

Nicole Godbout

Regulatory Counsel
Nova Scotia Power Incorporated
P.O. Box 910
Halifax NS B3J 2W5

March 26th, 2014

Dear Ms. Godbout,

**RE: M05522 – 2014 Integrated Resource Plan
*Ecology Action Centre Comments on Draft IRP Assumptions***

Ecology Action Centre (EAC) has reviewed the proposed IRP Assumptions provided by Nova Scotia Power Incorporated (NSPI) on March 14th, 2014. We appreciated the spirit of transparency and collaboration shown in the March 7th technical conference concerning the Draft Assumptions. We look forward to ongoing participation in an open and informative dialogue as the IRP develops.

Please find our comments and recommendations on the Draft Assumptions below.

CO₂/Greenhouse Gas (GHG) Emissions

As acknowledged during the March 7th technical conference, Nova Scotia is a national leader in setting targets for and achieving GHG emissions reductions from the electricity sector. EAC applauds Nova Scotia's initiative and impressive progress to date.

A critical concept also discussed during the technical conference is the unique opportunity the IRP process presents to identify possible worlds and explore their potential implications for Nova Scotia's and NSPI's future.

The EAC submits that while the two CO₂/GHG scenarios suggested by NSPI incorporate existing federal and provincial regulations, they do not sufficiently recognize the underlying commitment from which those regulations were derived, specifically Canada's signature to the Copenhagen Accord. The differing approaches federal parties have to fulfilling Canada's commitment to the Copenhagen Accord mean the regulatory world within which NSPI must operate through the 2039 IRP timeframe could change substantially with a change in government.

It is incumbent upon the IRP process to provide a full and realistic assessment of NSPI's carbon liability. To do this, an assessment of the impacts of global warming and complimentary assessments of both international conventions and future national political realities are critical.

International Conventions

The Copenhagen Accord, signed by world government representatives including Canada, at the COPP 16 UNFCCC conference states:

"We agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to

reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity.” i

The accord further commits developed nations, including Canada, to establish GHG emissions goals for 2020 that, in Canada, resulted in existing regulations.

National and international agencies across all sectors recognize that the costs of climate change are upon us and that action is required to avert both the physical and economic consequences.

The Canadian Council of Chief Executives state:

“The Copenhagen Accord is an important building block since it brings in all major emitting countries in a way that meets their needs and aspirations [...] Meaningful progress will not be possible without an overall framework that encourages and enables the ongoing creation and dissemination of new generations of low-carbon technology across the globe.”ii

The Organization on Economic Cooperation and Development (OECD) of which Canada is a member, writes:

“Acting now is not only environmentally rational, it is also economically rational. For example, (this) outlook suggests that if countries act now, there is still a chance – although a receding one – of global GHG emissions peaking before 2020 and limiting the world’s average temperature increase to 2 degrees C. To do so would make the costs of adaptation and mitigation much more affordable. But unless more ambitious decisions are taken soon, the window of opportunity will close. **Investment decisions that are being made today will lock in infrastructure for years or decades to come. The environmental consequences of emissions-intensive investments today will be long-lasting.**”iii [emphasis added]

Limiting GHGs to Prevent Greater Than 2° Celsius of Warming

The Copenhagen Accord’s core goal is to prevent greater than 2° Celsius of warming. Scientific understanding of this goal implies global reductions in GHG emissions to 80% below 1990 levels by 2050.

As the graph below from the Stern Review on Climate Change indicates, some of the most severe impacts begin to occur at a level of warming that is 2°C above the pre-industrial mean. At this level, extensive damage to coral reefs will have occurred, significant decreases in crop yields and water availability will occur, and the risk of dangerous feedbacks, leading to abrupt shifts in the climate system, could occur. After 2°C the climatic system is expected to enter the realm of “abrupt and major

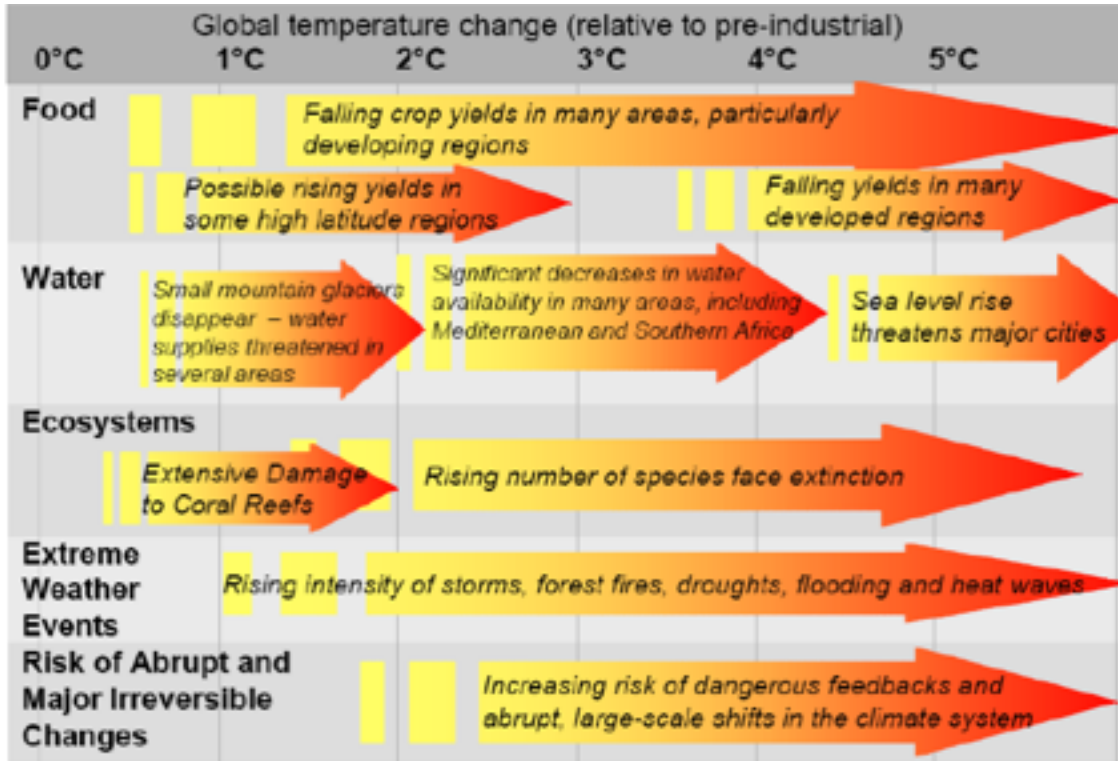
i UN Framework Convention on Climate Change. 2009. *Copenhagen Accord*. United Nations.

ii Canadian Council of Chief Executives. 2010. *Clean Growth 2.0: How Canada Can Be A Leader In Energy And Environmental Innovation*. Policy Paper Task Force On Energy, The Environment And Climate Change

iii OECD. 2012. OECD Environmental Outlook to 2050. OECD Publishing. <http://dx.doi.org/10.1787/9789264122246-en>

irreversible changes”. These abrupt changes can create a point of no return, where climate change becomes irreversible.

Projected Impacts of Climate Change iv
Stern Review on the Economics of Climate Change (2006)



The United Nations Framework on Climate Change notes that:

“[...] the largest share of the historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs.”v

International conventions such as the Copenhagen Accord therefore accept the principle that industrialized countries have both an historic responsibility and a capacity to act. Thus, emissions reduction targets to prevent greater than 2°C will ideally be greater for industrialized countries like Canada. These principles must be kept in mind when NSPI is considering any estimates of its future carbon liabilities.

iv Stern, N. 2006. *Stern Review: The Economics of Climate Change*. London School of Economics. http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreview_report_complete.pdf

v United Nations. 1992. *United Nations Framework on Climate Change*.

Potential Future National Political Realities

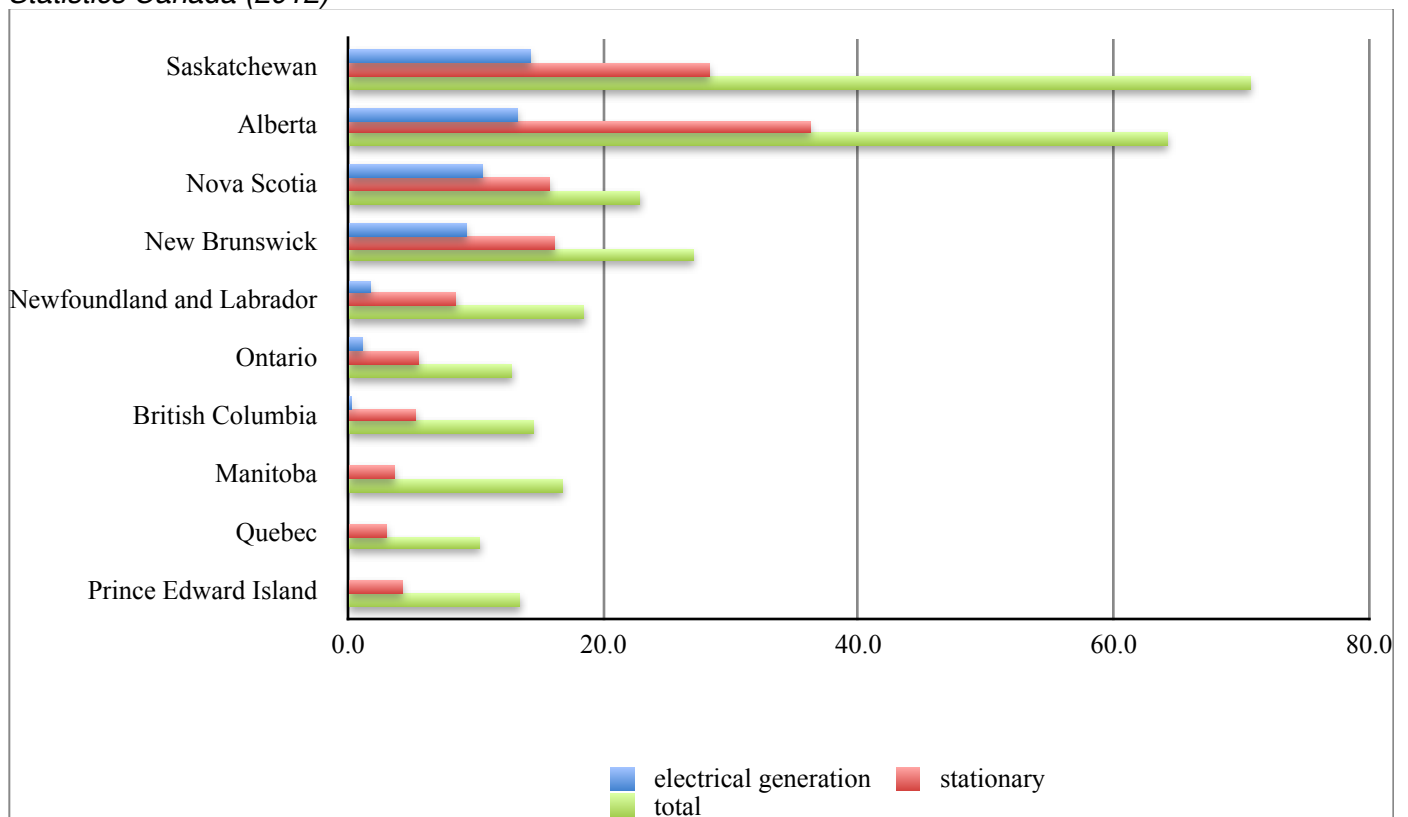
On a global per capita basis, a Canadian target consistent with the goal of preventing greater than 2°C would set national GHG emissions reductions by 2050 at 95% below 2010 levels. In the 2039 IRP timeframe, national targets would limit GHGs to approximately 1/3 to 1/4 of present-day emissions.

These reduction targets lie within the range of policies under consideration by Canadian federal parties. The Climate Change Accountability Act Bill C-311 (2010) proposed similar limits and passed third reading in the House of Commons in 2010. Originally sponsored by Member of Parliament Bruce Hyer (then an NDP MP and now a Green Party MP), Bill C-311 achieved broad support including, among others, current leaders of both opposition parties. Bill C-311 was only defeated on second reading in the Senate in 2010. The current official opposition has resubmitted this bill for consideration and policies similar to it are likely to remain under active consideration for the foreseeable future.

Stationary emissions, especially electrical power generation facilities, present the largest opportunity for easy reductions today, particularly when compared to the difficulty associated with reducing emissions from transportation or oil and gas extraction. For this reason, under potential future federal emissions reductions regulations, electricity generation will be looked to virtually eliminate GHG emissions as soon as possible.

2009 Per Capita CO₂ equivalent Emissions^{vi}

Statistics Canada (2012)



^{vi} Statistics Canada. 2012. *Reality Check: The State of Climate Progress in Canada*. National Round Table on the Environment and the Economy

To ignore the reality of global warming and its devastating impacts and the effect NSPI's future carbon liability could have on the ratepayers of this province will not allow the IRP to make a realistic assessment of the future. The IRP, therefore, should reflect the stark reality that deeper GHG emission limits will be imposed. To ignore this probable future is to risk potentially inappropriate investment in infrastructure that may need to be abandoned or subject to costly alteration.

Recommendations

1) The EAC proposes that a third GHG scenario that approaches zero electricity GHG emissions be added:

Scenario C: Emission limits as per An Agreement on the Equivalency of Federal and Nova Scotia Regulations for the Control of Greenhouse Gas Emissions from Electricity Producers in Nova Scotia (Sept. 2012)

Limit declines to 2.25 in 2040, 0 in 2050.

The downward path of the GHG constraint in Scenario C is consistent with the established medium term goals and long-term commitments consistent with the Federal government's signature to the Copenhagen Accord.

2) Scenario A, as an intermediate path, should be retained as it represents the path where regulatory response lags behind science-based recommendations.

3) Scenario B, although inconsistent with a science-based mitigation path, should be retained as it represents the current regulatory regime.

Renewable Electricity Standards (RES) Requirements

Given the above discussion of the likelihood that Canada's electricity sector will represent the 'low-hanging fruit' of GHG emissions reductions under potential future regulatory regimes, it would be wise for the IRP to consider a scenario where fossil fuel -dependent electricity generation is entirely phased out and replaced by renewable generation.

Recommendation

4) Include within the RES assumptions an **additional scenario** where:

Electricity Supply consists of 100% Renewable Energy Sources by 2040

Electricity Supply consists of 80% Renewable Energy Sources by 2030

Future Supply-Side Options

COMFIT

Community and distribution -scale generation is recognized to be an important element in an electricity system moving towards zero GHG emissions. In particular they build public acceptance and trust for both renewable energy and the public utility. In this sense they offer intrinsic value that reaches beyond the usual parsing of the regulatory process. Their presence encourages participation in the electricity system that builds a sense of ownership and undermines the cynicism that often conflates the ratemaking process. Continued modest expansion of the Community Feed-In Tariff (COMFIT) program should therefore be a basic assumption in the IRP.

Recommendation

5) The draft assumptions identify a government commitment of 200MW but propose only 150 MW by 2016. **The Ecology Action Centre strongly urges that the RES assumptions bring COMFIT projects to the full 200 MW level by 2016 and include an extension of the program ongoing at 20 - 30 MW per year.**

Capacity Value of Wind and Intermittent Generation Integration Costs AND Hydro Generation AND Import Options AND Transmission

EAC concurs that wind and hydro resources are complimentary as indicated in the draft assumptions: “much of the power system’s flexibility to integrate existing variable sources of generation is provided by legacy hydro facilities.” (Slide 29 – draft assumptions). These benefits grow as the regional footprint for both wind and hydro operations grow.

The approved Maritime Link will significantly alter the regional interplay of electricity generated from wind and hydro energy. The low cost of wind and hydro generation coupled with the inherent reliability of a more robust transmission system should be compared over the region to ensure that the recognized benefits are realized to their greatest extent.

Recommendation

6) In light of the agile transmission link available to Newfoundland and Labrador in the near term and the potential for near equal cost interconnection through New Brunswick to Quebec, **the IRP should thoroughly examine the capacity for inter-regional power pooling to maximize the value of zero emission wind resources across the Atlantic region.**

Fuel Price Forecast

Carbon Pricing

The carbon prices in the assumptions are low. As with assumed GHG limits, it would be prudent for the IRP to examine a stricter future carbon pricing regime.

Recommendation

7) High carbon pricing cases should explore prices well above \$50 a tonne by the end of the IRP timeframe and should be consistent with similar planning activities across North America.

Demand Side Management (DSM)

As highlighted by the 2007 IRP process, DSM is a cost-effective resource that can be rapidly deployed to reduce waste in the electricity system.

The assumptions for DSM in the IRP process are not entirely clear and should be presented in greater detail. Fair assessment of the full potential for DSM to reduce utility costs is critical to this IRP.

Economic benefit, energy security, and business energy productivity are all agreed to be critical to the success of Nova Scotia in the future. To disadvantage the full potential for DSM within the IRP will diminish the full impact of DSM and result in a sub-optimal plan that may be biased towards capital-intensive infrastructure of lesser benefit.

As such, the assumptions around DSM should not modify input load curves but should be included in the IRP analysis as a resource alongside generation options and traded off based on their cost to the utility. The analysis should be unconstrained regarding the level of DSM and be free to trade increasing levels of DSM at their estimated costs against other estimated supply side cost options. For the purposes of this work, the costs as estimated in the DSM Potential Study provide an adequate cost comparison. They will have accuracy on the same order as other supply side estimates while presenting considerably lower risk. Specific costs of DSM programs can be more carefully defined as the board reviews future detailed DSM plans.

Recommendations

8) **Treat DSM as a resource alongside generation options.**

9) It is essential that DSM programs be treated on equal economic footing to supply side options. **Program Administration Costs for incremental levels of DSM should be optimized along with supply side options so that the level of utility cost effective DSM is an output of the process, not an input.**

10) The Ecology Action Centre fully endorses Efficiency Nova Scotia's letter of comment (March 24, 2014) on this issue and urges NSPI to model DSM as ENSC suggests as it is the fairest method to ensure cost effective reliable service.

Another World: The Deep Green Scenario and Demand Response

Declining GHG emission levels may well be the fundamental driving requirement in the IRP but the ability to explore the full potential of a transformed electricity system may not emerge without explicit study.

A potential scenario exists where there may be considerably higher load due to heating fuel switching and transport electrification. Technology transformation is rarely linear and unforeseen price or political shocks can induce technology cascades that can leave a transformed landscape. The revolution in communications technology is a very recent example, but many others exist.

The IRP should therefore include analysis of a 100% renewables scenario that encompasses an increased level of load from heating demand and vehicle charging.

Within this world, aggressive assumptions around distributed demand response should be included to investigate the ability of vehicle battery and residential and commercial heat storage to cost effectively align electrical demand with the availability of renewable energy.

For example, a home built to the Passive House standard, the Naugler House in New Brunswick (www.nauglerhouse.com), had a peak heating demand this past winter of 730 kWhr/month, or less than 25 kWhr per day. Thermal storage systems, such as those currently being evaluated through the PowerShift Atlantic program would be capable of multi-day storage under loads of this magnitude offering both the ability to shift peak demand and minimize wind energy curtailment in high wind generation configurations. Promised retail renewable sales, in this environment, would begin to look more like fuel delivery and offer dramatically simpler dispatch arrangements than are currently envisioned for demand response.

Likewise electric car charging offers similar load shifting benefits and challenges. A model investigating significant penetration of these or similar loads with a 100% renewable supply should be examined.

Conclusion

The Ecology Action Centre appreciates the opportunity to present the above ten recommendations for amendments to the Draft Assumptions and an additional recommendation for the inclusion of another 'Deep Green' scenario.

Sincerely,

Catherine Abreu



Energy Coordinator
Ecology Action Centre