TRANSMISSION ALTERNATIVES CONSIDERED

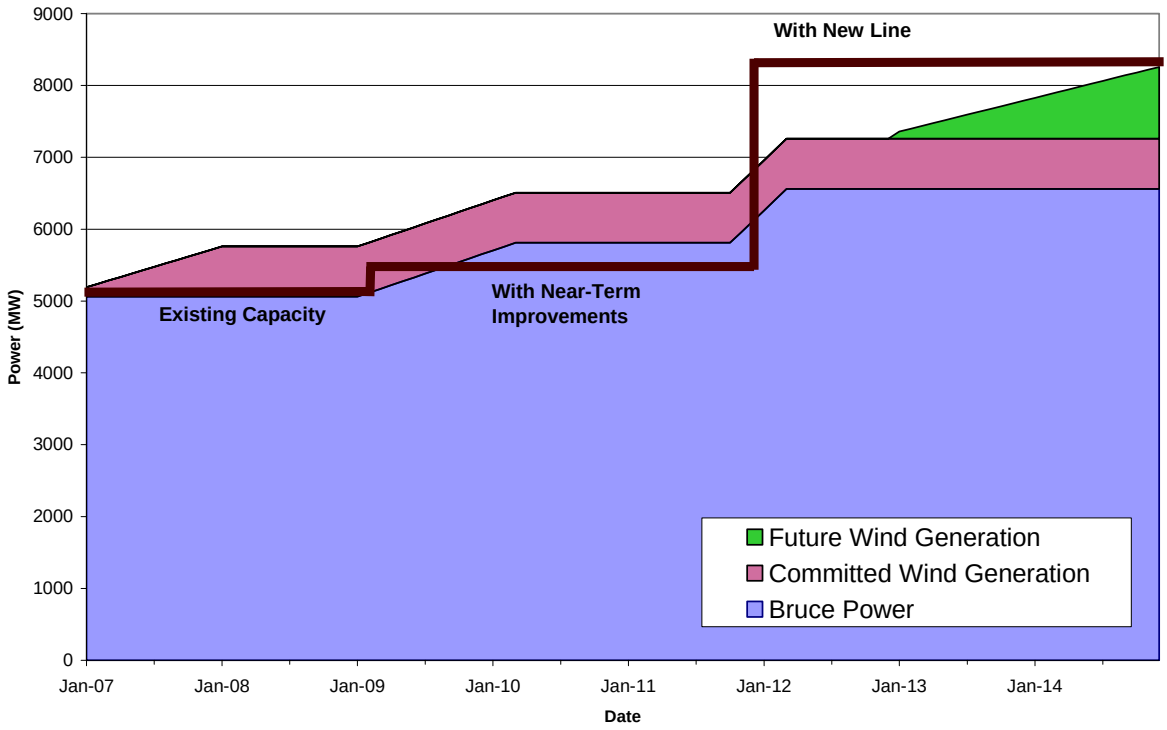
As indicated in Exhibit B, Tab 6, Schedule 5, Appendix 1, the OPA has the responsibility for long-term power system planning in Ontario under the *Electricity Act, 1998*. As part of the development of the IPSP, the OPA has assessed alternatives for reinforcing the transmission system in southwestern Ontario.

In the OPA's letter dated December 22, 2006 (found at Exhibit B, Tab 6, Schedule 5, Appendix 2), the OPA recommended that Hydro One implement certain near-term measures (uprating existing 230 kV circuits from Hanover to Orangeville, and installing static or dynamic shunt capacitors), and interim measures (installing generation rejection for the Bruce generation, and possibly, installing series compensation facilities on the Bruce to Longwood and Longwood to Nanticoke 500 kV circuits) in recognition of the fact that the new 500 kV transmission line could not be built by 2009, when additional generation is added to the area. In its letter dated January 17, 2007 to the OPA (found at Exhibit B, Tab 6, Schedule 5, Appendix 3), Hydro One indicated its commitment to proceed with these measures, other than series compensation which is pending the results of a due diligence study to be undertaken by the OPA. The near-term and interim measures bridge the transmission capability shortfall until the new 500 kV line is in-service. The earliest in-service date for the new 500 kV line is December 2011, assuming expedited approvals. At that time, the full capacity of all of the Bruce units and the committed wind generation in the Bruce area are expected to be available (refer to Figure 1 below).

While the near-term measures provide long-term value, the OPA indicated that the interim measures are not an alternative to the 500 kV transmission line since they increase the risk to the security and reliability of the power system. Furthermore, these measures will not provide sufficient capability to incorporate additional generation

resources in the Bruce area. The only option that is capable of that is a new 500 kV double-circuit line directly connecting the Bruce Power Complex to the GTA. The forecast resource capacity and the transmission capabilities associated with the near-term and long-term solutions are shown in Figure 1 below.

Figure 1: Bruce Area Available Generation & Transmission Capacity (2007 – 2014)



Source: OPA

As part of its assessment, the OPA assessed various options for reinforcing the transmission system to ensure that there will be adequate capacity available to transmit all available generation resources from the Bruce area. The OPA's determination, included in a letter dated March 23, 2007, is attached as Exhibit B, Tab 6, Schedule 5, Appendix 4. The OPA concluded that reinforcement of the 500 kV Bruce to the GTA

direct transmission path has superior technical advantages over all the other alternatives considered. The assessment also considered other key objectives, including:

- Consistency with provincial land use policy (refer to Exhibit B, Tab 6, Schedule 5, Appendix 13) for optimizing the use of existing transmission rights-of-way;
- The ability to be constructed and in-service as soon as possible;
- The use of proven and widely used technology; and,
- The reasonableness of the estimated project cost.

The OPA concluded that the only alternative that meets the long-term need and satisfies the other key objectives is a new double-circuit 500 kV line from Bruce to Milton within a widened existing Bruce to Milton corridor.

Other Alternatives Considered

The OEB Filing Requirements for Transmission and Distribution Applications (EB-2006-0170, page 35) require the Applicant to present to the Board "the smallest number of alternatives consistent with conveying to the Board the major solution concepts available to meet the same objectives that the preferred option meets" and to "compare the alternatives versus the preferred option along various risk factors."

This section sets out the alternatives considered and compares the risks of the proposed project against the alternatives using need and the other key objectives noted above.

Also as per the Filing Requirements, a "Do Nothing" Option is not required to be provided, as the project is a non-discretionary project (see Exhibit B, Tab 6, Schedule 5, Appendix 1, pages 3 to 4), and doing nothing would not meet the need.

In its work on the development of the IPSP, the OPA considered the alternatives below for new 500 kV transmission facilities in the Bruce area. These options were not carried forward as they either did not meet the transfer capability need highlighted in Exhibit B, Tab 1, Schedule 3 and in Exhibit B, Tab 6, Schedule 5, Appendix 1, or did not satisfy the other key objectives, including consistency with provincial land use policy to optimize the use of existing transmission corridors, achievability of a timely in-service date, the use of proven technology, and reasonable cost.

1. *A 190 km double-circuit 500 kV line from Bruce to Essa TS (west of Barrie in Simcoe County).* This option would provide only about 7,300 MW of transfer capability, which is about 1,000 MW less than the 8,300 MW of generation that will be available (see Exhibit B, Tab 1, Schedule 3). The Bruce to Essa option would also have a direct impact on the transmission path between Essa TS (Barrie area) and Claireville TS (GTA), using up more than 1,000 MW of transfer capability along this path, thereby limiting the future development of renewable generation in northern Ontario. Accordingly, this option was eliminated by the OPA for failing to meet the needed transfer capability. As the length of this route is similar to the length for Bruce to Milton (about 190 km vs. 180 km) and it would similarly run adjacent to existing transmission corridors, the cost for Bruce to Essa would likely be similar to the cost for Bruce to Milton and would also be consistent with provincial land use policy. Timelines for approval and construction would also be similar, and technology (AC overhead lines) would be the same.

2. *A 190 km double-circuit 500 kV line from Bruce to Kleinburg TS located north of Toronto on the Essa TS to Claireville TS transmission corridor (in the western part of York Region).* This option would meet the transfer capability need but would require the acquisition of a new transmission corridor over 52 km of the

route. Since this option is not consistent with provincial land use policy to optimize the use of existing corridors, it was eliminated. Although similar in length to Bruce to Milton (about 190 km vs. 180 km), this option would also tend to be more costly, due to the full corridor width required for a new right-of-way compared with Bruce to Milton, which widens an existing corridor. With the new right-of-way, approval timelines were also expected to be longer, leading to a later in-service date. Technology (AC overhead lines) would be the same.

3. *A 150 km double-circuit 500 kV line from Bruce to a potential future transmission station south of Guelph (Crieff TS) located along the 500 kV Middleport TS to Milton SS transmission corridor.* This option would meet the transfer capability need but would require the acquisition of a new transmission corridor over at least 30 km of the route. Since this option is not consistent with provincial land use policy to optimize the use of existing corridors, it was eliminated. Although shorter by 30 km than Bruce to Milton (about 150 km vs. 180 km), the lower construction cost associated with the shorter length of this option would be partly offset by the greater land requirements and costs associated with the full width of new right-of-way required, compared with the widened corridor required for Bruce to Milton. The costs would also be increased by the need for a new autotransformer station at Crieff, where none currently exists. With the new right-of-way and station required, approval timelines were also expected to be longer, leading to a later in-service date. Technology (AC overhead lines) would be the same.

4. *A new 190 km double-circuit 500 kV line from Bruce to Longwood TS near London, along the existing Bruce to Longwood TS transmission corridor, plus a new 150 km double-circuit 500 kV line from Longwood TS to Middleport TS southwest of Hamilton, along an existing transmission corridor.* This option

would provide a transfer capability which is inferior to the Bruce to Milton option and less than the 8,300 MW of generation available. The route is approximately 340 km long, which is considerably longer than Bruce to Milton (180 km) and hence significantly more expensive and technically complex. Accordingly, this option was eliminated. Although this option is consistent with provincial land use policy through its use of existing transmission corridors, the longer length and greater land requirements would also likely lead to longer approvals and a later in-service date. Technology (AC overhead lines) would be the same.

5. *A high voltage direct current (HVDC) line from Bruce to Milton SS.* This option would also require the construction of alternating current (AC) to direct current (DC) converter stations at both ends and either an underground or overhead HVDC line. This option is estimated to cost $1.5 billion or $2.0 billion, based on conventional overhead DC line or HVDC Lite underground cable technology, respectively. These costs are more than two to three times higher than the $635 million estimated for the AC double-circuit 500 kV line from Bruce to Milton. The HVDC Lite option is also not in commercial use elsewhere at the required level of capability, giving rise to a technology risk. In addition, HVDC Lite has higher losses than AC technology. For these reasons, the Bruce to Milton HVDC option was eliminated from further consideration.