THE INTEGRATED POWER SYSTEM PLAN FOR THE PERIOD 2008-2027

1.0 INTRODUCTION

This exhibit presents the Integrated Power System Plan (the "IPSP" or the "Plan") for the period 2008 to 2027.

2.0 OVERVIEW

The IPSP is designed to assist, through the effective management of electricity supply, transmission, capacity and demand, the achievement of the government of Ontario's goals identified in the Supply Mix Directive dated June 13, 2006 (the "Directive").

As discussed in Exhibit B-3-1, the OPA's plan to achieve the Directive's goals was developed by identifying the areas of discretion left open by the Directive and applying the OPA's planning criteria to make decisions in those areas. This resulted in an IPSP that prioritizes how Conservation and supply resources should be acquired through (i) meeting the requirements of the Directive in light of the OPA's planning criteria (the "Directive Priority"); and (ii) sequencing the installation of resources, in light of lead times and necessary transmission enhancements (the "Implementation Priority").

2.1 Directive Priority

With respect to the Directive Priority, the Directive identifies a number of goals respecting Conservation and supply resources. The IPSP ensures that these goals are met by identifying the priority order in which the resources are planned to meet the province's resource requirements with respect to capacity, electricity production, and flexibility. The IPSP is not represented by any single case or scenario but rather, it represents the ongoing capability to meet resource requirements across a range of conditions. The range of conditions described in Exhibits D-9-1 and G-2-1 illustrates the possible range of resource requirements. In planning to meet an estimated range of resource requirements, the IPSP identifies specific priorities for the near-term, but will, more generally, develop options for the mid term and explore opportunities for the longer term.

The resources identified in the Directive each make their own contribution to meeting these requirements. In summary, the Directive Priority is as follows:

1. Maximize feasible cost effective contribution from energy efficiency, demand management, fuel switching, and customer based generation ("Conservation");
2. Maximize feasible cost effective contribution from renewable sources;
3. Make up baseload requirements remaining after Steps 1 and 2 above with nuclear power;
4. Replace coal-fired generation with power from committed and planned resources. Specifically, in order to ensure that existing coal-fired facilities are replaced by 2014, gas-fired generation ("GFG") facilities are planned to be installed in the areas of Northern York Region, Kitchener-Waterloo-Cambridge-Guelph and the Greater Toronto Area ("GTA") by 2014; and
5. Restrict contribution of GFG to specific projects as required when additional Conservation and renewable resources are not feasible or cost effective.

Transmission is a facilitator and enabler of supply choices and therefore transmission considerations were integrated in all steps in the planning process. Transmission planning is particularly important in meeting the Directive's renewable goals since the accessing and delivery of potential renewable resources depends on making substantial transmission enhancements.

2.2 Implementation Priority

The Directive Priority outlined above does not necessarily represent the order in which resources will be installed. For example, in light of necessary transmission investments to enable hydroelectric resources, many hydroelectric resources will be brought on later in the Plan term. As a result, the Directive Priority is accompanied by an Implementation Priority.

The Implementation Priority should also be understood as enabling contributions from different resources as opposed to a rigid in-service schedule for specific facilities. The IPSP ensures that resources will be prioritized in an economically prudent and cost effective manner by creating opportunities for resource acquisition in the future. In other

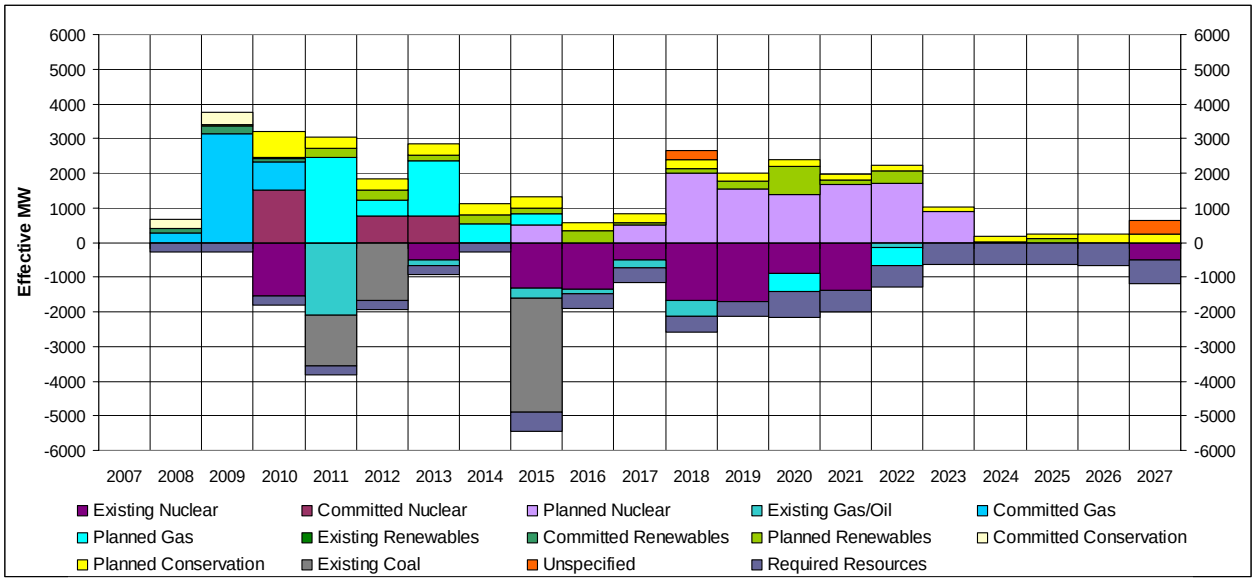
words, it is economically prudent and cost effective to have more than one choice when it comes to acquiring a resource.

It is also important to note that the IPSP will be implemented through a number of projects, facilities and programs, some of which are within the OPA's control and some of which are not. There are a number of initiatives that the OPA is currently pursuing and plans to pursue in order to implement the IPSP in accordance with the Directive and Implementation Priorities. These initiatives are summarized at the end of this exhibit at Table 5. The specific projects, facilities, and programs that are referenced in Table 5 comprise the OPA's current view of a reasonable way to implement the IPSP. The sequence and specific projects will likely change as opportunities present themselves in the market place. Included within those projects are resources that the OPA intends to procure through the OEB-approved procurement process prior to the end of 2010. These procurements are addressed in greater detail in Exhibit D-10-1. Also included in Table 5 are resources and programs that the OPA intends to pursue under existing Directives issued by the Minister of Energy under the *Electricity Act, 1998* (the "Act").

The change in the installed capacity of resources resulting from the Directive and Implementation Priorities is illustrated in summary form in Figure 1 below[1].

[1] This exhibit, including Figure 1, presents Case 1A. Case 1 B (which has minor variations in respect of this Figure), is presented in Exhibit D-9-1, Figure 12 and is described throughout the remainder of the evidence.

Figure 1: Annual Resource Additions and Reductions (Effective MW)



Source: OPA (Exhibit D-9-1, Figure 5)

The remainder of this exhibit addresses how the IPSP prioritizes and implements the contribution from the Conservation and supply resources identified in the Directive.

3.0 CONSERVATION

3.1 The Directive

The Directive's Conservation goals are to reduce demand by 1,350 MW by 2010 and an additional 3,600 MW by 2025. The Directive states:

> The goal for total peak demand reduction from Conservation by 2025 is 6,300 MW. The plan should define programs and actions which aim to reduce projected peak demand by 1,350 MW by 2010, and by an additional 3,600 MW by 2025. The reductions of 1,350 MW and 3,600 MW are to be in addition to the 1,350 MW reduction set by the government as a target for achievement by 2007. The plan should assume Conservation includes continued use by the Government of vehicles such as energy efficiency standards under the Energy Efficiency Act and the Building Code, and should include load reductions from initiatives such as : geothermal heating and cooling; solar heating; fuel switching; small scale (10 MW or less) customer-based electricity generation, including small scale natural gas-fired co-generation and tri-generation, and including generation encouraged by the recently finalized net metering regulation.

Directive Priority

Conservation takes priority over supply resources in that the IPSP first applies all economic and feasible Conservation to meeting resource requirements before applying supply resources. Economic Conservation is defined as Conservation that is more cost effective than supply resources as determined by applying a Total Resource Cost ("TRC") Test. Feasible Conservation is Conservation that can be used for resource planning. In other words, the Conservation contribution can make as predictable and reliable a contribution to meeting resource requirements as the alternative supply resource.

The OPA will seek to develop and identify Conservation opportunities that exceed the Directive's 2010 and 2025 Conservation goals. However, determining whether and how this can be done requires a realistic understanding of the feasibility of achieving Conservation beyond the goals. Such an understanding can only occur as Ontario gains more experience in Conservation and in associated evaluation, measurement and verification ("EM&V") results. In addition, the OPA will monitor future policy changes such as codes and standards, price, carbon taxes and land use that underpin the potential estimate to establish the feasibility of exceeding the goal.

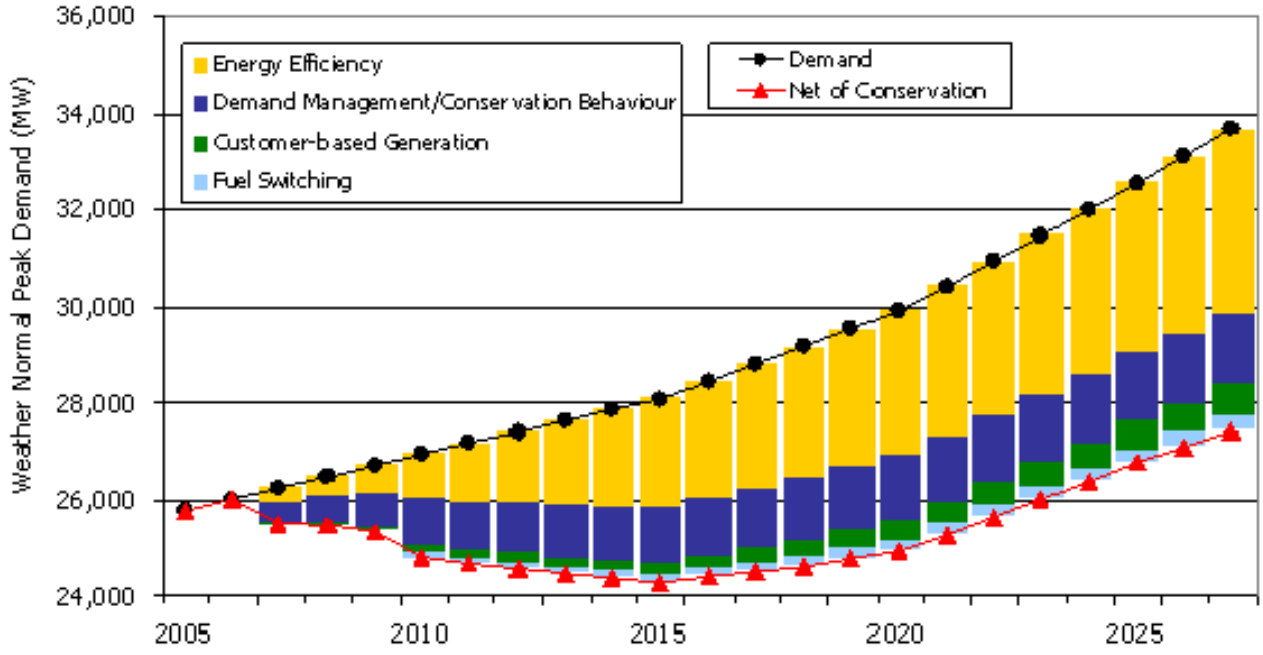
The IPSP has sufficient flexibility to develop a number of options on both the Conservation and the supply side. If experience from the 2008 to 2010 Conservation programs demonstrates that there is feasible Conservation to exceed the Directive goal, that Conservation will be compared to alternative supply resources before any commitment is made.

Implementation Priority

There are four types of Conservation identified in the Directive: efficiency, demand reduction/conservation behaviour, self-generation and fuel switching.

The contribution of each of the Conservation categories over the term of the IPSP are illustrated in Figure 3, as follows:

Figure 3: Impact of Conservation on Peak Demand (MW)



Source: OPA (Exhibit D-4-1, Figure 1)

The programs through which the OPA currently intends to implement the 2010 Conservation goals are set out in Table 1, below:

Table 1: Committed Conservation Resources 2008 – 2010

	PROGRAM TARGETS			CONSERVATION CATEGORIES			
Program	**Target (MW)**	**Free Rider Rate (%)**	**Net Demand Reduction (MW)**	**Energy Efficiency (MW)**	**Demand Management (MW)**	**Fuel Switching (MW)**	**Customer-based Generation (MW)**
New Construction Program	45	30	32	32			
Existing Buildings Retrofit	242	30	169	169			
Low Income & Aboriginal	16	30	11	11			
Demand Response	105	30	74		74		
Total Mass Market Programs	**408**	**30**	**286**	**212**	**74**		
New Construction Program	55	30	39	39			
Existing Building Retrofit	492	30	344	274		70	
Socially Assisted Housing	29	30	20	20			
Total Commercial/Institution Market Programs	**576**	**30**	**403**	**333**		**70**	
Industrial Markets							
Industrial Programs	113	30	79	79			
Demand Response Programs	451	30	316		316		
Total Industrial Market Programs	**564**	**30**	**395**	**79**	**316**		
Customer-based Generation							
Customer-based Generation Programs	211	30	**148**				148
Total OPA Resource Acquisition Programs	**1,759**	**30**	**1,231**	**625**	**390**	**70**	**148**
Other Influenced CDM							
Smart Meters	**176**	**0**	**176**				
Total Conservation & Demand Management[2]	**1,940**		**1,410**	**620**	**390**	**70**	**150**

Source: OPA (Exhibit D-4-1, Table 20)

All of the programs to meet the 2010 goals will be carried out in accordance with directives issued by the Minister of Energy. As a result, they will not be carried out in accordance with the procurement process for which the OPA is seeking OEB approval. The mix of programs will likely change as better opportunities present themselves.

[2] Totals have been rounded to nearest 10 MW.

4.0 RENEWABLE SUPPLY

4.1 The Directive

The Directive's goal is for a 2010 target for renewable supply of 10,402 MW and a goal of approximately 15,700 MW for 2025. It states:

> Increase Ontario's use of renewable energy such as hydroelectric, wind, solar and biomass for electrical generation. The plan should assist the government in meeting its target for 2010 of increasing the installed capacity of new renewable energy resources by 2,700 MW from the 2003 base and increase the total capacity of renewable energy sources used in Ontario to 15,700 MW by 2025.

Directive Priority

Renewable supply is second in priority to Conservation. After accounting for the feasible and economic contribution of Conservation, the IPSP applies the feasible and economic contribution from renewable supply. The OPA's approach to determine the feasible and economic contribution of renewable supply is as follows:

- All feasible hydroelectric resources are included on the basis that hydroelectricity is the most economic of the renewable resources;
- Bioenergy, wind (small sites) and solar resources were included generally on the basis of the expected response to standard offer procurement programs; and
- Large wind sites were used to provide the remaining resources needed to meet the goal. The sites were included on the basis of lowest "all-inclusive unit cost" (in which the cost of associated transmission is included).

The total capacity of the assumed planned resources meets the Directive's renewable goals. Unlike the plan for Conservation goals, the IPSP does not seek to exceed the Directive's goals for renewable resources. This is because the incremental renewable resource would be large wind projects. These projects would not be cost effective when compared to the supply resources included in the Plan that would be displaced.

Implementation Priority

There are two key elements to implementing the renewable goals: the acquisition of renewable supply and the transmission enhancements that are necessary to facilitate the supply.

With respect to supply, the 2010 Directive goal of 10,402 MW of renewable resources will be implemented through acquiring all renewable resources that may be feasibly implemented by that time.

The mix of renewable resources that currently make up the most attractive opportunities is illustrated in Table 2:

Table 2: Meeting the 2010 Renewable Resources Goal (Installed Capacity in MW)

		MW
The 2003 Base		7,702
Hydroelectric	7,636	
Bioenergy	66	
Resources Added Since 2003		
Hydroelectric	152	
Wind	395	
Bioenergy	9	
Total Resources Added Since 2003		**556**
Existing Resources		8,258
Hydroelectric	7,788	
Wind	395	
Bioenergy	75	
Committed Resources		
RES Hydroelectric	43	
RES Wind	865	
SOP Solar	88	
SOP Hydroelectric	19	
SOP Wind	385	
SOP Bioenergy	14	
Total Committed Resources		**1,415**
Quebec Interconnection		**1,250**
Planned Resources		
Hydroelectric	97	
Total Planned Resources		**97**
TOTAL RESOURCE INCREASE		**3,318**
REQUIRED RESOURCE INCREASE		**2,700**

Source: OPA (Exhibit D-5-1, Table 1)

The 2025 Directive goal of 15,700 MW of renewable resources will be implemented in order of feasibility in light of transmission availability. The mix of renewable resources that currently make up the most attractive opportunities is set out in Table 3:

Table 3: Meeting the 2025 Renewable Resources Goal – Existing, Committed and Planned Resources (Resources Used in Ontario - Installed MW)

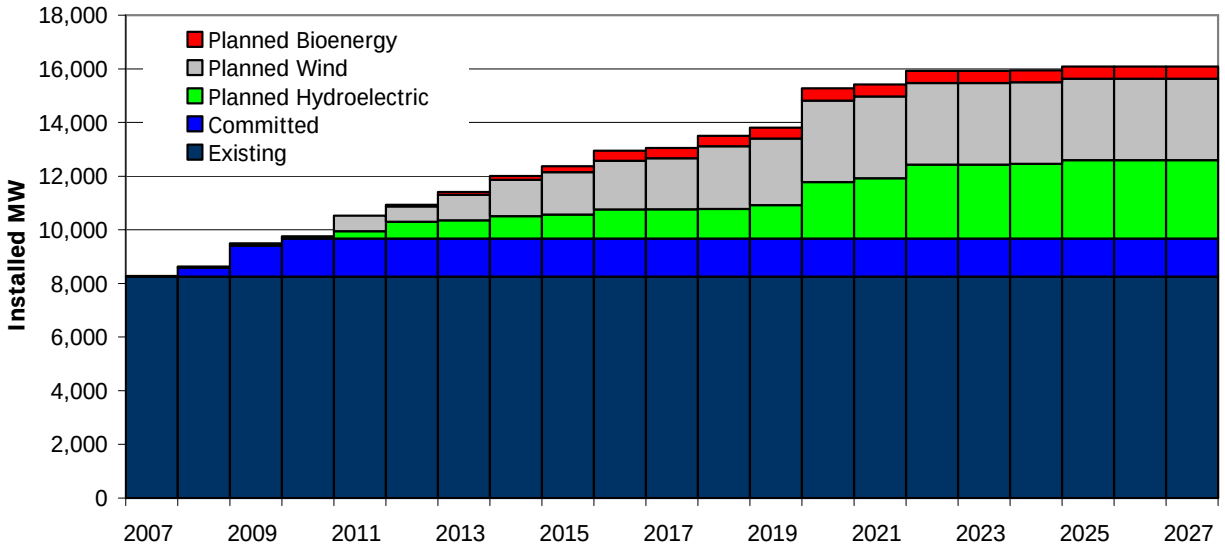
	MW
Hydroelectric	**10,771**
Existing	7,788
Committed	62
Planned	2,921
Wind Power	**4,685**
Existing	395
Committed	1,251
Planned	3,039
Bioenergy	**539**
Existing	75
Committed	14
Planned	450
Solar	**88**
Existing	-
Committed and Planned	88
Total Renewable Resources	**16,084**

Source: OPA (Exhibit D-5-1, Table 2)

The list of resources from which the OPA intends to procure, prior to the end of 2010 is set out in Exhibit D-10-1,Table 1 (sites under 20 MW) and Table 3 (sites over 20 MW).

The implementation schedule for planned renewable resources is set out in Figure 4:

Figure 4: Planned Renewable Resources (Installed MW)



Source: OPA (Exhibit D-5-1, Figure 1)

The detailed break-down of the existing, committed and planned renewable resource mix is set out at Tables 9, 27, 28, 30, 31 and 33 of Exhibit D-5-1. The mix of programs will likely change as better opportunities present themselves.

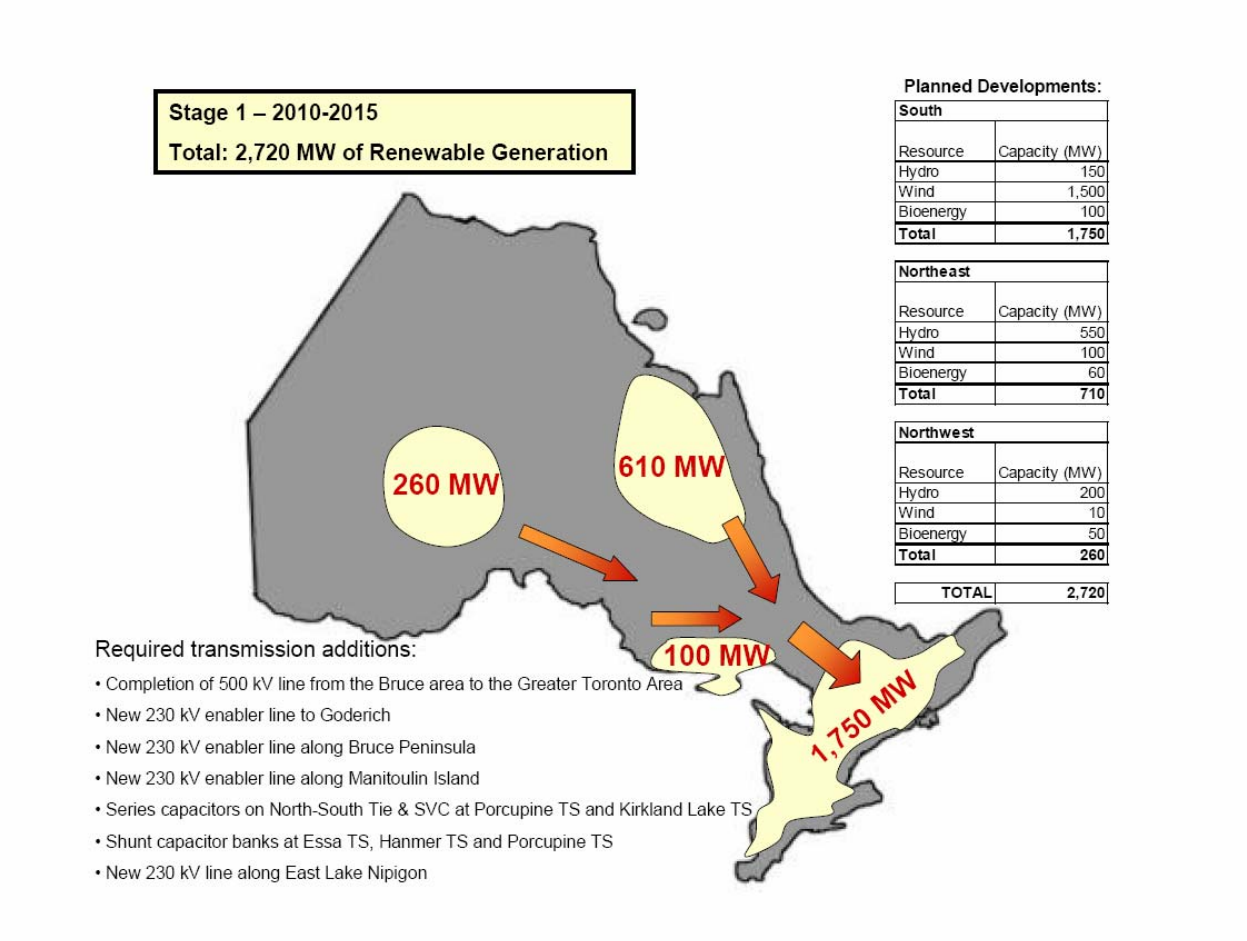
That mix will likely change as better opportunities present themselves and as progress with the implementation of transmission enhancements and enabler lines becomes clearer. All of the renewable resources to be procured by 2010 will be procured in accordance with Directives from the Minister of Energy. As a result, they will not be carried out in accordance with the procurement process for which the OPA is seeking OEB approval.

The staging of the planned renewables is closely linked to the development of enabling transmission reinforcement. Development is planned to occur in three stages, as presented in Figures 5, 6 and 7 as follows:

- Stage 1 adds about 2,720 MW of renewables resources over the period 2010-2015;
- Stage 2 increases planned renewables by 1,500 MW to a cumulative total of 4,220 MW, over the period 2016 to 2019; and

- Stage 3 further increases planned renewables by 2,280 MW to a cumulative total of about 6,500 MW, in 2020 and beyond.

Figure 5: Planned Development of Renewable Resources – Stage 1



Planned Developments:

South	
Resource	Capacity (MW)
Hydro	150
Wind	1,500
Bioenergy	100
Total	**1,750**

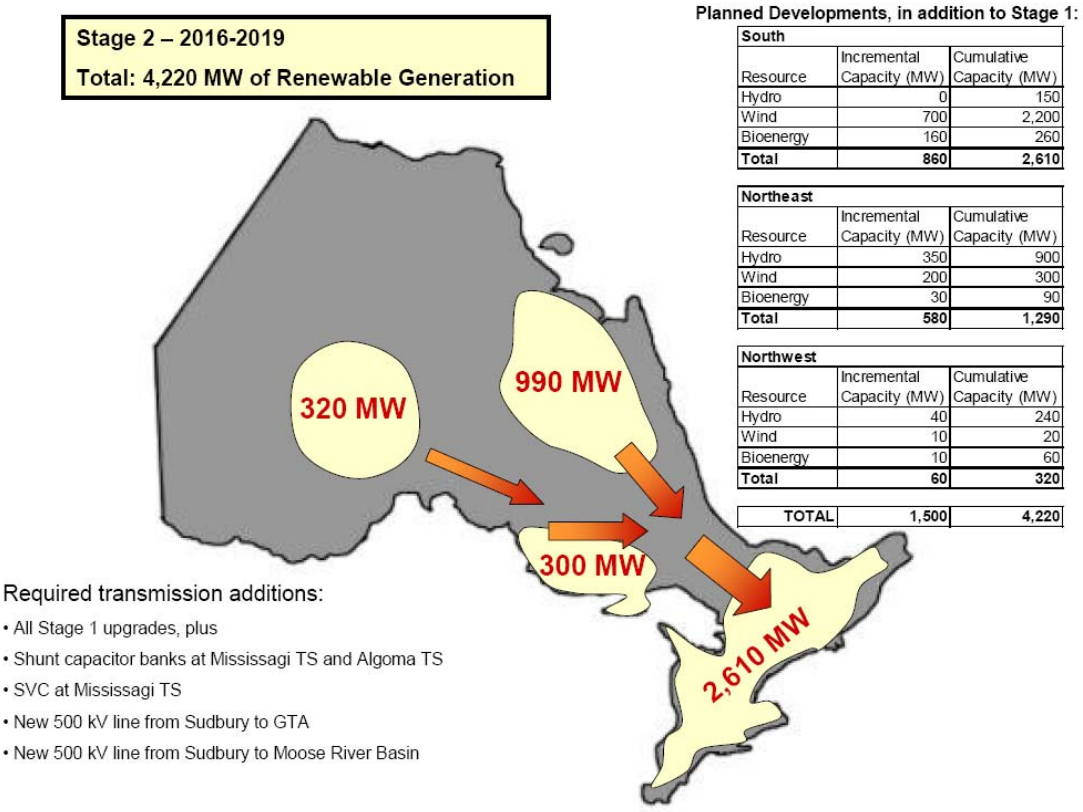
Northeast	
Resource	Capacity (MW)
Hydro	550
Wind	100
Bioenergy	60
Total	**710**

Northwest	
Resource	Capacity (MW)
Hydro	200
Wind	10
Bioenergy	50
Total	**260**

TOTAL	**2,720**

Source: OPA (Exhibit E-2-2, Figure 1)

Figure 6: Planned Development of Renewable Resources – Stage 2



Planned Developments, in addition to Stage 1:

South		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	0	150
Wind	700	2,200
Bioenergy	160	260
Total	**860**	**2,610**

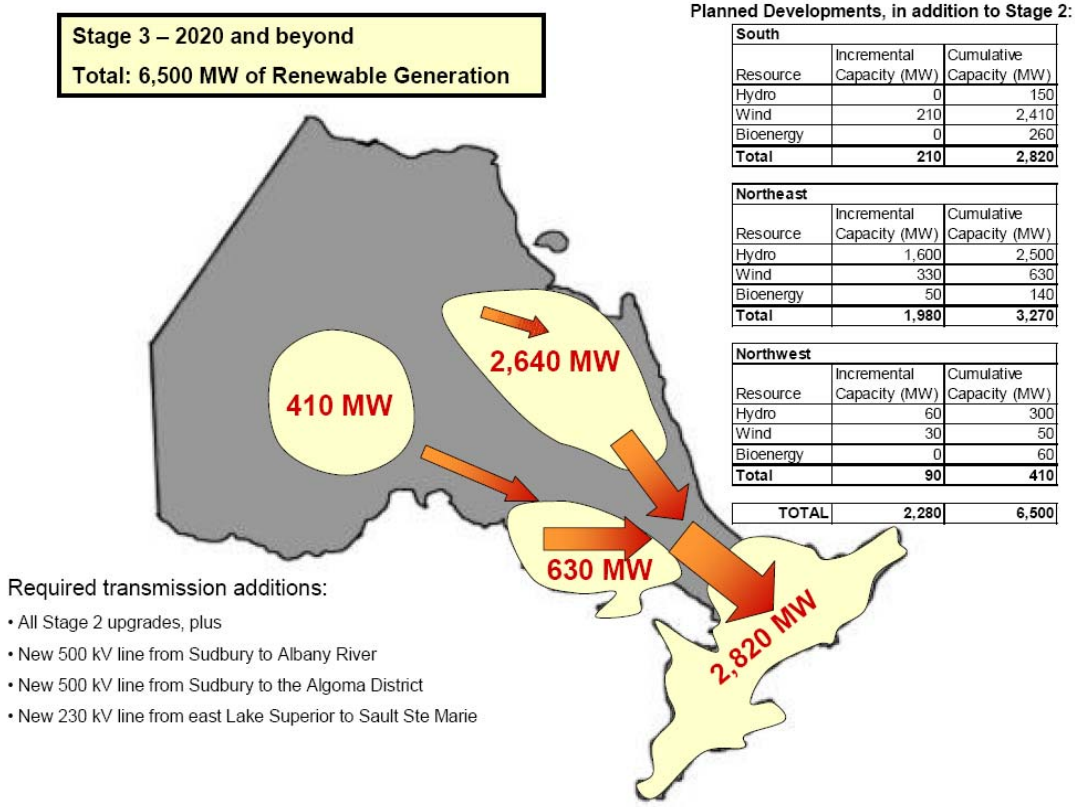
Northeast		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	350	900
Wind	200	300
Bioenergy	30	90
Total	**580**	**1,290**

Northwest		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	40	240
Wind	10	20
Bioenergy	10	60
Total	**60**	**320**

TOTAL	**1,500**	**4,220**

Source: OPA (Exhibit E-2-2, Figure 2)

Figure 7: Planned Development of Renewable Resources – Stage 3



Planned Developments, in addition to Stage 2:

South		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	0	150
Wind	210	2,410
Bioenergy	0	260
Total	**210**	**2,820**

Northeast		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	1,600	2,500
Wind	330	630
Bioenergy	50	140
Total	**1,980**	**3,270**

Northwest		
Resource	Incremental Capacity (MW)	Cumulative Capacity (MW)
Hydro	60	300
Wind	30	50
Bioenergy	0	60
Total	**90**	**410**

TOTAL	**2,280**	**6,500**

Source: OPA (Exhibit E-2-2, Figure 3)

Certain transmission development work will need to be initiated shortly to make the necessary transmission enhancements to meet the foregoing timetable. The specific transmission development work that is needed, the dates by which the development work must be commenced, and the estimated costs of the development work are addressed in the evidence relating to the applicable transmission projects.

5.0 NUCLEAR FOR BASELOAD

5.1 The Directive

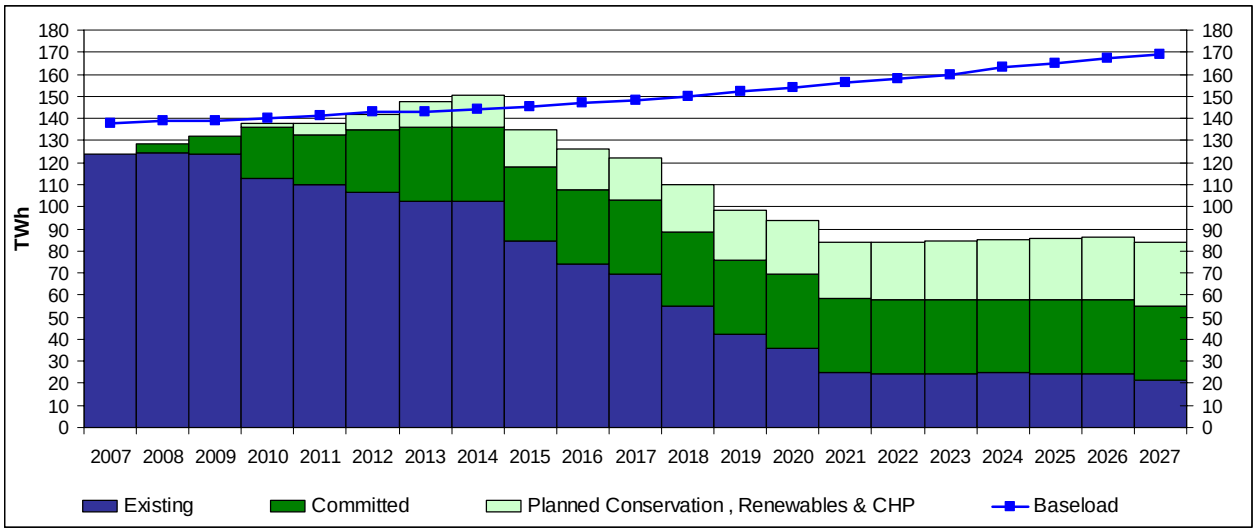
The Directive provides that the IPSP plan for nuclear power to meet baseload requirements but limit the installed in-service capacity to 14,000 MW. The Directive States:

> Plan for nuclear capacity to meet base load electricity requirements but limit the installed in-service capacity of nuclear power over the life of the plan to 14,000 MW.

Directive Priority

The Directive priority is to first apply the feasible and economic contributions of Conservation and renewable supply to meet base-load requirements. After this contribution is taken into account, there is a gap. This gap is illustrated in Figure 8, which demonstrates the contribution of existing and committed resources as well as planned Conservation and renewable resources to meet baseload resource requirements.

Figure 8: Existing and Committed Baseload Resources + Planned Conservation, Renewable and CHP Baseload Resources (TWh)



Source: Exhibit D-6-1, Figure 8

As illustrated in Figure 8, after the contributions from existing and committed supply, planned Conservation and renewable resources are taken into account, there remains a baseload requirement of 85 TWh. That baseload requirement may be met by one of two

candidates: nuclear power and combined cycle gas turbine generation ("CCGT"). The OPA's analysis in Exhibit D-6-1 demonstrates that, in light of the OPA's planning criteria, between those two candidates, nuclear power is superior. The IPSP therefore plans for nuclear power to meet the remaining baseload requirements.

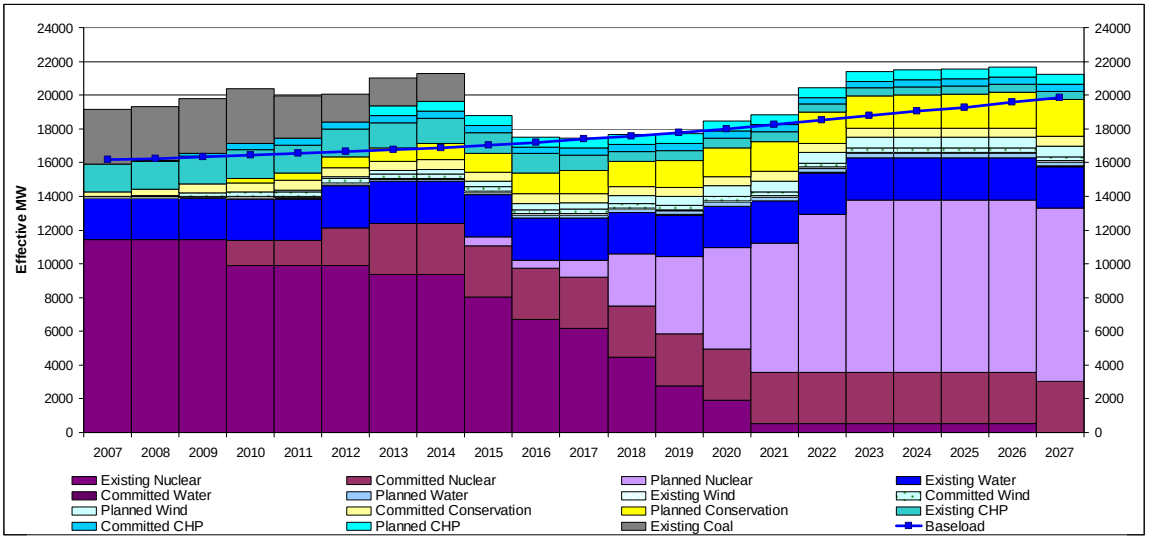
Implementation Priority

As indicated in the discussion respecting Directive Priority, nuclear power is preferable to CCGT for meeting baseload requirements. From an implementation perspective, the issue is whether the requirement for new nuclear resources should be met through refurbishment of existing nuclear plants ("refurbishment") or through building new plants ("new build"). Subject to economic viability, refurbishment is an attractive option for the following reasons:

- Compared to the new build option, refurbishment provides a shorter lead-time advantage as a result of unit refurbishment outages of two years or less;
- Refurbishment utilizes existing generation sites and transmission infrastructure thereby minimizing the associated environmental footprint;
- Local and surrounding community support for the continued operation of the Pickering, Bruce and Darlington generating stations is strong; and
- Experience from past and current refurbishment projects, both domestically and internationally, is leveraged on an on-going basis. This could result in improved project cost and schedules.

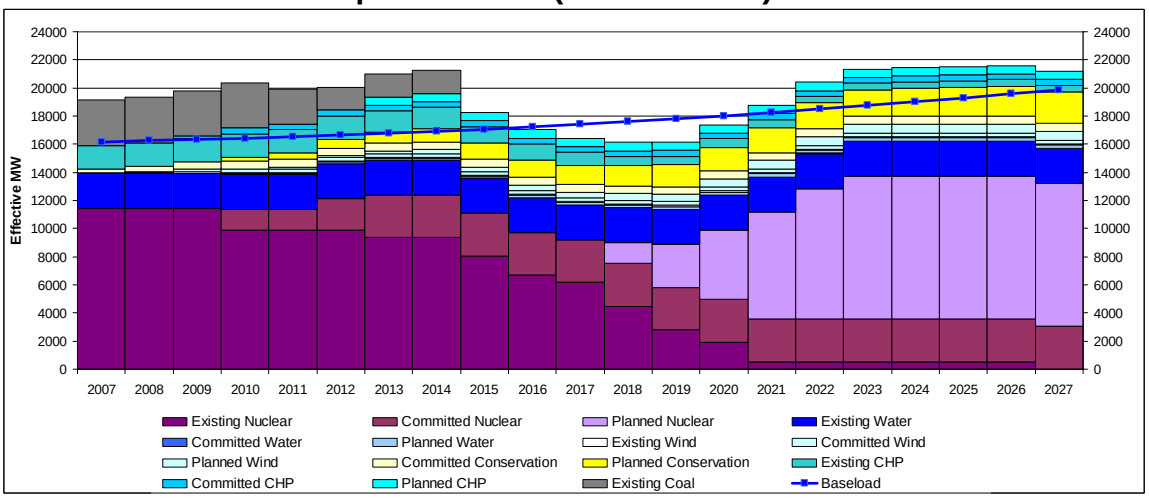
The most immediate implementation decision respecting refurbishment is with respect to Pickering B. The IPSP has built in the flexibility to address either scenario. If OPG decides to refurbish Pickering B, then the IPSP assumes that the associated capacity of 2,064 MW will be installed by 2018. This constitutes Case 1A under the IPSP. If OPG decides not to refurbish Pickering B, then the Plan assumes that the associated capacity of 2,064 MW will be replaced at a later time by new nuclear resources. This constitutes Case 1B under the IPSP. These cases are illustrated in Figure 9 and Figure 10, respectively, as follows:

Figure 9: Case 1A (with Pickering B Refurbishment): Resources to meet Baseload Requirements - Effective Capacity (MW)



Source: OPA (Exhibit D-6-1, Figure 4)

Figure 10: Case 1B (No Pickering B Refurbishment): Resources to meet Baseload Requirements – (Effective MW)



Source: OPA (Exhibit D-6-1, Figure 6)

To enable the retirement or the refurbishment of Pickering B, a new Oshawa transformer station may need to be built and brought into service by 2015. The details of this project, including the necessary transmission development work, are addressed in Exhibit E-4-1.

The OPA does not intend to procure any nuclear supply by the end of 2010.

6.0 COAL REPLACEMENT

6.1 The Directive

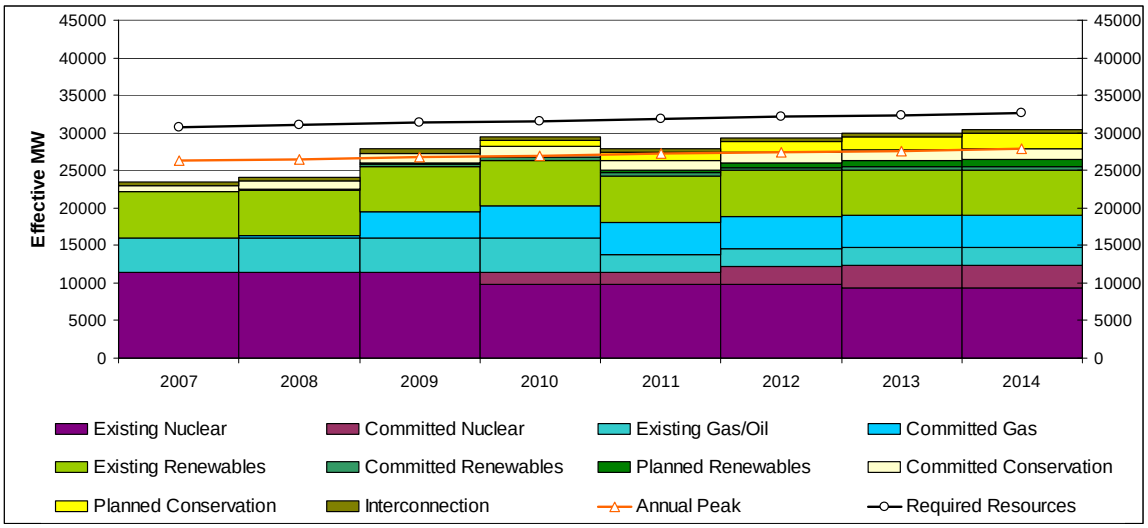
The Directive provides that the IPSP should plan for the replacement of coal-fired generation in the earliest practical time frame. It states:

> Plan for coal-fired generation in Ontario to be replaced by cleaner sources in the earliest practical time frame that ensures adequate generating capacity and electric system reliability in Ontario. The OPA should work closely with the IESO to propose a schedule for the replacement of coal-fired generation, taking into account feasible in-service dates for replacement generation and necessary transmission infrastructure.

Directive Priority

The Directive priority is to first apply the feasible and economic contributions of Conservation and renewable supply to replace coal-fired generation. Figure 11, below, demonstrates the contribution of existing and committed resources as well as planned Conservation and renewable resources to meet the requirements currently met by coal-fired generation:

Figure 11: Contribution from Existing, Committed and Planned Conservation, Renewable, Nuclear, Gas/Oil & Interconnection Resources in the Absence of Coal-fired Resources (MW)



Source: Exhibit D-7-1, Figure 1

As illustrated in Figure 11, after all alternative resources are taken into account, and coal is removed, there remains a capacity gap. In addition, there is also a gap with respect to the contribution of coal-fired generation to energy production and system reliability. These contributions are discussed in Exhibit D-7-1. The only remaining resource with the characteristics to replace these contributions is gas-fired generation ("GFG"). As a result, replacing coal-fired generation will require an additional contribution from GFG, accompanied by any necessary transmission enhancements. There are different reliability requirements in the North West system and the remainder of the system. Each area, therefore, has to be looked at separately.

With respect to the North West, the IPSP plans for the replacement of the Atikokan and Thunder Bay coal-fired generation plants with a combination of Conservation and renewable resources to be available by 2014. With respect to the remainder of the system, the OPA considered a number of options for GFG to replace coal-fired generation in the earliest practical timeframe. These included consideration of existing gas-fired resources such as Lennox and Non-Utility Generators ("NUGs"), the potential expansion of existing GFG sites or facilities, addition of local GFG, and the conversion of coal-fired generating units to GFG.

Based on this assessment, three candidate options were identified:

- GFG located near existing gas supply and infrastructure (i.e., the Sarnia area Dawn Hub, the location in Ontario with the lowest commodity and gas transportation cost);
- GFG located where there are local area reliability needs, accompanied by relatively modest transmission system enhancements (i.e., Northern York Region ("NYR"), Kitchener-Waterloo-Cambridge-Guelph ("KWCG"), and the Greater Toronto Area (the "GTA")); and
- Conversion of coal-fired generating units to GFG. This option requires extensive associated transmission system enhancements where there are local area reliability needs.

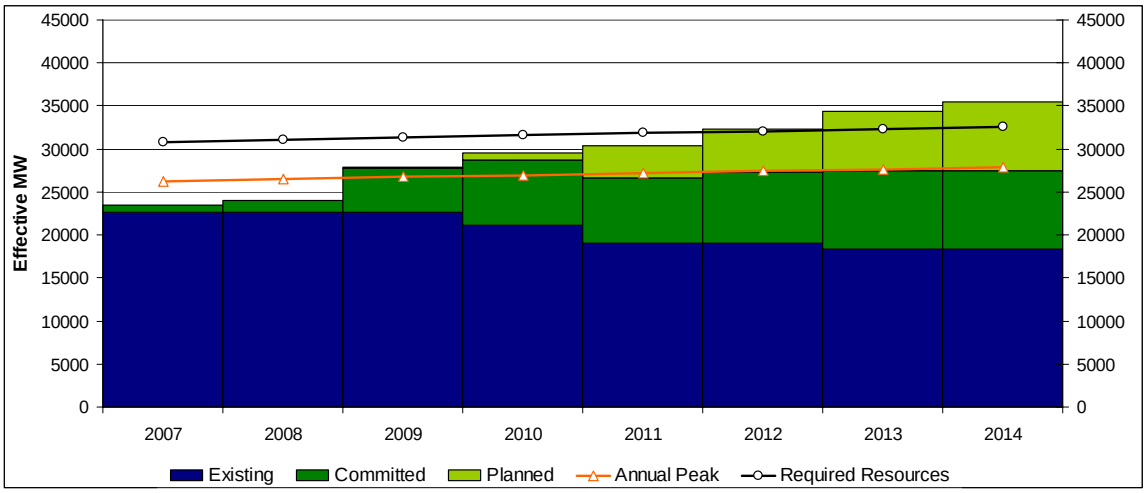
The OPA's analysis in Exhibit D-7-1 demonstrates that, in light of the OPA's planning criteria, among these three candidates, the installation of 1,400 MW of GFG to meet local area reliability needs in NYR, KWCG, and the GTA, accompanied by relatively modest

transmission system enhancements, most effectively meets the Directive's requirements with respect to replacement of coal-fired generation.

Implementation Priority

As indicated above, local GFG is planned for the energy and capacity production contributions for coal-fired generation to be replaced by 2012. The reliability contribution will be replaced by these and other facilities by 2014. This replacement schedule is illustrated by Figure 12:

Figure 12: Resources to Allow Replacement of Coal-fired Resources (MW)



Source: OPA (Exhibit D-7-1, Figure 3)

In addition, to enable coal replacement, certain enhancements to the transmission system are needed in the Thunder Bay area. The details of these enhancements, including the necessary transmission development work, are addressed in Exhibit E-6-1.

As a result, the OPA intends to implement the coal replacement requirements of the Directive by procuring 1,400 MW of GFG to meet local area reliability needs (in NYR, KWCG, and the GTA) in accordance with the OEB-approved procurement process. Further details with respect to these procurements are provided in Exhibit D-10-1.

7.0 GAS FOR PEAK, HIGH EFFICIENCY AND HIGH VALUE USE

7.1 The Directive

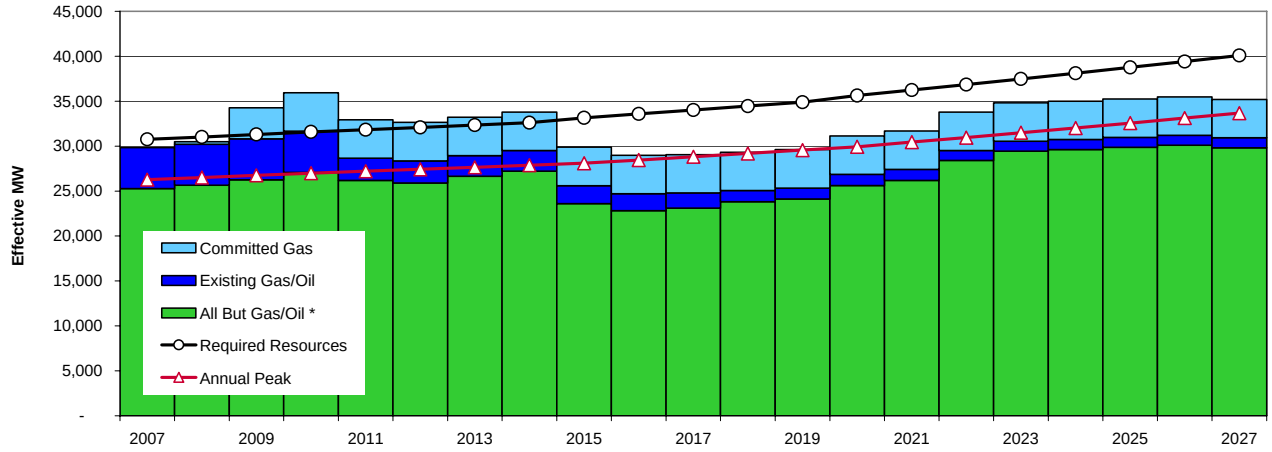
The Directive states:

> Maintain the ability to use natural gas capacity at peak times and pursue applications that allow high efficiency and high value use of the fuel.

Directive Priority

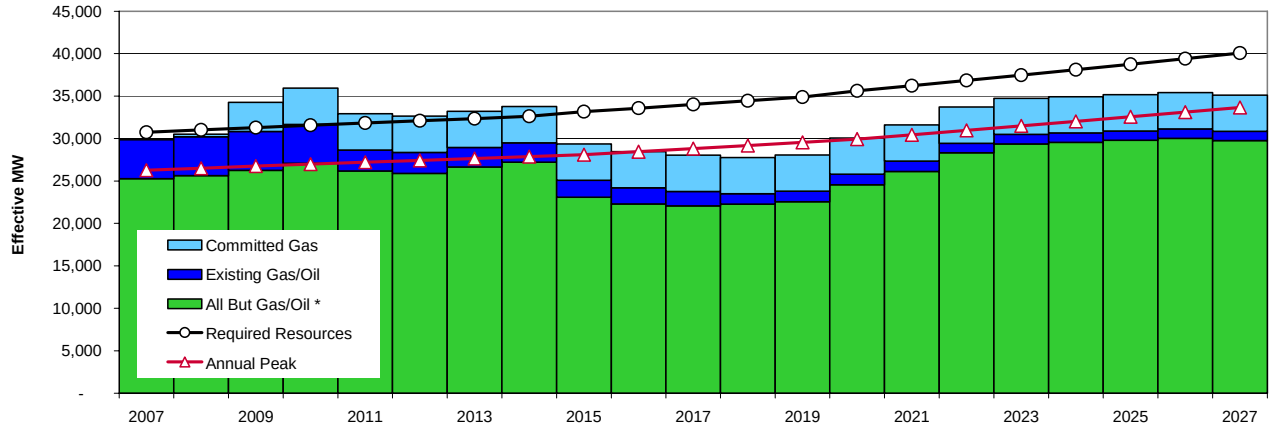
The Directive priority is to first apply the feasible and economic contributions of Conservation and renewable supply to meet peaking requirements. The contribution from nuclear power is then added. After these contributions are taken into account, there is a gap to be met by GFG. This gap is illustrated in Figure 13 and Figure 14, which demonstrate the contribution of these resources to meeting intermediate/peaking requirements under Case 1A (with Pickering B refurbishment) and Case 1B (without Pickering B refurbishment)

Figure 13: Required Gas-Fired Resources – Assuming Pickering B Refurbished (Effective MW)



Source OPA (Exhibit D-8-1, Figure 2)

Figure 14: Required Gas-Fired Resources – Assuming Pickering B Not Refurbished (Effective MW)



Source: OPA (Exhibit D-8-1, Figure 3)

As illustrated in Figures 12 and 13 after the contribution of existing, committed and planned resources, there remains a requirement for GFG.

In order to maintain the contribution by GFG to peaking, high value and high efficiency uses, the use of gas in the IPSP is restricted as much as possible to either simple cycle gas turbines ("SCGT") or CCGT.

Implementation Priority

As discussed above, GFG also contributes to meeting local area requirements, and to replacing the contribution of coal-fired generation. GFG will also be used when alternative resources are not feasible or cost effective. The IPSP also includes a certain amount of "proxy gas" to represent unspecified supply resources indicated for the long term, that will not necessarily prove to be gas-fired, but are modelled as if they will be.

When gas-fired resources are used, they are generally planned to be SCGT, to meet peaking requirements, or CCGT, to meet intermediate requirements. The Plan also includes combined heat and power ("CHP", also known as cogeneration) resources, that meet baseload requirements, where the amount included in the Plan is that expected to materialize from OPA procurement programs. There are also a number of gas-fired

generators, known as non-utility generators or NUGs, which are assumed to operate as baseload resources because of the contractual terms of their current NUG contracts. The Plan assumes that for the NUG contracts that expire by 2015, the associated capacity will continue, but will meet intermediate and peaking load requirements, depending on whether the NUGs are CCGT or SCGT resources, respectively.

The current list of contracts and projects through which the IPSP intends to meet the GFG requirements is set out in Table 4, below:

Table 4: Allocation of Planned Gas-Fired Resource Requirements

	Pickering B Refurbished			Pickering B Not Refurbished		
Project/Site	**Generation Type**	**MW**	**In-Service**	**Generation Type**	**MW**	**In-Service**
Lennox	CST	2,100	2011	CST	2,100	2011
CHP	CHP	586	2013	CHP	586	2013
Northern York Region	SCGT	350	2011	SCGT	350	2011
Kitchener-Waterloo-Cambridge-Guelph	SCGT	450	2012	SCGT	450	2012
Southwest GTA	CCGT	850	2013	CCGT	850	2013
GTA	SCGT	550	2014	SCGT	550	2014
NUG Replacement	SCGT/CCGT	469	2013 +	SCGT/CCGT	1,368	2013 +
Unspecified/Proxy Gas	SCGT/CCGT	650	2018+	SCGT/CCGT	825	2017 +
	Total	**6,005**		**Total**	**7,079**	

Source: OPA (Exhibit D-8-1, Table 9). Southwest GTA may be met by either CCGT or SCGT, but was modelled as CCGT. Likewise, GTA could be met by either type, but was modelled as SCGT. CST is the acronym for "Condensing Steam Turbine"

This mix will likely change as better opportunities present themselves.

Some of these projects/sites will be procured by the end of 2010 in accordance with the OEB-approved procurement process. These are: Northern York Region, Kitchener–Waterloo-Cambridge-Guelph, and the GTA (as discussed above). In addition, another facility, the Lennox Generating Station, operates under a Reliability-Must-Run contract with

the IESO. The contribution from that facility will also be procured by the OPA. This is described in greater detail in Exhibit D-8-1, Attachment 1 and Exhibit D-10-1.

8.0 NEAR-TERM ACTION PLAN

The Directive and Implementation Priorities lead to both near-term and longer-term action plans. As indicated in the introduction**,** the IPSP identifies specific priorities for the near-term, but will, more generally, develop options for the mid-term and explore opportunities for the longer-term.

This leads to a near-term action plan that the OPA will carry out over the 2008 to 2010 period to implement the IPSP. That near-term action plan has the following components:

- Conservation: The OPA will, through resource acquisition and under existing government Directives, procure approximately 1,400 MW of Conservation resources. It will also invest in market capability and market transformation activities;
- Renewable Supply: The OPA will, under existing government Directives, procure up to 2,700 MW of renewable resources; and
- Gas Fired Generation: The OPA will, through an OEB-approved procurement process, procure gas-fired projects that are required for local area supply and transmission relief. The capacity targets for these projects are as follows: (1) 850 MW of CCGT capacity in the Southwest GTA; (2) 550 MW of SCGT capacity in the GTA, (3) 300 MW of SCGT capacity in Northern York Region; and (4) 450 MW of SCGT capacity in Kitchener-Waterloo-Cambridge-Guelph. In addition, the OPA will enter into a procurement contract with OPG to replace the OEB-approved Reliability-Must-Run contract that is currently in place with respect to the Lennox GS.

In addition, it will be necessary for transmission proponents to carry out development work with respect to the transmission projects recommended in the IPSP. Certain of these projects, in addition to meeting the Directive's supply mix goals, are aimed at ensuring regional and local area reliability (i.e., Windsor Essex, Central and Downtown Toronto, and Milton Transformer Station). The recommended transmission projects, and the necessary development work, are referred to above and are addressed in more detail in the supporting evidence relating to the individual projects. It is not expected that any of these

projects will result in a leave-to-construct application before the OEB during this near-term period.

9.0 CONCLUSION

The OPA's Plan to achieve the Directive's goals involves prioritizing how Conservation and supply resources should be acquired through (i) meeting the requirements of the Directive in light of the OPA's planning criteria (the "Directive Priority"); and (ii) the sequencing of installing resources, especially in light of long lead times and necessary transmission enhancements (the "Implementation Priority").

With respect to the Directive Priority, the IPSP ensures that the identified resource goals in the Directive are met by identifying the priority order in which the resources are planned to meet the electricity needs of the province as follows:

1. Maximize feasible cost effective contribution from energy efficiency, demand management, fuel switching, and customer based generation (Conservation);
2. Maximize feasible cost effective contribution from renewable sources;
3. Make up baseload requirements remaining after Steps 1 and 2 above with nuclear power;
4. Replace coal-fired generation with power from committed and planned resources. Specifically, in order to ensure that existing coal-fired facilities are replaced by 2014, gas-fired generation ("GFG") facilities are planned to be installed in the areas of Northern York Region, Kitchener-Waterloo-Cambridge-Guelph and the Greater Toronto Area ("GTA") by 2014; and
5. Restrict contribution of GFG to specific projects as required when additional Conservation and renewable resources are not feasible or cost effective.

The Directive Priority is accompanied by an Implementation Priority. The Implementation Priority is the relative chronological ordering of resource additions. The IPSP is the combination of the Directive Priority and the Implementation Priority. It is set out in summary form in Table 5, below.

Table 5: Summary of the IPSP

Subject of Directive	Directive Goals	Directive Priority	Implementation Priority	Current Mix of Projects/ Facilities/ Programs (Evidence Reference)	Procurement Authorization (for resources to be acquired by end of 2010)
Conservation	2010: 1,350 MW 2025: an additional 3,600 MW	Maximize feasible cost effective contribution from Conservation before supply resources.	2010 goals to be met through resource acquisition; experience with programs to provide information on how to economically meet and exceed 2025 goal using combination of resource acquisition, capability building and market transformation programs.	2010: Exhibit D-4-1, Table 21 2025: Exhibit D-4-1, Table 22	Government Directives
Renewable Supply	10,402 MW by 2010 15,700 MW by 2025	Maximize feasible cost effective contribution from renewable sources before other supply resources in the following order of economic priority: hydro, bioenergy, and wind.	2010: All feasible renewable resources that can be installed prior to 2010 should be acquired; 2025 goal to be met by first applying all feasible hydro resources (2,921 MW); all feasible bioenergy (450 MW); and all small, standard offer wind projects (1,148 MW). The remainder of the goal (1,891 MW) to be made up of large wind projects. The order of implementation will be coordinated with necessary transmission enhancements.	2010: Exhibit D-5-1, Tables 19, 31, and 33 2025: Exhibit D-5-1, Tables 19, 31, 33 and 35.	Government Directives
Nuclear for Baseload	Up to 14,000 MW	Make up remaining baseload requirements remaining after Conservation and renewable supply with nuclear supply. Refurbished	10,249 MW of nuclear capability required, either from refurbishments or new build. Depending on refurbishments, new nuclear capacity of 1,400 MW to 3,400 MW, starting in 2018.	Exhibit D-6-1	No Procurements Planned

Subject of Directive	Directive Goals	Directive Priority	Implementation Priority	Current Mix of Projects/ Facilities/ Programs (Evidence Reference)	Procurement Authorization (for resources to be acquired by end of 2010)
		nuclear facilities have planning advantages and are generally preferred to new nuclear facilities. However, each case is fact dependent.			
Replacement for Coal Fired Generation	Replace coal-fired generation in earliest practical timeframe.	Replacing coal-fired generation requires replacing its three types of contributions to Ontario's electricity needs: capacity (6,434 MW), energy production (24.7 Two) and reliability (flexibility, dispatch ability, and ability to respond to unforeseen supply availability).	15,000 MW of resources are planned by 2015, partly to replace coal, partly to meet growth, and partly to catch up with deficiencies that existed in the beginning of the planning horizon. Gas-fired generation will be installed in the areas of York Region, Kitchener Waterloo and Southwest GTA. This will allow for the energy and capacity production contributions to be replaced by 2012. The reliability contribution will be replaced by these and other facilities by 2014.	Exhibit D-7-1, Table 4	Conservation and Renewable Resources: Government Directives GFG: OEB Approved Procurement Process
Natural Gas	Confine gas to peaking, high value and high efficiency uses.	Gas fired generation will be used to meet peak and intermediate requirements and to provide flexibility. When gas-fired resources are used, they should be restricted as much as possible to either simple cycle gas generation (to meet peaking	In addition to meeting the local area supply requirements in York Region, Kitchener-Waterloo and Southwest GTA, current facilities that operate as baseload may be converted to meet intermediate and peaking needs and energy will be procured from Lennox GS to replace the Reliability Must Run Contract with the IESO. An additional 400-650 MW of	Exhibit D-8-1, Table 9	OEB Approved Procurement Process

Subject of Directive	Directive Goals	Directive Priority	Implementation Priority	Current Mix of Projects/ Facilities/ Programs (Evidence Reference)	Procurement Authorization (for resources to be acquired by end of 2010)
		requirements) or combined cycle gas generation (to meet intermediate requirements). Any new contracts and facilities should reflect these requirements as much as possible.	"proxy gas" may be required around 2017.		