the PEMBINA institute Sustainable Energy Solutions

Comments on OPA Discussion Paper 7 – Preliminary Plan

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General Comments

The Pembina Institute's comments on the Preliminary Plan should be read in the context of the Institute's comments on discussion paper 2 (Load Forecast); 3 (CDM); 4 (Supply Resources) and 6 (Sustainability).

The plan as a whole appears structured around a misinterpretation of the Minister of Energy's June 2006 Supply Mix Directive. The OPA has interpreted the supply mix directive targets for renewables, Conservation and Demand Management (CDM) and natural gas as maximums to be achieved. At same time the Authority has interpreted the directive's cap on nuclear capacity as a target to be achieved.

The result is a plan that is organized around the achievement of the 14,000MW nuclear generating capacity cap, with all other plan components structured to accommodate that element of the plan. Whether this is by design, or simply a function of the fundamental inflexibility of nuclear energy as a generating option is unclear. The result is a plan that remains excessively dependent on a single fuel and generating technology, and faces significant risks in terms of sustainability, flexibility and reliability.

Consistent with the Supply Mix Directive's direction, the plan should be structured around the pursuit of all feasible and cost-effective opportunities for CDM, renewables, and high efficiency uses of natural gas, including those beyond the minimum targets set in the Supply Mix Directive. Available non-renewable supply options should then be assessed in terms of sustainability, cost, flexibility and reliability.

The Pembina Institute does not believe that the requirements to demonstrate consideration of safety, environmental protection and environmental sustainability contained in the IPSP regulation have been met.

The overall sustainability framework employed to assess the plan (Part 3) is incomplete, and fails to reflect key sustainability principles articulated in discussion paper 6, particularly intergenerational and intragenerational equity. Externalized environmental, social and some economic costs, and the avoided externalized costs associated with CDM initiatives, are generally not considered in the plan.

The examination of safety and environmental impacts and risks is incomplete, and excludes major areas of impacts and risk. The plan fails to consider the environmental and safety risks and impacts associated with different potential responses to the Supply Mix Directive.

A number of key assumptions that informed the direction of the Supply Mix Advice and subsequent Load Forecast paper have already been subject to change. These include the following assumptions:

- Natural gas prices are expected to be subject to moderate increases, or even declines over the life of the plan, rather than the extremely high prices on which the supply mix advice was premised.[1]
- The plan suggests that electricity costs will be higher in real terms by 2025 (pg.10), as opposed to the lower costs projected in the Load Forecast paper. This may have significant implications for future electricity demand.
- The estimated summer capacity factor for wind presented in the draft plan (17% (discussion paper 4 pg.43) is substantially higher than that employed in the Supply Mix Advice (10%). This has significant implications for the overall potential contributions from wind to electricity supply.

The draft plan fails to explain fully how the changes in these assumptions have affected projected demand in the plan or impacted on the relative roles of various supply options.

A number of key variables that may affect the plan are not identified. Nor is their impacts on the plan assessed. The plan, for example, generally fails to make apparent its assumptions regarding the impact of market dispatch rules on the utilization of different resources, including imports and exports.

In order to provide a more complete understanding of risks and potential trade-offs a number of alternative plans for meeting the requirements of the Supply Mix Directive should be presented, and then evaluated against a more clearly articulated set of sustainability criteria (see comments on Discussion Paper 6). Some of the alternative scenarios presented in section 3.4 might provide starting points for such alternative plans.

[1] See, for example, R.Wong and E.Wittingham, *A Comparison of Combustion Technologies for Electricity Generation: 2006 Update including a discussion of Carbon Capture and Storage in an Ontario Context* (Pembina Institute, November 2006), Table 4.

Specific Comments

Plan Summary

- The plan assumes sufficient funds are being set aside for managing nuclear wastes, and capacity being developed to manage wastes (pg.10). In reality the funds set aside for nuclear waste management are inadequate and rely on a substantial financial guarantee by the province. We note that the federal government has not accepted the Nuclear Waste Management Organization's proposals for waste nuclear fuel management, and no long-term management strategy for these wastes has been approved.
- The environmental goals of the plan are defined almost exclusively in terms of reducing GHG emissions (pg.11). The policy direction that underlies this goal is not apparent. Ontario has no articulated policy on GHG reductions. At the same time, the province is party to a number of intergovernmental and international agreements that highlight other environmental policy goals in terms of air and water quality. GHG emission reductions a critical goal. However responses to the GHG issue should focus on options that do not impose other risks and costs on future generations.
- The plan establishes feasibility and reliability as the overriding system goals (pg.13). Feasibility may a necessary condition for the plan. However, it is difficult to reconcile reliability for current consumers as an overriding goal with the sustainability principles outlined in discussion paper 6. Reliability for current consumers cannot be pursued at the expense of the interests of future generations.
- The loading order outlined in the summary (pg.14) and section 2 depart from standard practice in these areas. The plan considers existing and committed resources first, before CDM or renewables. The structure of the Supply Mix Directive suggests that CDM resources should be considered first, renewables second, and conventional supply third, with existing and committed non-renewable resources being given consideration within that portfolio.

Part 2 – Building the plan

2.1. Required capacity

- As noted in the Pembina Institute's comments on the load forecast discussion paper, the load forecast is subject to a wide range of variables. The projections of some key variables have already been subject to change (e.g. expected future electricity prices). The plan should seek to minimize risks arising from variations in projected load.

- The reserve capacity requirement is driven by considerations of the scale of generating assets (i.e. a system built around a relatively small number of large facilities using a limited range of technologies requires a larger reserve than one constructed around a large number of smaller facilities using a diversity of generating technologies). Potential reductions in reserve capacity requirements arising from different supply mix options do not appear to have been assessed.
- Documentation from the US Environmental Protection Agency (EPA) suggests that 18% is at the high end of reserve margins used utility planning. [2]

2.4. CDM Contribution

- Notwithstanding statements to the contrary, (pg.22) the Plan continues to treat the CDM target in the supply mix directive as a target and not a minimum.
- The Total Resource Cost (TRC) used to assess CDM options does not fully capture the avoided externalized costs associated with avoided generation requirements.
- The estimates of cogeneration potential remain extremely low over the life of the plan (90MW peak savings by 2027), vs. the existing target of 1000MW capacity and identified technical potential for over 16,000MW[3] capacity and economic potential of 6700MW capacity.[4]
- Figure 3.17 suggests the costs of conservation programs will decline over time, which begs the question why additional CDM activities are not contemplated.

2.5. Renewables

- Contribution from solar by 2025 remains extremely low (40MW), particularly relative to other jurisdictions.
- Potential contributions from solar thermal (hot water) and ground source heat pumps continue to be excluded from consideration.

- 2.5.2. New Wind
    - There does not appear to be any consideration of the potential contributions from offshore wind resources.

- 2.5.3. Bioenergy

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[2] http://www.epa.gov/airmarkets/epa-ipm/Section%203.pdf

[3] Hagler Bailly Canada, *Potential for Cogeneration in Ontario: Final Report*, (August 2000), p. 25.

[4] Winfield, et Al., *Power for the Future*, Table 3.5. Supplemental analysis identified 25,563GWh/yr potential for cogeneration in the commercial sector.

- Peat should not be considered a renewable biofuel, given its extremely long regeneration times in northern Ontario, and critical role in carbon storage in the boreal forest.[5]
- The definition of contributions from municipal solid waste (MSW) should be clarified.
    - Does this refer to landfill gas recovery only, or does it include combustion of MSW?
    - It should be noted that efforts to gasify MSW for energy recovery purposes have generally failed.[6] Mass burn MSW technologies are typically net energy consumers due to the need for supplemental fuels (typically natural gas). Use of gas for this purpose is a very low efficiency use of the fuel and therefore cannot be reconciled with the Supply Mix Directive. The need for supplemental fuels can only be reduced by increasing the portion of the energy bearing components of the MSW stream (e.g. organics, paper and plastics) diverted from recycling. Recycling generally provides a much more effective strategy for recovery of the embedded energy in MSW components. Criteria and hazardous air pollutant emission issues with MSW combustion technologies remain unresolved, and MSW combustion has been identified as a significant potential source of GHG emissions relative to recycling.[7] Combustion-based MSW energy 'recovery' efforts should be excluded from the OPA's defintion of biofuels for these reasons. The definition of biofuels in relation to MSW should be limited to landfill gas recovery and gas recovery from anaerobic waste digestion.

- 2.5.4. Hydro Imports
    - Considerable potential hydroelectric import opportunities seem likely to be available from Manitoba, Quebec, and Newfoundland and Labrador (pg.37). The plan currently only considers a short-term (2016-2019) purchase of these resources (Figure 2.13). The plan should provide a more complete analysis of these opportunities, and their potential impact on baseload

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[5] See, for example, M.Anielsi and S.Wilson, *Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems* (Ottawa: Pembina Institute and Canadian Boreal Initiative, 2005) http://www.pembina.org/environmental-governance/doc.php?id=204

[6] *Incinerators in Disguise: Case Studies of Gasification, Pyrolysis and Plasma in Europe, Asia and the United States* (San Francisco: Greenaction for Health and Environmental Justice and Global Alliance for Incinerator Alternatives, April 2006); *Waste Gasification: Impacts on the Environment and Public Health* (Glendale Springs NC: Blue Ridge Environmental Defence League, April 2002).

[7] M.Warhust and A.Watson, *Dirty Truths: Incineration and Climate Change* (London: Friends of the Earth, May 2006).

requirements and the levels of intermittent renewable sources (i.e. wind) that can be integrated into the plan. The continuation of imports from 2016 onwards, for example, could eliminate the requirement for 1400MW of new nuclear capacity by 2019.

- 2.6. Conventional resources
  - 2.6.1. Nuclear
    - The discussion highlights the significant uncertainties and long-time lines associated with the bringing of new or refurbished nuclear capacity into service. Opportunities to reduce the role of nuclear capacity should be maximized for these, among other reasons.
  - 2.6.2. Natural Gas
    - No new gas resources are assumed beyond 2013.
    - CHP and fuel cells are limited to 1100MW.
      - This remains well below the technical and economic potential previously identified by the Ministry of Energy (16,000MW) and the Pembina Institute (6700MW)
    - The OPA's approach to natural gas issues is again based on a misinterpretation of the Supply Mix Directive, which does not cap the use gas resources, it merely requires that gas be used in high value and high efficiency applications. Section 2.7 makes clear the primary rationale for not relying on additional gas to assist with the coal replacement is that it would displace other elements of the "desired long-term generation mix." If the use of additional gas is cost-effective and prudent, then it should be considered part of the "desired long-term generation mix."

- 2.7 Coal Phase-out
  - The plan needs to reconsider Nanticoke conversion to gas, or full replacement of Nanticoke with CCNG generating capacity, particularly if gas infrastructure is to be provided. Either option would provide an ongoing return on investment, as opposed to the relatively short anticipated life of the addition of pollution control equipment to the existing facility.

Part 3 – The Preliminary Plan

Part three of the plan is apparently intended assesses the draft plan in light of the context specific sustainability criteria articulated in discussion paper 6.

3.1. Feasibility and Reliability

3.1.2. Energy Production

- The Plan seems to anticipate substantial electricity exports (18TWh in 2010 and 2025 (Figure 3.10)). Bruce Power's recent export application to the NEB reinforces this theme. No policy framework has been articulated for assessing the need, role or desired level of export capacity, particularly where Ontario ratepayers and taxpayers may be required to bear substantial costs and risks in relation to such activities.
- The plan assumes capacity factors for new and existing nuclear far above historic levels (Figure 3.13).

3.2. Cost Perspective

3.2.1. Cost to consumer

- The discussion of costs to consumers completely excludes discussion of externalized costs. Externalized costs are also borne by consumers as part of their status as members of society. Their consideration should be an integral part of the plan.

3.2.2. Avoided costs and value of conservation

- The current OEB TRC excludes avoided externalized costs of generation arising from conservation efforts. This results in a significant underestimation of the benefits of CDM initiatives.
- The current TRC also operates on an individual program basis. The cost-effectiveness of CDM programs should be considered on a portfolio basis, recognizing the need for capacity building and infrastructure as well as program delivery activities.

3.3. Environmental Performance

- The Pembina Institute provided a detailed critique of the approach to assessing environmental performance in its comments on the Supply Mix Advice document
- Further comments have been provided in relation to Discussion Paper 6 – Sustainability
- The presentation of potential environmental impacts is largely meaningless, as it is based on highly speculative assumptions about the location and nature of future generating facilities and transmission infrastructure, and the contributions to total energy supply of different supply components. It provides little useful information regarding the likely impacts of the plan.
- In general the approach to assessing environmental performance is flawed and inconsistent with the sustainability principles outlined in Discussion Paper 6.
- The major flaws include the following:

- The assessment is incomplete in terms of the scope of assessment and endpoints considered:
    - It is unclear if assessment is lifecycle or generating facility only, and if lifecycle what upstream contributions have been considered in relation to each option.
        - Pg.147 suggests that only operating impacts have been considered. This would be a serious omission, as many generating options have major upstream impacts that must be considered within the framework of sustainability principles laid out in discussion paper 6.
    - Key endpoints are missing including
        - Impacts on water quality
            - This is discussed as a modifier to water use on pg.151, but no discussion is provided of the range and specific types of discharges considered.
        - Radiation releases to media other than air not considered.
        - Impacts on ecosystem structure and function are not considered.
    - The assessment fails to differentiate within key categories of impacts
        - The sustainability principle of intergenerational equity would require a heavier weighting be given to impacts and risks that persist over time vs those that are experienced by current electricity consumers.
        - Wastes generated, for example, are aggregated without differentiation with respect to the hazard properties of different waste streams (i.e. radioactivity, toxicity, acidity, persistence).
            - Pg.157-158 references permanence of waste storage facilities and potential for recycling as only modifiers.
                - This is a entirely inadequate approach given the range of different waste types and characteristics associated with different generating options.
    - The assessment overlooks key areas of risk, particularly with respect to the effects of non-routine events as opposed to normal operating conditions. The framework fails to identify cases where generating options may pose unique or particularly difficult to manage risks.

- The trends indicated over the life of the plan are of little or no value in terms of assessing performance from a sustainability perspective, given the incomplete scope of the assessment, and lack of differentiation within different types of impacts.

3.4. Flexibility

- The document generation does not identify plan attributes/themes that strengthen resilience and flexibility. The key characteristics or endpoints of a 'flexible' plan are not identified.
- The plan requires a more thorough consideration of potential variables affecting key plan assumptions (e.g. changes in load forecast are not considered).
- The plan requires some weighting/assessment of the likelihood of different scenarios.
- The plan needs to consider potential role of some of the mitigating options as alternatives to the plan as presented (Table 3.15).
- Failure/uncertainty around large generating projects (hydro and nuclear) are identified as major drivers of uncertainty. Does this not imply that a plan seeking flexibility would minimize the role of those options?
- Timeframes identified in relation to new nuclear facilities (9-12 years (pg.110)) are difficult to reconcile with the concept of flexibility.

3.5. Social Acceptance

- See comments on Sustainability Discussion Paper.
- The both the preliminary plan and sustainability paper provide little discussion of aboriginal rights issues. This is a significant gap, as questions related to aboriginal and treaty rights may emerge as major issues with respect to both generation development and transmission infrastructure, particularly in northern Ontario, particularly in light of recent judicial decisions regarding these issues.

4. Implementation

- The plan states environmental assessment and safety regulation processes "are well established" for nuclear facilities (pg.109). In reality there has never been a provincial or federal environmental assessment of a new build nuclear generating facility in Canada, and the actual process that such a project would be subject to is not certain.

Recommendations

- The plan should be structured to ensure the pursuit of all cost-effective opportunities for CDM, low-impact renewable energy sources and high-efficiency uses of natural gas, including combined heat and power. Where additional resources are available, the role of conventional supply resources should be reduced.

- The context specific criteria used to assess the sustainability of the plan should be revised to more strongly reflect the principles articulated in discussion paper 6: particularly intergenerational and intragenerational equity. Specific desired outcomes/endpoints should be identified with respect to the context specific criteria, and plan performance assessed in relation to these endpoints.
- The plan should consider imposed and avoided externalized environmental costs in its assessment of the cost-effectiveness of CDM, renewable and conventional options and overall plan costs and impacts. The cost-effectiveness of CDM resources should be considered on a portfolio, not individual program basis.
- The plan should make apparent its assumptions about the impact of market dispatch rules on the utilization of different resources, and consider the potential impacts of different market rules.
- The policy framework for assessing the need, role or desired level of export capacity incorporated into the plan, particularly where Ontario ratepayers and taxpayers may be required to bear costs and risks relation to these activities.
- The plan should assess the impact on reserve requirements associated with different supply models (large centralized vs. distributed).
- The plan should consider the potential contribution of demand displacement technologies, such as solar thermal hot water and ground source heat pumps.
- The plan should consider the potential contributions of off-shore wind resources.
- The definition of renewable bioenergy should exclude the combustion of peat or municipal solid waste (including gasification and pyrolysis).
- The plan should provide a more complete assessment of the opportunities for hydroelectric imports from Quebec, Manitoba and Newfoundland and Labrador, and their potential impact on baseload requirements and the levels of intermittent renewable resources (e.g. wind) that can be incorporated into the plan.
- The plan should re-assess the conversion of Nanticoke to natural gas, or full replacement with CCNG generating capacity.
- A framework for assessing the environmental, health and safety risks and impacts of different plan options should be developed. The framework should incorporate a life-cycle approach, and consider impacts of releases of radiological hazardous and conventional pollutants to the atmosphere and surface and ground water, water use and consumption, waste generation, and ecosystem and landscape impacts, as well as safety and security risks. Impacts that persist over time (imposing costs and risks on future generations), or impact communities and individuals other than Ontario electricity consumers should be highlighted. The risks and impacts of non-routine events (e.g. accidents and incidents) should be assessed, and unique or particularly difficult to manage risks identified.
- The plan should identify aboriginal and treaty rights issues that may affect plan assumptions.