Toronto Hydro-Electric System Limited 2012-2014 Rates Hearing (EB-2012-0064)

OPA Summary of its Evidence-in-Chief

Introduction

Toronto Hydro-Electric System Limited ("THESL") has applied for capital funding in respect of a new step down transformer station, Bremner TS in its current Rates Application.[1] This station is to be located within the geographical bounds of the ongoing integrated electricity plan for Toronto ("Toronto Regional Plan" or "TRP"), which is an integrated review and plan for the City of Toronto's long-term electricity needs. In response to a request from Environmental Defense, an intervenor in the THESL application, for the Ontario Power Authority ("OPA") to appear as a witness at the Bremner portion of the oral hearing, the OPA requested and was granted late intervenor status in the case.

The purpose of this submission is to provide the Board with information on the OPA's approach to regional planning; the current status of the TRP and how the TRP integrates THESL's distribution plans, including the Bremner TS Project; achievements in Conservation and Demand Management ("CDM") to date in Toronto and their associated cost; the potential for future OPA-funded CDM in the Toronto region, as allocated from provincial forecasts to a regional level; and the status of OPA-funded Distributed Generation ("DG"). This is consistent with the matters identified in the OPA's letter to the Board dated February 8th, 2013 as areas where the OPA is able to provide evidence.

The OPA's Current Approach to Regional Planning

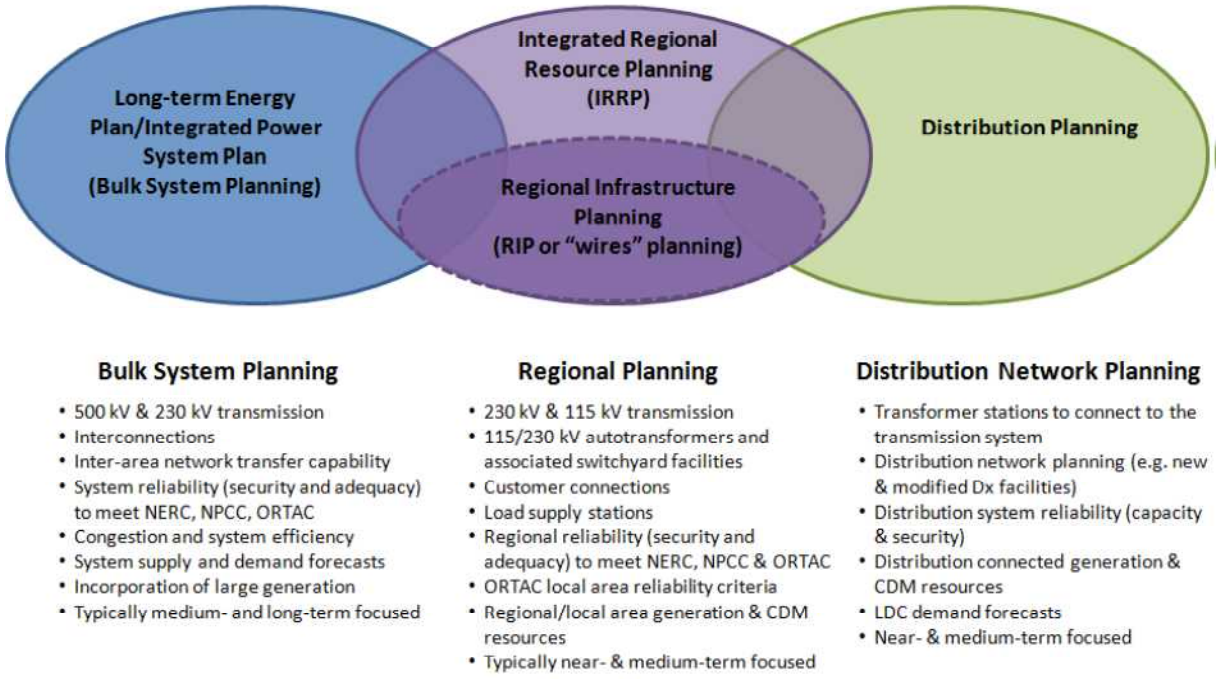
Planning for the electricity system in Ontario is generally conducted at three levels: (1) bulk system planning, (2) regional system planning, and (3) distribution system planning. The OPA has the accountability for the integrated planning of the bulk power system, which typically considers the 230 kV and 500 kV elements of the network. Regional system planning looks at supply and reliability issues more locally and typically considers the 115 kV and 230 kV elements of the power system. As such, regional planning can overlap with bulk system planning at common interface points, such as when a new bulk supply station can also function to serve a local load pocket. Similarly, regional planning can overlap with distribution planning. An example might be where multiple distributors can coordinate to leverage a single new station for additional supply.

Because of the interrelationships between these levels of planning, the integrated regional resource planning process ("IRRP") involves and reflects input from the OPA, Local Distribution Companies ("LDCs"), transmitters and the IESO, all of whom coordinate and as necessary collaborate to formulate regional solutions. For example, as discussed in more detail below, the OPA has been working closely

[1] A new step-down transformer station in downtown Toronto has been a consideration in at least three major transmission studies for Toronto dating back to the early 1990s: Toronto Integrated Electrical Service Study (Ontario Hydro, 1994); Electrical Study for the City of Toronto (Hydro One and THESL, 2003); City of Toronto Electric Supply Study: Adequacy of Transmission Facilities and Transmission Supply Plan for the Central Toronto Area 2006-2021 (Hydro One and THESL, 2006).

with THESL, the IESO, and HONI on an integrated electricity plan for downtown Toronto. Figure 1, taken from the Draft Planning Process Working Group Report to the Board, reflects the interrelationships between the three levels of planning.

Figure 1: Three levels of electricity system planning and their potential interrelationships



Source: Ontario Energy Board, Planning Process Working Group Report to the Board: The Process for Regional Infrastructure Planning in Ontario (February 5, 2013)

Although each IRRP study may differ in geographic scale and electricity service issues being addressed, there are certain processes common to most studies. Each participant brings their own relevant expertise and knowledge to the table. The OPA contributes its independent planning perspective and expertise, coordination and integration of the plan elements; LDCs contribute load forecasts, distribution plans, local knowledge with respect to asset condition and the distribution network, and local CDM and DG opportunities; Hydro One contributes transmission performance and condition data, and refurbishment plans; and, the IESO provides guidance on planning criteria, system operability, restoration, and load transfer capabilities. All organizations coordinate on stakeholder engagement activities.

Solutions consider and integrate all feasible options to meet the needs identified in the IRRP, and take into account conservation, generation, transmission and distribution. Distribution options are considered as potential components of the plan if they can address a regional need more effectively in cost and/or performance than transmission or other resource options.

While the IRRP process is informed by information and inputs from LDCs and may include distribution-level investments which can address regional needs, the OPA does not itself participate in distribution planning. LDCs, in accordance with their license conditions and applicable codes and regulations, are

responsible for distribution planning within their service territories and for ensuring that all local needs are appropriately addressed.

An Integrated Electricity Plan for Toronto

The TRP is reviewing electricity service needs for the City of Toronto, with a focus on the central and downtown 115 kV transmission supplied areas. The TRP integrates all resources including CDM, DG, distribution, and transmission options to meet Toronto's future capacity, reliability, and supply security needs, and is consistent with the process as described by the Planning Process Working Group's Report to the OEB.

The scope of the plan was determined in December 2011 and planning is ongoing. It is a joint plan being undertaken by the OPA, THESL, Hydro One, and the IESO.

The TRP has been initiated for the Central-Downtown Toronto area at this time because:

- Urban development, including intensification and revitalization, is occurring rapidly in the area, especially the tall building boom downtown, which needs to be considered from an electricity planning perspective;
- The transmission and distribution systems supplying the area include some of the oldest such systems in the province, with several key assets reaching end-of-life in the next 10-15 years;
- Stakeholders, including large commercial customers and trade associations, have expressed heightened concern about the reliability and security of electricity supply in the area, given the criticality of supply continuity in the central business area;
- The supply to downtown Toronto was last examined in detail in 2007 as part of the IPSP and is due for review;
- Supply to the 230kV supplied Metro Toronto area is generally adequate and reliable from a transmission standpoint (which is why the plan focuses on Central-Downtown Toronto area); and
- Re-examining the supply to downtown will assist with the coordination of broader system plans of the OPA, and will help Hydro One and THESL align their respective capital plans.

The status of the TRP is as follows:

- THESL delivered a long-term load forecast to the OPA in January 2013 covering a 25-year period.
- An assessment of transmission system adequacy and reliability has been completed using THESL's load forecast, with consideration of additional demand scenarios based on planned future CDM achievement and existing and contracted DG projects.
- Development of near-, medium- and long-term options, including additional CDM, DG, and transmission and distribution system enhancements, are in progress, and will be developed by Spring 2013.
- Preparations to consult with key stakeholders on needs and options are underway, and scheduled to commence once integrated options are fully developed – likely Q2 2013.

- Once stakeholder input has been received, it will be incorporated into the integrated plan.
- The plan is scheduled to be completed by the end of 2013.

Bremner TS Functionality and Relation to the TRP

THESL's plans to develop Bremner TS to meet immediate refurbishment needs were well underway at the time the scope for the TRP was developed. As such, the TRP assumes that Bremner TS will be in place and it recognizes the functionality that this additional TS will bring for downtown Toronto electricity service. If the outlook for Bremner TS changes, the assumptions used in the TRP would need to be revisited.

As indicated in THESL's evidence, this distribution station sited in the downtown core serves a number of key functions, in addition to providing the area with additional capability to supply future demand growth, in particular:

- Bremner TS will provide more feeder connection capacity for new buildings that are currently being constructed in the vicinity of the John/Windsor TS (there is no available bus capacity at John/Windsor TS for new feeder connections).
- Bremner TS will provide relief for THESL to take long outages at John/Windsor TS in order to refurbish obsolete switchgear; this work is necessary in the near-term to maintain reliability of electricity service in the downtown core.
- From a supply security perspective, Bremner TS will provide an alternate point of supply in the event of an interruption of service from John/Windsor TS, providing customers in the area with an enhanced level of reliability.

In addition to the rationale which THESL explains in its evidence, Bremner TS, as it is proposed by THESL, can also provide regional benefits, which are being taken into account in the development of the TRP. The addition of this station to the downtown system will provide an additional option for transferring loads from the west side of the city to the east side of the city, as required to meet prescribed reliability standards.[2] Without Bremner TS, options for transferring downtown load to meet reliability standards are more limited, and the magnitude of load curtailment required would be significantly greater.

As indicated in the OPA's letter to THESL dated November 21, 2012:

"The OPA supports strategic distribution investments that provide flexibility to enable connection of growth in demand, refurbishment of existing assets, and improvements in restoration for both distribution and transmission contingencies."

[2] The IESO's Ontario Resource and Transmission Assessment Criteria as well as the reliability standards of the Northeast Power Coordinating Council Inc. and the North American Electric Reliability Corporation recognize the condition of a system contingency following an outage and system re-preparation (e.g., "N-1-1").

Status of CDM in Toronto and Potential for Future CDM

The OPA has gained considerable experience over the past seven years of investing in CDM programs to enable customers to reduce their demand and energy consumption. CDM targets have been set by the province. The OPA is confident, based on projections and results to date, that electricity consumers will continue to become more efficient over time.

There is potential for continued savings from CDM in Toronto. The city also continues to grow and intensify as more people are moving into the downtown core and more tall buildings are being built and proposed. Higher efficiency of use will occur over time and the focus and investment will continue. THESL, as the primary delivery partner for the OPA-Contracted Province-Wide CDM programs, has the knowledge and customer relationships to effectively identify and target conservation opportunities in Toronto.

Conservation Targets

In February 2011, the Minister of Energy issued a Supply Mix Directive to the OPA setting out the government's policy direction for the province. This directive updated the conservation targets set in the previous Supply Mix Directive issued in 2006. The provincial conservation target is a peak demand reduction of 7,100 MW and an energy savings target of 28 TWh by the end of 2030. Interim targets designed to serve as milestones are also established with the milestone for 2015 being 4,550 MW and 13 TWh. These targets are measured from the base year of 2005 and include savings forecasted through the implementation of codes, standards, regulations and other initiatives that are progressive and reasonable based on OPA analysis.

In March 2010, the Minister of Energy and Infrastructure issued a directive to the Ontario Energy Board ("OEB") requiring it to establish targets for each LDC to be achieved by the end of 2014. As a result of this directive, LDCs are collectively accountable for peak demand reduction totaling 1,330 MW by 2014. This target can be achieved using either OPA-Contracted Province-Wide CDM programs, Board approved programs, or a combination. In April 2010, the Minister issued a directive to the OPA requiring it to undertake the strategic co-ordination of LDC conservation efforts by providing advice to the OEB on LDC targets and on the administration of conservation activities by the OEB, and to design, deliver and fund OPA-Contracted Province-Wide CDM programs.

Conservation Achievement to Date: Ontario and THESL

The OPA and THESL have been actively engaged in the development and execution of CDM programs since 2006. The results of these programs to date are summarized below.

In 2011, the most recent year for which verified data is available, the provincial incremental conservation savings achieved from energy efficiency and demand response programs offered by both the OPA directly and through the LDCs was 645 MW of demand reduction and 717 GWh of energy savings. Of these savings, 49.8 MW in incremental peak demand savings and 172.9 GWh in energy

savings were achieved by THESL within its service territory from the delivery of OPA-Contracted Province-Wide CDM programs.

The 2011 net annual provincial and THESL service territory CDM savings from a base year of 2006 is presented in Table 1. This table includes verified savings from OPA funded energy efficiency and demand response programs and provincial OPA estimated savings for codes and standards and time-of-use pricing. The provincial estimated savings for codes and standards and time-of-use pricing have been allocated to the THESL service territory based on a 2009 provincial-to-LDC peak demand allocation factor of 21.5%.

Table 1: Summary of Ontario and THESL energy and demand savings (2006-2011)[1]

	Ontario		**Toronto**	
	2011 Net Annual Energy Savings (2006 base year) (GWh)	2011 Net Annual Peak Demand Reduction (MW)	2011 Net Annual Energy Savings (2006 base year) (GWh)	2011 Net Annual Peak Demand Reduction (MW)
TOTAL	**3,686**	**1,612**	**1,066**	**404**
OPA funded programs – Energy Efficiency[2]	2,603	897	847	278
OPA funded programs – Demand Response[2]	70	384	1	55
Codes and standards[3]	1,012	284	218	61
Time-of-use[3]	0	48	0	10

Notes: [1] At the generator level
[2] OPA verified savings
[3] OPA estimated savings

CDM Forecast Assumptions Used in Developing the Toronto Regional Plan

Conservation is an important part of the regional planning process, and is primarily accounted for in the load forecast. This is done using the following methodology. First, the OPA develops a provincial forecast of annual CDM savings necessary to meet the provincial 2030 target, including expected contribution by category of conservation. Next, the provincial demand reduction forecast is allocated to the LDC level, weighted proportionately according to historical demand (Table 2). This approach assumes that CDM achievement will be distributed uniformly across the province based on historical demand.

These LDC level CDM forecasts must be further broken down to create accurate net demand forecasts on a transformer station ("TS") basis. Since CDM achievement is closely tied to factors such as customer composition, municipal plans and growth, the OPA works with the LDC involved to allocate these CDM savings. In the case of the TRP, THESL provided the OPA with a geographic distribution of residential and non-residential customer accounts. This information was used to allocate the CDM forecast across the THESL service territory on a geographic basis.

The forecast provided by THESL includes the effect of existing and new CDM programs to meet the 2014 LDC mandated targets and existing Codes and Standards, plus persistence for these measures during the forecast period. Up to the year 2014, THESL anticipated that these existing and planned programs would exceed the CDM levels forecast by the OPA. As a result, no modifications were made to the THESL load forecast in these years. After 2014, the OPA adjusted THESL's forecast by adding the CDM necessary to meet the total CDM forecast for their service territory, as allocated from the 2030 provincial targets.

In order to account for a range of possible CDM outcomes, different sensitivity scenarios were developed to test the robustness of the associated planning outcomes:

1. **100% forecast CDM Scenario** – assumes the provincial target will be fully met, including programs, Codes and Standards and Time-of-Use Pricing.
2. **50% forecast CDM Scenario** – considers the risk associated with partial achievement of the full target, delayed achievement, or CDM being distributed throughout the province in a non-uniform manner.
3. **100% Codes & Standards and Time-of-Use Scenario** – assumes full achievement of the provincial Codes & Standards and Time-of-Use pricing, with remaining categories only accounted for up to the 2014 LDC mandated target. This scenario was developed to address concerns that non-Provincial programs are currently unfunded beyond 2014, and has slightly higher CDM than the 50% CDM scenario, though achievement is higher among Non-Residential customers, which influences the heavily commercial loads of downtown Toronto.

The potential for enhanced CDM options will be considered within the context of the TRP.

Table 2: Allocation of provincial peak demand reduction targets to LDC for long term planning, by category (MW, incremental from 2010)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Toronto Hydro Electric System Limited	Provincial-to-LDC Peak Allocation Factor: 21.52%																				
Energy Efficiency (including C&S)	64.6	130.9	191.9	259.0	314.9	390.5	469.5	555.0	618.2	681.5	748.2	813.0	875.0	936.5	988.4	1022.6	1048.9	1074.1	1089.1	1108.5	1124.2
Codes and Standards (C&S)	*37.3*	*69.4*	*93.3*	*118.9*	*144.4*	*171.2*	*199.8*	*229.2*	*259.3*	*290.1*	*326.3*	*366.0*	*407.0*	*448.8*	*491.6*	*534.7*	*578.4*	*623.3*	*665.6*	*707.9*	*746.1*
Time-of-Use	7.9	16.5	26.6	36.5	44.3	46.7	48.2	48.2	48.2	48.2	48.6	49.0	49.5	50.0	50.6	51.2	51.8	52.4	53.0	53.7	54.3
Demand Response	18.9	43.5	70.8	98.6	99.7	101.3	102.9	104.5	106.2	107.0	107.4	107.8	108.1	108.5	108.8	109.2	109.6	110.0	110.3	110.7	111.1
Sub-total	*91.4*	*190.9*	*289.2*	*394.0*	*458.9*	*538.5*	*620.6*	*707.7*	*772.6*	*836.7*	*904.2*	*969.8*	*1032.6*	*1095.1*	*1147.8*	*1183.0*	*1210.3*	*1236.4*	*1252.4*	*1272.9*	*1289.6*

Status of DG in Toronto

In general, the OPA's experience in generation procurement and planning has provided some insights on DG potential in urban areas. While there may be substantial technical potential for DG resources, there are challenges to attracting existing building or asset owners to develop DG that is cost-effective for electricity ratepayers. A number of factors may be contributing to this, including lack of sufficient space for siting, environmental regulations, technical challenges, and complexity of commercial arrangements that increase the cost and difficulty of building, permitting and operating DG in urban areas.

In recent years, generation procurements under which DG resources have been eligible have included the Renewable Energy Standard Offer Program ("RESOP"), Feed-in Tariff Program ("FIT"), Combined Heat and Power (CHP IV) and the Clean Energy Standard Offer Program ("CESOP"). The response and uptake from all of these programs is taken into account in OPA's assumptions and assessments of transmission adequacy and reliability for the area. A summary of the results of these procurements are provided in Table 3.

Table 3: Summary of applications and contracts for Distributed Generation in Downtown Toronto

	Non-Terminated Application Count	Applied Capacity (MW)	Contracted Capacity (MW)	Peak Contribution (MW)
Micro-FIT	52	0.3	0.138	0.04
FIT	Applications currently under review		1.1	0.33
CESOP	2	3.5	0	0
CHP IV	1	45	0	0

Source: OPA

The potential contribution to peak demand of the contracts offered to date, which is the critical measurement used in system planning, is 370 kW at the five downtown Toronto transformer stations (Esplanade TS, John/Windsor TS, Strachan TS, Cecil TS and Terauley TS).

In developing plans within the IRRP process, the OPA considers opportunities for DG for meeting local and regional system needs. The LDCs generally have the best information regarding new DG resources proposing to connect to their distribution system through inquiries and applications for connection. As referenced in THESL's 2012 GEA Plan, there is currently about 18 MW of DG connected to the downtown transformer stations, and in the following five years, up to an additional 2 MW is forecast to connect at these stations. This is consistent with the OPA's general view on the likely uptake of DG resources.

As part of the ongoing planning work, the OPA has engaged a number of stakeholders regarding the potential opportunity to leverage the existing fleet of backup generators within the study area, the vast majority of which are diesel powered. These discussions indicate that this fleet has the potential to provide some peak contributing capacity, most likely in the order of tens of MW. However, accessing this capacity could require substantial investment in Selective Catalytic Reduction exhaust after-treatment, potential upgrades to the fuel storage systems, as well as enhancements to building switchgear and electrical protections and Environmental Assessment costs. There is also no certainty

that the Ministry of the Environment would authorize the required changes to Certificates of Approval that would allow these machines to operate for power generation purposes (non-emergency generation). Therefore, at this time it is not known what the scope of required improvements would be or the total cost of contracting the resources. The OPA continues to assess the potential for DG as part of the TRP.