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**2008 Long Term Acquisition Plan**

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**APPENDIX G3**

**Natsource Estimate of Probability of Main GHG Scenarios**

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NATSOURCE® LLC

MEMORANDUM

February 27, 2008

To: Craig Godsoe

From: Doug Russell, Rich Rosenzweig, Rob Youngman

RE: Probabilities for scenarios in Natsource's "2007 Greenhouse Gas Offset Forecast Report for BC Hydro"

*I. Background / Overview*

This memo is in response to a request from BC Hydro following the receipt of Natsource's "2007 Greenhouse Gas Offset Forecast Report for BC Hydro." It provides Natsource's best estimates of the probability of each of the three main scenarios in the report occurring. This memo includes estimates of the probability that the main policy drivers in each of the scenarios will occur. However, it does not include the probability that prices will be within any specific range in the future. We also note that in practice there are a wide range of possible policy variations (e.g. with respect to specific targets in the U.S. and Canada; specific provisions on offsets, linkage, price caps, and other design elements; and the timing of various actions).

The report and this memorandum contain forward-looking statements that reflect Natsource's current beliefs with respect to future events and are based on information currently available to Natsource. Forward-looking statements inherently involve uncertainties and assumptions. Many factors could cause actual events and scenarios to differ materially from the events and scenarios discussed in the forward-looking statements. Although the forward-looking statements contained in the report and this memorandum are based upon what Natsource believes to be reasonable assumptions, Natsource cannot assure that actual events and scenarios will be consistent with these forward-looking statements. These forward-looking statements are made as of the date of the report and this memorandum, and Natsource assumes no obligation to update or revise them to reflect new events or circumstances.

*II. Estimated Probability of Scenarios*

- 1) **Most likely scenario: Linked Markets**  
**Probability: Roughly 60%**

*Rationale*

In this scenario, the U.S. and Canada link trading programs after 2015, join an international agreement by 2020 and allow for unlimited or nearly unlimited use of international offsets for compliance, while agreeing to undertake ambitious emission

reduction targets. In our view, this is the most likely scenario at this time in light of current political trends in the U.S., pressures from Canadian business to avoid a regulatory “patchwork” for climate change, the ongoing effort by the international community to complete an international negotiation for a post-2012 climate framework agreement by the end of 2009, and economic considerations. A brief discussion on these dynamics follows.

In the U.S., the likely Republican nominee for President and the two leading Democratic candidates all support the U.S. participating in an international climate agreement and adopting an economy-wide emissions trading program with targets comparable to those assumed in the Linked Markets scenario. Over the past several years, Senator McCain has also co-sponsored the McCain-Lieberman emissions trading bill, which is considered in the Linked Markets scenario. Senators Clinton and Obama both support legislation that would set targets at least as stringent as those included in the Lieberman-Warner proposal (which are even more stringent than those in the McCain-Lieberman bill). The Lieberman-Warner proposal was recently adopted by the Senate Committee on Environment and Public Works and is waiting for floor action by the full Senate.

In Canada, a number of provincial governments are either implementing regulations (e.g. Alberta) or introducing legislation incorporating long-term targets for GHG emissions reductions (e.g. B.C., Ontario and Quebec), while the federal government continues to develop its regulatory program. This evolution in climate policy is one of the reasons that the Canadian business community, led by the Canadian Council of Chief Executives, has come out strongly in support of development of national as opposed to regional or provincial programs. Business is calling on the federal government to ensure that GHG reduction programs across all Canadian jurisdictions are harmonized and consistent. This harmonization is consistent with the Linked Markets scenario.

The conclusion of a post-2012 agreement now appears to be gaining momentum after the U.S. joined the rest of the world in adopting the “Bali roadmap,” which sets a goal of finalizing international negotiations at a meeting to be held in December 2009. It is noteworthy that the Bush administration – which has been accused of delaying meaningful U.S. participation in international negotiations for the past seven years – is now committed to engaging in international negotiations and has agreed to the Bali roadmap. (The administration also hosted a meeting of the major GHG-emitting countries in Washington, and plans to hold several more such meetings.) The Bali roadmap notes that “deep cuts in global emissions will be required to achieve the ultimate objective of the Convention,” and references text in Working Group III’s contribution to the Intergovernmental Panel on Climate Change’s (IPCC) Fourth Assessment Report stating that

“[u]nder most equity interpretations, developed countries as a group would need to reduce their emissions significantly by 2020 (10–40% below 1990 levels) and

to still lower levels by 2050 (40–95% below 1990 levels) for low to medium stabilization levels (450–550ppm CO<sub>2</sub>-eq).”<sup>1</sup>

These reduction levels are broadly consistent with the emission reduction targets for the U.S. in the Linked Markets scenario.

With respect to economic considerations, once the debate in Congress over different emissions trading proposals begins to receive closer attention as it moves through the legislative process, it is likely that members of Congress will place greater emphasis on reducing the costs of achieving GHG targets. This could result in legislation that authorizes the use of international offsets for compliance. In this context, we think it is likely that Congress will opt for international offsets provisions that more closely resemble those in the Linked Markets scenario than those in the Made in North America scenario, in which no international offset use is allowed. Moreover, it would be inconsistent with participating in an international climate agreement if the U.S. adopts an overly restrictive approach on offsets. It also would be economically inefficient. The use of international offsets will be critical for the U.S. in achieving tough targets, particularly before carbon capture and storage technology is widely available. It is also important to note that the Senate Environment Committee has been more liberal on these issues than the full Senate and the House of Representatives. We expect the full Senate and House to be more favorable to the use of international offsets for compliance than was the Committee.

Finally, we would expect that by 2020, the large majority of state/provincial and regional trading programs would be harmonized with federal programs. By that point, targets under federal programs are likely to be sufficiently stringent, and sub-national trading programs will have succeeded in helping to motivate the adoption of ambitious targets at the federal level. In addition, it likely would be difficult to maintain varying targets at the state/provincial/regional and federal levels for long, as it could have competitiveness impacts on companies with operations in several jurisdictions.

**2) Second most likely scenario: Made in North America – Aggressive Targets  
Probability: Roughly 25%**

***Rationale***

In this scenario Canada and the U.S. do not join an international regime, and instead link their trading programs to create a regional (i.e. North American) trading program. In addition, they do not allow for use of offsets created by projects located outside of North America. As noted in the report, this scenario could occur if the Canadian Federal Government decides that the climate change issue requires more ambitious targets than the currently planned intensity-based targets. The scenario could also occur if the U.S.

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<sup>1</sup> Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Technical Summary, page 90, <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-ts.pdf>

and Canada seek to facilitate the turnover of old, emissions-intensive power plants as part of efforts to meet ambitious GHG emission reduction targets. In addition, this scenario would also be consistent with the development of bilateral and regional trade blocs and agreements that have formed and been adopted over the past 15 years. These include the continued integration of the European Union, the North American Free Trade Agreement (NAFTA), the Association of Southeast Asian Nations (ASEAN), and U.S. bilateral trade agreements with Central and South American countries. It will continue to be challenging for the international community to reach consensus in negotiations to develop a successor agreement to the Kyoto Protocol. These negotiations will remain contentious over such issues as emission reduction targets, the use of markets for compliance, and the level of developing country participation among others. In the event that an agreement is not reached, it is conceivable that the U.S. and Canada would link their trading programs, in light of NAFTA and how closely their economies are linked. It also is conceivable in this scenario that the U.S. and Canada seek to meet their targets through domestic actions and bilateral trading in order to stimulate investment in the U.S. and Canada, and to forego the use of international offsets. Our probability estimate of 25% is based on our concluding that this scenario is the second-most-likely to occur, and that the Linked Markets scenario is more than twice as likely to occur as the Made in North America scenario.

**3) Third most likely scenario: Price Cap  
Probability: Roughly 15%**

***Rationale***

In this scenario, the U.S. and Canada each incorporate a price cap for their trading programs. The price cap may take the form of a special compliance unit that the government makes available, such as the proposed contribution in Canada to a Technology Fund. Alternatively, it could involve the imposition of a carbon tax. There is concern with price caps and taxes in the U.S. Congress, and many in the environmental community are also opposed to a price cap given that a program that includes one is less likely to achieve environmental objectives. For these reasons, the Price Cap scenario may be less likely to occur than the Linked Markets scenario. It is still possible that concerns over costs, competitiveness and potential relocation of industry to countries that do not impose comparable targets could result in serious consideration of a price cap. In the U.S., price caps have appeared to have less support than other cost control options, perhaps because they could jeopardize the achievement of any emissions cap.

In Canada, however, industry, and the oil and gas sector in particular, has in recent months been seriously floating the idea of a carbon tax as an alternative to a trading system. In January 2008 the National Round Table on Environment and Economy (NRTEE) released “*Getting to 2050: Canada’s Transition to a Low-Emissions Future*”. The central observation of the NRTEE report was that a price signal, either in the form of a trading system or carbon tax or a hybrid of the two, would be essential for Canada to meet longer-term tougher targets for GHG emissions reductions. The report stopped short of making recommendations on which policy path to choose, but a new program of work

is being launched in 2008 to provide recommendations on which path would work best for Canada.

Taking into account these considerations we assign this scenario a 15% probability based on our concluding that it is less likely to occur than the Made in North America scenario. It is also based on our view that even if Canada were to choose a carbon tax as its primary policy tool for combating climate change, it is highly unlikely that Canada would maintain the price at \$18 per tonne from 2015 through 2050, given the need to achieve significant emission reductions over that period in order to achieve any concentration target under discussion. As well, we believe that it is unlikely that a carbon tax will be implemented in the U.S. for the foreseeable future, and it is unlikely that Canada would choose to follow a distinctly different long-term strategy than the U.S. Our view on this issue is shaped by events that occurred in the first Clinton Administration. In 1993, President Clinton proposed a small tax on the BTU content of energy sources. It met with extensive opposition in the Congress controlled by his own party and it ended up as a 4.3 cent gasoline tax. A tax to limit GHG emissions would necessarily be much larger to have its intended effect. Because of this, we think it is unlikely that a carbon tax would be implemented in the U.S. In this context, we would highlight that this scenario was considered in the report for the purpose of setting a hypothetical lower-bound case.

We note that this probability estimate could increase if we were to assume different price cap levels than those assumed in the report, and if we were to assume that price caps would be used for a shorter period of time. For example, a price cap or tax could be set at a relatively high level – e.g. a level comparable to the estimated marginal cost of abatement to achieve the targets in the economy-wide bill or linked to some type of backstop technology. This approach could receive some support because it would provide more compliance cost certainty to industry while having less likelihood (than a low price cap) of jeopardizing emissions caps. In addition a price cap could be viewed more favorably by policy-makers if it was viewed as a transition mechanism and was not in place through the middle of the century. On the other hand, a price cap would still make it difficult or impossible to link to other trading schemes. This variant of the scenario could have a slightly greater likelihood of occurring.

Alternatively, it could be assumed that the price cap in Canada continues at \$18 out to 2020. This appears to be a plausible case, as the current policy is to maintain a price cap of \$18 through 2018. This policy could be maintained until 2025 in response to industry concerns regarding competitiveness and as a means to provide extra time for key technologies (e.g. carbon capture and storage) to be developed. This variant of the scenario would also have a slightly greater likelihood of occurring.