

25 Adelaide St. E  
Suite 1602  
Toronto ON, M5C 3A1

[www.appro.org](http://www.appro.org)



**APPRO**  
ASSOCIATION OF  
POWER PRODUCERS  
OF ONTARIO

**Association of Power Producers of Ontario**

**Response to Ontario Power Authority  
Call for Written Submissions on the Supply Mix for Ontario**

August 26, 2005

## **Executive Summary**

APPPrO's long term goal is an open and competitive electricity industry in Ontario with multiple sellers and buyers which results in: a) a sustainable electricity supply and infrastructure in Ontario that is safe, reliable and economically sound and b) a healthy, equitable and environmentally sound supply solution which relies primarily on private sector investment and which allocates risk where it is best managed.

We do not believe that all of the necessary factors now exist in a sufficiently robust manner to achieve such an outcome with the result that, at present, the role of the OPA and the longer term contracts it offers must continue.

APPPrO believes that the government should set broad objectives or targets for the supply mix – not be prescriptive. Central planning should be kept to a minimum and all supply solutions should be competing on a demonstrably level playing field. Supply mix policy / regulation must first address reliability requirements in the broadest possible way.

Next it must address environmental requirements in similar fashion. In the environment of OPA procurement, the mix must be economically optimized, taking account of all externalities.

For reliability reasons, the supply mix should therefore be sufficiently diverse to avoid excessive reliance on any particular technology type or fuel. It would likely follow that a mechanism will be required to avoid this, probably in the form of established “bands” for each type of technology.

Ultimately, we want to find the lowest total cost for consumers taking into account all of the above, bearing in mind that the primary purpose of energy systems in modern societies is to benefit consumers.

## Introduction

Energy will arguably be one of the defining issues of this century -- reinvesting in energy infrastructure in Ontario is the single most important aspect of this issue facing Ontario today. Despite continued demand growth in world and North American energy markets, investments in energy supply in Ontario are lagging.

Although some progress has been made in Ontario with the addition of approximately 3000 MW over the last 5 years (including the refurbishments of Bruce A units 3 and 4 and Pickering A, together with TransAlta's Sarnia facility, Brighton Beach, etc.) not enough major new capacity has been built in Ontario since the mid 1990's. A series of RFPs for renewable and clean energy initiated by the government over the past year will add more, but the reality is that Ontario's reserve margins are currently thin, and the province must rely increasingly on imports for reliability purposes.

At the same time demand scenarios from the IESO point to continued growth at between 1-1.3% per year. Much has been made about the potential for relief through conservation and demand management initiatives but while these are worthwhile – and important - they are a mitigating factor only and not a replacement for new supply to meet growing demands.

Factoring in the growth of our economy, Ontario will need to refurbish, rebuild or replace 25,000 megawatts of generating capacity over the next 20 years. That represents more than 80 per cent of Ontario's current capacity of about 30,500 megawatts. The estimate is that this will require an investment anywhere from 25 to 40 billion dollars, depending on what generation resources we choose to build, and when.

The supply challenge is exacerbated by an off-coal policy which will have eliminated approximately 5600 MW of intermediate resources from the supply mix through 2007-2009.

The Ontario Government clearly does not have the capacity or intention to fund new generation resources, and is turning primarily to the private sector to invest in new generation in Ontario through competitive solicitation processes.

In our submission, APPrO<sup>1</sup> is taking a longer term perspective and focusing on what the primary principles, guidelines and considerations should be in developing a successful solution to Ontario's supply challenge including the optimum mix of supply resources within such a solution.

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<sup>1</sup> APPrO is the collective voice of generators in Ontario: a non-profit organization representing more than 100 companies involved in the generation of electricity in Ontario. APPrO members produce power from co-generation, hydro-electric, gas, coal, nuclear, wind energy, waste wood and other sources. Our members currently produce over 95% of the electricity made in Ontario, and include both investor and publicly owned generators.

## **A. APPrO Perspectives on Supply Mix**

### **1. APPrO's overall goal in electricity restructuring**

As we noted in our presentation to the OPA on the Procurement Process on July 26, 2005, APPrO's long term goal is an open and competitive electricity industry in Ontario with multiple sellers and buyers which results in:

- A sustainable electricity supply infrastructure in Ontario which is safe, reliable and economically sound
- A healthy, equitable and environmentally sound supply solution which relies primarily on private sector investment and which allocates risk where it is best managed

Underlying this goal is a strong commitment on the part of APPrO to the principle stated by the Electricity Conservation and Supply Task Force that "Competition and choice are essential if we hope to achieve an efficient and responsive electricity sector<sup>2</sup>."

APPrO argues that a functioning market is a key part of the solution. APPrO sees the OPA processes as transitional to more market based functions. Long term planning over time might migrate to the IESO. We have addressed some thought to mechanisms by which this could be accomplished in our July 26 paper on procurement and it is not appropriate to dwell on those at any length in this submission.

Of course under present conditions, the availability of long-term contracts for power is fundamental to securing the required levels of supply and achieving core public objectives for the electricity sector including reliability.

### **2. The need for transition**

Most experts believe that the most efficient results in a sector like electricity are achieved when the number of functions dealt with through market mechanisms is maximized. Although the optimal arrangements will change over time, only those functions which can not effectively be managed through market mechanisms should be controlled through centrally-administered structures. Since central planning is not really a market function, its role in the present system is an excellent example of the need for transition.

The current system does not support market-based investment in new capacity. When new capacity is built on a non-market basis, ie for reliability reasons, it tends to suppress energy market prices, and makes it difficult if not impossible to finance new capacity based on energy market prices alone. Investment in new capacity therefore requires a capacity "premium" in addition to the energy market payments. The OPA is the only party able to pay and recover such a premium in today's framework. At the same time, there remains unmanageable political risk in the market. Likewise, the OPA is the only party able to cover such political risk in today's framework. The consequence is that there is monopsony in capacity and all material investment. Hence the need for the OPA transition.

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<sup>2</sup> EC&STF Final Report

Given the fact that the transition to a more fully market-based system appears to be an incremental process in Ontario, we can understand that there may be a need to continue with central planning for a number of years. However, central planning should not be seen as a fundamental requirement for the system, as other jurisdictions have demonstrated an ability to support functional markets for electricity with little or no central planning.

This does not change the fundamental circumstances at present which require a system to ensure the availability of long term contracts for development of new supply.

### **3. APPrO's preferred outcome at the end of an OPA transition<sup>3</sup>**

Clearly any successful market must be populated by multiple sellers and buyers, not just a few sellers and one buyer. In this successful market APPrO's view is that consumers would pay the full cost of capacity and energy, would be exposed to the appropriate elements of risk, and have the market tools to manage such risk. There would be appropriate exposure to time of day prices to incent CDM actions, and equity between buyers and sellers in CDM. At the same time, there would be a process in place to facilitate ongoing emission reduction and energy efficiency improvements.

This will require a stable political dynamic, with no undue political interference, a stable independent regulatory environment with a commitment to regulation that aims to coordinate and, where possible, harmonize regulatory requirements among departments and agencies within governments and jurisdictions without undue regulatory or economic burden, certainty in energy and environmental policy, generators willing to make long term investments in the market and creditworthy power purchasers who are willing to enter into long term contracts, predictable pricing over the long term, the ability to hedge risk, willing financiers and finally a level playing field for all participants.

We do not believe that all of the above factors now exist in a sufficiently robust manner with the result that, at present, the role of the OPA and the longer term contracts it offers must continue. However we strongly believe that the long term model for Ontario should be a fully functioning market.

### **4. The need for policy / regulatory determination of supply mix**

In the long run, and arguably even in the end state, it will probably be necessary for policy or regulatory prescription of a minimum diversity of supply. However, it will be important to maintain as a continual priority efforts to ensure that the degree of prescriptiveness in this regard is kept to a minimum. Given the fundamental role of electricity in our society and economy, its reliability has come to be regarded as a social good. It is incumbent on the OPA to plan for long term reliability. Reliability is broadly acknowledged to depend (inter alia) on diversity of supply. The minimum diversity standard may therefore warrant long term determination by policy or regulation. Such determination of diversity requirements for reliability purposes would typically result in a wide range of acceptable solutions.

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<sup>3</sup> A complete description of our preferred outcome transition can be found at [www.appro.org](http://www.appro.org) ([http://www.appro.org/APPrO\\_submission\\_on\\_procurement\\_July\\_26\\_2005.pdf](http://www.appro.org/APPrO_submission_on_procurement_July_26_2005.pdf)).

Environmental policy objectives establish a second level of supply mix prescription. As noted elsewhere, APPrO prefers that environmental policy objectives be set through environmental regulation, as opposed to being embedded in electricity policy. But this remains a long term issue, as the need for more prescriptive supply mix decisions arises from the transitional OPA monopsony for new capacity.

In the present circumstances the OPA will need to fulfill its mandate to procure supply through a centrally organized contracting process. The forms of contract need to be somewhat technology-specific. Fully open competition between technologies is not practical in achieving the best results. The OPA must therefore pre-determine at some level the mix of technologies for all new supply. In doing this, it must clearly add economics to the reliability and environmental criteria for determination of the supply mix. But in advising the government under its present mandate, it must provide for flexibility to adapt to changing circumstances, and thus still leave itself some bandwidth of acceptable solutions.

## **B. Guiding Principles for determining the Supply Mix**

### **1. Government's role should be limited**

Fundamentally, APPrO's view is that the appropriate role of government is to set overall directions and objectives, while competitive forces and markets find the most economic and attractive means to meet those objectives. As a corollary, government must be careful not to change directions or objectives too frequently: this would badly compromise the objective.

A first principle then is that government is setting objectives or targets for the supply mix – not being overly prescriptive. Central planning should be kept to a minimum and all supply solutions should be competing on a demonstrably level playing field.

### **2. Allow for market based fulfillment**

To the extent there are socially-mandated supply mix obligations, these must allow for market-based fulfillment. We must be cognizant, however, that even in market-based fulfillment, there will be some limitations. In particular, different types of technologies will not be able to bid against each other in an open bid process, as their cost structures will be very different, and we would likely end up with a system with insufficient diversity. The solution to this problem will most probably be technology specific bidding, or alternatively to use a bilateral negotiation process in situations that do not lend themselves to an RFP-type process.

Similarly, acceptable levels of emissions should be set explicitly by government and do not need to be prescriptively executed through a supply mix: market participants and competitive forces can decide how best to meet them in the context of new supply. Clearly, parties supplying generation in Ontario will be required by law to meet any environmental standards established by the government – this is not a task for a supply mix direction.

### **3. No “silver bullet” solution**

Ontario will need adequate supplies of baseload<sup>4</sup>, intermediate and peaking<sup>5</sup> power. Each is necessary because of certain desirable and necessary unique features; however they all have different capital costs, operating costs, expected useful life spans and operating characteristics. Diversity requirements for reliability purposes would typically result in a wide range of acceptable solutions.

### **4. Not all MWs are equal...**

When determining a logical supply mix it is important to realize that while all MWs may appear equal, they are most definitely not equal from a reliability point of view. For instance, coal units can provide baseload and ramping capabilities, which can't necessarily be provided by other types of technology. However, other facilities such as

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<sup>4</sup> The power used to meet minimum expected customer requirements at a given time.

<sup>5</sup>Power which offers greater operational flexibility to take advantage of market opportunities compared with base load facilities that provide little or no operational flexibility.

simple cycle gas turbines can provide quick response and flexible power at possibly a more efficient cost over the long run for peaking capacity. Hydro facilities are reliant on water flows and have a much longer expected life span, which give them yet again a different reliability and cost profile. If the supply mix is planned on the assumption that all technologies are the same, then it will not be able to meet vital reliability criteria. We touch more on the importance of reliability criteria below.

The role of imports and the adequacy of inter-ties with neighbouring jurisdictions needs to be considered as well.

## **5. Transmission and distribution have important roles**

It is important to note that there is another key policy area which has significant impacts on supply: the sector strategy for Transmission and Distribution, both in its own right and for its major impact on generation investment and operation in Ontario. A government policy on delivery (T&D) of supply is needed to provide guidelines for the formulation of an integrated plan within which there is an underlying supply mix premise.

## **C. Other important considerations**

### **1. First Step, Determine the Need**

Before the process of actually determining the supply mix begins, system needs must first be established.

### **2. Long Term View of the Supply Situation**

Any supply mix recommendation (and decision) must be made within the context of a long term view in order to be properly implemented. The absence of a long term plan will tend to produce “quick fixes”, which may not necessarily serve Ontario well in the long term. APPrO would suggest a 20 year view would be appropriate.

The following factors should be considered in determining the long term view:

- Start with an inventory of the current supply mix. This requires a good assessment of what is available now, what type of operating characteristics each plant possesses, likely retirement date etc.
- Factor in the long term plans for all plants, including retirement, refurbishments, expansions, etc. This includes nuclear, coal and all other facilities (both OPG and non-OPG) as well as DG, CHP, and renewables, etc.
  - With respect to renewables, APPrO has consistently supported the need for a RPS and suggests that the current target of 10% be considered a minimum.
- Assessment of the current NUG contracts
  - When do they expire?
  - How will the assets dispatch once the contracts expire?
- Recognition of industry capabilities to deliver equipment
- Regulatory approvals timing and coordination
- Infrastructure support (e.g., natural gas), and system and market integration
- Realistic projections of load growth
- Comparison of prices and supply available from neighbouring jurisdictions

### **3. Functionality of mix**

There are certain system functionality requirements that any supply mix must be able to meet. In other words, the requirements for baseload, intermediate and peaking supply must be clearly identifiable through the establishment of target reserve margins. Targets for ancillary services, such as reactive power, and any requirements for load following/ramping capabilities must also be established.

In determining the requirements, target ranges and standards, rather than specifics should be established, for the simple reason that it will be impossible to meet specific targets, with so many variables at play. If the targets and standards are established so that reliability criteria can still be met, then the goal has been achieved.

#### **4. Reliability**

Reliability is the most important criterion in determining any supply mix. Reliability standards must be based on recognized reliability standards for the region. There are both technical reliability standards such as NPCC and NERC, and reliability objectives and principles which must be met or kept in mind. The OPA needs to be careful to avoid duplicating work on reliability in terms of supply mix that is properly the responsibility of the IESO or the OEB.

As discussed above in Guiding Principles for Determining the Supply Mix, not all MWs are equal from a reliability point of view. It will be necessary to assess various components in determining how to meet reliability criteria. These might include:

- Different capacity for different types of technology.
- Is it appropriate to rely on imports to meet targets?
- It is important to have diversity of technology, fuel, size and location
- Adequacy of transmission is another key element. For example, adding supply behind a transmission constraint without addressing that constraint could mean that supply is unable to be brought on line to meet load when required.

Too much reliance on any one factor, e.g., type of technology, fuel, size, location, capacity factors etc. can result in a system which is unable to perform as required. All of these are important factors in determining whether or not Ontario can meet required reliability criteria. The supply mix should therefore be sufficiently diverse to avoid excessive reliance on any of these factors. But it may be that some type of mechanism would have to be introduced to avoid excessive reliance on a particular technology type or fuel, unless there were compelling long-term market reasons to support it otherwise.

This said, we believe that government should minimize being prescriptive in this area as it is unlikely that any government could develop a mechanism that was both fair and economically efficient. As a basic approach, market forces should sort it out in the context of 'general rules' to be established by the government.

#### **5. Economics**

Once reliability criteria have been met, the goal should be to minimize expected costs for any given level of risk, while minimizing expected risk for any given level of costs. In determining the lowest cost options, there are obviously a number of key considerations, such as capital and operating costs (including fuel costs) that will lead to a preliminary cost rating. It is essential that all direct costs be taken into account.

There are then a number of indirect costs which should also be factored into the equation, such as:

- Emissions
- Waste disposal
- Decommissioning costs
- Disaster insurance
- Any transmission and distribution upgrades required

And finally, another layer of costs or factors to consider are various externalities. These might include:

- Environmental impacts/sustainability
- Economic Development
- In province vs. out of province (all generators whether in or out of province should be treated equally) investment
- Thermal benefits
  - Power supply/infrastructure often provides more than just electricity, such as steam benefits through industrial cogeneration.
- In many cases there will be issues that are unique to certain locations in the province. This might include:
  - Transmission constraints
  - Distribution constraints
  - Voltage support
  - Gas supply
  - Gas transportation
- A “perfect” supply mix will allow flexibility for:
  - Market forces
  - Fuel price changes
  - Technology changes
  - Changes in demand patterns
  - Impact of CDM on load shape

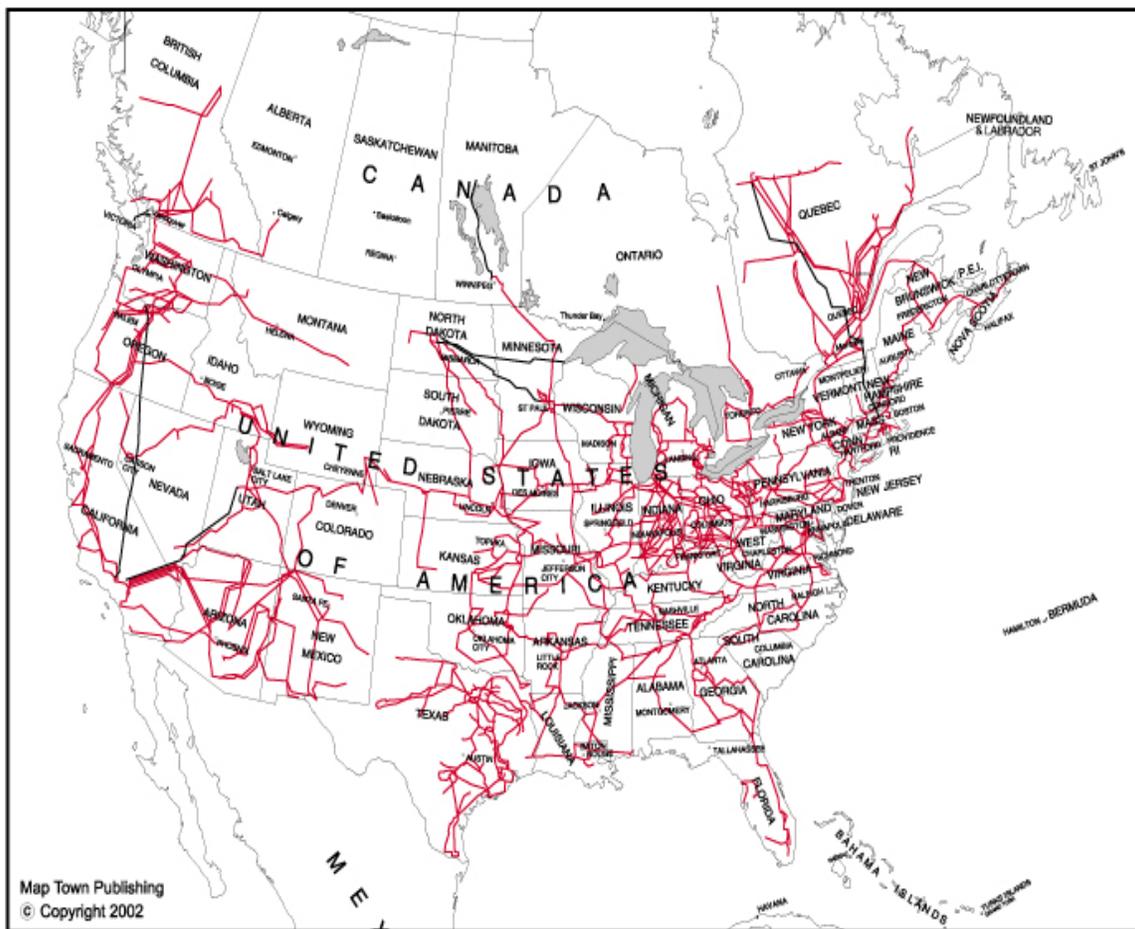
Once the least cost alternatives have been developed, sufficient optionality will need to be ensured in the mix to allow the market to find the most economic solutions. This can be done by defining ranges within which the market can operate to fine tune the mix. Ultimately, we want to find the lowest total cost for consumers taking into account all of the above.

## **6. Imports and interconnections**

Finally there is the issue of imports. There are a number of key issues that arise with regards to the role of imports in the supply mix:

- i. Are they primarily to meet reliability criteria? APPrO believes that imports should be used primarily for optimizing domestic marginal resources and should not be a backstop security without meeting specific safeguards and criteria, i.e., that reliability should not be reliant on interconnections, unless a truly level playing field can be established. On the margin, short term import support improves economics, broader competition, and should drive efficiency.
- ii. What do the recognized reliability standards dictate as far as reliance on imports?
- iii. What is their role with respect to public policy/political needs or policies (e.g., Kyoto, industrial development, etc.)? APPrO takes the position that investment in new supply should be primarily focused on optimizing Ontario-based resources in an economically efficient manner. Supply Mix decisions (as we noted earlier) must clearly start from recognition of the existing Integrated Electricity System and its capabilities and interdependencies; in other words, a decision by the OPA to procure electricity on a long term basis from generation outside Ontario should only be taken after an explicit policy on extra-provincial acquisitions has been developed and approved, including a review of reliability standards.

- iv. Interconnections: As this illustration<sup>6</sup> shows, Ontario has extensive infrastructure integration with U.S. natural gas and electricity networks, and there are significant import/export transactions in both. Any decision on supply mix must consider the relationship of domestic and external resources and their role. The government has made reference to the need for an East-West electricity grid, but as this illustration shows, our current arrangements reflect Ontario's significant relationship with key trading partners to the south. Should we be investing scarce resources in east-west connections? The relationship between transmission policy and supply solutions needs much more discussion to ensure that actions in either realm are optimal from a cost-benefit perspective, particularly considering that the current east-west grid discussions are focused on hydroelectric resource development and this together with their functional quality will have to be factored into supply mix decisions if these projects are to go ahead.



<sup>6</sup> Source: Energy Dialogue Group

#### **D. Summary**

APPrO believes that the government should set broad objectives or targets for the supply mix – not be prescriptive. Central planning should be kept to a minimum and all supply solutions should be competing on a demonstrably level playing field. The supply mix should therefore be sufficiently diverse to avoid excessive reliance on any particular technology type or fuel. It would likely follow that some type of mechanism will be required to avoid such excessive reliance.

There are both technical reliability standards, and reliability objectives and principles which must be met or kept in mind. The key criterion determining any supply mix prescription must be reliability. Additionally, reliability standards must reflect recognized reliability standards for the region. The industry standards of NPCC and NERC should be used.

The objective of the exercise should be to allow for sufficient optionality in the mix to allow the market to find the most economic mix. This can be done by defining ranges within which the market can operate to fine tune the mix. Ultimately, we want to find the lowest total cost for consumers taking into account all of the above, bearing in mind that the primary purpose of energy systems in modern societies is to benefit consumers.