to the analysis of potential electricity savings and their costs, it is also important to examine the social aspects of DSM programming. These include the employment opportunities from energy retrofits, the changes in quality of life from living in an energy-efficient home rather than one that is cold and draughty, and the barriers to accessing DSM programming for various constituencies, including renters, northern Aboriginal communities and the poor. At present there is, in praxis, little or no power smart programming appropriate for First Nation communities and low income communities. Recent Hydro-funded research initiatives such as "Healthy Housing in West Broadway" are important first steps to examine these issues, but these need to guide much more extensive and appropriately tailored conservation opportunities for the poor. While Manitoba Hydro has several energy saving programs aimed at residential consumers, many of these programs are not effectively reaching community groups and low income earners in First Nation communities or inner city neighbourhoods.

**Comment on DSM programming:**

In its two rebuttals, MH has given the strongest defense of its programming that we have seen, far beyond the perfunctory treatment in the 2002 PUB hearing. We are pleased at the many new measures recently adopted or under consideration and hope that the momentum will not again be lost, as it was in the early 1990's. We are disappointed that, after all these years, so few houses are constructed to the cost-effective R2000 standard (less than 1%) and lament the many lost opportunities in new construction. Visible signs of longer range corporate (and provincial) commitment to DSM would be (1) an investment in training for the building trades to conduct retrofits comparable to the level of training investment for Wuskwatim and (2) an investment in innovation, design and demonstration for cost-effective conservation measures comparable to the engineering investment in Wuskwatim. We have not seen these signs yet.

Some elements of actions Manitoba Hydro could take that would improve the acceptance and utilization of DSM programs include:

- Increase what it pays for DSM resources up to the full cost or nearly the full cost, as it does for supply side resources.
- Redesign its business strategy, including its revenue base and its commodity pricing strategy, around the provision of least cost energy services. Abandon the RIM test in favour of a solution that focuses on the cost of service provision.
- Manage its supply/demand balance to maximize the revenue from export sales and minimize the risk of repeating the downturn in DSM activity of the mid 1990's
- Put Wuskwatim aside and concentrate on the development of a DSM/DG strategy for maintaining peak export capability while putting the province on a path to a sustainable energy future, which includes energy retrofit and powersmart training and programming, marketed to First Nation Communities.
- Adopt a customer-oriented business philosophy. Develop comprehensive solutions to customers end use needs for energy services, incorporating efficiency, gas and electricity in an integrated approach.
- Provide high levels of technical assistance, up to and including direct installation where appropriate
- Develop and maintain in-house databases and models of end use energy in Manitoba for use in scenario planning, market identification, and demand side program development.
- Form collaboratives with industry, NGO, government, First Nation communities and community groups to achieve common objectives.
- Actively support the development of a Manitoba wind energy industry
- Assist with the development of and advocate the adoption of minimum energy efficiency standards for buildings and equipment.

#### **Comment on NUG:**

Given the evidence presented before the Commission, including the recent licensing of 99 MW of wind capacity by Sequoia Energy, we do not think it unreasonable to contemplate five times that amount of wind and/or other NUG capacity (~ 500 MW) over the next decade.

- Note that Econalysis (CAC/MSOS), in recommending that MH leave it to the private sector to develop wind generation capacity, did not recommend against adding wind to the Manitoba system, but encouraged MH to create a wind development plan.
- Note too that Econalysis indicated that MH's corporate learning regarding wind generation would be valuable and could be accommodated through a joint venture arrangement with the private sector, which would reduce MH's risk exposure.
- Note too that both CAC/MSOS and MIPUG believe that non-wind NUG is possible from some industrial power users if the right incentives and policies were in place.

#### **Alternatives to Wuskwatim**

- As noted above, the "export gap" that Manitoba Hydro puts forward as a central justification for Wuskwatim Advancement grows to about 1,500 GW.hours by 2010 and to 3,500 GW.hours by 2018. The development of 250 MW of wind power by 2010 would narrow "the export gap" by 770 GW.hours per year, or by 1,540 GW.hours per year by 2018 with 500 MW of capacity. When combined with a load forecast adjustment (1,200 -2,400

GW.hours per year) and incremental DSM (700 to 2,000 GW.hours per year), the “gap narrowing” potential is in the range of 2,600 GW.hours to 6,000 GW.hours, compared to the gap itself at 3,500 GW.hours.

- In various combinations with each other and with the adjusted load forecast, a number of plausible resource portfolios exist to supply the estimated on-peak export market of 10,500 GW.hours during the period of Wuskwatim advancement *and before*. Clearly there exist plausible alternatives to Wuskwatim Advancement that have not been identified and analyzed in Manitoba Hydro’s proposal.
- These DSM/DG alternatives have a number of advantages over the construction of Wuskwatim, as summarized in CNF/TREE/RCM I NFAAT – 5, the value of which can only be properly assessed in an integrated scenario analysis. Of particular note in comparison to Wuskwatim Advancement is the ability of the DSM/DG-based scenarios to deliver results beginning immediately, as compared with the lengthy construction period for Wuskwatim, during which time it has only negative cash flow for the utility. Because of this the present value of the DSM/DG-based alternatives compares favourably with Wuskwatim Advancement, even at levels smaller than Wuskwatim’s output.
- TSA has identified a number of plausible alternatives to Wuskwatim advancement that need to be evaluated in a proper and thorough NFAAT analysis alongside Manitoba Hydro’s proposed resource plan that includes Wuskwatim. TSA has not provided that analysis but only demonstrated that plausible alternatives exist, while critiquing MH’s analyses.
- While there are no doubt weaknesses in the illustrative scenarios that TSA put forward, there is nothing in Manitoba Hydro’s Rebuttal that refutes the existence of plausible scenarios for Manitoba Hydro in which different combinations of demand trends, DSM and green power outperform the Wuskwatim investment. Sensitivity analysis of the Wuskwatim investment is no substitute for the identification and analysis of alternative strategies for meeting underlying business and sustainable development objectives.
- The information and analysis in Manitoba Hydro’s Rebuttal largely ignores the central point of the TREE/RCM illustrative scenarios, and instead focuses on criticisms of specific numbers in the scenarios, particularly with regard to the “adjusted load forecast”. The specific criticisms of the TREE/RCM illustrative scenarios in Manitoba Hydro’s Rebuttal should be viewed in the context of the larger issues mentioned above. Some of Manitoba Hydro’s criticisms are based on invalid methods (e.g. imputing a growth rate to a forecast by replacing its base year and calculating growth rates without re-analyzing all the dynamics) and misunderstanding of the TREE/RCM analysis (e.g. suggesting that a subsector disaggregation of the load forecast is similar to the exercise we conducted in developing an end use calibration). The information introduced in the Rebuttal on these matters comes too late for TREE/RCM to redo all of its analysis, and in any event it would be difficult to proceed without first fully examining the new material that Manitoba Hydro has produced.
- The models that TREE/RCM used for their scenario analysis take an integrated approach to the future demand for electricity, in which varying electricity intensities and differing levels of DSM are quantified together. This ensures that a change in an electricity intensity that lowers the future demand for electricity will automatically be taken into account when the future potential for DSM is calculated for that same end use. Changes in the “business as usual” electricity intensities or activity levels will always trump the impact of those changes on DSM potential. A kilowatt.hour of future demand is typically only reduced by DSM

measures, whereas it is eliminated altogether by lower activity intensities or electricity intensities.

**Comment:**

The readjustment of Mr. Torrie's baseline for his reference scenario may reduce somewhat the surpluses achievable for export from the original estimations in CNF/TREE/RCM I NFAAT – 13. There is a need to re-estimate these, which we are unable to do. TREE/RCM Undertakings 84 and 85 illustrate a possible adjustment downwards of the existing resources after subtracting 400 GW.hours from the baseline in TSA's original adjusted forecast. To these declining existing resources available for export would be added various amounts and combinations of wind and DSM to achieve the alternative scenarios.

**Perverse incentives and subsidies**

Our 2002 PUB intervention was initiated when we asked what are the implications of low electricity rates in Manitoba for energy conservation, given the general economic principle that lower costs of a product tend to increase its consumption? We sought to explore rate options that were more favorable to conservation and proposed an inverted rate for the residential sector. The PUB ordered that Hydro study inverted rates for all customer classes.

In our view, there are a number of factors that depress Manitoba's rates, such as those identified in our response to CAC/MSOS/TREE/RCM I – NFAAT – 8. We argued that current methods of allocating costs and the system export dividend, which are the foundation for rate-setting, are both inefficient and inequitable.

- They are energy inefficient because low-cost power encourages wastage and reduces the incentive to conserve. (This principle was uncontested at the hearings.)
- They are environmentally inefficient, because the wasted energy is unavailable to displace GHG-producing fossil fuel generation elsewhere on the continental grid, thus adding to the global environmental costs of North American electricity.
- They are economically inefficient, because (a) wasted energy is non-productive and (b) using the system export dividend to subsidize inefficient consumption makes the dividend unavailable for more productive investments (including conservation investments that would reduce both energy wastage and customer bills and increase the system export dividend to Manitoba).
- They are inequitable, because higher consuming customers grab more than their share of both (a) the benefits of low-cost resources in the system, such as Winnipeg River generation, and (b) the export dividend earned by a crown corporation and resource belonging to us all.

The point of these conclusions for the Wuskwatim hearing is that, as a part of a concerted effort to adhere to principles of sustainability and the Manitoba Hydro legislated mandate to promote efficient production, distribution and end-use of its product, we have to stop subsidizing the wastage of energy and promote the preferred alternative to Wuskwatim of energy conservation.

It is possible to stop subsidizing wastage of energy while still trying to reduce customer energy costs. Two principle ways of doing this are to redirect subsidies (a) from rates to conservation

measures, and (b) from tailblock rates to initial block rates and fixed charges. It is thus possible to do this in a revenue-neutral way that will lower the bills of conservers, raise the bills of larger consumers, bring tailblock rates closer to the marginal cost of energy and thus increase the incentives and cost-effectiveness to consumers of conservation measures.

We are currently pursuing these matters before the PUB as it examines Manitoba Hydro's 2004 General Rate Application.

## **Recommendations**

In conclusion we make the following recommendations.

### **General**

1. Insure that the principles and guidelines of sustainability are integral to the Manitoba Hydro mandate in all resource planning and operations. These should guide the formulation of corporate and program goals, strategic planning, investments, and performance measures.
  - a) This should lead to an examination of long-range global energy futures and Manitoba Hydro's role and responsibilities in contributing to the more sustainable of these.
  - b) In particular, Manitoba Hydro should address the challenge of converting ever-rising consumption and production trends to a course that reflects the limits of renewable and non-renewable energy supplies.
2. The NFAAT exercise, which Manitoba Hydro failed to conduct for these hearings, should become an integral part of resource planning, whether or not it must be defended in a formal hearing.
3. Proper resource planning requires appropriate models and databases with as much end-use data for various energy sources as possible to integrate forecasting and scenario creation, strategic planning, DSM programming, and sustainability review.
4. Manitoba Hydro should continue its recent development of initiatives to create state-of-the-art DSM programming with more ambitious targets that reflect the urgency of getting rising consumption trends under control and generate the accompanying social and economic co-benefits.
5. Manitoba Hydro should also create a detailed wind and NUG development plan with appropriate policies and incentives attractive to potential investors, as recommended by CAC/MSOS.
6. As noted in earlier testimony, one feature of the Wuskwatim project that RCM and TREE applaud is the partnership with Nisichawayasihk Cree Nation (NCN). Past hydroelectric projects, which benefited southern communities with energy, had disproportionate negative impacts on northern Aboriginal communities and ecosystems located near projects. A

partnership that exercises greater care over local ecosystems and promises a share in the dividends is certainly an improvement over the past.

At the same time, we note that partnership in dam building is a divisive issue within and between Aboriginal communities. We believe that partnerships and training opportunities built around community building and conservation projects provide an alternative, and less divisive, foundation for community development and improved relations. In any case there is a need for more effective targeted programming to benefit a variety of customers who are unable to avail themselves of current DSM programming.

7. Finally, it is important to stop subsidizing the waste of energy in Manitoba. Proper resource pricing and incentives are an integral part of sustainability strategies, which have not yet penetrated deeply into energy policy in Manitoba.

### **Wuskwatim**

There is still much unfinished business before Wuskwatim could proceed, even if it were approved by the CEC. There is need for further collar data on the caribou range in areas potentially affected by the dam and transmission corridors. There are needed consultations and negotiations with a variety of affected communities, including those centered at South Indian Lake and the Manitoba Metis. There is still a need for NCN to decide if they wish to proceed. and the federal and provincial governments must complete their constitutionally required consultations with affected Aboriginal peoples.

TREE and RCM evidence and arguments (and those of CAC/MSOS as well) have also indicated deficiencies in resource planning and the absence of a proper NFAAT analysis. Thus our position is that while the unfinished business in consultation and environmental assessment is being completed, the unfinished business in resource planning and NFAAT analysis should also be done and reviewed by the CEC later this year. The analysis should incorporate as many of the elements of recommendations 1-7 as possible and update the planning of additional transmission and intertie capacity..

## APPENDIX

### Other Comments on Manitoba Hydro's Rebuttal to TREE/RCM Evidence and Interrogatory Responses

Manitoba Hydro issued two rebuttals to TREE/RCM evidence. Because the first rebuttal was issued before TSA were able to assemble their interrogatory responses, the latter were able to take some account of the first rebuttal in those responses. However issues related to load forecasting and DSM programming were raised again in the second rebuttal.

Most of the points raised by TREE/RCM in their evidence and Interrogatory Response remain unchallenged in Manitoba Hydro's Rebuttals, and as indicated above, the points that are made in the Rebuttals avoid the central conclusion of the TREE/RCM review of Manitoba Hydro's evidence: that there are reasonable and plausible alternatives to Wuskwatim Advancement but Manitoba Hydro has not identified and analyzed them in a proper assessment of the need for and alternatives to Wuskwatim.

The following are some additional observations and responses to Manitoba Hydro's Rebuttal to the TREE/RCM Interrogatory Responses, made without introducing new information.

#### **From p.2 of the MH Rebuttal:**

*In response CEC/TREE/RCM NFAAT – 1, TREE/RCM state that “Manitoba Hydro has not demonstrated that Wuskwatim needs to be developed for a 2009/10 in-service date in order to fulfill its mandate to export power. Advancing Wuskwatim to 2009/10 is not the only way ... to take full advantage of the export market.” Contrary to this assertion, in Chapter 4 “Resource Options” and Attachment 2 “Generation Technology Review” of the CEC NFAAT submission as well as in analyses and previous reports submitted as part of the CEC interrogatory process, there is considerable examination of a number of various ways that power could be delivered to the export market.*

#### *Response:*

The rebuttal is not responsive to the point being made. Of course there are various ways that power can be delivered to the export market. Our criticism of Manitoba Hydro's evidence in this regard is that alternative strategies and scenarios for “taking full advantage of the export market” were not identified and compared to Wuskwatim Advancement. There was no NFAAT analysis.

#### **From p. 2 of the Manitoba Hydro Rebuttal:**

*The argument of creating a package of DSM/DG to compare to Wuskwatim lacks economic soundness as DSM, DG and Wuskwatim are all independent projects. This means that DG can be compared directly to Wuskwatim. There is no more*

*rationale to create a package of DSM and DG than there is to create an equivalent package of DSM and Wuskwatim.*

*Response:*

Again, Manitoba Hydro's rebuttal point here reflects a lack of understanding of the nature of NFAAT analysis. The unsupported (and somewhat nonsensical) assertion that creating a package of DSM/DG to compare to Wuskwatim lacks economic soundness has nothing to do with whether DSM, DG and Wuskwatim are independent projects. It is the different ways these resources could be combined to maintain export capability that should have been the focus of Manitoba Hydro's NFAAT case. This criticism is supported by the testimony of the CAC/MSOS experts on the nature of and need for portfolio analysis in a NFAAT analysis for Wuskwatim Advancement.

**From p. 3 of Manitoba Hydro's Rebuttal:**

*Additionally, in CNF/TREE/RCM I – NFAAT – 5, TREE/RCM state that one of the benefits of DSM and distributed generation is shorter lead times which can improve cash flow by starting to earn revenue sooner – through operational revenue earning or regulatory rate-basing as soon as each module is built - rather than waiting for the entire total capacity to be completed. We recognize this is true for some DSM opportunities such as energy efficient commercial lighting upgrades. However, it is widely acknowledged that scaling up the manpower, institutional and financial capacity to create energy efficiency savings within other technology markets such as residential building retrofits, can take a considerable amount of time (12 to 20 years) even with aggressive implementation rates.*

*Response:*

Manitoba Hydro has already had more than twelve years to put a DSM delivery capability in place.

**From p.5 of Manitoba Hydro's Rebuttal:**

*Although TREE/RCM characterizes Manitoba Hydro's DSM program as "on-again, off again", in reality, Manitoba Hydro was simply exercising sound business practices and being a leader in promoting energy conservation. It is interesting to note that during this fourteen year period, Manitoba Hydro exercised the same strategy twice (during the early 1990s and early 2000s); both times to pursue export opportunities through a combined resource strategy involving both the construction of new hydraulic generation and pursuing energy conservation in an aggressive manner. This strategy realizes benefits to its domestic customers through lower rates and lower bills and also contributes to meeting the Corporation's environmental goals.*



*Response:*

Manitoba Hydro simultaneously argues that DSM and Wuskwatim are independent projects with no impacts on each other, but then uses these historical examples of how supply side and DSM strategies are inextricably linked to defend their on-again off-again commitment to DSM. Even during the CEC hearings Manitoba Hydro acknowledged that updating of the Power Smart plan has been delayed by the diversion of resources to the Wuskwatim Advancement application. Manitoba Hydro's repeated assertions that DSM and Wuskwatim are essentially independent opportunities that are not affected by each other's timing or rate of deployment flies in the face of historical experience, common sense and the utility's own evidence.

**From p. 5 of the Rebuttal:**

Manitoba Hydro argues that its DSM program should be compared with other North American utilities by comparing their spending in 2000/01 with Manitoba Hydro's spending in 2003/04.

*Response:* Surely comparisons should be based on spending by different utilities in the same years and over the same periods, as is done in the TREE/RCM evidence. The utilities in the ACEEE database on which the comparison's in the TREE/RCM are based have been steadily increasing their DSM spending, but the 2000/01 is the most recent year for which comprehensive data have been compiled to support North America-wide comparisons.

From pp. 12-15 of the Rebuttal, Manitoba offers a number of "observations" with respect to the TREE/RCM criticism of the DSM Market Potential Study contained in CNF/TREE/RCM I NFAAT – 6. Most of these observations either do not challenge the conclusion of the TREE/RCM analysis, or they challenge secondary aspects of that analysis while leaving the main point unchallenged.

For example, in response to "Observation #1" (p. 12), Manitoba Hydro states that it was beyond the scope of the DSM Market Potential Study to review the energy savings potential associated with fuels other than electricity. But this was not the point; the point was that even the all-electric buildings that were included in the analysis exhibit very modest whole building energy improvements (although this is masked by the abstract segment-wide numbers presented in the DSM Market Potential Study), and that even in natural gas heated buildings, there will be electricity demand impacts from building envelope measures that will add up to a significant amount in a province where most buildings are heated with gas.

In response to "Observation #2" (p. 12) Manitoba Hydro points out that air sealing was including in new buildings, but there is no indication of whether it was integrated into the existing building analysis.

In response to "Observation #3" on cost tunneling, it would appear that consideration of the impact on cost tunneling was restricted to electric heated buildings, thus missing the bulk of the potential which exists in the form of the reduced electricity requirements that result from state-of-the art envelope and building design in gas heated buildings.

In response to “Observation #8”, Manitoba Hydro concedes that the decision not to include integrated lighting systems in any building types other than offices was not the result of an economic analysis but of a prejudged and weakly supported assumption that it would not be feasible in other building types..

### **General Comments on the Load Forecasting Section of the Rebuttal (pp. 17 ff.)**

The “Load Forecast” section of Manitoba Hydro’s Rebuttal to TREE/RCM contains a great deal of new information and analysis that should have been part of the utility’s original submissions, and that would have benefited from cross examination. For example, among the elements of this analysis that had not been presented to CEC earlier there is a disaggregation of the General Service Mass Market forecast into commercial and industrial segments, a sector breakdown of the electricity consumption and forecast of the former Winnipeg Hydro service area, and an explanation (or perhaps a guess) of what made residential electricity demand jump in 2002/03.

Manitoba Hydro’s analysis of the TREE/RCM load forecast incorrectly characterizes the TREE/RCM evidence with regard to the load growth rates under business-as-usual conditions, even incorrectly stating that TREE/RCM’s reference forecast includes a negative growth rate for electricity demand in the commercial sector, which it does not. To support their contention that the TREE/RCM reference forecast is unrealistically low they have attributed an electricity demand growth rate to the scenario based on actual sales in 2003 and the adjusted 2002 Load Forecast in 2017/18, a fundamentally invalid method.

Throughout the new material presented in Manitoba Hydro’s Rebuttal, historical trends are based on the former Manitoba Hydro service area, excluding Winnipeg Hydro, but future demand levels include Winnipeg Hydro. Because there has been very little growth in the Winnipeg Hydro electricity consumption in recent years, combining it with the former Manitoba Hydro service area has the effect of reducing the electricity productivities (as calculated by Manitoba Hydro) and the rate of change of the productivities. This observation affects all the comparisons in the Rebuttal between historical growth rates (excluding Winnipeg Hydro) and future growth rates (including Winnipeg Hydro).

On pp.25-26, Manitoba Hydro writes:

*Almost half (46.1%) of the growth in the general service mass market occurred in the industrial sector, with agriculture (19%) and miscellaneous industrial (12.1%) accounting for a large portion of the growth. Although the General Service Mass Market was forecast to grow at an annual rate of 1.6%, only a little more than half (53.9%) of this growth should be allocated to the commercial sector. Therefore, the 2002 Load Forecast assumes that commercial electricity consumption will grow about 0.8% per year (Table 1.6). The DSM market potential study assumed a growth rate of 1.6% which has been recognized and will be addressed in the next phase (i.e. detailed design phase) of Manitoba Hydro’s efforts to revise its DSM targets. This will have the effect of lowering economic and achievable DSM potential identified in the DSM market potential study. The impact is mitigated by the fact that approximately 20% of the DSM*

*potential actually comes from new buildings. This effect on the economic and achievable DSM potential is in a direction opposite to that proposed by TREE/RCM (i.e. that there is more DSM potential in Manitoba than the DSM market potential study indicates).*

There are a number of issues raised in this paragraph. First, it is stated that half the growth in the General Service Mass Market category in the load forecast occurred in the industrial sector, and the other half in the commercial sector. This observation is then used to support the mathematical *non-sequitor* that the growth rate of the commercial sector should therefore be 0.8% per year, or half the growth rate of the GS Mass Market forecast. While we agree that the growth rates in the DSM Market Potential Study for the commercial sector are too high and inconsistent with the 2002 Load Forecast, the arbitrary cut in the growth rate assumed by Manitoba Hydro should have been determined by the type of end use calibration of the load forecast that we have referred throughout our evidence.

Cutting the growth rate of the commercial segment of the General Service Mass Market forecast results in a higher growth rate for the industrial segment, but to see the implicit growth rate assumed in Manitoba Hydro's Rebuttal (e.g. Table 1.5 on p. 27) it is necessary to first subtract the Top Customer Forecast from the industrial sector totals shown (in Table 1.5). This reveals an implied growth rate in general manufacturing electricity consumption of 2.9%, higher than the projected growth in output and therefore implying deterioration in the electricity productivity of the non-Top Customer portion of the industrial load. While there is some validity in the comment that individual industry electricity/output ratios are a risky basis for projecting electricity demand in the energy intensive Top Customer category, the same does not hold true for general manufacturing, where a gradual and steady improvement in electricity productivity can be observed over the past ten years. The upshot of Manitoba Hydro's recasting of the 2002 General Service Mass Market Forecast is that either output growth rates for the general manufacturing industries (including food and beverage and motor vehicles) would have to be inconsistent with the GDP growth in the Economic Forecast and/or the electricity/output ratios of those industries would have to reverse their long term tendency toward improvement. In other words, Manitoba Hydro's simple subsector allocation of the GS Mass Market forecast reveals what a fuller end use calibration of the 2002 Forecast shows in more detail – you cannot square the forecast with reasonable assumptions about output growth and electricity intensity that are consistent with the underlying Economic Forecast – an adjustment to the Forecast is required.

An example of the need for a more thorough examination of the new evidence presented in Manitoba Hydro's Rebuttal to TREE/RCM Interrogatory responses is provided by their sectoral allocation of the Winnipeg Hydro demand. In the Rebuttal document, 23% of the former Winnipeg Hydro demand is allocated to the residential sector, considerably less than the 692 GW.hours that is assumed in the DSM Market Potential Study for the Residential Sector (Ex 2.12 on p. 30).

On p. 28 of the Rebuttal, Manitoba Hydro states that “the residential load increased significantly in 2002/03, due to increased saturation and usage of computers, increased saturations of electric water heating and increased saturations of large screen televisions.” The weather corrected residential electricity demand in Manitoba increased by over 225 million kilowatt-hours in

2002/03; it would be interesting to see the end use analysis and support for the implied conversion of tens of thousands of households to electric water heat, combined with the purchase of tens of thousands of large screen televisions and computers that would be needed to achieve such a large increase in residential electricity consumption in one year.

The Manitoba Hydro Rebuttal ends with the presentation of a number of sectoral “electricity productivities”, but without the segmentation of GDP that is necessary to produce more useful and meaningful sectoral productivities. As a result the comparisons with TREE/RCM evidence presented here are not of much use.