

External Review Panel Consultative Report
on the
BC Hydro 2007 Conservation Potential Review

January 18, 2008

Submitted to:

BC Hydro

Prepared for the External Review Panel by:

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CPR 2007 External Review Panel Members

Robert Barry	Canadian Home Builders Association (CHBA)
Colleen Brown *	University of British Columbia (UBC)
David Craig	Commercial Energy Consumers of BC
Barbara Docherty	Independent Power Producers Association of BC (IPPBC) <i>(replaced David Kiess after the third ERP meeting)</i>
Steven Earle	Malaspina University-College
Mansell Griffin	Nisga'a Lisims Government
Tom Hackney	Sierra Club of Canada, BC Chapter
Nicholas Heap	David Suzuki Foundation
Len Horvath	Building Owners and Managers Association of BC
Dave Humber	West Fraser Mills
David Isaac	Student
Casey Jarvis	Residential Customer
Tom Knox	Kwantlen University College
Michael Margolick *	Greater Vancouver Regional District (GVRD)
Ian May	Joint Industry Electricity Steering Committee (JIESC) <i>(participated in Dan Potts' absence in Achievable Potential Workshops & ERP meetings in June, July and August, 2007)</i>
Kevin Pegg *	BC Sustainable Energy Association (BCSEA)
Dan Potts	Joint Industry Electricity Steering Committee (JIESC)
Don Scarlett	Residential Utility Customer Advocate
Sarah Smith	Terasen Gas
Keith Veerman	FortisBC <i>(participated initially as an ex-officio member for the Ministry of Energy, Mines and Petroleum Resources, MEMPR)</i>
Ex Officio Members	
Murray Bond	BC Hydro
Steve Hobson	BC Hydro
Andrew Pape-Salmon	Ministry of Energy, Mines and Petroleum Resources <i>(replaced Keith Veerman, June 2007)</i>

*** Individual formally withdrew from the Panel before the completion of the CPR process.**

Note:

Consensus opinions were not sought in putting this report together, so unless indicated otherwise in the text, the views expressed are those of individual Panel members. Ex-officio members' perspectives are not reflected in this document.

Notes to the Reader

Individual Panel Members' Views – Not Consensus

This Consultative Report records the opinions of some of the Conservation Potential Review 2007 External Review Panel members on the results of the CPR 2007 studies and their experiences as Panel members.

There was no requirement to achieve consensus views in assembling this report; consequently, the opinions expressed in the report are those of individual Panel members, unless otherwise identified in the text. The report reflects the diversity of the backgrounds and perspectives of the Panel members. It covers subjects requested by BC Hydro; it also covers views on topics that individual Panel members wished to put on the record.

It should be noted the comments in sections 2, 3 and 4 of the main body of this report primarily address areas where individual Panel members had questions about elements of the study or would like to see something done differently, or in addition to, what was done in this CPR. Areas of the study and the Panel process that Panel members are generally comfortable with receive few or no comments in these sections.

This report was written for the Panel by its independent facilitator, drawing on discussions during Panel meetings, questionnaire responses, interviews, summary notes of Panel meetings, and the Panel members' reviews and suggested modifications to two drafts of the report.

Organization of the Report

The Executive Summary provides an overview of the report contents. Most sections in the main body of the report can be read on their own, so the reader is free to browse through the report, focusing on the topics of most interest.

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Murray Bond, Manager, Evaluation, Measurement and Verification, Power Smart

Christine Gustafson, Manager of Market Analysis and Information, Power Smart

Zechy Khoo, Quality Assurance, Power Smart

Cindy Verschoor, Community Relations Manager, Stakeholder Engagement,
Corporate Affairs

Jennifer Hrankowski, Stakeholder Engagement

Coop Students Roshena Huang and Mao Murakami.

BC Hydro 2007 Conservation Potential Review External Review Panel Consultative Report

Executive Summary

1. Consultative Report Origins

This report summarizes the reflections of some members of the External Review Panel (ERP) for BC Hydro's 2007 Conservation Potential Review (CPR 2007) on their experiences as Panel members and their thoughts on the results of the CPR 2007 study.

The report was requested by BC Hydro as part of the terms of reference (TOR) for the Panel. There was no requirement that this report contain consensus views of the ERP; it contains the opinions of individual Panel members, except where the text indicates otherwise.

This report was written for the Panel by its independent facilitator, drawing on Panel meeting discussions, questionnaire responses, interviews, and summary notes of Panel meetings. ERP members reviewed and modified two drafts of the report before authorizing its release.

2. ERP's Composition and Mandate

The ERP was composed of 19 members representing a diverse range of generations, geographical regions, and perspectives in British Columbia, including First Nations, BC Hydro customers, trade organizations, business and industry, environmental organizations, universities, other utilities and special interest groups. In addition, there were three ex-officio members of the Panel; two from BC Hydro and one from the provincial Ministry of Energy, Mines and Petroleum Resources.

The Panel served in an advisory capacity to BC Hydro during the conduct of the entire CPR 2007, from reviewing and recommending additions to the draft request for proposal for the study; to providing input, advice and information to BC Hydro and the consultant team throughout the analysis; to reviewing all the consultants' draft reports. The Panel participated in 17 days of meetings and workshops over a 17-month period from June 2006 to November 2007, and reviewed 42 draft reports.

Although the Panel operated on a consensus decision-making basis; there was no requirement that it reach consensus on any of the CPR approaches or results. There was no expectation on BC Hydro's part that the Panel would formally endorse or approve the study results.

3. ERP Members' Perspectives on the CPR 2007 Results

While the majority of ERP members express satisfaction with the CPR 2007 results, there are areas where some ERP members have questions or concerns. This Consultative Report focuses on those areas. Panel members have made little or no comment on areas of CPR analysis they are in agreement with or where they are generally comfortable with the results.

Areas of the CPR 2007 study that one or more ERP members chose to comment on include those listed below. Numbers in parentheses refer to the sections in the main body of the report where the subjects are discussed more fully.

Changing context of the study (sec. 2.2): The design and conduct of the CPR 2007 *"straddled a very fundamental shift in attitudes, in government and among the public on the environment"*, climate change, green house gas (GHG) reductions, energy efficiency and conservation. The concern is that the CPR results are a transitional product, not fully representative of either attitudes when the study started or the world that now exists after the shift.

Accuracy of achievable potential estimates (sec. 2.7): The changing study context (see above) is partially reflected in the different assessments of the reliability of the "lower" and "upper achievable" potential estimates. One member expresses serious doubts that the "upper achievable" is *"really achievable at all"*; while two suggest that the estimates may be conservative in light of recent changes in public awareness and government commitments.

Industrial sector risks (sec. 2.8): Several ERP members question whether the CPR methodology adequately takes account of the risk to the continuity of a facility, including its future viability, that may affect customers' willingness or ability to invest in electricity conservation measures.

Fuel switching analysis (sec. 2.9): Terasen Gas *"disagrees strongly with the finding in the report that engaging in programs to pursue the Economic Potential offered by Fuel Switching will result in net increased regional GHG emissions by 2026"* . . . and argues that *"BC Hydro Power Smart should pursue Fuel Switching programs and initiatives to achieve the conservation, energy self-sufficiency and emissions reduction goals of the BC Energy Plan."*

Key assumptions and analysis parameters (sec. 2.3): A request is made for a more thorough explanation and documentation of the derivation, use and implications of key assumptions and analysis parameters used – what was done in the study and why.

Bundling of cost effective conservation measures (sec. 2.4): Several ERP members suggest BC Hydro consider, and the British Columbia Utilities Commission (BCUC) allow, the bundling of higher cost effective conservation measures with lower cost ones to achieve higher overall electricity savings.

Cost of conservation measures (sec. 2.5): A request is made that more investigation be pursued on the viability of higher cost conservation measures in all sectors, but especially in the industrial sector where relatively little work has been done on measures other than those with very short financial paybacks.

Treatment of green house gases (sec. 2.6): Three members express disappointment that the cost of GHG impacts was only generally included in the CPR analysis, rather than being *"fully and explicitly incorporated in the methodology"*.

"The reader should also note that in the spring of 2007, while the CPR studies were underway, the new BC Energy Plan was released. The 2007 BC Energy Plan contains specific implications for the pursuit of fuel switching beyond the CPR 2007. The Plan requires all new electricity generation projects to have zero net GHG emissions. In addition, there will be zero net GHG emissions from existing thermal generation power plants by 2016. The Plan also requires that BC become electricity self sufficient by 2016. After this time there will be no net GHG emissions from imports. Fuel switching from electricity to natural gas would result in a net increase in greenhouse gases as the purpose of a fuel switching initiative would be to lower BC Hydro market forecast such that BC Hydro would plan to supply less electricity to British Columbians. It would not impact exports. The GHG impact would be an increase in the long term because zero emissions electricity would be replaced by natural gas with an emissions intensity profile of 0.050 tCO₂/GJ."

Sarah Smith, Manager, Marketing and Energy Efficiency, for Terasen Gas expresses the following views on the CPR 2007 fuel switching analysis (from electricity to natural gas).

"Terasen Gas agrees with the conclusions of the CPR Fuel Switching Analysis that '...from a provincial economic perspective, there are opportunities where switching from electricity to natural gas may be beneficial.' The Economic Potential of Fuel Switching measures was found by the study to be 6,674 GWh/yr by 2026 in the current natural gas supply cost scenario, and 3,293 GWh/hr in the high natural gas supply cost scenario. The efficient end use of natural gas for space and water heating results a favourable provincial economic scenario due to the much higher avoided cost of electricity supply (8.8 cents/kwh) than the cost of using natural gas (2.2 cents/kwh equivalent in the current gas cost scenario and 3.18 cents/kwh equivalent in the highest gas cost scenario) to meet the avoided electricity demand. This favourable cost/benefit result of the economic potential for fuel switching does not take into account the same avoided cost for electricity as was used in the analysis of economic potential from increasing the efficiency of electrical end use appliances, which was higher at 13.0 cents/kwh. If the same economic screen had been used for the fuel switching analysis, the economic potential available from fuel switching would have been significantly greater. Using efficient natural gas end use appliances for as much space and water heating load as possible dampens the growing demand for electricity in BC, allows BC Hydro to reach its goal of electricity self sufficiency sooner, meets the provincial goal of energy security as the natural gas consumed is for the most part produced in BC and more quickly frees up British Columbia's excess electricity for export thereby increasing potential revenues from trading activity, but also reducing greenhouse gas emissions overall in Western North America and globally. There can be no question that the efficient end use of natural gas for space and water heating has a lower emissions impact than using electricity for the same purposes. The electrical grid in British Columbia is not an island. British Columbia is not isolated from the remainder of the grid in Western North America; the grid is interconnected, and the vast majority of electrical generation in Western North America is from the inefficient combustion of

one form of energy - coal or natural gas - to create another form of energy – electricity. The study recognizes this fact in assigning a GHG factor of 550 tons CO₂e/GWh for electricity to 2016 and 180 tons CO₂e/GWh equivalent for natural gas consumed in direct end use applications.

“Although the government’s Energy Plan has in its Policy Actions a requirement for every kilowatt hour produced in British Columbia to incur zero net GHG emissions by 2016, to date there has been no timeline, no action plan and no budget laid out as to how BC Hydro will achieve this particular Energy Plan goal. Given that BC Hydro’s last call for power was for 8.8 cents kwh, and that prices for construction materials and labour are increasing and show no signs of declining; given the attrition rate seen to date of Independent Power Producers and the capacity of the IPP industry to actually bring GHG neutral electricity onstream; and given the very long lead times for Independent Power Projects as well as megaprojects such as Site C, until an actual plan reveals how BC Hydro will achieve this particular goal of the Energy Plan by 2016, and stakeholders attain a level of comfort around BC Hydro’s plan for GHG neutrality and the resultant costs, Terasen’s view is that the GHG factor attributed to electricity should remain at 550 tons CO₂e/GWh. For this reason, and because the electrical grid in BC is connected to the remainder of the grid in Western North America, Terasen disagrees strongly with the finding in the report that engaging in programs to pursue the Economic Potential offered by Fuel Switching will result in net increased regional GHG emissions by 2026.

“The study found that although there is significant Economic Fuel Switching Potential available to BC Hydro, there is no Achievable Potential for BC Hydro Power Smart to actively engage in Fuel Switching programs. This is because the natural gas measures were found by the study to either have excessively long payback periods or cost customers more to install and in many cases marginally more to operate compared to electricity, using current customer rates for electricity and natural gas. This contradictory result (Significant Economic Potential vs. Zero Achievable Potential) arises because the retail rates for electricity are lower than BC Hydro’s cost of incremental supply, which Terasen Gas feels is an untenable situation for two reasons:

- o It is unsustainable – at some point, electrical rates have to rise to reflect the true cost of buying more electricity, especially when Acquisition Plans revolve around more costly green power. It sends entirely the wrong message in an era where BC Hydro is attempting to create a “culture of conservation”. If the end use customer is not being charged the cost of the energy that they are consuming, how can they be expected to change their behaviour?*
- o Customers should be encouraged by Power Smart to participate in helping BC Hydro to achieve the Economic Potential offered by Fuel Switching programs, not only through the use of education and incentives, but also through the use of connection policies and rates.*

“Using efficient natural gas appliances for space and water heating allows British Columbia to optimize the value of our electricity resources. By

engaging in fuel switching from electricity to natural gas, BC Hydro can achieve a number of the Policy Actions in the BC Energy Plan, primarily:

- Policy Action #1 – Set an ambitious conservation target, to acquire 50 per cent of BC Hydro's incremental resource needs through conservation by 2020
- Policy Action #2 – Ensure a coordinated approach to conservation and efficiency is actively pursued in British Columbia
- Policy Action #3 – Encourage utilities to pursue cost effective and competitive demand side management opportunities
- Policy Action #10 – Ensure self-sufficiency to meet electricity needs, including "insurance"
- Policy Actions # 18-21 regarding net zero GHG emissions from electricity

"BC Hydro Power Smart should pursue Fuel Switching programs and initiatives in order to achieve the conservation, energy self sufficiency and emissions reduction goals of the BC Energy Plan."

Tom Hackney (Sierra Club) adds the following perspective on fuel switching. He is joined in this view by **Steven Earle (Malaspina University-College)**.

"We urge caution in drawing conclusions about the putative benefits of switching from electricity to natural gas, as a way to reduce greenhouse gas emissions. Such conclusions assume that the electrical alternative to gas would have associated greenhouse gas emissions, but this is not the case with renewable energies. Reductions in greenhouse gas emissions achieved by switching from gas-fired electricity to the direct burning of gas, e.g. for space or water heating, can only reduce, not eliminate emissions. Renewable generation can make the electrical generation system greenhouse gas neutral; this is not possible with the natural gas system."

Nicholas Heap (David Suzuki Foundation) noted that:

"Switching from electricity to natural gas for space heating would increase GHG emissions within the province and make it more difficult to achieve the province's greenhouse gas reduction target for 2020. A shift towards ground-source or air-source heat pumps, however, will provide heat far more efficiently than electric resistance heating can provide, without increasing GHG emissions."

"In reviewing the CPR 2007 fuel switching analysis, it became apparent that the economic viability of fuel switching measures was very sensitive to installation costs and practical limitations on retrofits, such as whether there was sufficient space available for the bulkier natural gas equipment. Given the importance of these factors in determining the cost effectiveness of electricity to natural gas fuel switching measures, it is important to ensure that these factors are included in all future analyses."