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March 17, 2008

BY COURIER (10 COPIES) AND EMAIL

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, Suite 2700
Toronto, Ontario M4P 1E4
Fax: (416) 440-7656
Email: boardsec@oeb.gov.on.ca

Dear Ms. Walli:

Re: Pollution Probe – Motion for Full and Adequate Interrogatory Responses
EB-2007-0791 – Ontario Power Authority – Fiscal 2008

Please find enclosed Pollution Probe's motion for the Ontario Power Authority to provide full and adequate interrogatory responses in this matter.

Yours truly,

Basil Alexander

BA/ba

Encl.

cc: Applicant and Intervenors per Procedural Order No. 1

EB-2007-0791

ONTARIO ENERGY BOARD

IN THE MATTER OF sections 25.20 and 25.21 of the *Electricity Act, 1998*;

AND IN THE MATTER OF a Submission by the Ontario Power Authority to the Ontario Energy Board for the review of its proposed expenditure and revenue requirements and the fees which it proposes to charge for the year 2008.

MOTION RECORD

(Pollution Probe Motion for Full and Adequate Interrogatory Responses)

March 17, 2008

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Counsel for Pollution Probe

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EB-2007-0791

ONTARIO ENERGY BOARD

IN THE MATTER OF sections 25.20 and 25.21 of the *Electricity Act, 1998*;

AND IN THE MATTER OF a Submission by the Ontario Power Authority to the Ontario Energy Board for the review of its proposed expenditure and revenue requirements and the fees which it proposes to charge for the year 2008.

NOTICE OF MOTION
(Pollution Probe Motion for Full and Adequate Interrogatory Responses)

THE INTERVENOR, POLLUTION PROBE, will make a motion to the Board on a date and time to be set by the Board, at the Board's Hearing Room, 25th Floor, 2300 Yonge Street, Toronto, ON, M4P 1E4.

PROPOSED METHOD OF HEARING: The motion is to be heard:

[ ] in writing because it is ;

[ ] in writing as an opposed motion;

[X] orally.

THE MOTION IS FOR:

1. An Order that the Ontario Power Authority shall provide full and adequate responses to Pollution Probe Interrogatory Nos. 1 to 38; and

2. Such further and other relief as counsel may request and that seems just to the Board.

THE GROUNDS FOR THE MOTION ARE:

Summary

1. Pollution Probe seeks an Order that the Ontario Power Authority (the "OPA") provide full and adequate responses to Pollution Probe's Interrogatories Nos. 1 to 38 related to local area electricity supply in the Northern York Region and the Kitchener-Waterloo-Cambridge-Guelph area.

Detailed Submissions

2. The Board included Issue 1.2.b as an issue on the Final Issues List for this proceeding. This issue focuses on whether the budget allocated to Local Area Supply and CDM activities is appropriate. The Board also noted in its *Decision on Issues* that:

> In order to determine if the [OPA's] fees are reasonable, of course, some examination of the costs that make up this fee may be necessary.

3. The Board's conduct of this proceeding is governed by the Board's standard statutory objectives in section 1(1) of the *Ontario Energy Board Act, 1998*:

> 1. (1) The Board, in carrying out its responsibilities ***under this or any other Act in relation to electricity***, shall be guided by the following objectives:
>
> 1. ***To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service.***
>
> 2. ***To promote economic efficiency and cost effectiveness*** in the generation, transmission, distribution, sale and demand management of electricity and to facilitate the maintenance of a financially viable electricity industry. [emphasis added]

4. In the OPA's prefiled evidence, the OPA states the following regarding Local Area Supply Concerns:

> The OPA has been working to address local area supply issues and will continue to do so in 2008. Many of the local areas in Ontario with supply concerns are in different stages of the planning process. ***In some local areas, the needs have already been assessed and a plan has been developed. These areas are now in the implementation phase***, but still require support from the OPA for further technical studies and consultation with local municipalities and community groups. ***Examples include Northern York Region, Kitchener-Waterloo-Cambridge-Guelph***, and Downtown Toronto. Work in these areas will included monitoring implementation of the recommended solution and initiating back-up plans if necessary. [Exhibit B, Tab 1, Schedule 1, page 3] [emphasis added]

5. Accordingly, Pollution Probe submitted to the OPA 19 interrogatories specifically regarding the Northern York Region local supply area and a further similar 19 interrogatories specifically regarding the Kitchener-Waterloo-Cambridge-Guelph local supply area.

6. However, the OPA simply responded that it considered these interrogatories to be outside the scope of this proceeding without further explanation as to why these interrogatories are outside this proceeding's scope. Pollution Probe fails to see any valid rationale behind the OPA's position given the apparently clear language of the Final Issues List and the Board's Decision on Issues as well as the apparently clear references in the OPA's own prefiled evidence.

7. The OPA also stated that ***some*** of the sought information ***may*** be found in filings in various other proceedings. However, Pollution Probe submits that it is the OPA's obligation to fully and adequately respond to interrogatories instead of asking Pollution Probe to search for "needles in haystacks", particularly when the requested information may not even be there, and when it is the OPA who has the most familiarity with the information to which it has referred.

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8. Pollution Probe thus submits that the OPA has not, as required by the Rules, provided full and adequate responses to these interrogatories, which appear to be within the scope of this proceeding given the apparently clear language of Issue 1.2.b, the Board's Decision on Issues, the Board's statutory objectives, and the OPA's own prefiled evidence. Pollution Probe thus further submits that the Board should order the OPA to provide full and adequate answers to these interrogatories.

9. For the Board's reference, Pollution Probe does not intend to lead evidence in this proceeding; it simply wants the information to which it believes it is entitled in order to properly understand, analyze, and potentially cross-examine regarding the OPA's activities with respect to these local supply areas in accordance with the Board's statutory objectives.

Statutory Instruments and Orders Relied On

10. Pollution Probe particularly relies on section 1(1) of the *Ontario Energy Board Act, 1998*, section 25.21 of the *Electricity Act, 1998*, and Rules 29.01, 29.02, and 29.03 of the *Ontario Energy Board Rules of Practices and Procedure.*

THE FOLLOWING DOCUMENTARY EVIDENCE will be used at the hearing of the motion:

1. The affidavit of Jack Gibbons and the exhibits attached thereto; and

2. Such further materials as Pollution Probe may submit.

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Date: March 17, 2008

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Counsel for Pollution Probe

TO: **ONTARIO POWER AUTHORITY**
per Procedural Order No. 1, Appendix A

AND TO: **INTERVENORS**
per Procedural Order No. 1, Appendix A

EB-2007-0791

ONTARIO ENERGY BOARD

IN THE MATTER OF sections 25.20 and 25.21 of the *Electricity Act, 1998*;

AND IN THE MATTER OF a Submission by the Ontario Power Authority to the Ontario Energy Board for the review of its proposed expenditure and revenue requirements and the fees which it proposes to charge for the year 2008.

AFFIDAVIT OF JACK GIBBONS
(Affidavit Supporting Pollution Probe Motion for Full and Adequate Interrogatory Responses)

I, **JACK GIBBONS**, of the City of Toronto in the Province of Ontario, **MAKE OATH AND SAY:**

Background

1. I am an economist and a consultant to Pollution Probe and Director of the Energy Programme at Pollution Probe, and I am authorized to swear this affidavit on Pollution Probe's behalf. I have participated and provided evidence at Ontario Energy Board hearings on multiple occasions, and I am a former Toronto Hydro Commissioner.

2. Except where I obtained information from other sources, I have personal knowledge of the matters discussed here. In cases where I obtained information from other sources, I state the sources of such information, and I declare that I verily believe all such information to be true.

3. I swear this affidavit in support of the motion being brought by Pollution Probe for the OPA to provide full and adequate responses to various Pollution Probe interrogatories. I

do not swear this affidavit for any improper purpose.

Key Information for Motion

4. Attached as **Exhibit "A"** is a marked-up copy of the Final Issues List approved by the Board for this proceeding (which was attached as Appendix "B" to the Board's Decision on Issues dated February 11, 2008). Issue 1.2.b clearly states that one of the issues in this proceeding is "***Is the budget allocated to Local Area Supply*** and CDM ***activities appropriate?*** [emphasis added]". It thus appears that the OPA's budget with respect to its Local Area Supply activities are clearly an issue for this proceeding.

5. In addition, the Board has clearly stated that "[i]n order to determine if the fees are reasonable, of course, some examination of the costs that make up this fee may be necessary." This statement can be found at page 3 of the Board's Decision on Issues for this proceeding dated February 11, 2008, and a marked-up copy of the Decision without appendices is attached as **Exhibit "B"**. Accordingly, it appears that the intervenors can ask interrogatories about the OPA's activities with respect to Local Area Supply as part of this proceeding, for the aforementioned purposes.

6. The OPA's pre-filed evidence includes two overview pages about the OPA's activities with respect to Local Area Supply at Exhibit B, Tab 1, Schedule 1, pages 3-4, and a marked-up copy of these pages is attached as **Exhibit "C"** to my affidavit. In particular, page 3 of the OPA's evidence states the following:

> The OPA has been working to address local area supply issues and will continue to do so in 2008. Many of the local areas in Ontario with supply concerns are in different stages of the planning process. ***In some local areas, the needs have already been assessed and a plan has been developed. These areas are now in the implementation phase***, but still require support from the OPA for further technical studies and consultation with local municipalities and community groups. ***Examples include Northern York Region, Kitchener-Waterloo-Cambridge-Guelph***, and Downtown Toronto. Work in these areas will included monitoring implementation of the recommended solution and initiating back-up plans if necessary. [emphasis added]

7. However, the OPA's evidence does not contain further details beyond the general statements attached in the two pages attached as Exhibit "C" to my affidavit. Thus, in order to obtain further information, Pollution Probe submitted to the OPA a set of 19 interrogatories regarding the OPA's activities specifically for the Northern York Region local supply area. Pollution Probe further submitted to the OPA a similar set of an additional 19 interrogatories regarding the OPA's activities specifically for the Kitchener-Waterloo-Cambridge-Guelph local supply area.

8. Unfortunately, despite the apparently clear language of the Final Issues List and the Board's Decision on Issues, as well as the apparently clear references in the OPA's own prefiled evidence, the OPA simply responded that "[it] considers this to be outside the scope of this proceeding." Attached as **Exhibit "D"** is a copy of Pollution Probe Interrogatories Nos. 1 to 38 regarding these local supply areas and the OPA's responses. For ease of reference, the key OPA responses are the responses to Interrogatory Nos. 1 and 20 as the other responses simply refer back to these specific responses.

9. The OPA did not provide any further elaboration regarding why it considered Pollution Probe's interrogatories outside the scope of the proceeding. The OPA instead stated that it ***may*** be possible to find ***some*** of the requested information in the OPA's IPSP prefiled evidence at Docket No. EB-2007-0707, Exhibit E, Tab 5, Schedules 1 and 2 (copies of which are attached to my affidavit respectively as **Exhibit "E"** and **Exhibit "F"**). However, based upon my review, very little of the requested information can be found in these references (which is understandable since those documents are ultimately about the OPA's recommendation for new gas-fired generation in these areas as part of the OPA's long-term Integrated Power System Plan, not the issues raised in Pollution Probe's interrogatories).

10. With respect to Pollution Probe's interrogatories for the Northern York Region local supply area, the OPA also stated that that information may be available as part of various filings and consultations as part of the Northern York Region Electricity Supply Proceeding in Docket No. EB-2005-0315 (including the entirety of the initial report and

its associated exhibits). However, it appears that, especially given the volume of documents referred to, it is the OPA's responsibility to fully and adequately answer interrogatories within the scope of this proceeding rather than having Pollution Probe search for "needles in a haystack" elsewhere (particularly when the information may not even be there).

11. For the Board's reference, Pollution Probe does not intend to lead evidence in this proceeding. However, it does wish to obtain full and adequate responses to its legitimate interrogatories in order to properly understand, analyze, and potentially cross-examine regarding the OPA's activities with respect to these local supply areas (which form part of the OPA's 2008 revenue requirement that the Board is currently reviewing) in accordance with the Board's statutory objectives.

12. In light of all of the above, I believe that the Pollution Probe interrogatories regarding Northern York Region local supply area and the Kitchener-Waterloo-Cambridge-Guelph local supply area are within the scope of this proceeding. Accordingly, I believe that the OPA should have provided full and adequate responses to those interrogatories, and the Board should now order the OPA to provide those responses.

SWORN before me at)
the City of Toronto, in)
the Province of Ontario, on)
this 17th day of March, 2008)

A Commissioner for taking affidavits, etc.)

Basil Alexander

JACK GIBBONS

EB-2007-0791

OPA 2008 Fees Review

Final Issues List

1. **Strategic Objective #1- POWER SYSTEM PLANNING- Plan for an adequate, reliable and sustainable system that integrates conservation, generation and transmission.**

1.2 Has the OPA presented a reasonable and appropriate 2008 budget for programs and activities associated with strategic objective number 1?

1.2 Budget allocation to activities under the Strategic Objective # 1.

a. Is the budget allocated to activities to complete the current IPSP proceeding and to prepare the next IPSP plan appropriate?

b. Is the budget allocated to Local Area Supply and CDM activities appropriate?

c. Is the budget allocated to Policy Development activities appropriate?

2. **Strategic Objective # 2: CONSERVATION AND DEMAND MANAGEMENT- Contribute to the achievement of Ontario's Conservation Resource Targets and to fostering a culture of conservation using market-based approaches.**

2.1 Has the OPA presented a reasonable and appropriate 2008 budget for programs and activities associated with strategic objective number 2?

2.2 In the context of determining the OPA's 2008 Revenue Requirement, are the OPA's energy conservation, demand response, fuel switching and combined heat and power targets (MW and MWh) for 2008 appropriate?

2.3 In the context of determining the OPA's 2008 Revenue Requirement, is the OPA's proposed system to evaluate, measure and verify conservation programme data and results appropriate?

3. **Strategic Objective # 3: SUPPLY PROCUREMENT AND CONTRACTS- Consistent with the IPSP, ensure that the Province of Ontario has diverse electricity generation resources.**

3.1 Has the OPA presented a reasonable and appropriate 2008 budget for programs and activities associated with strategic objective number 3?

3.2 Budget allocation to activities under the Strategic Objective # 3.

a. Is the budget allocated to conduct standard procurement process activities in 2008 appropriate?

b. Is the budget allocated to design contracts by the OPA appropriate?

c. Is the budget allocated to manage and settle conservation and generation resources contracts appropriate?

4. Strategic Objective # 4 –SECTOR DEVELOPMENT- Define sector development goals and facilitate the efficient allocation of risk between customers and investors in conservation and generation

4.1 2008 Operating Budget for Strategic Objective # 4 – sector development

a. Is the Operating Budget of $ 1.252 million allocated for 2008 sector development appropriate?

5. Strategic Objective # 5- BUILDING ORGANIZATIONAL CAPACITY -Maintain and develop organizational capacity to achieve the strategic objectives.

5.1 Has the OPA presented a reasonable and appropriate 2008 budget for programs and activities associated with strategic objective number 5?

6. General

6.1. Proposed Fees

a. Are the proposed usage and registration fees appropriate?

6.2. Commitments from Settlement Agreement 2007 (EB-2006-0233)

a. Has the OPA met its commitments, as set out in the 2007 Settlement Agreement (EB-2006-0233)?

6.3 Are the OPA's proposals for deferral and variance accounts appropriate?

Ontario Energy Board

Commission de l'Énergie de l'Ontario

EB-2007-0791

IN THE MATTER OF sections 25.20 and 25.21 of the *Electricity Act, 1998*;

AND IN THE MATTER OF a Submission by the Ontario Power Authority to the Ontario Energy Board for the review of its proposed expenditure and revenue requirements and the fees which it proposes to charge for the year 2008.

DECISION ON ISSUES

On November 2, 2007, the Ontario Power Authority (the "OPA") filed with the Ontario Energy Board (the "Board") its proposed 2008 expenditure and revenue requirement and fees for review ("2009 OPA Fees Review")pursuant to subsection 25.21(1) of the *Electricity Act, 1998* (the "Act"). Pursuant to subsection 25.21(2) of the Act, the OPA is seeking the following, among other, approvals from the Board:

1) approval of an overall Operating Revenue Requirement of $58.616 million;
2) approval of proposed 2008 capital expenditures of $2.6 million;
3) approval to establish a usage fee of $0.391/MWh;
4) approval of an Interim Fees Order effective January 1, 2008 in the absence of a final Order.

The Board assigned file number EB-2007-0791 to this matter.

The Board issued a Notice of Application dated December 6, 2007 with respect to this proceeding. On December 20, 2007 the Board issued Interim Fees Order effective January 1, 2008.

Registered Intervenors in the proceedings are as follows: Green Energy Coalition ("GEC"), Pembina Foundation, and the Ontario Sustainable Energy Association ("OSEA") - joint intervenor; Energy Probe Research Foundation ("Energy Probe"); Pollution Probe Foundation ("Pollution Probe"); Vulnerable Energy Consumer's Coalition ("VECC"); Electricity Distributors Association ("EDA"); Direct Energy Inc.; Ontario Power Generation Inc. ("OPG") and Hydro One Inc. ("Hydro One"). Hereafter, the intervenors

and the Applicant are referred to as Parties.

On January 16, 2008 the Board issued Procedural Order No. 1 and set a timeline for an Issues Conference to be held on January 30, 2008; an Issues Day to be held February 7, 2008; for written interrogatories on the Applicant's pre-filed evidence to be filed by February 14, 2008; and for responses to the interrogatories to be filed by February 28, 2008. The Board also set the time for the Settlement Conference on March 18 and 19; and for a hearing a Settlement Proposal on March 28, 2008.

Procedural Background

On January 30, 2008, parties to the OPA 2008 Fees Review met for an Issues Conference in an attempt to produce a mutually agreeable Issues List to present to the Board for approval in this proceeding. Although a wide degree of consensus was reached, parties were unable to agree to the wording of one issue (the "Contested Issue"). A proposed issues list (the "Proposed Issues List") was prepared, which set out all of the agreed to issues and the single contested issue. The Proposed Issues List is attached as Appendix "A" to this decision.

On February 7, 2008, the Board held an Issues Day to review the Proposed Issues List and to hear argument on the Contested Issue.

Consensual Changes to the Proposed Issues List

Over the course of the Issues Day, the Board panel and certain parties suggested wording and numeration changes to the uncontested issues in the Proposed Issues List. In particular, for clarity for what was intended, it was suggested that the words "to achieve" in issues 1.1, 2.1, 3.1 and 5.1 be changed to "associated with"; and that issues 2.1(a) and 2.1(b) be re-labelled as issues 2.2 and 2.3. There were no objections to any of these revisions, and the Board accepts these changes. The changes are reflected in the Final Issues List, which is attached as Appendix "B".

The Contested Issue

The Contested Issue below was issue 2.1(a) (now re-labelled as issue 2.2) on the Proposed Issues List:

> In the context of determining the OPA's 2008 Revenue Requirement, are the OPA's energy conservation, demand response, fuel switching and combined heat and power targets (MW and **MWh**) for 2008 appropriate?

The only part of the issue that was contested was the inclusion of the word MWh (which is bolded above).

The OPA was opposed to the inclusion of the word MWh. In its view, none of the government's directives to the OPA involve MWh (i.e. total reductions in energy consumption). Instead, the government's directives are focussed on reducing peak consumption (MW). Given that the government has not seen fit to set any MWh targets, it was the OPA's view that it would not be appropriate to include the disputed language in issue 2.1(a). The OPA was concerned that the effect of adding MWh to the issue would be to require the OPA to set MWh targets.

The addition of the word MWh to issue 2.1(a) was supported by Pollution Probe, GEC, VECC, and Energy Probe. These parties were of the view that, although specific MWh targets have not been set by any government directives, a focus on MWh was implicit in at least some of the directives. For example, it was the position of GEC that the low-income conservation directive could not be aimed at reducing peak load, as typically low-income consumers do not have air conditioners and do not contribute greatly to peak load. Therefore, it is implicit that the governmental directives recognize the importance of reducing overall energy consumption, not just peak consumption.

Decision

The Board accepts the inclusion of the word MWh into issue 2.1(a) (now issue 2.2). However, the Board wishes to stress that it will be restricting the scope of the MWh issue. As several parties noted, this is an OPA fees case and the overall purpose of this hearing is to determine if the revenue requirement and fees proposed by the OPA are reasonable. In order to determine if the fees are reasonable, of course, some examination of the costs that make up this fee may be necessary. The Board does not intend, however, to entertain a debate concerning specific programs that the OPA should consider to meet a MWh goal or target. Questions and submissions surrounding the extent to which the OPA should be focussing some of its attention on MWh reduction, however, will be acceptable. The Board does not consider that allowance of this issue, as scoped, requires the OPA to set specific MWh targets for the purposes of this proceeding, which is to review the proposed revenue requirement and fees.

The Board Orders That

1. The Final Issues List (attached as Appendix "B" to this decision) is hereby approved for the OPA fees case.

Issued at Toronto, February 11, 2008.
ONTARIO ENERGY BOARD

Original Signed By

Kirsten Walli
Board Secretary

The third is consolidating and analyzing the lessons learned and experience gained from the first IPSP.

Measures of Success

The following are indicators of success for meeting this first strategic initiative:

- the IPSP has been reviewed and accepted by the OEB as a sound basis for planning;
- required models, data, and their capabilities have been identified for the next IPSP; and
- monitoring of current developments is underway.

Initiative 2 – Local Area Supply Concerns

Continue to address local area supply issues in the province.

Certain areas of the province have electricity supply constraints so critical that near-term solutions are required. The OPA has legislated responsibilities to examine integrated solutions and a role to play in identifying solutions for alleviating near-term local area supply constraints.

The OPA has been working to address local area supply issues and will continue to do so in 2008. Many of the local areas in Ontario with supply concerns are in different stages of the planning process. In some local areas, the needs have already been assessed and a plan has been developed. These areas are now in the implementation phase, but still require support from the OPA for further technical studies and consultation with local municipalities and community groups. Examples include Northern York Region, Kitchener-Waterloo-Cambridge-Guelph, and Downtown Toronto. Work in these areas will include monitoring implementation of the recommended solution and initiating back-up plans if necessary.

In other areas, the OPA will be identifying future needs for areas with upcoming supply concerns by conducting analysis, consultation, and developing plans to recommend solutions that are most appropriate for each specific situation. An example of this type of

work is in the Ottawa area. In these cases, the OPA will define the nature and timing of near-term local area supply concerns in consultation with the IESO, transmitters, and distributors, and identify and assess solutions. Proposed solutions will be determined on the basis of the OPA's planning criteria: feasibility, flexibility, reliability, cost, environmental performance, and societal acceptance. The OPA will also obtain input on potential solutions from stakeholders such as municipal and community leaders, and the general public, and then recommend a preferred solution in coordination with other parties in the electricity sector.

The OPA will also monitor planning choices, trends, and technological and regulatory developments in other jurisdictions for incorporation into future local area supply planning.

Measures of Success

The following are indicators of success for meeting this strategic initiative:

- near-term local area supply concerns have been resolved or solutions have been developed in consultation with local communities, the IESO, transmitters, distributors, developers and other stakeholders; and
- implementation of these plans advances in a timely manner.

Initiative 3 – Policy Development

Continue to work towards streamlining approval processes and advancing policy development related to power system planning.

There are many barriers to the development of electricity infrastructure in Ontario. These barriers include local objections to the installation of electricity infrastructure, lack of zoning for electricity infrastructure in official plans, and complex and sometimes duplicative approval processes. This initiative is important for ensuring that the electricity infrastructure needs of the province are met in a timely fashion. The OPA has a role to play in streamlining approval processes and advancing public policy with respect to these issues.

In order to meet the requirements of this strategic initiative, PSP will monitor, anticipate and influence key policy and regulatory developments relevant to power system planning by

This is Exhibit D referred to in the affidavit of Jack Gibbons sworn before me, this 17th day of March 20 08

A COMMISSIONER FOR TAKING AFFIDAVITS

Filed: February 28, 2008
EB-2007-0791
Exhibit I
Tab 7
Schedule 1
Page 1 of 1

POLLUTION PROBE INTERROGATORY 1

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

1. Please provide a map showing the location of Northern York Region local supply area (the "NYR" or the "Region").

RESPONSE

The OPA considers this to be outside the scope of this proceeding.

However, over the course of the Northern York Region project, a substantial amount of information has been made publicly available. It may be possible to find some of the requested information in the evidence filed as part of the Integrated Power System Plan Proceeding (EB-2007-0707, Exhibit E-5-1, Northern York Region). In addition, information may be available from the following documents filed as part of the Northern York Region Electricity Supply Proceeding (EB-2005-0315):

- "Northern York Region Electricity Supply Study" report and associated exhibits dated September 30, 2005;
- "Northern York Region CDM" Phase I report dated May 31, 2007; and
- "Phase II Northern York Region Report" dated October 15, 2007.

As well, documentation from the 2005 stakeholder engagement process can be accessed on the OPA website at the following link:
http://www.powerauthority.on.ca/Page.asp?PageID=1224&SiteNodeID=128.

Filed: February 28, 2008
EB-2007-0791
Exhibit I
Tab 7
Schedule 2
Page 1 of 1

POLLUTION PROBE INTERROGATORY 2

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

2. Please provide the following for the Northern York Region by year from 2000 to 2007 inclusive:
   (a) its total peak day area demand (MW);
   (b) a break-out of its total peak day area demand by LDC (i.e. Newmarket Hydro, PowerStream, and Hydro One Distribution);
   (c) a break-out of its peak day local area generation and demand response resources; and
   (d) its net area load (MW).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

Filed: February 28, 2008
EB-2007-0791
Exhibit I
Tab 7
Schedule 3
Page 1 of 1

POLLUTION PROBE INTERROGATORY 3

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

3. Please provide the following for the Northern York Region by year from 2000 to 2007 inclusive:
   (a) its total annual demand (MWh);
   (b) a break-out of its total annual demand (MWh) by LDC (i.e. Newmarket Hydro, PowerStream, and Hydro One Distribution);
   (c) a break-out of its local area generation supplies (MWh); and
   (d) its net area load (MWh).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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EB-2007-0791
Exhibit I
Tab 7
Schedule 4
Page 1 of 1

POLLUTION PROBE INTERROGATORY 4

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

4. Please provide the following for the Northern York Region (by year from 2008 to 2015 inclusive:
   (a) the OPA's forecast of the Region's total peak day area demand (MW);
   (b) a break-out of the OPA's forecast of the Region's total peak day area demand by LDC (i.e. Newmarket Hydro, PowerStream, and Hydro One Distribution);
   (c) a break-out of the OPA's forecast of the Region's peak day local area generation and demand response resources; and
   (d) the OPA's forecast of the Region's net area load (MW).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

POLLUTION PROBE INTERROGATORY 5

QUESTION

ISSUE 1.2B

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

5. Please provide the following for the Northern York Region by year from 2008 to 2015 inclusive:
   (a) the OPA's forecast of the Region's total annual demand (MWh);
   (b) a break-out of the OPA's forecast of the Region's total annual demand (MWh) by LDC (i.e. Newmarket Hydro, PowerStream, and Hydro One Distribution);
   (c) a break-out of the OPA's forecast of the Region's local area generation supplies (MWh);
   (d) the OPA's forecast of the Region's net area load (MWh).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

Filed: February 28, 2008
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Exhibit I
Tab 7
Schedule 6
Page 1 of 1

POLLUTION PROBE INTERROGATORY 6

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

6. Please provide the annual load duration curves for the Northern York Region for 2006 and 2007. For each year, please also state the incremental loads (MW) during the top 88 and the top 219 demand hours.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 7

QUESTION

ISSUE 1.2B

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

7. Please provide your best estimate of the Northern York Region's electricity demands by end-use (e.g. residential cooling, commercial cooling, lighting, industrial process machine drive, etc.) at the time of the Region's peak day demand.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 8

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

8. Please state the existing electricity supply limit for the Northern York Region.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 9

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

9. Please state how many MW of demand were curtailed in the Northern York Region at the time of its 2007 peak demand pursuant to:
   (a) the demand response contract with Rodan Energy;
   (b) the PeakSaver contract with PowerSteam;
   (c) the PeakSaver contract with Newmarket Hydro; and
   (d) the PeakSaver contract with Hydro One.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 10

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

10. Please state the OPA's demand response resources (MW) in the Northern York Region, as of December 31, 2007, pursuant to:
    (a) the demand response contract with Rodan Energy;
    (b) the PeakSaver contract with PowerStream;
    (c) the PeakSaver contract with Newmarket Hydro; and
    (d) the PeakSaver contract with Hydro One.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 11

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

11. Please state the OPA's forecasted demand response resources (MW) in Northern York Region, as of June 1, 2008, pursuant to:
    (a) the demand response contract with Rodan Energy;
    (b) the PeakSaver contract with PowerStream;
    (c) the PeakSaver contract with Newmarket Hydro;
    (d) the PeakSaver contract with Hydro One; and
    (e) any other demand response contract(s).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 12

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

12. Please state the OPA's forecasted demand response resources (MW) in Northern York Region, as of December 31, 2008, pursuant to:
    (a) the demand response contract with Rodan Energy;
    (b) the PeakSaver contract with PowerStream;
    (c) the PeakSaver contract with Newmarket Hydro;
    (d) the PeakSaver contract with Hydro One; and
    (e) any other demand response contract(s).

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 13

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

13. Please state the number of homes in the Northern York Region that:
    (a) have central air-conditioning;
    (b) have enrolled their central air conditioners in the PeakSaver programme as of December 31, 2007; and
    (c) are forecast to have enrolled their central air conditioners in the PeakSaver programme by:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 14

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

14. Please state the number of small businesses in the Northern York Region that:
    (a) have central air-conditoners that are eligible to enroll in the PeakSaver programme;
    (b) have enrolled their central air-conditioners in the PeakSaver programme as of December 31, 2007;
    (c) are forecast to have enrolled their central air conditioners in the PeakSaver programme by:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 15

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

15. Please state the number of small businesses in the Northern York Region that:
    (a) have central air-conditoners that are eligible to enroll in the PeakSaver programme;
    (b) have enrolled their central air-conditioners in the PeakSaver programme as of December 31, 2007;
    (c) are forecast to have enrolled their central air conditioners in the PeakSaver programme by:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

POLLUTION PROBE INTERROGATORY 16

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

16. Please state how many commercial, institutional and industrial electricity consumers are located in the Northern York Region. Please also state how many of these customers:
    (a) have enrolled in an OPA demand response programme, other than PeakSaver, as of December 31, 2007; and
    (b) are forecast to be enrolled in an OPA demand response programme, other than PeakSaver, as of:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 17

QUESTION

ISSUE 1.2b

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

17. Please provide your best estimate of how many MW of diesel back-up electricity generation capacity exist in the Northern York Region.
    (a) greater than 10 MW in size; and
    (b) less than 10 MW in size.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

POLLUTION PROBE INTERROGATORY 18

QUESTION

ISSUE 1.2B

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

18. Please provide your best estimate of the total combined heat and power potential in the Northern York Region. Please also break-out your estimates according to projects that are:
    (a) greater than 10 MW in size; and
    (b) less than 10 MW in size.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 19

QUESTION

ISSUE 1.2B

A. Northern York Region – Reference: Ex. B, Tab 1, Sch. 1, pp. 3 - 4

19. Please state how much money the OPA has spent, as of December 31, 2007, to obtain reductions in the Northern York Region's electricity demands (regarding both MW and MWh). Please also state the quantity of savings (in both MW and MWh) that the OPA has obtained as of December 31, 2007.

RESPONSE

Please see response to Pollution Probe Interrogatory 1, at Exhibit I-7-1.

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POLLUTION PROBE INTERROGATORY 20

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

20. Please provide a map showing the location of the Kitchener-Waterloo-Cambridge-Guelph local supply area (the "KWCGLSA" or the "Area").

RESPONSE

The OPA considers this to be outside the scope of this proceeding.

However, evidence on Kitchener-Waterloo-Cambridge-Guelph is filed as part of the Integrated Power System Plan Proceeding, so it may be possible to find some of the requested information there (see EB-2007-0707, Exhibit E-5-2, Kitchener-Waterloo-Cambridge-Guelph).

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POLLUTION PROBE INTERROGATORY 21

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

21. Please provide the following for the KWCGLSA by year from 2000 to 2007 inclusive:
    (a) its total peak day area demand (MW);
    (b) a break-out of its total peak day area demand by LDC;
    (c) a break-out of its peak day local area generation and demand response resources; and
    (d) its net area load (MW).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

POLLUTION PROBE INTERROGATORY 22

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

22. Please provide the following for the KWCGLSA by year from 2000 to 2007 inclusive:
    (a) its total annual demand (MWh);
    (b) a break-out of its total annual demand (MWh) by LDC;
    (c) a break-out of its local area generation supplies (MWh);
    (d) its net area load (MWh).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 23

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

23. Please provide the following for the KWCGLSA by year from 2008 to 2015 inclusive:

(a) The OPA's forecast of the Area's total peak day area demand (MW);
(b) a break-out of the OPA's forecast of the Area's total peak day area demand by LDC,
(c) a break-out of the OPA's forecast of the Area's peak day local area generation and demand response resources; and
(d) the OPA's forecast of the Area's net area load (MW).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 24

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

24. Please provide the following for the KWCGLSA by year from 2008 to 2015 inclusive:
    (a) The OPA's forecast of the Area's total annual demand (MWh);
    (b) a break-out of the OPA's forecast of the Area's total annual demand (MWh) by LDC;
    (c) a break-out of the OPA's forecast of the Area's local area generation supplies (MWh);
    (d) the OPA's forecast of the Area's net area load (MWh).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 25

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

25. Please provide the annual load duration curves for the KWCGLSA for 2006 and 2007. For each year, please also state the incremental loads (MW) during the top 88 and the top 219 demand hours.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 26

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

26. Please provide your best estimate of the KWCGLSA's electricity demands by end-use (e.g. residential cooling, commercial cooling, lighting, industrial process machine drive, etc.) at the time of the Area's peak day demand.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

POLLUTION PROBE INTERROGATORY 27

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

27. Please state the existing electricity supply limit for the KWCGLSA.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 28

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

28. Please state how many MW of demand were curtailed in the KWCGLSA at the time of its 2007 peak demand pursuant to:
    (a) the OPA's PeakSaver contracts with local LDCs (broken out by LDC); and
    (b) all other OPA demand response contracts.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 29

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

29. Please state the OPA's demand response resources (MW) in the KWCGLSA, as of December 31, 2007, pursuant to:
    (a) the OPA's PeakSaver contracts with local LDCs (broken out by LDC); and
    (b) all other OPA demand response contracts.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

POLLUTION PROBE INTERROGATORY 30

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

30. Please state the OPA's forecasted demand response resources (MW) in the KWCGLSA, as of June 1, 2008, pursuant to:
    (a) the PeakSaver contracts with local LDCs (broken out by LDC); and
    (b) any other demand response contract(s).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 31

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

31. Please state the OPA's forecasted demand response resources (MW) in the KWCGLSA, as of December 31, 2008, pursuant to:
    (a) the PeakSaver contracts with local LDCs (broken out by LDC); and
    (b) any other demand response contract(s).

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 32

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

32. Please state the number of homes in the KWCGLSA that:
    (a) have central air-conditioning;
    (b) have enrolled their central air conditioners in the PeakSaver programme as of December 31, 2007; and
    (c) are forecast to have enrolled their central air conditioners in the PeakSaver programme by:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 33

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

33. Please state the number of small businesses in the KWCGLSA that:
    (a) have central air-conditoners that are eligible to enroll in the PeakSaver programme;
    (b) have enrolled their central air-conditioners in the PeakSaver programme as of December 31, 2007; and
    (c) are forecast to have enrolled their central air conditioners in the PeakSaver programme by:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 34

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

34. Please state how many commercial, institutional and industrial electricity consumers are located in the KWCGLSA. Please also state how many of these customers:
    (a) have enrolled in an OPA demand response programme, other than PeakSaver, as of December 31, 2007; and
    (b) are forecast to be enrolled in an OPA demand response programme, other than PeakSaver, as of:
        (i) June 1, 2008; and
        (ii) December 31, 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

POLLUTION PROBE INTERROGATORY 35

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

35. Please provide your best estimate of how many MW of diesel back-up electricity generation capacity exist in the KWCGLSA.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

POLLUTION PROBE INTERROGATORY 36

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

36. Please provide your best estimate of the total combined heat and power potential in the KWCGLSA. Please also break-out your estimates according to projects that are:
    (a) greater than 10 MW in size; and
    (b) less than 10 MW in size.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 37

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

37. Please state how much money the OPA has spent, as of December 31, 2007, to obtain reductions in the KWCGLSA's electricity demands (regarding both MW and MWh). Please also state the quantity of savings (in both MW and MWh) that the OPA has obtained as of December 31, 2007.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

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POLLUTION PROBE INTERROGATORY 38

QUESTION

ISSUE 1.2b

B. Kitchener-Waterloo-Cambridge-Guelph Local Supply Area – Reference Ex. B, Tab 1, Sch. 1, pp. 3 - 4

38. Please state the OPA's forecasted incremental electricity savings (in both MW and MWh) and budget for the KWCGLSA for 2008.

RESPONSE

Please see response to Pollution Probe Interrogatory 20, at Exhibit I-7-20.

NORTHERN YORK REGION

1.0 EXECUTIVE SUMMARY

The OPA recommends the siting of new gas-fired generation in Northern York Region (NYR) and intends to procure such generation for a projected in-service date of the end of 2011.

The purpose of gas-fired generation in NYR is to address two needs: a capacity need that will arise in 2013, and a security need that is present today. It will also further the Directive's goals of using gas for high value and high efficiency applications and replacing coal with cleaner sources in the earliest practical timeframe.

NYR has experienced robust growth in the past few years and this has resulted in the area's demand exceeding the capability of the electrical infrastructure serving the area. There are four electrical service needs identified for NYR. They are:

a) inadequate supply capacity;
b) inadequate transformation capacity at Armitage Transformer Station (Armitage TS);
c) a lack of supply diversity; and
d) insufficient distribution feeder positions at Armitage TS for expansion.

In the past two years, Hydro One Networks has implemented near-term reinforcement measures including the addition of shunt capacitors to increase the supply and transformation capacity. It has also been seeking environmental assessment ("EA") approval for the construction of the new Holland Junction Transformer Station in King Township. This station will alleviate the transformation and the distribution feeder position needs. The OPA and the LDCs serving the NYR have also implemented a number of conservation and distributed generation measures to supplement the supply capability. Together, these measures will address the capacity needs in NYR until about 2013, although the security need remains to be addressed.

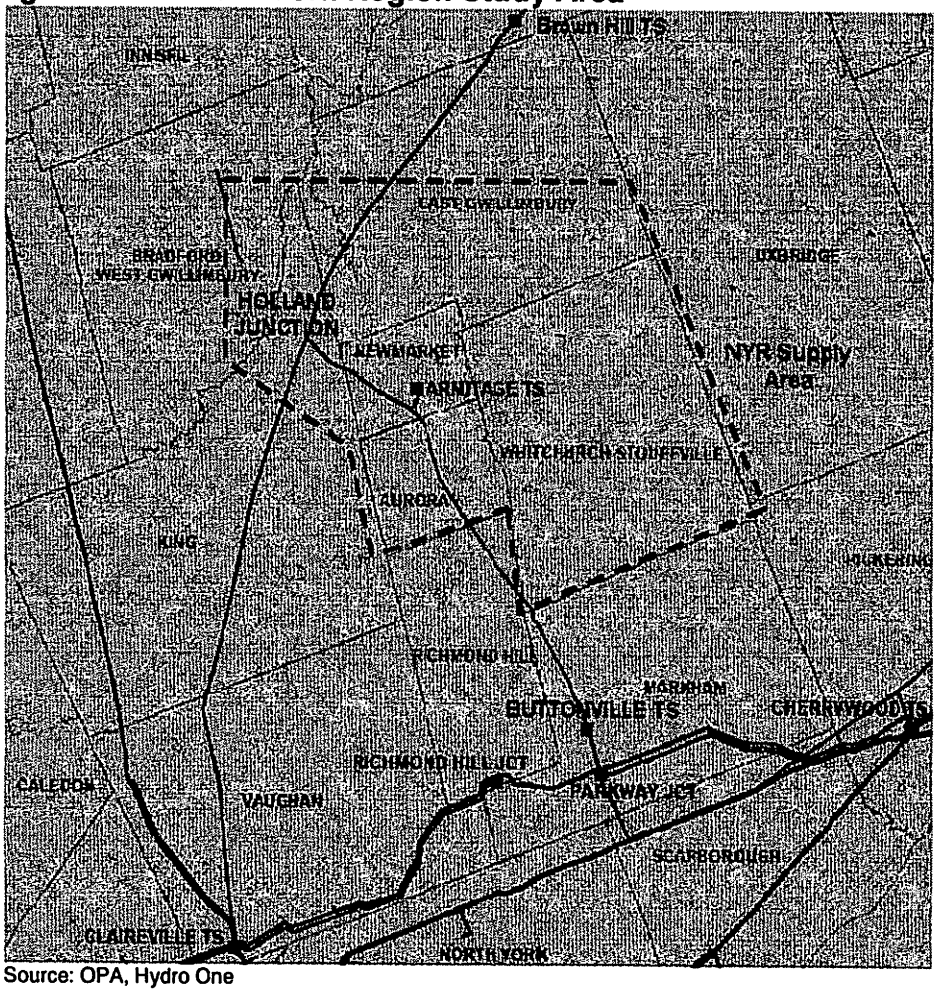
The OPA recommends that gas-fired generation be built in NYR to address the supply capacity and security needs as early as practical. Based on the lead-time required to develop major supply options, the earliest in-service date is estimated to be the end of 2011. As noted, the proposed generation will address both the local area need and the Directive's goals of using gas at peak times for high efficiency and high value applications, as well as replacing coal. Gas generation also offers cost, feasibility, flexibility, environmental performance and societal acceptance benefits. The OPA therefore intends to procure gas-fired generation in NYR.

2.0 PROJECT LOCATION & OVERVIEW

As identified in the OPA's report 'Northern York Region Electricity Supply Study' submitted to the OEB on September 30, 2005, York Region is a rapidly growing community with a population of roughly 960,000 in 2006. While the southern portion of York Region had its electricity infrastructure upgraded in 2004, the northern portion has continued to grow without major improvements since the 1990s. The focus of the 2005 study was on the more urgent needs of the northern half of this region, specifically the communities served from Armitage TS. This station supplies six York region municipalities: Aurora, East Gwillimbury, Georgina, King, Newmarket, and Whitchurch-Stouffville, as well as Bradford West Gwillimbury in Simcoe County.

A map of the area of focus for this study is provided below at Figure 1. The demarcated area on the map is defined collectively herein as "Northern York Region" or "NYR".

Figure 1: Northern York Region Study Area



Source: OPA, Hydro One

3.0 EXISTING FACILITIES

NYR is a summer peaking area with close to 400 MW of load. The primary supply to this load is from Armitage TS. There are presently two transformer groups at Armitage TS: "Armitage 1" and "Armitage 2". These groups are relatively independent in operation, but have some support systems in common and some capability to back each other up. Armitage TS supplies sixteen feeders at the distribution level. Presently, six are allocated to Newmarket Hydro, three to PowerStream, and seven to Hydro One Distribution.

The 230 kV transmission in the area consists of one double-circuit 230 kV line, B82V/B83V, that connects Claireville TS in Vaughan to Brown Hill TS in Georgina. At Holland Junction

in King Township, an eight kilometre line tap connects Armitage TS in Newmarket to this main supply line, as shown in Figure 1.

There is also one gas-fired generating plant located in the NYR service area at the Keele Valley Landfill site. It currently supplies about 19 MW of power and is connected to a 44 kV feeder which feeds directly into Armitage TS.

4.0 ASSESSMENT OF NEED

For assessing the supply adequacy at Armitage TS, the forecast demand at peak for the NYR service area was examined. The amount of available local resources was then deducted, and the remaining load was compared to the supply capability of the area. The determination of need was consistent with the assumptions, considerations and criteria contained in the IESO Ontario Resource and Transmission Assessment Criteria (Exhibit E-7-1, Attachment 3).

4.1 Historical Growth and Forecast Demand

The demand in NYR has seen a robust rate of growth of about 4% over the last four years, as shown in Table 1 and Figure 2. The local distribution companies, Newmarket Hydro, PowerStream and Hydro One Distribution, forecast an overall growth rate of approximately 3.1% for NYR for the next ten years in their recent (June 2007) load forecasts. For area planning purposes, the summer peak demand assumed is based on extreme temperature conditions, consistent with the IESO Ontario Resource and Transmission Assessment Criteria. Typically, the peak demand under this condition is about 6% higher than under normal peak summer temperature conditions.

Individually, Newmarket Hydro, PowerStream and Hydro One Distribution forecast their loads to grow at approximately 3%, 3.5% and 2.9%, respectively, without adjusting for load transfers. In the past years, load was transferred to neighbouring stations due to inadequate supply capacity in NYR. For determination of supply need, the assumption is that, once there is sufficient capacity in NYR, the load that was transferred out of the NYR

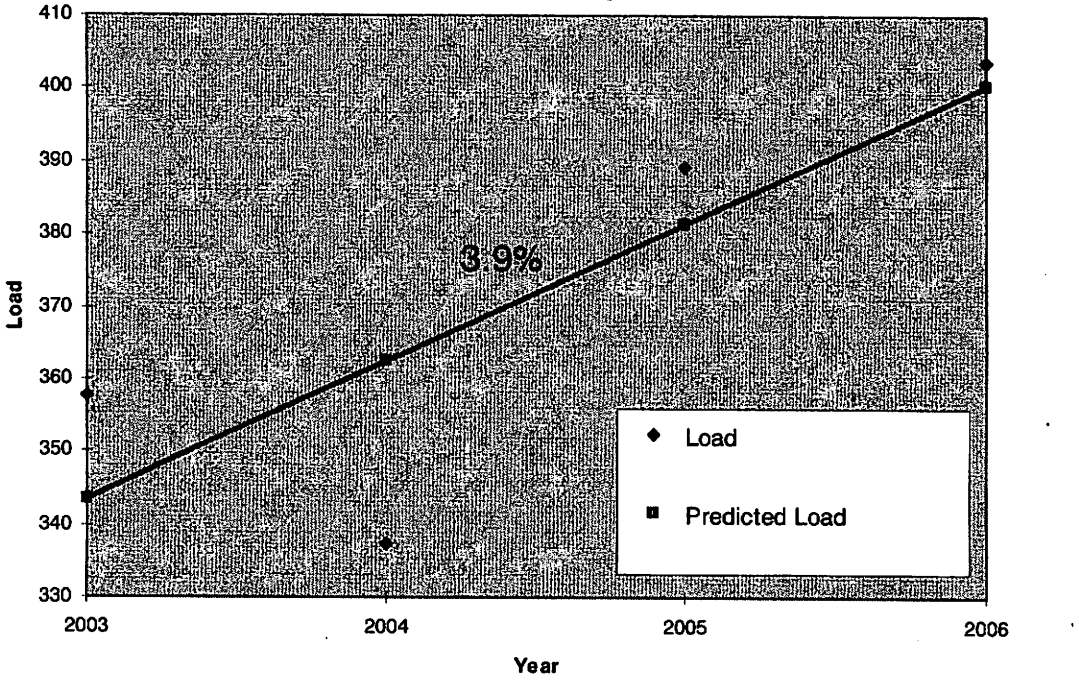
service area will be returned. In addition, roughly 10 MW of external load is expected to be transferred to the area to optimize the region's overall supply. The repatriation of load and additional transfer is not expected to occur until additional supply is added around the end of 2011, at which point this load can be supplied reliably. See Table 2 for a detailed 10 year load forecast for NYR.

Table 1: Northern York Region Historical Load

Entity	2003 Actual (MW)	2004 Actual (MW)	2005 Actual (MW)	2006 Actual (MW)	Average Growth
Total Area Demand	**358**	**337**	**389**	**404**	**4.1%**
Adjusted Load - Transfers	-	-17	-17	-17	-
Net Demand	**358**	**320**	**372**	**387**	**2.6%**

Source: OPA, Hydro One, PowerStream, Newmarket Hydro

Figure 2: Historical Load Regression Analysis



Source: OPA

Table 2: Northern York Region Forecast Load

Entity	2007 (MW)	2008 (MW)	2009 (MW)	2010 (MW)	2011 (MW)	2012 (MW)	2013 (MW)	2014 (MW)	2015 (MW)	2016 (MW)	2017 (MW)	Average Growth
Newmarket	163	169	175	181	187	194	200	208	215	217	220	3.0%
PowerStream	100	105	110	115	120	124	128	132	136	140	142	3.5%
Hydro One Distribution	160	164	169	174	179	184	189	195	200	206	212	2.9%
Total Area Demand	**423**	**438**	**454**	**470**	**486**	**502**	**517**	**535**	**551**	**563**	**573**	**3.1%**
Adjusted Load - Transfers	-17	-30	-30	-30	-30	10	10	10	10	10	10	-
Net Demand	**406**	**408**	**424**	**440**	**456**	**512**	**527**	**545**	**561**	**573**	**583**	**3.7%**

Source: OPA, Hydro One, PowerStream, Newmarket Hydro

4.2 Supply Capability and Needs

In assessing the adequacy and reliability of the Armitage supply, the OPA relies on reliability standards and criteria, as described in Exhibit E-2-7. To test the reliability of the system, the contingencies considered for NYR supply are as follows:

- loss of one of the two 230 kV supply circuits [N-1];
- loss of one of the four step-down transformers [N-1]; and
- loss of the double-circuit 230 kV line [N-2].

The first two are referred to as single-element or [N-1] contingency events, and the last is referred to as a double-element or [N-2] contingency event.

For the application of the reliability criteria in the planning of NYR service needs, load meeting capacity (LMC) is defined as the maximum load in the area that can be served so that following the critical single-element or [N-1] contingency, the system is stable, all equipment is within its rating, voltages are within the acceptable operating range, and no load is interrupted. Similarly, supply security is the ability of the delivery system to restore interrupted load in a reasonable time following the critical double-element or [N-2] contingency. The application of the security criterion indicates when an area would require an alternative source of supply or the need for greater diversity of supply.

Due to large and sustained load growth over the past years, the demand in NYR has exceeded the capability of the existing supply. As discussed below, there are four needs identified for NYR:

a) inadequate supply capacity;
b) inadequate transformation capacity at Armitage TS;
c) a lack of supply diversity; and
d) insufficient distribution feeder positions at Armitage TS for expansion.

4.2.1 Supply Capacity

As described above, the two [N-1] contingency events that are critical to determining the capacity of the Armitage supply are the loss of one of the two 230 kV supply circuits and the loss of one of the four step-down transformers. Each of the two 230 kV circuits supplying Armitage TS can supply about 400 MW each. The nominal capacity of each of the four step-down transformers at Armitage TS is 125 MVA.

Following the loss of one of the 230 kV circuits, B82V or B83V, circuit breakers at Claireville, Brown Hill, and Armitage TS would open to isolate the faulted circuit. This would also result in the loss of two transformers connected to that circuit at Armitage TS, leaving the total station load now supplied from the remaining 230 kV circuit and the two transformers. The most restrictive limits in this case are the Long Term Emergency Rating ("LTR") and maximum voltage drop limit. Both limit the LMC of Armitage TS to 340 MW. Reliability standards and criteria indicate that no load should be lost for this outage. Therefore, additional supply is required when the load supplied by Armitage TS exceeds 340 MW. This limit was exceeded by 2003, as shown in Table 1. There are also three less restrictive limits for this contingency:

- the point at which the steady voltage in NYR is near instability, about 380 MW prior to the addition of Holland TS and roughly 480 MW afterwards;
- the thermal capability of B82V/B83V between Woodbridge Junction and Holland Junction which limits the NYR load to approximately 420 MW; and
- the summer thermal rating of the 230 kV tap to Armitage which is approximately 440 MW.

The voltage instability limit of 380 MW has been exceeded and increasing load continues to approach the thermal capabilities.

There is also a transformation capacity limit so as to maintain safe operation of the remaining equipment for the loss of a transformer at Armitage TS. Immediately following the loss of one of the transformers, the protection system would open the transformer's supply line and the other transformer sharing this circuit. Supply at Armitage TS is limited by the 10 day LTR of 340 MW. Reliability standards and criteria require that no load should be lost for an [N-1] outage, so additional transformation capacity is required when the load exceeds 340 MW. As shown in Table 1, Armitage TS has been subjected to loading beyond this limit since 2003. Any load exceeding this limit would have to be interrupted following a contingency.

4.2.2 Supply Security

The most critical line section for an [N-2] contingency in NYR is between Armitage TS and the tap point at Holland Junction. All load in NYR, other than load that can be transferred to adjacent supply points through the distribution system, would be interrupted until the line is repaired as there is no supply alternative for Armitage TS. If a contingency occurs on the line section between Claireville station and Holland Junction, about 100-150 MW can be supplied from Brown Hill, once the faulted section is isolated. However, rotational load interruptions would occur for the remaining load (i.e., approximately 250-300 MW in 2007) until the line is repaired. For the loss of the line north of Holland Junction, all of the power to Armitage TS can be provided from the Claireville station, after the faulted line section has been isolated.

The current supply to Armitage TS does not meet the security specifications for [N-2] contingencies as laid out in the IESO's Ontario Resource and Transmission Assessment Criteria. Even with generation at Keele Valley operating and load transfers on the distribution system, it is not possible to restore the area load within the time frames specified in Exhibit E-2-7. In fact, for the worst contingency, loss of the Armitage tap, it is

not possible to restore any load until the line is back in-service. This means that in 2007 approximately 400 MW of load could be without power for eight hours or more.

4.2.3 Distribution Considerations

One other consideration with regard to supply capability is the loading on the distribution system. Each distribution feeder has a planned loading of about 23 MW based on Hydro One Distribution guidelines. Exceeding this level could result in lower than planned voltages at the end of the feeder and a lack of transfer capability under feeder outage situations. The addition of new feeders at a station is limited by the number of 44 kV breaker positions available and the transformation capacity. Armitage TS is limited to 16 breaker positions, all of which are currently utilized. Existing feeders have exceeded their planned capacity, and with the load growth shown in Table 2, new feeder capacity is required to meet the needs of LDCs. For a station load of 387 MW, as recorded in the summer of 2006, and assuming the load is evenly distributed, the feeder loading is close to 24 MW per feeder. The need for additional feeders will necessitate new feeder positions at a new station (since Armitage TS is limited to sixteen feeder positions).

5.0 DEVELOPMENT OF ALTERNATIVES

5.1 Near-Term Transformation and Distribution Reinforcements

The OPA's 2005 report to the OEB identified the need for a new transformer station in the vicinity of Holland Junction as the preferred method of addressing the near-term transformation and distribution needs. Subsequently, the OEB issued an Order to Hydro One Networks to proceed with the development of this station. Hydro One Networks has recently received EA approval for a site near Holland Junction. The current probable in-service date is before the summer of 2009. As detailed in the System Impact Assessment (SIA) in Attachment 1 to this exhibit, the proposed Holland TS will connect along B82V/B83V near the Armitage Tap. As the station will be able to connect to the main 230 kV line, rather than the tap, this station will avoid using up capacity on the Armitage tap and will lessen the risk of voltage collapse (as it is electrically closer to the Claireville

station supply source) following an [N-1] circuit outage. Holland Junction TS is also centrally located to growing loads in the northern part of NYR. This station will provide relief for NYR's immediate transformation and feeder position needs. These near-term reinforcements will not address the other identified security and supply adequacy needs.

5.2 Distributed Generation and Conservation

The OPA and LDCs have explored distributed generation and Conservation opportunities in the area to help address the need for additional supply. Preliminary estimates from the LDCs indicate distributed generation potential of close to 21 MW by 2008: 12.5 MW of currently unused gas-fired capacity is expected to come online at Keele Valley; 6 MW has been identified by aggregators in NYR; and, an additional 2.7 MW at a water pumping station in Aurora.

Table 3: Distributed Generation in NYR

Source	Amount (MW)
Keele Valley	12.5
Aggregated generation	6
Water pumping station	2.7
Total DG	**21.2**

Source: OPA

As well, a number of Conservation programs and initiatives are presently underway. The regional share of the 6,300 MW provincial Conservation target was disaggregated for NYR based on the methodology described in Exhibits D-4-1 and E-2-3. The estimated Conservation potential for NYR increases from 9 MW in 2007 to 58 MW by 2017, as presented in Table 4. Based on these estimated levels, Conservation can contribute to meeting the need for additional supply.

Table 4: Northern York Region Conservation Estimate

	2007 (MW)	2008 (MW)	2009 (MW)	2010 (MW)	2011 (MW)	2012 (MW)	2013 (MW)	2014 (MW)	2015 (MW)	2016 (MW)	2017 (MW)
Cumulative Conservation	9	12	17	27	31	36	41	45	50	54	58

Source: OPA

Distributed generation and Conservation will reduce the need for other measures based on present estimates, but they will not fully address the need for additional supply on their own. Table 5 summarizes the load remaining after accounting for Conservation and distributed generation.

Table 5: Forecast Load after Conservation and DG

Entity	2007 (MW)	2008 (MW)	2009 (MW)	2010 (MW)	2011 (MW)	2012 (MW)	2013 (MW)	2014 (MW)	2015 (MW)	2016 (MW)	2017 (MW)	Average Growth
Newmarket	163	169	175	181	187	194	200	208	215	217	220	3.0%
PowerStream	100	105	110	115	120	124	128	132	136	140	142	3.5%
Hydro One Distribution	160	164	169	174	179	184	189	195	200	206	212	2.9%
Total Area Demand	**423**	**438**	**454**	**470**	**486**	**502**	**517**	**535**	**551**	**563**	**573**	**3.1%**
Cumulative Conservation	9	12	17	27	31	36	41	45	50	54	58	-
DG	10	21	21	21	21	21	21	21	21	21	21	-
Net Demand	**404**	**405**	**416**	**422**	**434**	**445**	**456**	**468**	**479**	**489**	**494**	**2.0%**
Adjusted Load - Transfers	-17	-30	-30	-30	-30	10	10	10	10	10	10	-
Net Total Area Demand	**387**	**375**	**386**	**392**	**404**	**455**	**466**	**478**	**489**	**499**	**504**	**2.7%**

Source: OPA

Several other distributed generation options were considered but eliminated as not being feasible for addressing the needs in this area:

- Wind generation was not considered in NYR, as no capability was identified; and
- Hydroelectric generation was not evaluated as a viable option for meeting any of the needs, as no potential was identified in the area.

5.3 Future Transformation and Distribution

A second new station will be required by roughly 2015 to meet the needs of the area over the longer-term. Depending on the preferred supply alternative, the LDCs will choose a location for the second transformer station. There is sufficient time to address the next station in the subsequent IPSP as part of regional plans.

5.4 Major Supply Reinforcement Need Date

With the transformation and distribution needs addressed in the near-term, the need for additional supply capability and the need for an alternative supply source both remain. The need date based on supply adequacy consideration is 2013. This assumes that: the load

will be as forecasted in Table 2; it is possible to sustain load transfers at neighbouring stations; the estimated amount of conservation and distributed generation will be developed; Holland Junction Station will be in-service as soon as possible; and, the other near-term transmission and distribution measures will be implemented. If less Conservation or distributed generation materializes, load transfers cannot be sustained, or near-term measures are not implemented as planned, then the need date for additional supply capability will be sooner. The supply security need, as discussed, is today. Therefore, additional supply should be implemented as soon as practical. Based on the lead-time required to develop major supply options, the earliest in-service date is estimated to be the end of 2011.

6.0 ALTERNATIVE ANALYSIS

6.1 Alternative #1: Local Generation

This option would involve a simple-cycle gas generation plant in NYR. This facility would need to provide approximately 150 MW of firm capacity, with an overall size of roughly 350 MW.

The firm capacity is determined by the loss of one of the 230 kV supply circuits, B82V or B83V to the area. For this contingency, approximately 420 MW can be supplied in NYR after the addition of Holland Junction TS, according to the IESO's Holland Junction TS SIA, in Attachment 1 to this exhibit. The maximum area demand that can be supplied in this area is roughly 600 MW (i.e., four step-down transformer stations) and so the generator would need to be able to provide roughly 150 MW of firm capacity (i.e., with one generating unit out of service) in conjunction with other Conservation and distributed generation measures to meet future adequacy needs.

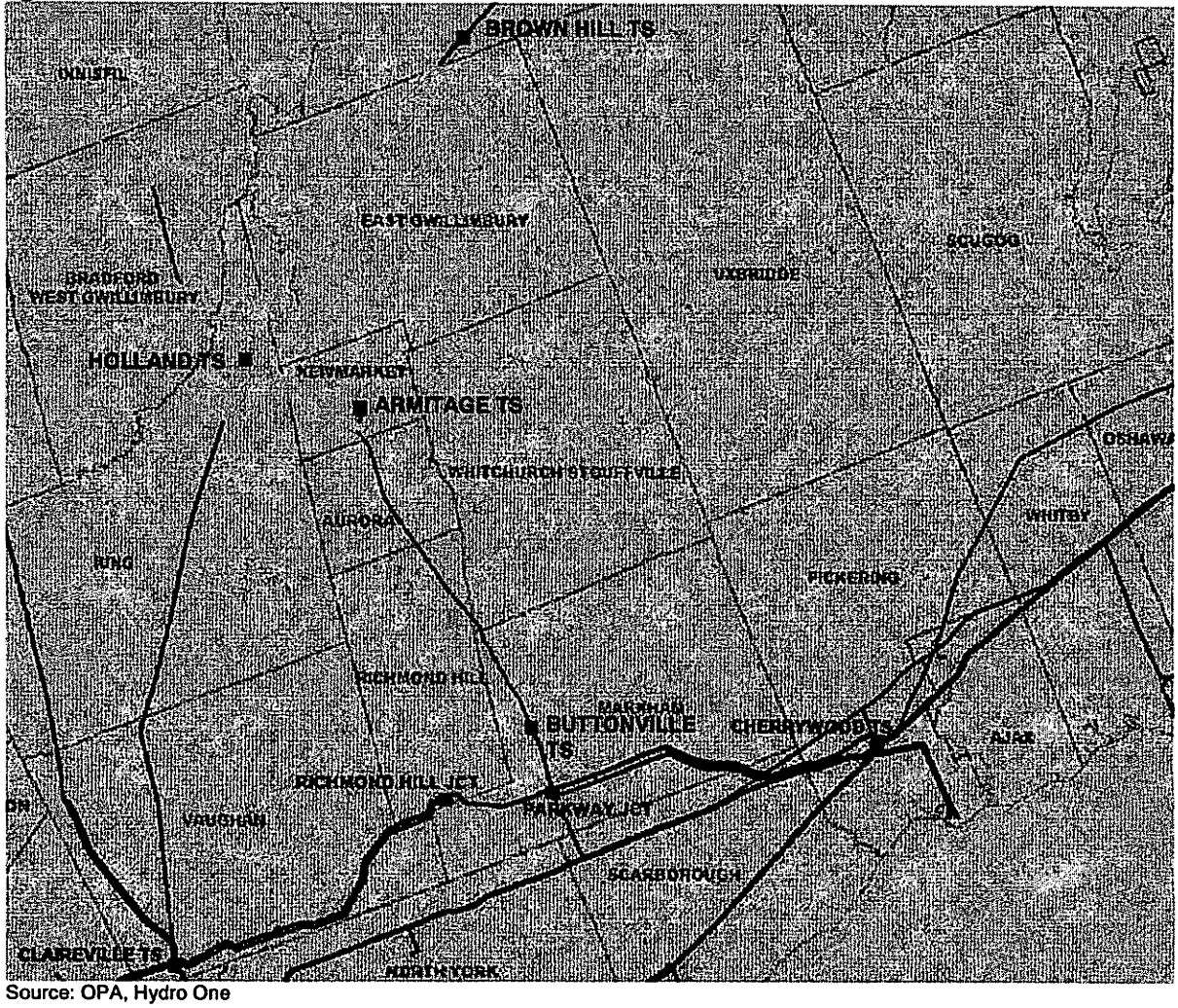
The overall size of the generation plant is determined by an [N-2] contingency, or the loss of the 230 kV line from Claireville. The Brown Hill end of the line can supply approximately 150 MW of load to NYR following this contingency. After deducting the existing Keele Valley generation (19 MW), expected future distributed generation (21 MW) and load

transfers in the distribution system, approximately 350 MW of supply is required to be provided by local generation.

Beyond the benefits for loads in NYR, local generation in NYR will also relieve loading demand on the 500/230 kV autotransformers at Claireville and reduce system losses.

The generation facility for NYR would need to be a transmission connected, peaking gas generator in order to satisfy both system and local needs. This facility could be connected anywhere on the Armitage tap, up to 5 km south of Holland Junction, and up to the East Gwillimbury boundary to the north, as shown in the diagram in Figure 3.

Figure 3: Connection Point for Generation in NYR



Source: OPA, Hydro One

The closer the generator is to Armitage TS, the lower the risk of an outage necessitating load curtailment. Ideally, the generator would be connected to Armitage so that if a line outage ([N-2] contingency) was suffered anywhere on the Claireville to Brown Hill line or the Armitage tap, the area would still have sufficient supply capacity. As the distance from Armitage increases, the risk of exposure to a contingency also increases. Locating generation within the identified boundaries will minimize this risk to the extent possible while permitting more options for siting of the generating plant.

The in-service date of the end of 2011 can be met if some of the preliminary work is initiated now and the formal procurement process is initiated at latest in 2008.

While the generating plant will be acquired through an appropriate procurement process, based on typical costs for a generic gas-fired peaking plant, the capital cost for this option, assuming a 350 MW size plant, is estimated to be about $200 million.

6.2 Alternative #2: Transmission and Generation Elsewhere in Ontario

This option would involve a new transmission line serving the area and an equivalent sized gas-fired generating plant located elsewhere in Ontario. The transmission component of this option proposes the replacement of the existing 115 kV line from Buttonville TS to Armitage TS, a distance of 22 km, with a new double-circuit 230 kV line. This new line will require both a Class EA and an OEB Section 92 leave-to-construct approval. The estimated capital cost of this transmission line, assuming overhead line construction, is $60 million. There was significant community opposition to this option, including the view that if the line was built, it should be buried, at least through urban areas. Undergrounding half of this line would significantly increase the capital costs, to an estimated $110 million. The capital cost of the generation component of this option would be similar to the local generation option.

Other transmission options were examined by the OPA and the community working group in the summer of 2005. None exhibited any overall advantage in terms of cost and impact over the Buttonville to Armitage option.

Assuming a roughly three year lead time is required for approval and construction, the end of 2011 in-service could be met if the development process commenced in 2008.

7.0 ALTERNATIVE COMPARISON

In planning a preferred alternative to meet the needs in NYR, the OPA assessed the alternatives with respect to feasibility, reliability, cost, flexibility, environmental performance and community acceptance. While largely aimed at addressing NYR's local reliability needs, the OPA also took into consideration aspects of the Directive, in particular, respecting natural gas-fired generation and coal-fired generation replacement.

7.1.1 Feasibility

Both generation and transmission alternatives are feasible for NYR. They use well-known technologies that have been implemented in Ontario. Both alternatives are capable of meeting the necessary timeline, although community opposition to the transmission option increases the risk of this option being delayed beyond the need date.

7.1.2 Reliability

Both generation and transmission alternatives address reliability needs in NYR – both options provide supply capability and meet applicable reliability standards and criteria.

7.1.3 Costs

Both the transmission and generation alternatives address the needs in NYR. However, in either case, new generation will be required in Ontario to meet the Directive's gas objectives and system needs. This being the case, the OPA began its analysis by (i) considering whether NYR was an appropriate location to site gas-fired generation for system needs, and if so (ii) how the cost of locating gas generation in NYR compared to the cost of locating gas near Sarnia or converting some of the Nanticoke units plus implementing the local transmission option.

A financial analysis was performed to compare the difference in cost between pursuing the generation alternative in NYR and the transmission alternative in NYR, in combination with system generation elsewhere. Two alternative locations for system generation were examined: the Dawn Hub (the location in Ontario with the lowest commodity and gas transportation cost) and Nanticoke (the location in Ontario with the lowest plant capital costs due to conversion of the existing coal units to gas generation). The goal of the analysis performed was to determine whether the incremental cost of providing generation locally was cost effective. See Exhibit E-2-5 for a description of the methodology for evaluating and comparing these alternatives. The specific cost assumptions used for analyzing these alternatives are summarized in Table 6. The cost assumptions are net-present values, listed in 2007 dollars.

Table 6: NYR Gas Analysis Costs and Results

	Nanticoke	Dawn	York
Plant Size (MW)	**500**	**350**	**350**
Capital Cost ($M)	$ 65.4	$ 192.3	$ 195.4
Gas Infrastructure: Up-Front Cost ($M)	$ 131.7	$ 14.0	$ 8.3
Gas Tariffs ($M)	$ 109.7	$ 48.1	$ 79.9
Fuel Cost ($M)	$ 121.9	$ 110.2	$ 110.2
Fixed OM&A ($M)	$ 143.9	$ 67.2	$ 67.2
Variable OM&A ($M)	$ 6.3	$ 3.9	$ 3.9
SUB-TOTAL ($M)	**$ 578.8**	**$ 435.5**	**$ 464.8**
Transmission Costs - Overhead (O/H) ($M)	$ 59.5	$ 59.5	$ -
Transmission Costs - Partially Underground (U/G) ($M)	$ 109.1	$ 109.1	$ -
TOTAL - with O/H Transmission ($M)	**$ 638.3**	**$ 495.0**	**$ 464.8**
TOTAL - with Partially U/G Transmission ($M)	**$ 687.9**	**$ 544.6**	**$ 464.8**

Source: OPA

Local Gas versus Generation at the Dawn Hub —The cost of generation is essentially common between these alternatives – the only additional costs are reflected in gas infrastructure charges and costs for transportation and storage of gas. The choice of location in NYR can change the up-front capital required for gas infrastructure as well as the annual tariff charges. Therefore, an average of the highest and lowest cost plant locations in NYR was examined in this analysis. The overall results show that generation located in NYR is more cost effective than locating the same generation at the Dawn Hub and building new transmission to serve the demand growth in NYR. As shown in Table 6,

the local generation alternative was more economic by roughly $30 million assuming overhead transmission in NYR for the alternative with system generation at the Dawn Hub. The cost difference between the two alternatives will increase further if undergrounding is required. If partial underground transmission is assumed for the Dawn Hub alternative, the cost difference will increase to close to $80 million.

Local Gas versus Nanticoke Conversion —The next analysis compared local generation in NYR to generation at Nanticoke. The analysis compared converting one unit at Nanticoke to 350 MW of local generation in NYR. The Nanticoke units are 500 MW in size and are not scalable to match the requirements of the local area. The NYR generation was assumed to operate at an average capacity factor of three percent with an equal annual energy output assumed from the converted Nanticoke units. Again, an average of the highest and lowest cost plant locations was assumed in NYR. The cost analysis model indicated that the local generation alternative was lower in cost by about $174 million, assuming overhead transmission in NYR for the Nanticoke alternative. The cost difference between the two alternatives would increase to approximately $223 million if the transmission project requires even partial undergrounding. Table 6 summarizes this comparison.

The OPA concluded that in both cases, the local generation alternative was the most cost effective.

7.1.4 Flexibility

Both generation and transmission resources are large lumpy capital expenditures. There is little capability to stage their development. However, generation in NYR will function as a system resource, as it is required by the system regardless of the NYR supply capacity requirements. Therefore, pursuing local generation in the near-term leaves the option for additional supply capacity to be provided by the transmission alternative over the longer-term. Should the area demand growth exceed the capacity of the local generation in the future, the transmission alternative can always be implemented to provide additional supply. Therefore, the local generation alternative is superior from a flexibility perspective.

7.1.5 Environmental Performance

The system requires gas-fired generation and if gas-fired generation is not built in NYR then it would have to be built elsewhere. The environmental impact of gas-fired generation – greenhouse gas emissions and water use – are relatively equivalent across Ontario. The NYR local generation alternative is preferable to the system generation plus transmission alternative since it is less impactive from a land use requirement perspective.

7.1.6 Societal Acceptance

In considering the needs and potential solutions for NYR, there was a significant level of community involvement and input over the course of the study. The OPA engaged the affected communities and local utilities in the process by soliciting and receiving advice, feedback, and comment with respect to the identification, definition and evaluation of electricity supply and Conservation options. The OPA met with key staff and elected officials; organized three large public meetings; formed a working group of municipal government staff, residents, school board representatives, business community representatives, and public interest group representatives; developed a project website; and invited the general public to all working group sessions and elected officials meetings, as observers.

The community, through the stakeholder consultation process, expressed considerable concern about the transmission alternative. Concerns generally focused on the impact on property values, electromagnetic fields and aesthetics. However, in terms of job creation, and future economic and regional development, generation and transmission were found to be equivalent.

The overall preference heard through the stakeholder consultation process was for a local generation solution.

7.1.7 Choice of Alternative

Local gas-fired generation was the preferred alternative based on feasibility and cost, as shown in Table 7. It also has greater societal acceptance, better environmental performance, and more flexibility.

Table 7: Alternative Comparison

	Feasibility	Reliability	Economics	Flexibility	Environmental Performance	Societal Acceptance
Alternative 1 - Generation		Equivalent				
Alternative 2 - Transmission	Less Favourable	Equivalent	Less Favourable	Less Favourable	Less Favourable	Less Favourable

Source: OPA

However, acquiring a major generating resource through a procurement process is never certain either in terms of cost or the success of the proponent in siting and obtaining regulatory approvals. Thus, the OPA considers it prudent to maintain the transmission option as a back-up plan. Should the generation option experience setbacks or not reach a successful outcome, the OPA will take the necessary steps to initiate project development work on the transmission option.

8.0 RECOMMENDATIONS AND PROJECT TIMELINE

8.1 Recommendation

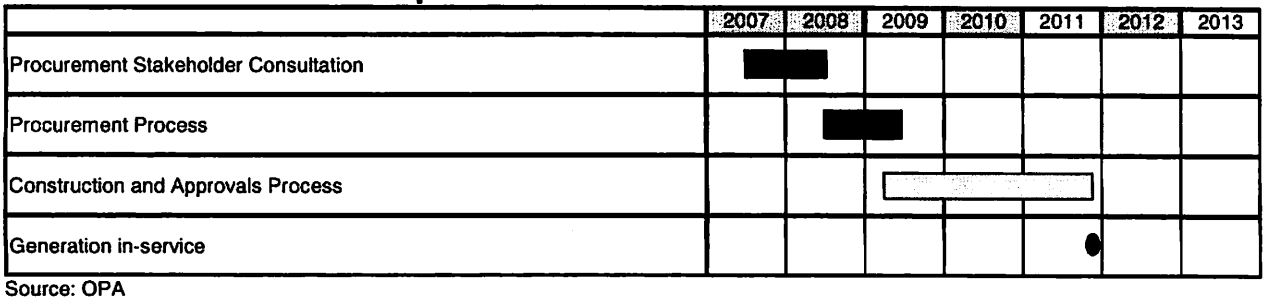
After evaluating the alternatives for meeting the needs in NYR, the OPA recommends that the supply need in NYR be addressed by providing local generation with transmission as a back-up. Accordingly:

- The OPA intends to procure approximately 350 MW of gas-fired peaking generation in Northern York Region;
- In the event the procurement process is delayed or in the OPA's view is unlikely to lead to the desired outcome, the OPA will take steps to immediately initiate the necessary Transmission Development Work (defined below). The estimated cost for the Transmission Development Work is about $2 million, or about 2% of the total project cost.

8.2 Timeline

Figure 4 illustrates the estimated timeline for implementation of local generation:

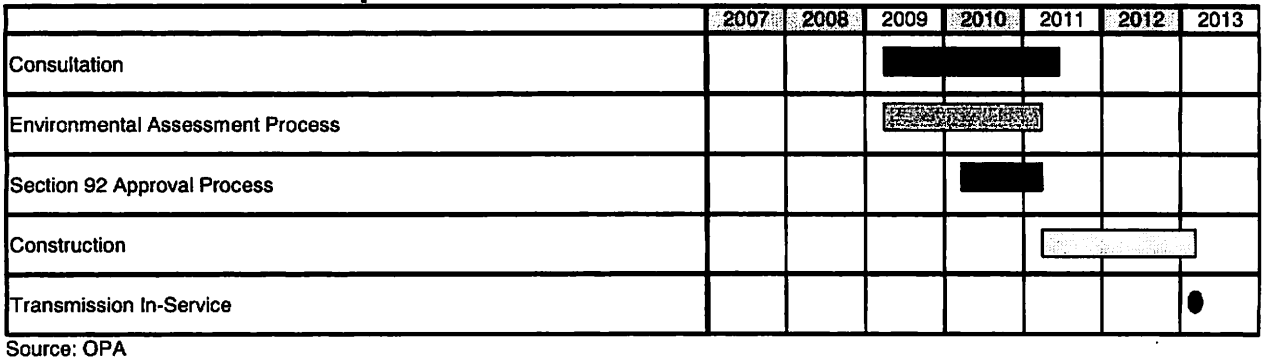
Figure 4: Local Generation Option Estimated Project Timeline
NYR - Local Generation Option



Source: OPA

If the back-up transmission option were to proceed in 2009, then the estimated timeline in Figure 5 may be followed. Development work encompasses all items up to the construction of the facilities.

Figure 5: Transmission Option Estimated Project Timeline
NYR - Transmission Option



Source: OPA

KITCHENER-WATERLOO-CAMBRIDGE-GUELPH

1.0 EXECUTIVE SUMMARY

The OPA recommends the siting of new gas-fired generation in the Cambridge area and intends to procure such generation for a projected in-service date of the end of 2012. The OPA also recommends the reinforcement of the transmission system serving Guelph, Cambridge and the broader Kitchener-Waterloo-Cambridge-Guelph ("KWCG") Area. The purpose of the recommended gas-fired generation in Cambridge and transmission reinforcements is to address local area reliability needs. As well, the gas-fired generation located in Cambridge will further the Directive's goals of using gas for high value and high efficiency applications and replacing coal with cleaner sources in the earliest practical timeframe.

The KWCG Area is a major regional centre in Ontario. It has a peak electrical demand of roughly 1,400 MW. The area has experienced a fairly robust growth, averaging about 2.1% per annum over the past five years. This is higher than the average load growth of 1.0% for Ontario. Forecasts from the local utilities serving this area indicate that a rate of growth higher than the provincial average will continue into the future. As a result, the electrical infrastructure serving the area is increasingly being stressed and is becoming inadequate.

The OPA has identified three specific needs. They are: a) inadequate supply capacity for the Cambridge and Guelph areas in the near term; b) inadequate supply security for the Cambridge area in the near term; and c) inadequate supply security for the Kitchener-Waterloo-Guelph loads supplied directly from the Kitchener-Waterloo 230 kV lines in the longer term. After evaluating a range of options, the OPA recommends that the electric service needs in the KWCG Area be addressed by an integrated plan consisting of the following remedial measures in the near and medium terms:

1. Pursuing the Conservation and distribution generation potentials forecast for the area;
2. Implementing minor transmission reinforcements consisting of adding shunt capacitors at a number of transformer stations and on the distribution system in the Cambridge and

Guelph areas, and uprating a section of 230 kV line (15 km) in the Cambridge area to maximize the capability of the existing transmission network;

3. Procuring gas-fired generation located near the Preston station in Cambridge, which will meet both the local area need and the Directive's goal of using gas at peak times for high efficiency and high value applications. In the event the procurement process is delayed or in the OPA's view is unlikely to lead to the desired outcome, the OPA will take steps to immediately initiate the necessary transmission development work for a transmission alternative; and
4. Initiate project development work for the installation of two 230/115 kV autotransformers at or near Campbell Transformer Station ("TS") or Cedar TS and the upgrading of about 5 km of the existing 115 kV circuits B5G/B6G between Campbell TS and Cedar TS via Canadian General Electric "CGE" Junction.

In the long term there is also a need to install 230 kV circuit breakers at suitable locations between Middleport Transformer Station and Detweiler Transformer Station by 2017 to sectionalize circuits M20/21D, and between Orangeville Transformer Station and Detweiler TS beyond 2020, to sectionalize circuits D6/7V. There is no action required at this time, as there is sufficient time to monitor the need and implement actions later.

There is also a need to add new transformation capacity in the KWCG Area. This need will be assessed and developed by the affected LCDs and Hydro One. The regional supply plan as proposed in the IPSP for the KWCG Area has taken into account the development of these future step-down transformer stations.

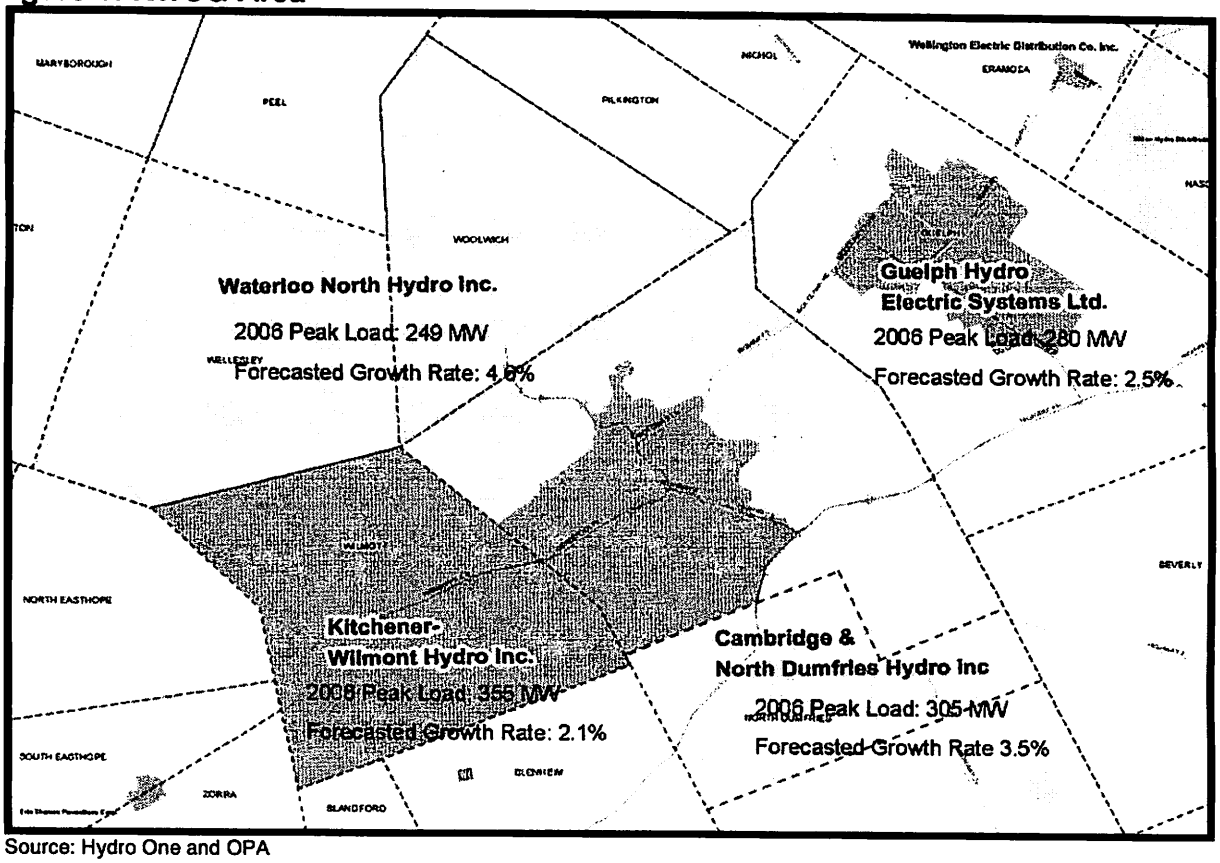
The OPA intends to procure the necessary gas fired generation for the Cambridge area for a projected in-service date of the end of 2012. In addition, there is a need to commence transmission development work on project (4) above in order to meet a 2013 need date for these transmission reinforcements. The necessary development work and estimated timetable for this work is addressed in section 10.0 below. Lastly, there is a need for the LDCs and Hydro One to proceed as soon as possible with the remedial measures identified in remedial measure (2) above. Remedial measure (1) will be addressed by the OPA's Conservation and resource procurement plans and programs.

2.0 PROJECT LOCATION AND OVERVIEW

The KWCG area is located in the heart of southwestern Ontario, and includes the geographic area as shown in Figure 1. The area has been undergoing rapid increases in population and economic development. The estimated population for the KWCG Area is now over 530,000 (Statistics Canada Census 2006). There are major automotive and related industries, "high tech" development centres, three major universities and a number of other educational institutions located in the area. The KWCG Area is one of the "Places to Grow" identified by the government of Ontario in their "Places to Grow Discussion Paper".

The area's electricity demand is a mix of residential, commercial and industrial loads. Electricity services to customers in the KWCG Area are provided by Hydro One Distribution and four other LDCs: Kitchener and Wilmot Hydro, Waterloo North Hydro, Cambridge & North Dumfries Hydro, and Guelph Hydro. Figure 1 below shows the LDC service territories in the KWCG Area. Also shown are the actual peak demands recorded for 2006 and the forecast growth rates for the LDCs. The total demand for the area was approximately 1,400 MW in the summer of 2006. It is one of the largest load centres in Ontario.

Figure 1: KWCG Area



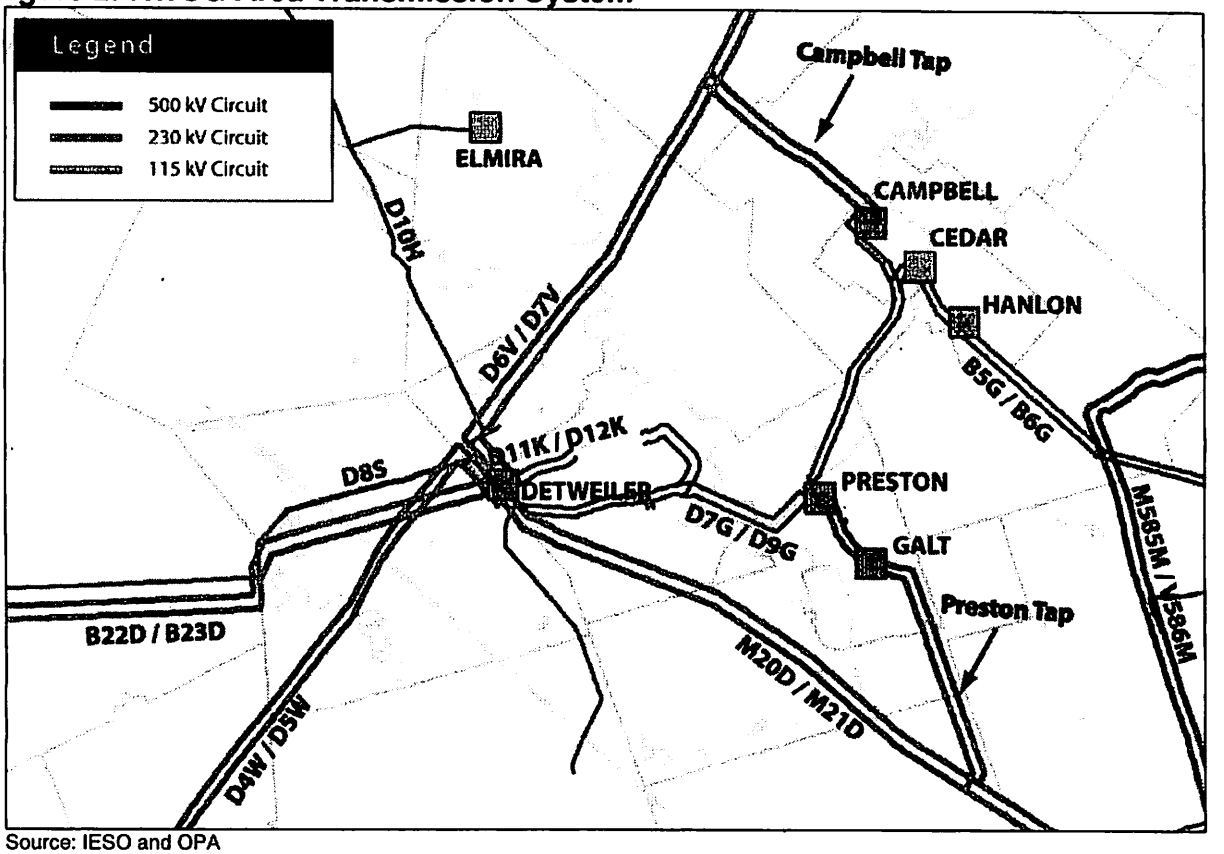
Source: Hydro One and OPA

The electricity supply to the KWCG area is obtained almost entirely from the main Ontario power grid delivered through the 230 kV and 115 kV transmission lines serving the area. There are no major generation facilities in the vicinity. A small generator, located at a land-fill site southwest of Waterloo, presently produces about 4 MW and feeds into the Kitchener-Wilmot Hydro system. There is a potential to develop an additional 4 MW from this plant. Another small generator located at a land-fill site in Guelph injects about 2.5 MW into that system. There is wind generation north of Orangeville Transformer Station as well as new wind generation projects to be connected into stations in Fergus and Elmira, which do not provide any significant relief to the KWCG area.

3.0 EXISTING FACILITIES

Figure 2 below shows the geographic layout of the transmission system of the KWCG area.

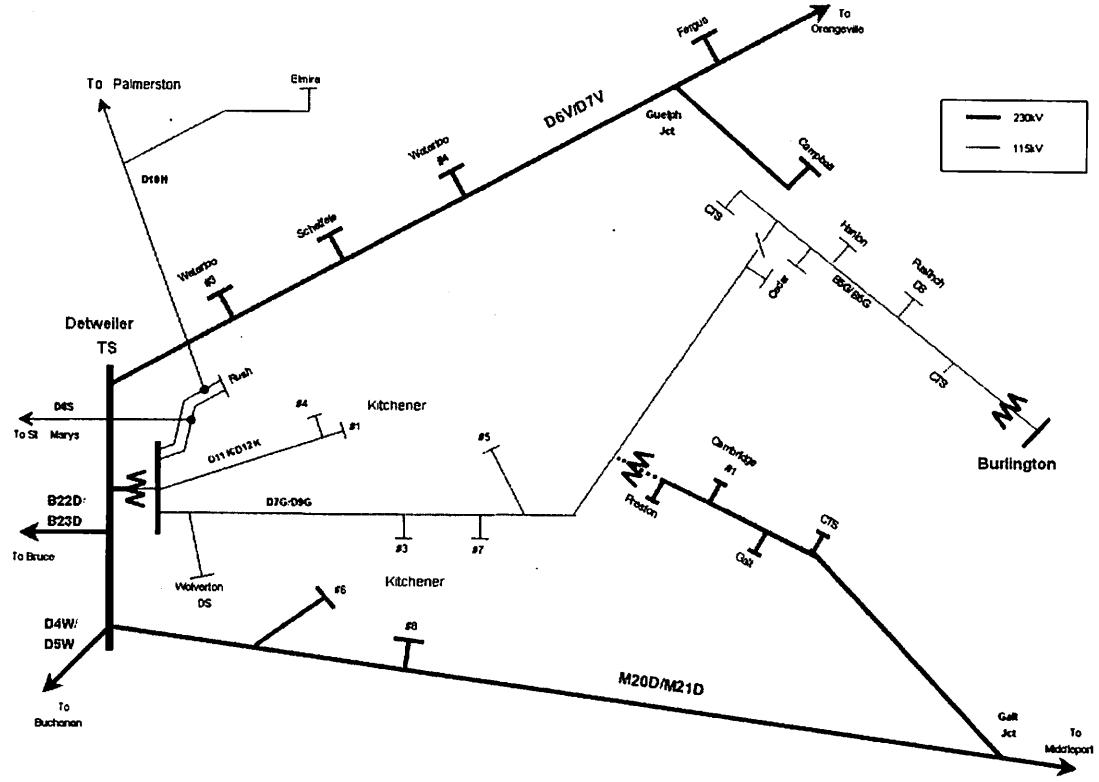
Figure 2: KWCG Area Transmission System



Source: IESO and OPA

Figure 3 is the one-line diagram of the same electrical system of the KWCG area.

Figure 3: KWCG Area One-Line Diagram



Source: Hydro One and OPA

The 230 kV and 115 kV transmission systems supplying the KWCG area consist of four 230 kV double circuit lines and four 115 kV double circuit lines. The 230 kV double circuit lines are D6V/D7V, M20D/M21D, B22D/B23D and D4W/D5W, between Detweiler TS, Buchanan TS, Bruce GS, Orangeville TS and Middleport TS. The four 115 kV double circuit lines are D8S/D10H, D11K/D12K, D7G/ D9G, and B5G/B6G, emanating from Detweiler TS and Burlington TS. The double circuit line, D8S/D10H, is split into two single circuit lines from Rush MTS, one to Elmira, the other to St. Marys. High voltage 230/115 kV autotransformers are located at Detweiler TS, Burlington TS and Preston TS (in-service in late 2007) to provide the necessary transformation from the 230 kV system to the 115 kV system. Step-down transformer stations are connected to both 230 kV and

115 kV systems to bring the power to distribution levels serving the area by Hydro One Distribution and the four other LDCs.

3.1 Kitchener and Wilmot Hydro ("KWH")

Step-down transformer stations serving Kitchener and Wilmot Hydro's loads are Kitchener MTS #6 and Kitchener MTS #8 supplied from the 230 kV circuits M20D/M21D; Kitchener MTS #1 and Kitchener MTS #4 supplied from the 115 kV circuits D11K/D12K; and Kitchener MTS #3, Kitchener MTS #5 and Kitchener MTS #7 supplied from the 115 kV circuits D7G/D9G. The township of Wilmot is supplied from a 27.6 kV supply at Detweiler TS. The peak load of Kitchener and Wilmot Hydro for 2006 was about 355 MW.

3.2 Waterloo and North Hydro ("WNH")

The loads serviced by Waterloo and North Hydro are mainly supplied by step-down transformer stations, Waterloo MTS #3 and Scheifele TS from the 230 kV circuits D6V/D7V, by Rush TS from the 115 kV circuits D8S/D10H, and by Elmira TS from the 115 kV circuit D10H. Some of WNH's loads are supplied from Fergus TS, Preston TS and Detweiler TS. A new step-down transformer station, Waterloo MTS #4, is proposed by WNH for in-service by 2010 in order to meet future demand. The connection point for the new Waterloo MTS #4 is assumed to be connected to the 230 kV circuits D6V/D7V in this study. The peak load of WNH for 2006 was about 249 MW.

3.3 Cambridge and North Dumfries Hydro ("CNDH")

The loads serviced by Cambridge and North Dumfries Hydro are mainly supplied by step-down transformer stations, Galt TS, Cambridge MTS #1 and Preston TS from 230 kV circuits tapped off M20D/M21D at the Galt Junction ("Preston Tap"). Some of CNDH's loads are supplied from Wolverton DS. A new step-down transformer station, Cambridge MTS #2, is proposed by CNDH for in-service by 2012, to supply loads in the general area of Maple Grove Road and Fountain Street, north of Highway 401 as most of the new development is expected to occur north of the 401. The closest transmission facilities are the 115 kV circuits D7G/D9G or the Preston TS at 230 kV level. The exact location and

connection voltage level (230 kV or 115 kV) are yet to be determined. CNDH has expressed its preference for a 230 kV connection. The peak load of CNDH for 2006 was about 305 MW.

There is a large industrial load with a peak load of about 40 MW also supplied from the 230 kV circuit M21D of the Preston Tap, the same circuit shared by Galt TS, Cambridge MTS #1 and Preston TS.

3.4 Guelph Hydro ("GH")

The loads serviced by Guelph Hydro are supplied by step-down transformer stations, Campbell TS from 230 kV circuits tapped off the 230 kV circuits D6V/D7V at the Guelph Junction ("Campbell Tap"), Hanlon TS from the 115 kV circuits B5G/B6G, and Cedar TS which is split into two stations to receive supply from 115 kV circuits D7G/D9G as well as from 115 kV circuits B5G/B6G. In its load forecast, GH identifies a need for additional transformation capacity at Hanlon TS (2010), Cedar TS (2012) and Campbell TS (2014). The peak load of GH for 2006 was about 280 MW.

There is a small industrial load south of Guelph connected to the south section of the 115 kV circuit B5G. Another very small industrial load near Campbell TS is connected to the northern section of the 115 kV line, B5G/B6G.

3.5 Hydro One Distribution

The loads serviced by Hydro One Distribution are supplied by step-down transformer stations, Fergus TS from the 230 kV circuits D6V/D7V, Puslinch DS from the 115 kV circuits B5G/B6G, Wolverton DS from the 115 kV circuit D7G, and Galt TS from M20D/M21D. Fergus TS, Galt TS and Wolverton DS also provide supply to WNH and CNDH and others.

3.6 Recent Reinforcements

Actions have been taken in recent years by Hydro One Networks and the four other LDCs to reinforce the supply to the area. They are listed below in Table 1 and Table 2.

Table 1: Reactive Compensation Facilities

Year	Station	Voltage (kV)	Mvar
2004	Burlington	115	125
2006	K-W Hydro	13.8	37.5[1]
2007	Detweiler	230	225 (second one)
2007	Cedar T1/T2	13.8	20

Source: LDCs, Hydro One Networks, and OPA

Table 2: 230/115 kV Transformation Upgrades

Year	Station	Voltage(kV)	Description
2004	Detweiler	230/115	T3 Replaced
2006	Burlington	230/115	T4 Replaced
2007	Preston	230/115	T1 New[2]

Source: LDCs, Hydro One Networks, and OPA

4.0 HISTORICAL AND FORECAST DEMAND FOR THE KWCG AREA

The area is summer peaking with almost 1,400 MW of demand recorded in the summer of 2006. Based on the regression analysis shown in Figure 4, historical load growth of the area as a whole averaged about 2.1% on average over the past 5 years from 2002 to 2006, as shown in Table 3. This is higher than the provincial average of about 1% per annum.

Table 3: KWCG Historical Load (Regional Coincident Peak) (MW)

Year	2002	2003	2004	2005	2006
Area Load (MW)	1,296	1,306	1,247	1,406	1,384

Source: IESO

The sum of the peak demands for the four KWCG LDCs in 2006 was approximately 1,200 MW. This is not the same as the 2006 regional total peak demand for the KWCG

[1] Kitchener-Wilmot Hydro has installed a large number of distribution capacitors to increase reactive compensations. Installation was completed in the spring of 2006 with the final total of 37.5 Mvar.

[2] A 230/115 kV autotransformer T1 at Preston TS is being added for in-service in 2007, together with in-line breakers on D7G/D9G to address the supply inadequacy of the 115 kV circuits D7G/D9G.

Area as not all of the utility peaks are coincident with the regional peak of 1,384 MW. A portion of the load is on Hydro One Distribution, and there are a number of directly connected industrial customer loads that are not part of the LDC total.

Revised load forecasts for individual transformer stations were prepared by the LDCs for the period from 2007 to 2015 inclusive. A summary of this forecast is provided in Table 4 through Table 7. They show a forecast growth ranging from 2.3% to 3.2% over this time period.

Table 4: Kitchener-Waterloo 230 kV Subsystem Load Forecast (MW)

Kitchener-Waterloo 230kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Station	MW	MW	MW	MW	MW	MW	MW	MW	MW
[redacted]									
Campbell TS JQ	47.1	47.9	48.2	47.5	48.4	49.3	50.3	51.3	52.3
Campbell TS BY	47.1	47.9	48.2	47.5	48.4	49.3	50.3	51.3	52.3
Campbell TS ZE	47.1	47.9	48.2	47.5	48.4	49.3	50.3	51.3	52.3
Fergus TS	88.0	89.6	91.1	92.7	94.2	95.8	97.3	98.9	100.5
Scheifele T1/T2	60.9	59.6	60.2	60.8	61.5	59.3	59.9	60.5	61.1
Scheifele T3/T4 JH	49.0	47.5	48.0	48.5	49.0	46.3	46.8	47.2	47.7
Scheifele T3/T4 QT	50.1	47.8	49.5	42.2	43.7	47.3	47.8	48.3	48.8
Waterloo #3	42.9	62.4	74.1	67.8	74.6	73.4	69.9	76.9	75.4
Waterloo #4	0.0	0.0	0.0	27.3	30.2	32.7	46.3	50.1	63.3
Subtotal:	432.1	450.7	467.7	481.7	498.3	502.8	518.8	535.7	553.7
[redacted]									
Kitchener #6 B1	36.7	37.4	38.0	38.7	39.3	40.0	40.7	41.3	42.0
Kitchener #6 B2	36.7	37.4	38.0	38.7	39.3	40.0	40.7	41.3	42.0
Kitchener #8	31.8	34.1	36.2	38.2	40.5	42.7	44.9	47.2	49.4
Subtotal:	105.1	108.8	112.2	115.5	119.1	122.7	126.2	129.8	133.4
Subsystem Total:	537.2	559.5	579.9	597.3	617.4	625.5	645.0	665.5	687.1

Source: LDCs, Hydro One Networks, and OPA

Table 5: Cambridge 230 kV Subsystem Load Forecast

Cambridge 230kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Station	MW	MW	MW	MW	MW	MW	MW	MW	MW
[illegible]									
Cambridge CTS	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Cambridge CTS	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Cambridge CTS	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Galt TS J	84.6	84.6	84.6	84.6	88.0	91.7	91.7	91.7	91.7
Galt TS Y	84.6	84.6	84.6	84.6	88.0	91.7	91.7	91.7	91.7
Cambridge #1	67.0	79.1	91.5	95.1	101.7	101.7	101.7	101.7	101.7
Cambridge #2	0.0	0.0	0.0	0.0	0.0	6.4	20.7	35.5	50.9
Preston TS J	50.7	50.7	50.7	55.4	55.4	55.4	55.4	55.4	55.4
Preston TS Q	50.7	50.7	50.7	55.4	55.4	55.4	55.4	55.4	55.4
Subsystem Total:	377.6	389.7	402.1	415.1	428.5	442.3	456.6	471.4	486.8

Source: LDCs, Hydro One Networks, and OPA

Table 6: Kitchener 115 kV Subsystem Load Forecast

Kitchener 115 kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Station	MW	MW	MW	MW	MW	MW	MW	MW	MW
[illegible]									
Kitchener #3 A	23.6	23.8	24.1	24.4	24.8	25.1	25.4	25.7	26.0
Kitchener #3 B1	16.2	16.6	16.9	17.2	17.6	17.9	18.2	18.5	18.8
Kitchener #3 B2	16.2	16.6	16.9	17.2	17.6	17.9	18.2	18.5	18.8
Kitchener #5 B1	36.8	37.5	38.3	39.0	39.8	40.5	41.3	42.1	42.8
Kitchener #5 B2	36.8	37.5	38.3	39.0	39.8	40.5	41.3	42.1	42.8
Kitchener #7	36.6	37.2	37.8	38.4	39.0	39.6	40.3	40.9	41.5
Cedar TS T1/T2 BY	43.4	44.1	44.4	43.6	44.4	45.2	46.0	46.8	47.8
Cedar TS T1/T2 ID	28.1	30.9	32.8	34.3	37.0	39.6	42.4	45.1	48.1
Wolverton DS T1	9.7	9.8	9.8	10.0	10.1	10.2	10.3	10.4	10.4
Wolverton DS T2	9.7	9.8	9.8	10.0	10.1	10.2	10.3	10.4	10.4
Subtotal:	257.0	263.7	269.0	273.1	279.8	286.5	293.4	300.4	307.3
[illegible]									
Kitchener #1	29.7	30.1	30.9	31.3	31.9	32.5	33.1	33.6	34.2
Kitchener #4 B1	35.7	36.4	37.2	37.9	38.5	39.2	39.8	40.4	41.1
Kitchener #4 B2	35.7	36.4	37.2	37.9	38.5	39.2	39.8	40.4	41.1
Subtotal:	101.1	102.9	105.2	107.0	108.9	110.8	112.7	114.4	116.3
[illegible]									
Rush MTS	35.9	36.2	36.6	36.9	37.3	54.6	56.5	58.6	60.7
Elmira TS	31.1	29.8	30.1	30.4	30.0	30.0	30.0	30.0	30.0
Subtotal:	66.9	66.0	66.7	67.3	67.3	84.6	86.6	88.6	90.7
Detweiler TS	30.4	30.9	31.3	31.8	32.3	32.7	33.2	33.6	34.1
Subsystem Total:	455.5	463.5	472.2	479.3	488.3	514.5	525.9	537.0	548.4

Source: LDCs, Hydro One Networks, and OPA

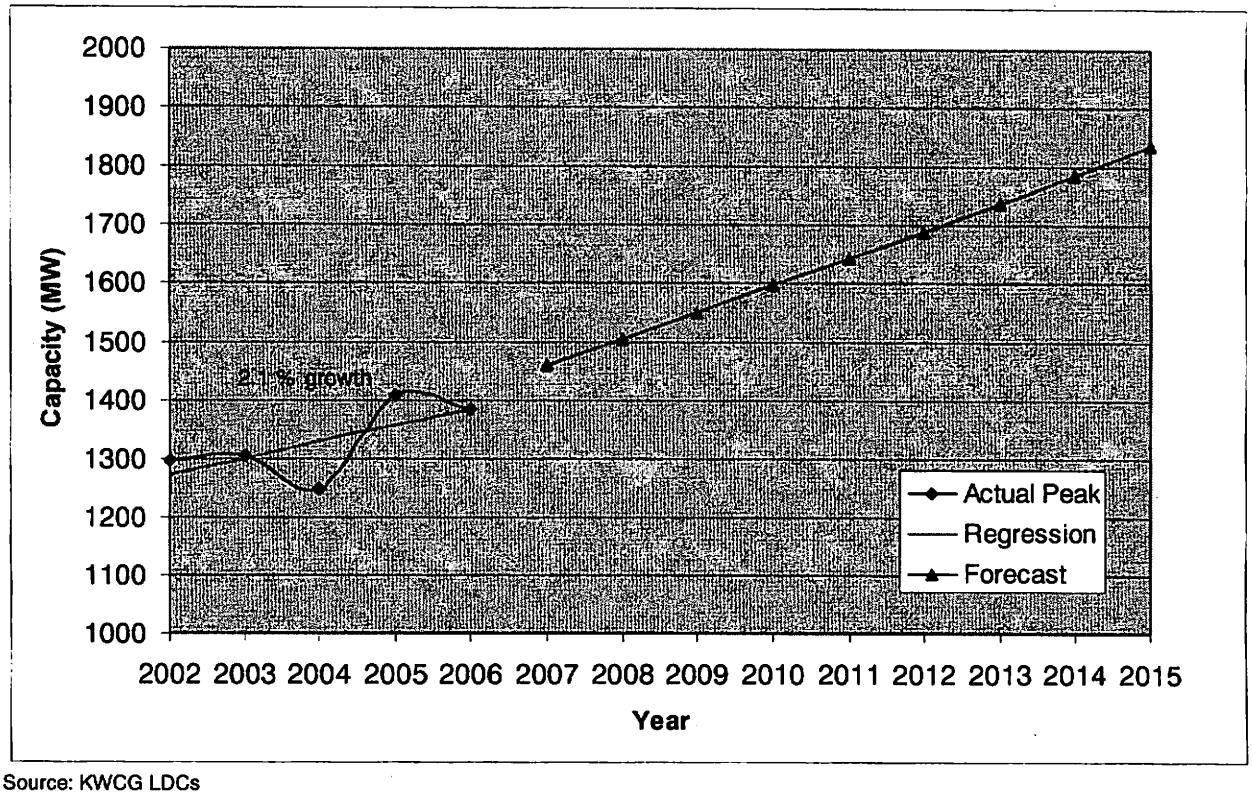
Table 7: Guelph 115 kV Subsystem Load Forecast

Guelph 115 kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Station	MW	MW	MW	MW	MW	MW	MW	MW	MW
Guelph CTS 1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Guelph CTS 2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Puslinch DS B1	11.0	11.1	11.2	11.4	11.5	11.7	11.8	11.9	12.1
Puslinch DS B2	11.0	11.1	11.2	11.4	11.5	11.7	11.8	11.9	12.1
Guelph Hanlon TS	33.0	35.6	39.0	50.0	51.5	53.0	54.6	56.3	58.0
Cedar TS T7/T8	40.8	40.7	40.4	39.0	39.0	39.1	39.2	39.2	39.3
Subsystem Total:	102.7	105.3	108.8	118.6	120.6	122.4	124.2	126.3	128.3

Source: LDCs, Hydro One Networks, and OPA

The above load forecasts indicate that the rate of growth in electricity demand for the area will be about 2.9% for the period 2007-2015. The combined forecast peaks for the area together with the historical demand data are shown in Figure 4.

Figure 4: KWCG Historical and Forecast Demand



Source: KWCG LDCs

5.0 NEED ASSESSMENT AND SOLUTION DEVELOPMENT

5.1 Methodology and Approach

In general, for assessing the service needs in KWCG, a forecast of the peak demand to 2015 was developed based on the information provided by the affected LDCs and Hydro One Distribution. Naturally occurring Conservation is incorporated in the demand forecasts. For regional electrical service planning, the mid-term horizon is considered appropriate as forecast of growth is very uncertain beyond that time, and in most cases, lead time of most regional supply facilities are in the order of five to seven years, and long-term development plans can be adjusted to accommodate changes in long-term forecasts. From the forecast demand, the amount of available local resources was then deducted, and the remaining demand was compared to the supply capability of the existing system. The determination of need was consistent with the assumptions, considerations and criteria contained in the IESO Ontario Resource and Transmission Assessment Criteria (the "IESO ORTAC") found in Exhibit E-7-1, Attachment 3.

5.2 Supply Capability

In assessing the reliability of the electrical services to the KWCG Area, the OPA relies on the IESO's reliability standards and criteria, as described in Exhibit E-2-7. To test the reliability of the system, the contingencies considered for the KWCG supply include:

- loss of one 115 kV or one 230 kV supply circuits [N-1];
- loss of one of the major 230/115 kV autotransformers serving the area [N-1]; and
- loss of one of the double-circuit 115 kV or 230 kV lines [N-2].

The first two are referred to as single-element or [N-1] contingency events, and the last is referred to as a double-element or [N-2] contingency event.

For the application of the reliability criteria in the planning of KWCG service needs, load meeting capability ("LMC") is defined as the maximum load in the area that can be served

so that following the critical single-element or [N-1] contingency, the system is stable, all equipment is within their ratings, voltages are within the acceptable operating range and no load is interrupted. Similarly, supply security is the ability of the delivery system to restore interrupted load in a reasonable time following the critical double-element or [N-2] contingency. Additionally, the maximum amount of load than can be interrupted under the security criterion for a [N-2] contingency is 600 MW. The application of the security criterion identifies when an area would require an alternative source of supply or a greater diversity of supply to maintain an adequate level of security.

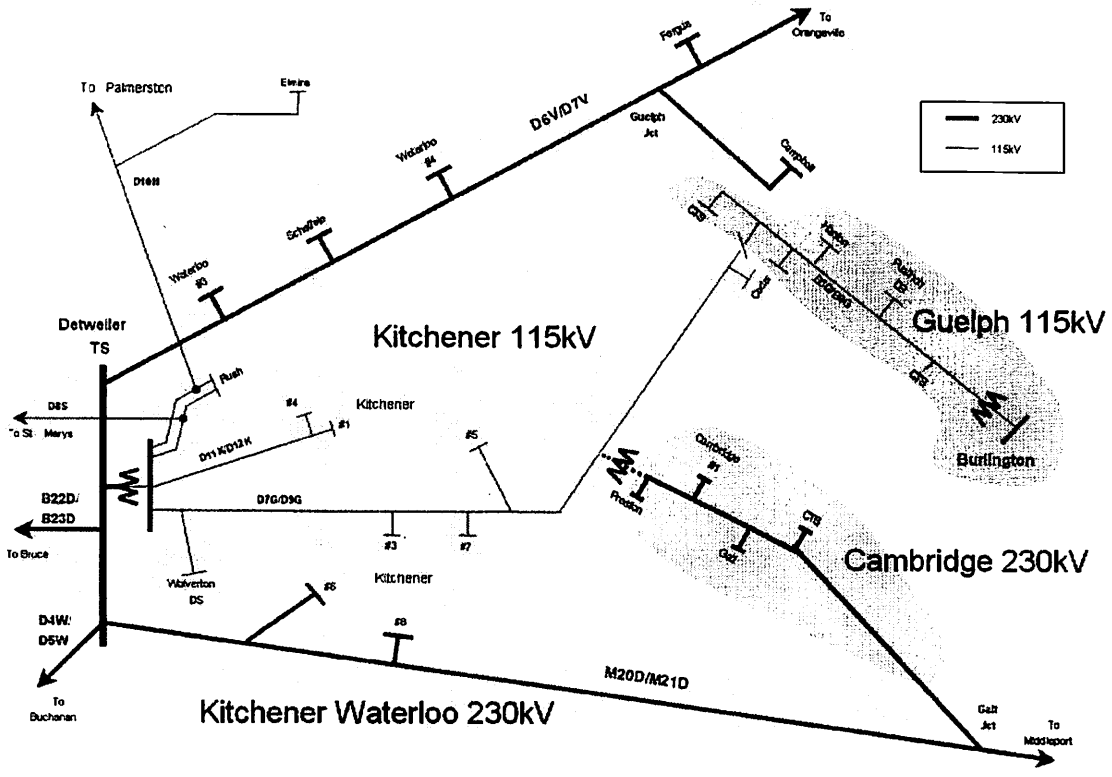
5.3 KWCG Subsystems

The electricity supply infrastructure in the KWCG area has been developed over the years in an integrated manner. For example, part of the Guelph area load is currently supplied from the Kitchener 115 kV system in order to relieve the Burlington 115 kV supply to Guelph and maximize the use of available capacity from Kitchener. Recently, a 230/115 kV autotransformer was added at Preston TS in Cambridge to reinforce the Kitchener 115 kV supply from the Cambridge 230 kV system. While the KWCG Area electrical service needs should be considered in an integrated manner, the nature and configuration of the transmission system today in the KWCG Area permit the service planning for the area to be addressed as four relatively independent subsystems as follows:

- The Guelph 115 kV Subsystem – customers in Guelph supplied from Burlington TS via B5G/B6G;
- The Kitchener 115 kV Subsystem – customers in Kitchener, Waterloo and Guelph supplied from Detweiler TS via 115 kV lines, D7G/D9G, D11K/D12H, D8S/D10H;
- The Cambridge 230 kV Subsystem – customers in Cambridge supplied from the 230 kV line M20D/M21D via the "Preston Tap"; and
- The Kitchener-Waterloo 230 kV Subsystem – customers in Kitchener, Waterloo and Guelph supplied directly from 230 kV lines D6V/D7V and M20/21D.

These four sub-systems are shown in the Figure 5 below.

Figure 5: Four Subsystems



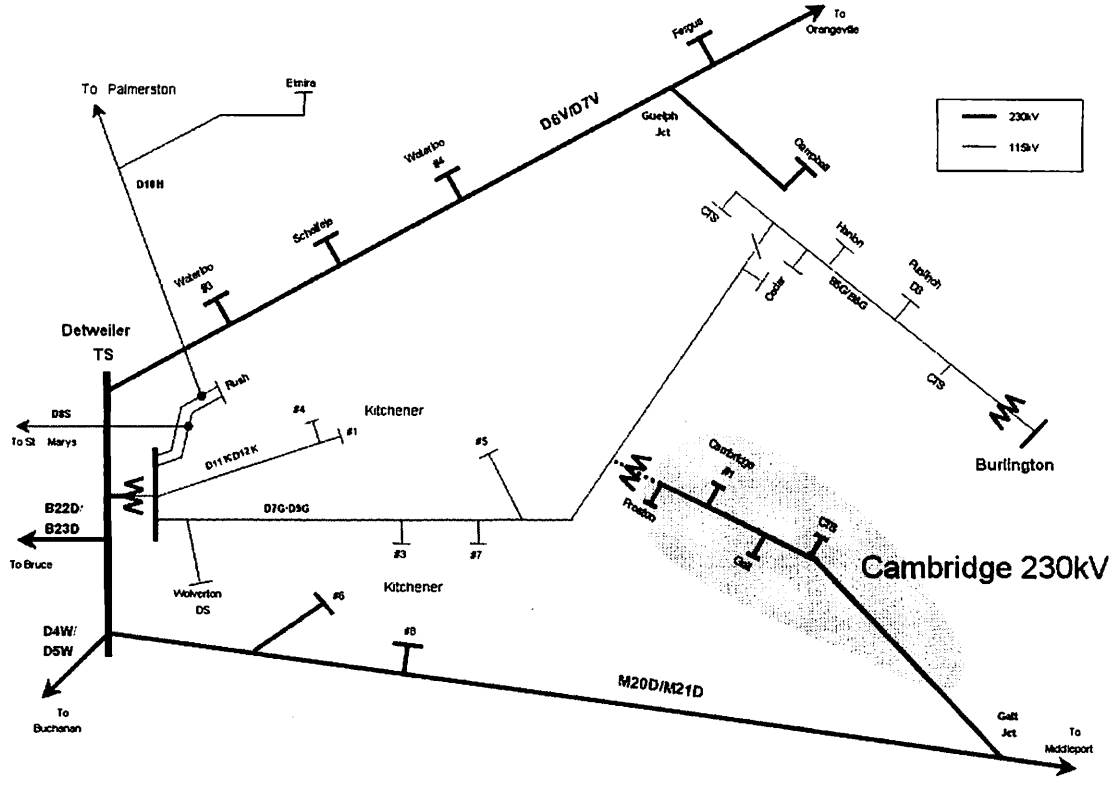
Source: Hydro One and OPA

A number of near-term and mid-term needs for two of the subsystems (the Cambridge 230 kV subsystem and the Guelph 115 kV subsystem) were identified. In the longer term, a need to improve the security of the Kitchener-Waterloo 230 kV subsystem was also identified. The supply to the Kitchener 115 kV subsystem was found to be adequate over the Plan period, following the installation of the 230/115 kV autotransformer at Preston TS in 2007, which reinforces the Kitchener 115 kV supply. The following sections will discuss in more detail these needs and the recommended solutions to address these needs.

6.0 CAMBRIDGE 230 KV SUBSYSTEM – NEED AND SERVICE IMPROVEMENT OPTIONS

The Cambridge 230 kV subsystem is shown in Figure 6 below.

Figure 6: Cambridge 230 kV Subsystem



Source: Hydro One and OPA

The Cambridge area load and a large industrial customer are supplied from a line connection tapped off 230 kV circuits, M20D and M21D, from Middleport TS to Detweiler TS, at Galt Junction as shown in the above figure. This tapped connection is also referred to as the Preston Tap.

6.1 Demand Forecast

The 2006 summer peak load supplied from the Preston Tap was 344 MW. CNDH's load forecast predicts a growth of about 3.5% per annum. Assuming that the large industrial customer load connected to circuit M21D will remain at its current 40 MW level, the total

load connected to the Preston Tap will reach 442 MW by 2012, and about 500 MW by 2016. These peak loads are based on summer extreme weather conditions which are used for local area service planning, consistent with the IESO ORTAC. Typically, peak load under extreme summer weather conditions is about 6% higher than that for normal weather conditions.

The demand forecast on a station basis for transformer stations supplied from this subsystem is shown above in Table 5.

6.2 Supply Adequacy

The Preston Tap, which is tapped off of the main M20D and M21D circuits, can supply 450 MVA, while the main M20D and M21D circuits can each supply 750 MVA.

In accordance with the IESO ORTAC, the transmission system should be planned to avoid load interruptions for single-element or [N-1] contingencies. The planning need date for determining when supply reinforcements will be required in meeting the planning standard is based on the first year when the forecast demand in the area exceeds its LMC.

The [N-1] contingency event that is critical to the Cambridge supply is the loss of one of the two 230 kV M20/21D supply circuits comprising the Preston Tap. The large industrial load there connects only to circuit M21D, and therefore the loss of circuit M20D is more critical than the loss of circuit M21D. Based on this, the LMC for this tap is about 390 MW which includes the large industrial load of about 40 MW. Additionally, the maximum allowable voltage drop limit is also reached at this level of loading as discussed in Attachment 1 to this exhibit.

Based on the load forecast for stations supplied from the Preston Tap and assuming no demand or supply remedial measures, the LMC of 390 MW is reached in 2009.

The other [N-1] contingency of importance is the loss of one of the step-down transformers. Hydro One Networks and CNDH have determined the transformation capacity of the three step-down transformer stations in this sub-system as shown Table 8 below.

Table 8: Transformation Capacity (MVA)

Station	Station Capacity (MVA)
Galt TS	195
Preston TS	126
Cambridge #1 MTS	113

Source: Hydro One and CNDH

CNDH has indicated that the capacity at these three stations will be exceeded in 2012. This need for a new station has been identified in CNDH's forecast. This new station will be accommodated in the supply plan for Cambridge.

6.3 Security of Supply

For the loss of a double-circuit 230 kV supply line or other [N-2] contingencies, the IESO ORTAC requires that in the planning of electrical services to an area the interrupted loads must be restored in a reasonable time. Specifically, for interrupted load of over 250 MW, the portion above 250 MW must be restored within 30 minutes with the remainder restored between 4 to 8 hours.

The critical line section for such a contingency in the Cambridge 230 kV subsystem is the Preston Tap between the large industrial customer and the tap point at Galt Junction. At present, there is no capability to restore any load on this subsystem via the 230 kV system. After the Preston autotransformer is placed in-service later this year, about 50 MW load can be restored from 115 kV circuits D7G/D9G in Kitchener via this autotransformer. The amount of load that may be transferred to adjacent supply points through the distribution system is very little. Should this contingency occur, most of the Cambridge load plus the industrial load would be interrupted until the line is repaired.

There have been two instances of a long duration outage to the 230 kV supply line supplying Cambridge. The most recent incident took place on January 31, 2003. CNDH lost its 230 kV supply from the Preston Tap due to contaminated insulators. The outage affected the whole City of Cambridge, parts of the Township of North Dumfries and parts of the City of Kitchener. It impacted 45,000 customers for nearly five hours. A prior instance

occurred in the 1980s. A transport truck hit a 230 kV tower and knocked out the main power supply to the area. The power was interrupted for a number of hours.

The load on the Preston Tap has now reached 344 MW which is 94 MW above the 250 MW level where load is required to be restored in 30 minutes. This load is not presently capable of being restored within 30 minutes. Furthermore, the ability to restore the other 250 MW in 4 to 8 hours would be a challenge as there is no alternative major source of supply for this subsystem. The new 230/115 kV autotransformer at Preston will be able to restore about 50 MW of the total load from D7G/D9G, but that falls short of the total restoration requirements. Thus, should there be another [N-2] outage to occur on this line, a large portion of the load would need to be curtailed for durations longer than the required restoration times in the IESO ORTAC. The need date for supply security improvement is, therefore, immediate.

6.4 Service Improvement Options

6.4.1 Conservation

The regional Conservation share of the 6,300 MW provincial target was disaggregated for Cambridge based on the methodology discussed in Exhibits D-4-1 and E-2-3. The estimated Conservation potential for Cambridge is 12 MW in 2007 increasing to 52 MW by 2015, and is presented in Table 9 below. Based on these estimated levels, Conservation can contribute to meeting some of the capacity and security needs identified by reducing the amount of load to be supplied.

Table 9: Cambridge Conservation (MW)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Conservation (MW)	12	15	21	31	35	40	44	48	52

Source: OPA

This level of Conservation has been assumed in the development of the integrated solution for the Cambridge area needs.

The achievement of the full amount of estimated Conservation potential will defer the capacity need date from 2009 to 2011 as shown in Table 10.

Table 10: Cambridge 230 kV Subsystem Load and Conservation (MW)

Cambridge 230kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Subsystem Total:	377.6	389.7	402.1	415.1	428.5	442.3	456.6	471.4	486.8
CDM (MW):	12.0	15.0	21.0	31.0	35.0	40.0	44.0	48.0	52.0
Net Load (MW):	365.6	374.7	381.1	384.1	393.5	402.3	412.6	423.4	434.8

Source: OPA, LDCs and Hydro One Networks

The estimated Conservation will reduce the magnitude of supply security need somewhat, but is not sufficient by itself. Improvement to supply security is still required immediately.

6.4.2 Distributed Generation

Distributed generation ("DG") refers to small-scale power generation which is located close to where the electricity is consumed. DG would reduce the need for other measures. There is no existing DG in the CNDH service area. Based on information from CNDH and from OPA's small generation programs, no significant new DG potential (wind, bioenergy or Combined Heat and Power) has been identified that would contribute to addressing the needs identified for the Cambridge subsystem. However, some smaller DG resources on customers' premises that net against their system load consumption are included in the Conservation forecast.

6.4.3 Minor Transmission Upgrades

To meet the IESO's requirement of 0.9 power factor at the Defined Point of Sales, CNDH is planning to install distribution capacitors on their Cambridge #1 MTS, Preston TS and Galt TS feeders. Upon completion of this work by CNDH, the LMC will be increased to the 390 MW level discussed in Section 6.2. By adding another 50 MVar of reactive support at Preston TS and Cambridge #1 TS, and uprating the Galt Junction to the industrial customer connection point of the Preston Tap (about 15 km) to a higher rating, the LMC can be increased to 445 MW. This work can be completed by 2011 if it proceeds soon. These

minor transmission upgrades can defer the capacity need date to 2012, assuming no contributions from the forecast Conservation measures. When combined with forecasted Conservation measures, these minor reinforcements could defer the capacity need date from 2009 to 2016. However, the need date to improve supply security remains immediate.

6.4.4 Large Local Generation

Locating large gas-fired generation in the Cambridge area is a viable solution for addressing the needs identified. There are certain requirements that are considered to determine whether a gas generation plant is a feasible option. In order to minimize inefficient operation of such a plant, the load shape of the area should be highly correlated with that of the overall system such that operation of the local gas generation would satisfy both system and local needs. As well, the existing transmission infrastructure must be capable of accommodating a fairly large plant without impacting on its reliable operation. Finally, in determining whether gas-fired generation is an economic solution for addressing an area's reliability needs, the cost of the gas infrastructure required, the incremental cost of gas at different locations on the system, and the cost of the alternative transmission solution are considered.

Based on these considerations, analysis shows that a gas generation plant of sufficiently large size at the appropriate location in the Cambridge area is a feasible option for addressing the need identified. To meet the capacity need, local generation with firm capacity of about 300 MW is required, which is defined as the amount of generating capacity available with one generating unit out of service. To meet the security need, local generation with total capacity of about 450 MW is required which is the total generating capacity with all units in-service. The nominal size of the plant, about 450 MW, is based on the greater of the two requirements. To be effective in solving the supply needs, this generation should be electrically connected to Preston TS or to the Preston Tap between the Cambridge #1 station and Preston TS. Connection to the Preston Tap farther south of the Cambridge #1 station is less preferred.

The capital cost of a typical 450 MW simple-cycle gas-fired generating plant is about $260 million.

A typical lead time of about five years is required for procuring, siting and building this type of generating plant. Thus, an in-service date of the end of 2012 is possible for this option if some preliminary work is initiated now and the formal procurement process is initiated in early 2009.

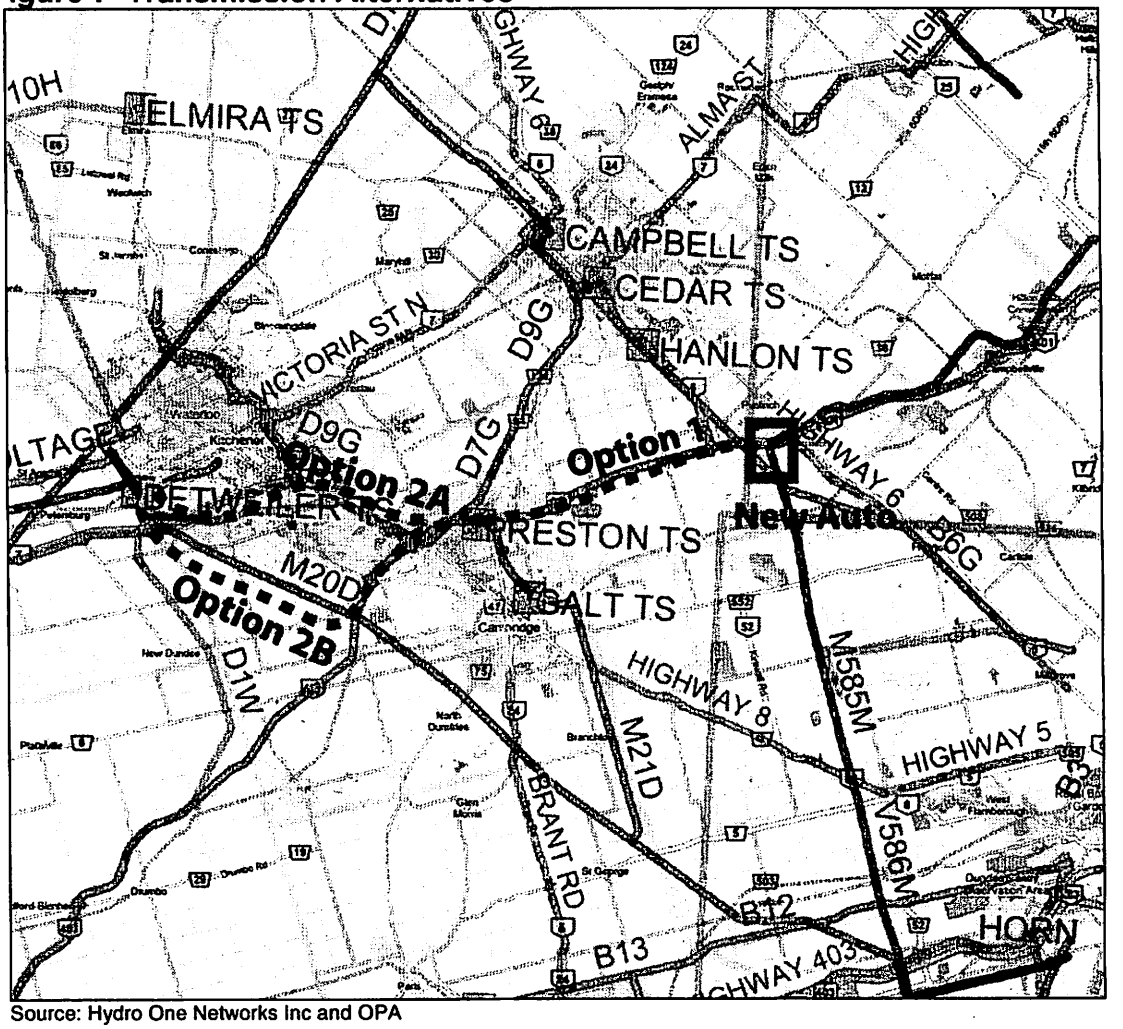
6.4.5 Transmission and Generation Elsewhere in Ontario

This option would involve adding new transmission facilities to serve the needs of Cambridge and installing an equivalent sized gas-fired generating plant located elsewhere in Ontario. That is because this 450 MW of gas-fired generation is, in any event required for system needs. OPA, with input from Hydro One Networks and the affected LDCs, identified two transmission options that would address the needs identified. They are:

- Option 1 – Install two 500/230 kV autotransformers at a new site near Puslinch Junction (near Highway 6 north) and build a new 230 kV double circuit line of about 16 km long going along Highway 401 from this new station to Preston TS; and
- Option 2 – build a new double-circuit 230 kV line from Detweiler TS to Preston TS. There are two possible routes:
    - Route A (Option 2A) about 20 km long going along the existing 115 kV right-of-way for circuits D7/9G;.and
    - Route B (Option 2B) about 23 km long going along the existing 230 kV right-of-way for circuits M20/21D then along Highway 401 to Preston TS.

These routes are shown on Figure 7.

Figure 7 Transmission Alternatives



Source: Hydro One Networks Inc and OPA

The costs of these transmission options are estimated to be $95 million for Option 1, $90 million for Option 2A, and $65 million Option 2B. The cost for Option 2B would increase to $100 million if some sections of the new line into Preston TS had to be underground cable. The cost of the generation component of this option would be similar to the local generation option taking into account the locational differences. These locational difference costs are discussed below in the evaluation of alternatives.

Assuming a four year lead time is required for approval and construction, a 2012 in-service date could be met if the development process commenced in 2008. Class Environmental

Assessment ("Class EA") and OEB leave-to-construct approvals would be required for the transmission facilities.

7.0 EVALUATION OF ALTERNATIVES

Two integrated alternative plans were developed and evaluated for addressing the electrical service needs of the Cambridge 230 kV subsystem. They are:

- Alternative 1 – Conservation and distributed generation; minor transmission reinforcements; and a large gas-fired generating plant located in Cambridge; and
- Alternative 2 – Conservation and distributed generation; minor transmission reinforcements; major transmission Options 1, 2A or 2B; and, a large gas-fired generating plant located elsewhere in Ontario.

Since the Conservation, distributed generation and minor transmission reinforcements are common to both alternatives, the analysis and evaluation of the two alternatives focuses on the large local generation and the transmission/system generation option components of the two alternative plans. Option 2B, the lowest cost transmission option, was assumed for the analysis.

7.1 Alternative Evaluation

The two alternatives were assessed with respect to feasibility, reliability, cost, flexibility, environmental performance and societal acceptance. While largely aimed at addressing Cambridge's local reliability needs, the OPA also took into consideration the Directive's natural gas and coal replacement goals.

7.2 Feasibility

Both generation and transmission alternatives are technically feasible for Cambridge.

7.3 Reliability

Both generation and transmission alternatives address reliability needs in the area. Both options provide supply capability and meet applicable reliability standards and criteria.

7.4 Costs

Both the transmission and generation alternatives address the needs in KWCG. However, in either case, new generation will be required to meet the Directive's gas objectives and system needs. This being the case, analysis was begun by (i) considering whether KWCG was an appropriate location to site gas generation for system needs; and if so (ii) how the cost of locating gas generation in KWCG compared to the cost of locating gas near Sarnia at the Dawn Hub (or converting Nanticoke) plus implementing the local transmission option.

A financial analysis was performed to compare the difference in cost between pursuing the generation alternative in KWCG and the transmission alternative in KWCG, in combination with system generation elsewhere. Two alternative locations for system generation were examined: Dawn Hub in the Sarnia area (a main gas hub in Ontario with the lowest gas delivery and commodity cost) or Nanticoke, by converting the existing coal units to gas-fired units without changing steam turbine and generator (deemed to be the location in Ontario with the lowest transmission connection and plant capital costs). The goal of the analysis was to determine whether the incremental cost of providing generation locally was justified. Exhibit E-2-5 provides a more detailed description of the methodology for evaluating and comparing these alternatives. The specific cost assumptions used for analyzing these alternatives are summarized in Table 11. The cost assumptions are net-present values, listed in 2007 dollars.

Table 11: KWCG Gas Analysis Costs and Results (2007 $Millions)

	Nanticoke	Sarnia	KWCG
Plant Size (MW)	**500**	**450**	**450**
Capital Cost ($M)	$ 65.4	$ 260.9	$ 260.9
Gas Infrastructure: Up-Front Cost ($M)	$ 131.7	$ 7.6	-
Gas Tariffs ($M)	$ 109.7	$ 70.8	$ 109.1
Fuel Cost ($M)	$ 156.7	$ 140.3	$ 140.3
Fixed OM&A ($M)	$ 143.9	$ 86.3	$ 86.3
Variable OM&A ($M)	$ 8.1	$ 5.0	$ 5.0
SUB-TOTAL ($M)	**$ 615.5**	**$ 570.8**	**$ 601.6**
Transmission Costs - Overhead (O/H) ($M)	$ 63.5	$ 63.5	-
Transmission Costs - Underground (U/G) ($M)	$ 99.2	$ 99.2	-
TOTAL - with O/H Transmission ($M)	**$ 678.9**	**$ 634.3**	**$ 601.6**
TOTAL - with U/G Transmission ($M)	**$ 714.6**	**$ 670.0**	**$ 601.6**

Source:

Local Gas versus Generation in Sarnia —The cost of generation is essentially common between these alternatives – the only additional costs are reflected in gas infrastructure charges and costs for transportation and storage of gas. The choice of location in KWCG can change the up-front capital required for gas infrastructure as well as the annual tariff charges. Therefore, an average of the highest and lowest cost plant locations in KWCG was examined in this analysis. The overall results show that generation located in KWCG is more cost effective than locating the same generation at the Dawn Hub and building new transmission to serve the demand growth in KWCG. As shown in Table 11, the local generation alternative was more economic by roughly $33 million assuming overhead transmission in KWCG for the alternative with system generation at the Dawn Hub. The cost difference between the two alternatives will increase further if undergrounding is required. If partial underground transmission is assumed for the Dawn Hub alternative, the cost difference will increase to close to $70 million.

Local Gas versus Nanticoke Conversion —The next analysis compared local generation in KWCG to generation at Nanticoke. The analysis compared converting one unit at Nanticoke to 450 MW of local generation in KWCG. The Nanticoke units are 500 MW in size and are not scalable to match the requirements of the local area. Again, an average of the highest and lowest cost plant locations was assumed in KWCG. The cost analysis model indicated that the local generation alternative was lower in cost by about $77 million,

assuming overhead transmission in KWCG for the Nanticoke alternative. The cost difference between the two alternatives would increase to approximately $113 million if the transmission project requires partial undergrounding. Table 11 summarizes this comparison.

The OPA concluded that in both cases, the local generation alternative was the most cost effective.

7.5 Flexibility

Both generation and transmission resources are large lumpy capital expenditures. There is little capability to stage their development. However, generation in KWCG will function as a system resource, as it is required by the system regardless of the KWCG supply capacity requirements. Therefore, pursuing local generation in the near-term leaves the option for additional supply capacity to be provided by the transmission alternative over the longer-term. Should the area demand growth exceed the capacity of the local generation in the future, the transmission alternative can always be implemented to provide additional supply. Therefore, the local generation alternative is superior from a flexibility perspective.

7.6 Environmental Performance

The system requires gas-fired generation and if gas-fired generation is not built in KWCG then it would have to be built elsewhere. The environmental impact of gas-fired generation – greenhouse gas emissions and water use – is relatively equivalent across Ontario. The KWCG local generation alternative is preferable to the system generation plus transmission alternative since it is less impactive from a land use requirement perspective.

7.7 Societal Acceptance

In considering the needs and potential solutions for KWCG, there was a significant level of local utilities' involvement and input over the course of the study. The OPA engaged the local utilities in the process by soliciting and receiving advice, feedback, and comment with respect to the identification, definition and evaluation of electricity supply options. The OPA

also met with staff of the four cities in the KWCG area, the Region of Waterloo, and others. A key message of the feedback was for the OPA to include Conservation and distributed generation. The OPA has incorporated Conservation and distributed generation estimates into the overall area supply plan.

7.8 Selection of the Preferred Alternative

Generation was the preferred alternative based on cost, as shown in Table 12. Generation also offers better flexibility and environmental performance benefits as well. Transmission would serve as the back-up alternative, should generation not proceed.

Table 12: Alternative Comparison

	Feasibility	Reliability	Economics	Flexibility	Environmental Performance	Societal Acceptance
Alternative 1 - Generation	Equivalent	Equivalent				Equivalent
Alternative 2 - Transmission	Equivalent	Equivalent	Less Favourable	Less Favourable	Less Favourable	Equivalent

Source: OPA

7.9 Recommendations for Service Needs of the Cambridge 230 kV Subsystem

The needs of the Cambridge 230 kV sub-system are: inadequate supply capacity by 2009 and inadequate supply security now. Based on its analysis and evaluation, the OPA recommends the following local integrated resource plan for addressing the needs identified:

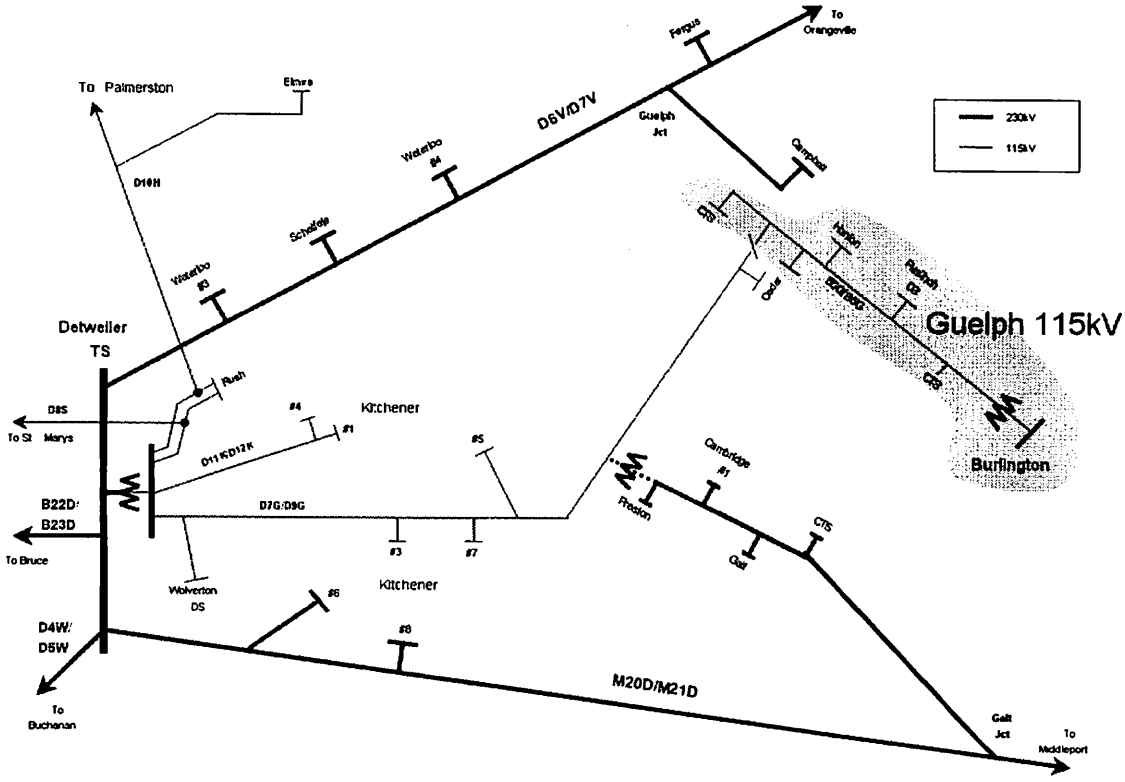
- The OPA and the LDCs should pursue the forecast Conservation and distributed generation in the KWCG Area in order to defer the need date beyond summer 2012 or later;
- Hydro One Networks should proceed with the work to increase the ampacity of the 15 km section of the Preston Tap from Galt Junction to where the industrial customer is connected by increasing the conductor's maximum operating temperature to about 127 °C. This action will provide an additional capability of 30 MW and increase the LMC of the Preston Tap from 390 MW to about 420 MW;
- Hydro One Networks and CNDH should install an equivalent of about 50 Mvar of shunt capacitors on stations supplied off the Preston Tap. This measure will further increase the LMC of the Preston Tap by 25 MW to 445 MW;

- The OPA should proceed with the procurement process, following the approval of this IPSP, to acquire gas-fired generation with a nominal size of 450 MW connected to Preston TS or in the vicinity of this station. Considering the lead time required, an in-service date of end of 2012 is possible;
- In the event the procurement process is delayed or, in the OPA's view, is unlikely to lead to the desired outcome, the OPA will take steps to immediately initiate the necessary transmission development work. The estimated cost for the transmission development work is about $2 million, or about 2% of the total project cost.

8.0 GUELPH 115 KV SUBSYSTEM - NEED AND SERVICE IMPROVEMENT OPTIONS

The Guelph 115 kV subsystem is shown in Figure 8 below.

Figure 8: Guelph 115 kV Subsystem



Source: Hydro One and OPA

The south and central parts of the City of Guelph and the surrounding area are served by this subsystem. The primary supply to this subsystem is from the double-circuit 115 kV

line, B5/6G, from Burlington TS, a distance of about 35 km. Three transformer stations - Cedar T7/T8 TS, Hanlon TS and Puslinch DS – step the 115 kV transmission voltage level down to the lower distribution voltages for serving customers in the area.

8.1 Demand Forecast

Based on the load forecast provided by Guelph Hydro and Hydro One Distribution, the growth for this subsystem is forecasted to be about 2.8% per annum. Assuming that the large industrial customer load connected to circuit B5G will remain at its current level of 5 MW, the total load in this subsystem is expected to reach 128 MW by 2015. This peak load level assumes summer extreme weather conditions which are used for local area service planning, consistent with the IESO ORTAC. Typically, peak load under extreme summer weather conditions is about 6% higher than that of normal weather conditions.

The demand forecast on a station basis for transformer stations supplied from this subsystem is shown in Table 7.

8.2 Supply Adequacy

The 115 kV supply circuits, B5G and B6G, can each supply over 110 MVA based on ampacity consideration. The LMC for this supply, factoring in the power factor of the load demand, is about 100 MW. Based on the latest load forecast, this capability is expected to be exceeded today. Additionally, inadequate pre- and post- contingency voltages on this subsystem are current supply concerns and will worsen with growth. To be capable of operating to the 100 MW LMC level or higher, additional reactive power support will have to be provided in the near term.

The capacities of the three step-down transformer stations are shown below in Table 13.

Table 13: Guelph 115 kV Subsystem Step-down Transformer Station Capacities (MVA)

Station	Station Capacity (MVA)
Cedar TS T7/T8	44
Hanlon TS	48
Puslinch DS	33

Source: Hydro One

Guelph Hydro identifies the need for additional transformation capacity at Hanlon TS by 2010 and at Cedar by 2012. This will be addressed by the utility and Hydro One Networks.

Supply security is adequate for this subsystem considering the size of load served. Following the loss of the primary supply, the B5/6G 115 kV line from Burlington, most of the loads can be restored fairly quickly via the 115 kV line D7G/D9G from Kitchener 115 kV supply.

8.3 Service Improvement Options

8.3.1 Conservation

As discussed in Section 6.4.1, the regional Conservation share of the 6,300 MW provincial target was disaggregated for Guelph based on the methodology in Exhibits D-4-1 and E-2-3. The estimated Conservation potential for Guelph Hydro increases from 13 MW in 2007 to 60 MW by 2015, as shown in Table 14. Based on these estimated levels, Conservation from Guelph's loads supplied from B5/6G is estimated to be about 3 MW in 2007 increasing to 17 MW in 2015. Conservation can contribute to meeting the need for additional supply by reducing the amount of load to be supplied.

Table 14: Guelph Conservation (MW)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Guelph Hydro	13	18	24	36	41	46	51	55	60
Guelph 115 kV	3	5	6	10	12	13	14	15	17

Source: OPA

Assuming the above Conservation forecast is realized and that inadequate voltages are addressed, the need date for additional capacity is deferred to 2008.

Table 15: Guelph 115 kV Subsystem Load and Conservation

Guelph 115 kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
Subsystem Total (MW):	102.7	105.3	108.8	118.6	120.6	122.4	124.2	126.3	128.3
CDM (MW):	3.0	5.0	6.0	10.0	12.0	13.0	14.0	15.0	17.0
Net Load (MW):	99.7	100.3	102.8	108.6	108.6	109.4	110.2	111.3	111.3

Source: OPA, LDCs and Hydro One Networks

8.3.2 Distributed Generation

Distributed generation ("DG") refers to small-scale power generation which is located close to where the electricity is consumed. DG would reduce the need for other measures. There is no existing DG in the Guelph 115 kV subsystem currently. Based on information from Guelph Hydro and from OPA's small generation programs, no significant new DG potential - either wind, bioenergy or combined heat and power ("CHP") - has been identified that would contribute to addressing the needs identified for the Guelph 115 kV subsystem. However, smaller DG resources that are installed by customers for netting their load demand are included in the Conservation forecast.

8.3.3 Minor Transmission Reinforcements

As discussed earlier in Section 8.2, there is a need to address the inadequate voltages in this area. Minor transmission reinforcement consisting of the installation of about 20 MVar of station capacitors at Hanlon TS, at an estimated cost of $1.3 million, has been identified and will address this need. The addition of these capacitors at Hanlon TS also increases the LMC of the B5/6G supply to about 110 MW by reducing the reactive power flows on these circuits. This will defer the capacity reinforcement need date to 2010, assuming no contributions from the forecast Conservation measures. If all of the forecast Conservation materialized, the need date is deferred to 2013.

8.3.4 Large Local Generation

Large gas-fired generation is a viable solution option for addressing the capacity need of this subsystem. The preferred connection point is to circuits B5/6G close to Cedar TS, the

end point of the existing supply. The limited capacity of the B5/6G circuits and the long distance from Burlington TS, however, constrains the size of this local gas-fired generating plant to between 50 to 100 MW, for stability and ampacity considerations. The smaller plant size could result in a higher cost per MW installed as compared to a larger installation located elsewhere in Ontario. The need to locate it in an urban area such as south/central can also be an issue. For these reasons, there are better locations for gas-fired generation on the system; this option was not pursued further.

8.3.5 Transmission

Two transmission options were considered which will be capable of providing additional supply capacity to the area for meeting the capacity adequacy need.

Option 1: Upgrade B5/6G from Burlington to Cedar (about 42 km) to 1100A at a cost of $37 million.

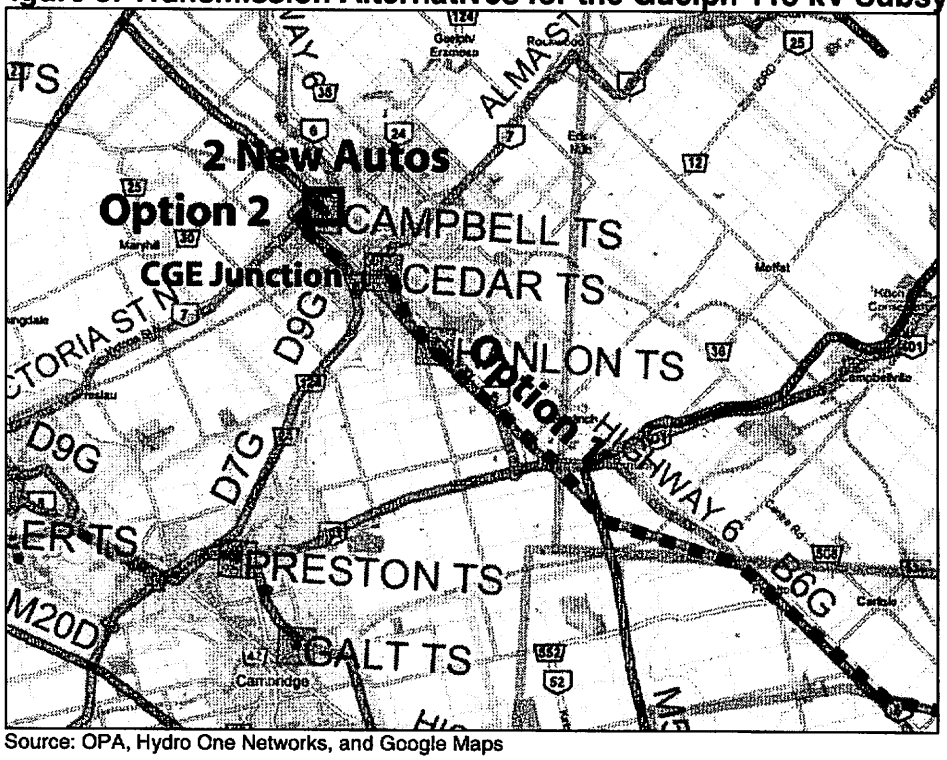
Option 2: Add two new 230/115 kV autotransformers at Campbell TS, connected to 230 kV circuits, D6/7V Tap and upgrade the section of B5/6G from Campbell TS to CGE Junction to Cedar TS to 1100A (about 5 km). Alternatively, locate the two autotransformers in or near Cedar TS and rebuild the 5 km line as a 230 kV line from Campbell TS. The cost of these options is estimated at $25 to $30 million.

Option 1 was subsequently eliminated in favour of Option 2 because:

- while the costs of the two options are similar, Option 2 provides more LMC than Option 1;
- Option 2 line upgrading work is easier to carry out than Option 1 as the 5 km section is presently idle; and
- Option 1 will continue to maintain the supply to the Guelph area from the Burlington 115 kV system, which has little capacity margin remaining because of the increasing demand in the Hamilton, Burlington and Brantford areas. Option 2 will provide relief to this Burlington system.

Figure 9 shows the locations of the facilities for the two alternatives.

Figure 9: Transmission Alternatives for the Guelph 115 kV Subsystem



Source: OPA, Hydro One Networks, and Google Maps

For Option 2, there is insufficient space at Campbell TS to install the two new autotransformers and associated switching facilities. There is available industrial land near the station that could be procured and used for this purpose. Additionally, the 115 kV line carrying circuits B5/6G between Campbell TS and CGE Junction (5 km) is of fairly low capability (as it was used to supply a small industrial load in the past). It will have to be uprated – either by retensioning or replacing the existing conductors, and reinforcing the existing support structures. Both aspects – extension of the Campbell station and uprating the existing 115 kV line – require Class EA approvals. A lead time of about five years is assumed.

8.4 Recommendations for Guelph Service Needs

The OPA has assessed the electrical service needs for the Guelph 115 kV subsystem in the KWCG Area. There is a near-term need to increase the supply capacity to the area in respect of the forecast demand for the area. The following is an integrated demand and supply plan to address this need:

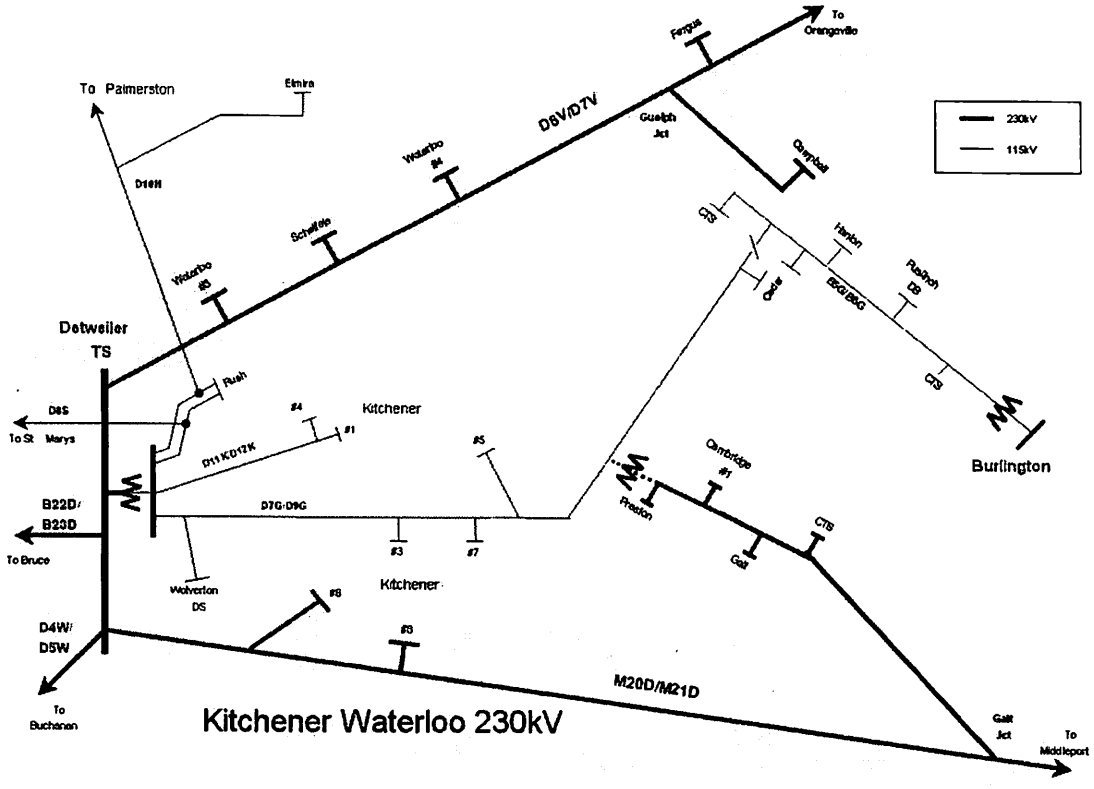
- Hydro One Networks or Guelph Hydro should install about 20 MVar of capacitors at Hanlon TS in 2008 to address inadequate voltages in the area and to increase the LMC of the B5/6G supply circuits;
- The OPA and the LDCs should pursue Conservation and distributed generation to the level of potential that was forecast for this area; and
- While the previous measures could adequately supply the forecast growth to about 2013, it is recommended that Hydro One Networks initiate development work associated with the longer term transmission option (Option 2: adding two 230/115 kV autotransformers at Campbell TS or Cedar TS and upgrading circuits B5/6G between Campbell TS and Cedar TS) in 2008 so that this option can be implemented by that time or earlier, should less Conservation and/or higher growth occur.

9.0 NEED ASSESSMENT AND SOLUTION DEVELOPMENT – KITCHENER-WATERLOO 230 KV SUBSYSTEM

9.1 Demand Forecast

The Kitchener-Waterloo 230 kV subsystem is shown in Figure 10.

Figure 10: Kitchener-Waterloo 230 kV Subsystem



Source: Hydro One and OPA

The demand forecast on a station basis for transformer stations supplied from this subsystem is shown in Table 4. The forecast loads are based on summer extreme weather conditions used for local area service planning. The total loads connected to the 230kV lines in this subsystem and their estimated conservation potential are shown in Table 16.

Table 16: Kitchener-Waterloo 230 kV Subsystem Load and Conservation

Kitchener-Waterloo 230kV Subsystem	2007	2008	2009	2010	2011	2012	2013	2014	2015
[redacted]									
Load (MW):	432.1	450.7	467.7	481.7	498.3	502.8	518.8	535.7	553.7
CDM (MW):	14.0	19.0	25.0	39.0	45.0	50.0	55.0	62.0	67.0
Net Load (MW):	418.1	431.7	442.7	442.7	453.3	452.8	463.8	473.7	486.7
[redacted]									
Load (MW):	482.7	498.5	514.3	530.6	547.6	565.0	582.8	601.2	620.2
CDM (MW):	12.0	16.0	22.0	34.0	38.0	42.0	46.0	52.0	57.0
Net Load (MW):	470.7	482.5	492.3	496.6	509.6	523.0	536.8	549.2	563.2

Source: OPA, LDCs and Hydro One Networks

9.2 Supply Adequacy

The Waterloo and Guelph-Campbell loads are forecast to be 432 MW in 2007 and are supplied from the double-circuit 230 kV line, D6/7V, from Orangeville TS to Detweiler TS. Each of the 230 kV circuits has a thermal capability of 600 MVA at the Orangeville end and 450 MVA at the Detweiler end. In addition to directly supplying the above loads, these circuits also carry bulk power transfers from the Orangeville Area to the KWCG Area, and generally from the Bruce area across southwestern Ontario.

Similarly, a large portion of the Kitchener load, forecast to be 105 MW in 2007, is supplied directly from the double-circuit 230 kV line, M20/21D, from Middleport TS (located just west of Hamilton) to Detweiler TS. Each of these circuits has a thermal capability of 750 MVA. In addition to directly supplying these Kitchener loads, these circuits are forecast to supply about 378 MW of load in 2007 via the Preston Tap, and bulk power transfers from the Hamilton area to the KWCG Area.

The supply capacity of D6V/D7V and M20/21D is adequate for the level of load forecast in the KWCG Area under a wide range of power transfer conditions across the Southwestern Ontario system. The incorporation of a new 500 kV line from Bruce to Milton estimated to be built by the end of 2011 will result in a decrease in the dependence on the 230 kV network in southwestern Ontario and through the Kitchener Area to deliver power from Bruce to the Ontario main grid in the Greater Toronto Area ("GTA"). Some general relief in the 230 kV line loading in the KWCG Area is anticipated.

The 230 kV transmission system voltage at Detweiler TS has improved significantly with the addition of a second 230 kV capacitor bank at Detweiler TS recently. This will further be improved with a new 230 kV capacitor bank going in service at Orangeville TS in 2008, and future banks at Middleport TS in 2009.

9.3 Supply Security

While the supply capability is adequate from the D6/7V and M20/21D 230 kV lines, some improvement in supply security is required when the load supplied directly from these circuits reaches 600 MW. Restoration requirements for the loss of either of these supply lines are manageable since these lines are connected to two strong sources; each can supply the affected loads on its own. However, in addition to the restoration requirement associated with supply security, the IESO ORTAC also requires that the amount of load that can be interrupted as the consequence of a double-circuit outage be limited to below 600 MW. This will be reached beyond 2020 for the D6/7V line and 2017 for the M20/21D line. These dates assumed the forecast level of Conservation and distributed generation will be in place.

9.4 Service Improvement Options

The likely option to address the above needs is to install 230 kV in-line breakers on these lines at two appropriate locations. By sectionalizing these circuits, the maximum load that can be interrupted is maintained below 600 MW. Since the timing of need is 2017 and beyond, there is sufficient time to review the need over the next few years to monitor the resource development and load growth on this subsystem before a decision is made on the need and how to proceed. No work is being recommended for this subsystem at this time.

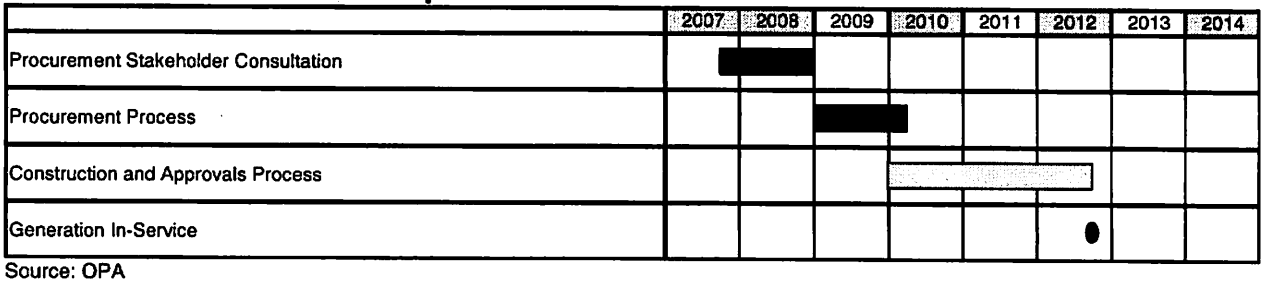
10.0 RECOMMENDATIONS AND TIMELINES

The OPA has identified three specific needs in the KWCG Area. They are: a) inadequate supply capacity for the Cambridge and Guelph areas in the near term; b) inadequate supply security for the Cambridge area in the near term; and c) inadequate supply security for the Kitchener-Waterloo-Guelph loads supplied directly from the Kitchener-Waterloo 230 kV

lines in the longer term. After evaluating a range of options, the OPA recommends that the electric service needs in the KWCG Area can be best addressed by an integrated plan consisting of the following remedial measures in the short and medium terms:

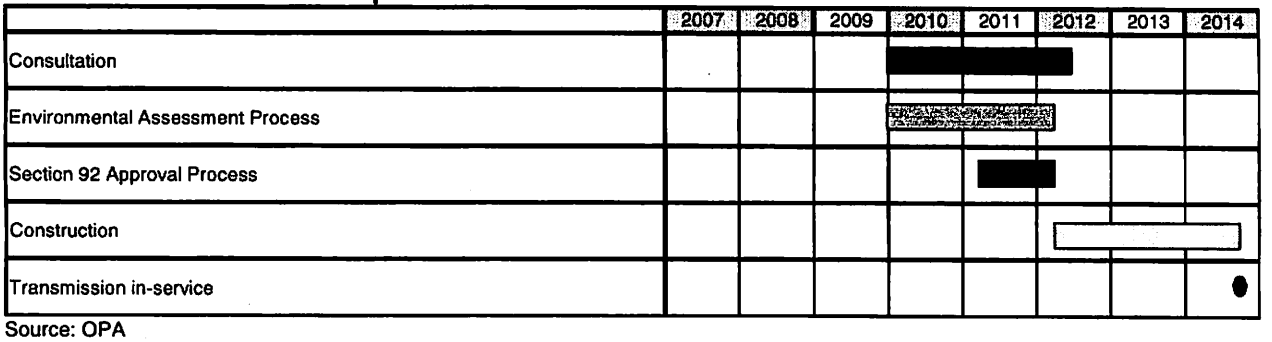
1. Pursuing the Conservation and distributed generation potentials forecast for the area;
2. Implementing minor transmission reinforcements consisting of adding shunt capacitors at a number of transformer stations and on the distribution system in the Cambridge and Guelph areas, and uprating a section of 230 kV line (15 km) in the Cambridge area to maximize the capability of the existing transmission network;
3. Procuring gas-fired generation located near the Preston station in Cambridge, which will meet both the local area need and the Directive's goal of using gas at peak times for high efficiency and high value applications. The timeline for this work is shown in Figure 11. In the event the procurement process is delayed or, in the OPA's view, is unlikely to lead to the desired outcome, the OPA will take steps to immediately initiate the necessary transmission development work. An estimated transmission solution timeline is shown in Figure 12; and
4. Initiate project development work for the installation of two 230/115 kV autotransformers at Campbell TS or Cedar TS and upgrading about 5 km of the existing 115 kV circuits B5G/B6G between the Campbell station and Cedar TS. An estimated timeline for this work is shown in Figure 13.

Figure 11: Local Generation Option Estimated Project Timeline
KWCG - Local Generation Option



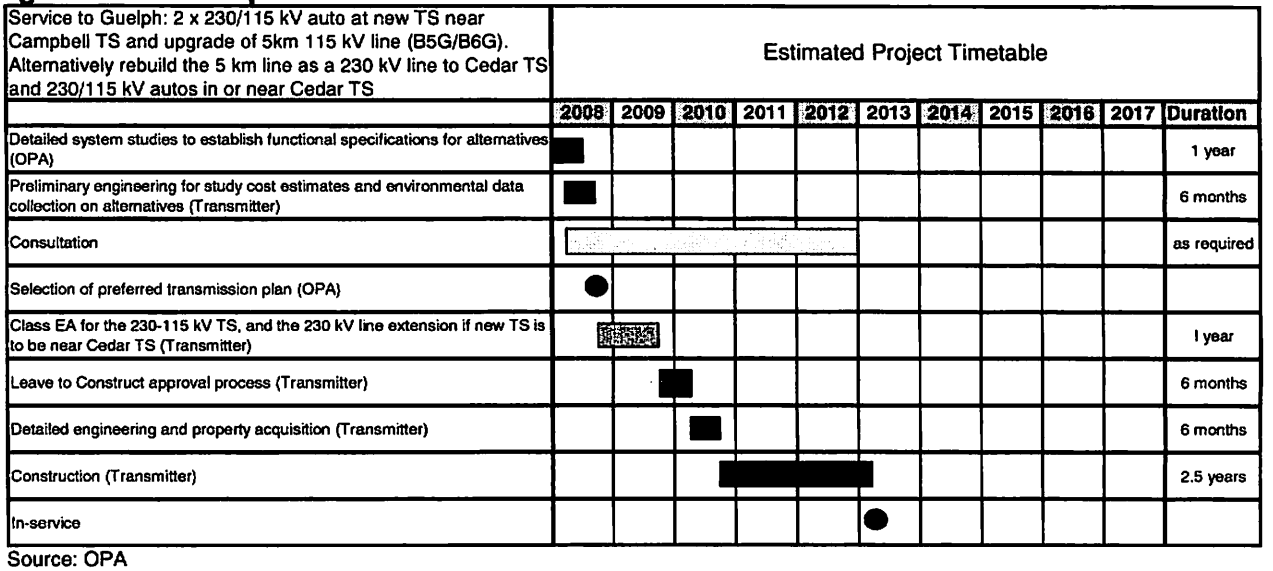
Source: OPA

Figure 12: Transmission Option Estimated Project Timeline
KWCG - Transmission Option



Source: OPA

Figure 13: Development Work Schedule



Source: OPA

In the longer term there is also a need to install 230 kV circuit breakers at suitable locations between Middleport TS and Detweiler TS by 2017 to sectionalize circuits M20/21D, and between Orangeville TS and Detweiler TS beyond 2020 to sectionalize circuits D6/7V. There is no action required for this at this time, as there is sufficient time to monitor the need and implement actions.

There is also a need to add new transformation capacity in the KWCG Area. This need will be assessed and developed by the affected LDCs and Hydro One Networks. The regional

supply plan as proposed in this IPSP for the KWCG Area has taken into account the development of these future step-down transformer stations.

The OPA intends to procure the necessary gas fired generation for the Cambridge area for a projected in-service date of the end of 2012. In addition, there is a need to commence transmission development work on remedial measure (4) above in order to meet a 2013 need date for these transmission reinforcements. Lastly, there is a need for the LDCs and Hydro One Networks to proceed as soon as possible with the remedial measures identified in remedial measure (2) above.