



**ELECTRICITY TRANSMISSION
AND DISTRIBUTION
IN ONTARIO – A LOOK AHEAD**

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Electricity Transmission and Distribution in Ontario – A Look Ahead

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Executive Summary

Ontario's electricity sector has undergone significant change in recent years, including restructuring of the former Ontario Hydro, and commercialization of electricity distribution and transmission companies in the province. In hindsight, Ontario's efforts to quickly implement a viable, competitive marketplace may have been overly ambitious and failed to provide sufficient adjustment time for the sector, or security for consumers.

The current government is taking action to promote a healthier and more sustainable electricity sector. This includes a more responsible approach to electricity pricing that better reflects the true cost of electricity, ending subsidies of electricity prices. It is a balanced approach to energy policy that combines features of a regulated industry with those of a competitive electricity sector.

This paper identifies and discusses changes and challenges facing Ontario's wires sector, and poses questions and a process for public consultation that might help guide the government in developing a policy framework for this sector.

The paper identifies the following issues as significant to the future of Ontario's wires sector:

- the potential to further efficiencies in the electricity distribution sector through voluntary consolidation activity, operational and administrative streamlining, and functional "unbundling" (separation);
- the development of distributed generation (the location of a generation facility at or very near a customer load);
- addressing transmission issues, such as the need for new investment, congestion, and the need to simplify the planning and approvals process.

Supported by a policy framework encouraging a voluntary approach to consolidation, the number of distributors in Ontario's local electricity distributors (LDCs) sector has decreased by two-thirds since 1998.

Consolidations enhance efficiency by facilitating system integration, streamlining system administration functions, and improving distribution system planning. However, consolidations may impose new costs and may not be required to achieve efficiencies, which are available through other business strategies.

The government recognizes that distribution sector efficiency encompasses more than rationalization through consolidation. It includes pursuing administrative and operational efficiencies, and seeking opportunities for further functional unbundling. Many of Ontario's LDCs have been pursuing innovative ways to achieve greater efficiencies, including looking at opportunities for outsourcing and alliances. The distribution sector

must continue to pursue innovative and cost-effective ways to deliver traditional distribution services as well as new services that will be required to implement the government's priorities for conservation and energy efficiency.

Distributed generation is expected to become increasingly important as existing coal-fired generation facilities are replaced. Distributed generation provides important benefits for the wires network, including delaying the need for capital expenditures to upgrade the wires network; offering local solutions to transmission constraints; reducing system losses; improving load factor; and increasing reliability of supply.

There are barriers to the development and growth of distributed generation in Ontario including economic, system planning, and regulatory issues. The government recognizes that in order to address Ontario's emerging supply needs, further regulatory work is required to ensure that investment, construction and development of new distributed generation is facilitated to the maximum extent possible.

Ontario's electricity supply will be increasingly derived from smaller-scale renewable and distributed generation facilities. This will require new investment and some reconfiguration in distribution and transmission lines, streamlined approaches for transmission planning and approvals and improved congestion management.

The development of distributed generation, the enhancement of Ontario's transmission network, and facilitation of greater efficiency in the distribution sector all depend on, and require, new investment and a supportive regulatory environment. The government understands the importance of promoting private sector investment to help rebuild and strengthen Ontario's electricity sector. The government also understands that investors and all stakeholders in Ontario's electricity sector need stability and predictability.

In developing a policy framework for the distribution and transmission sectors, the government is mindful that there has been much change in the past few years. It is time to work towards building a long-term, stable policy and regulatory framework that supports and encourages new investment, promotes efficiency, and fosters conservation.

Introduction

Since the late-1990s, Ontario's electricity sector has been subject to profound structural economic, technological, legislative, and institutional changes.

Until financial pressures that resulted in its 1998 restructuring, the former Ontario Hydro was a monopoly generator, power transmitter and rural distributor. That year, legislated changes envisioned the creation of a competitive electricity marketplace and unbundled the Ontario Hydro monopoly. Key institutional changes included:

- separating Ontario Hydro into stand-alone “wires” (distribution and transmission) and generation businesses (respectively, Hydro One and Ontario Power Generation);
- establishing an independent body, the Independent Electricity Market Operator (IMO), to manage the wholesale marketplace;
- expanding the Ontario Energy Board's (OEB's) role to regulate the electricity distribution and transmission sectors.

Restructuring had important ramifications for Ontario's electricity distribution and transmission sectors. Key changes included:

- articulating municipal government ownership over local electricity utilities, formerly known as municipal electric utilities (MEUs);
- commercializing Hydro One and local electricity distributors (LDCs)
- facilitating greater efficiencies in the local electricity distribution sector.

Local electricity distributors were restricted to monopoly wires activities and required to “unbundle” (separate) competitive activities, the latter to be performed by affiliates or independent electricity retailers.

In hindsight, Ontario's efforts to quickly implement both a wholesale and retail competitive marketplace may have been overly ambitious, as serious difficulties were encountered.

The changes envisioned were far reaching, particularly from the perspective of adapting or building entirely new institutional structures. Shortly after market opening in 2002, increased demand combined with tight electricity supply resulted in sudden spikes in electricity prices. This prompted a decision to impose a freeze on electricity rates, including distribution rates paid by businesses and residential customers. The fledgling electricity retailing sector also required tighter regulation to protect the public interest from undesired marketing behavior.

It clearly proved challenging to try to impose a competitive market framework on an industry that had long been a monopoly in Ontario. There was also insufficient time given for the industry to adjust to a different market structure and allow for a fuller development of regulatory tools to help foster competitive outcomes and adequately protect consumers.

Taking Action

The current government is taking action to promote a healthier and more sustainable electricity sector.

In December 2003 the government passed the *Ontario Energy Board Amendment Act (Electricity Pricing), 2003* (tabled as Bill 4) which provided a responsible, sustainable approach to electricity pricing that better reflected the true cost of electricity, ending subsidies of electricity prices. This gave the OEB responsibility to determine, no later than May 1, 2005, the commodity price for electricity payable by low-volume customers in Ontario. This legislation restored much of the OEB's role in setting and approving electricity distribution and transmission rates, easing requirements for ministerial approval prior to the regulator being allowed to proceed with transmission rate applications.

In December 2004, the government passed the *Electricity Restructuring Act, 2004* (tabled as Bill 100). As the provisions of this legislation are proclaimed into force, they will amend the *Electricity Act, 1998* and the *Ontario Energy Board Act, 1998* to create the Ontario Power Authority ("OPA") and institute the government's policy of a hybrid electricity market. This legislation takes a balanced approach to energy policy by combining features of a regulated industry with those of a competitive electricity sector. This will include regulated prices for electricity from major nuclear and baseload hydro generation assets; non-utility-generators (NUGs) and contracted generation; and a wholesale market for all other generation. This combination of pricing mechanisms will result in a blended cost for consumers.

This legislation is intended to encourage and foster a culture of conservation in Ontario, as a means to address the tight supplies arising from Ontario's growing economy and the need to replace older nuclear and coal-fired generation assets. It will also strike a balance between the need for private investment in supply, and the need to protect consumers from large fluctuations in their electricity bills.

In short, to reflect the true cost of generating electricity in Ontario, this legislation addresses issues associated with ensuring adequacy of supply, promotes conservation, and sets electricity prices at more realistic levels.

Addressing Transmission and Distribution Issues

The next step is to address how the distribution and transmission sectors fit into the government's overall vision for Ontario's electricity industry. In his speech to the Empire Club in April 2004, Energy Minister Dwight Duncan confirmed that the government would address transmission and distribution issues beginning in the fall.

The Minister noted, "Without a thorough examination of the network side of our electricity infrastructure, it will be impossible to bring about the changes needed to develop a safe, secure supply for Ontarians."

This paper identifies and describes some of the key challenges facing the electricity wires sector, as it adapts to support the government's new energy policies and priorities. It also poses questions for public consultation that might help guide the government in developing a policy framework for the distribution and transmission sectors.

The intent of this consultation process is to look forward and to provide industry stakeholders and all Ontarians the opportunity to provide input into how the distribution and transmission sectors can help facilitate the development of Ontario's electricity sector.

In the next few years, significant changes in Ontario's electricity sector will include:

- less reliance on large-scale generation and more on smaller-scale, renewable, and distributed generation (the location of a generation facility at or very near a customer load);
- a culture of energy conservation and demand-side management;
- implementation and promotion of new technologies to support newer and cleaner generation, electricity storage, and more efficient transmission and distribution systems.

Clearly, the distribution and transmission sectors will play a key role in helping to support these changes. This government looks forward to initiating consultations on these issues with all interested stakeholders and Ontarians.

Context

Ontario's Electricity Wires Network

Ontario's electricity wires network is an integrated system of high-voltage transmission lines and distribution lines that delivers electricity from generation stations to customers. Because of Ontario's vast geographic size, our electricity system requires different types of high-voltage lines to deliver electricity safely, reliably and economically to customers.

High-voltage transmission lines, which carry electricity at voltages above 50 kilovolts (kV), (typically at 115 kV, 230 kV and 500 kV), are required to move electricity over long distances from generating stations to load or population centers to ensure minimal power losses. Once the electricity nears a distribution point, voltage is reduced at a transformer station to allow its distribution over distribution lines (voltages under 50 kV) for local distribution to customers.

Electricity Transmission

Ontario's high-voltage grid comprises over 29,000 kilometres of transmission lines and is one of the largest in North America. Hydro One accounts for 97 per cent of the province's high-voltage transmission network. Two hundred and seventy-four transmission and switching stations support Hydro One's massive transmission network.

Hydro One serves 92 distribution companies, 113 large industrial customers, and 174 generators, including 78 generating stations owned by Ontario Power Generation. There are also five other transmitters: Great Lakes Power Limited; Canadian Niagara Power Inc. (CNP); Niagara West Transformation Corporation; Five Nations Energy Inc.; and Cat Lake Power Utility Ltd.

The IMO directs grid operations to ensure reliable supply. This direction extends to all owners of transmission assets. The OEB establishes uniform wholesale rates for the transmission services provided by these companies.

Electricity Distribution

Electricity is delivered in Ontario through a network of over 90 municipally and privately owned distributors (LDCs), and Hydro One. There are approximately 4.4 million distribution customers in Ontario. The largest distributor is Hydro One, which serves about one-quarter of all distribution customers in Ontario.

The LDCs and Hydro One differ in customer density, size of customer base, geographical spread and financial base. The size distribution of distributors is skewed, with Ontario's LDCs tending to be either very large or very small. As an illustration, the ten largest distributors in Ontario, including Hydro One and several large urban LDCs, serve nearly two-thirds of all customers, while the smallest 42 LDCs serve fewer than 10,000 customers each.

Electricity distribution in Ontario involves several distinct functions and activities, including:

- distribution wires and infrastructure (building lines, repair and maintenance, tree trimming/removal);
- customer care management (power connection, account administration, billing services);
- meter and relay services (meter installation, testing and repair; meter reading, records and inventory management; meter accreditation facilities).

As Ontario's electricity sector evolves and fosters greater conservation, electricity distribution will increasingly function as a delivery mechanism for demand-side management and technological innovation to better manage and conserve load.

Recent Developments

There have been significant developments in the electricity distribution sector since 1998. These have included legislative changes, new institutional arrangements, and consolidation activity.

Ontario's distribution sector in the mid-1990s was highly fragmented, with 308 separate LDCs. At the time, a number of distributors saw potential opportunities for economies of scale and efficiency gains from strategic mergers and acquisitions. In the public policy domain, there was recognition of the need for distribution sector restructuring. Both the Macdonald Committee Report "A Framework for Competition" (1996) and the Ontario government's White Paper "Direction for Change: Charting a Course for Competitive Electricity and Jobs in Ontario" (1997) identified this need.

On the legislative front, the *Energy Competition Act, 1998* (ECA) made fundamental changes in the structure and operation of local distribution companies (LDCs). LDCs received clear business mandates and underwent reorganization as entities subject to the *Ontario Business Corporations Act* (OBCA). With clarification of municipal ownership of their local electrical utility, municipalities became the shareholder of their LDC.

This change in ownership and new commercial mandate also provided greater financial flexibility to distributors in how they could raise funds and structure their capital (debt/equity). Prior to OBCA reorganization, local distributors held virtually no debt. After restructuring, many LDCs assumed a more commercial debt-to-equity balance in their capital structures, often issuing debt to their municipal owners.

The second major development was regulatory reporting, processing, and requirements. Regulatory responsibility for the LDCs was transferred from the former Ontario Hydro to the expanded OEB. This resulted in a more formalized working relationship between regulator and regulated entity, and the development of codes and licence requirements to govern the activities of distributors.

These two elements induced important behavioral changes in the way LDCs and their new shareholders conducted business. LDC shareholders, mainly municipal governments, had flexibility to make decisions about how they maximized the return from their LDC assets. Shareholders placed greater demands on the LDCs to deliver a return on their investment. In addition, LDC shareholders saw the opportunity to seek out merger and amalgamation opportunities.

Subsequent to the passage of the ECA, provincial tax policy was designed to encourage rationalization activity by providing a temporary two-year exemption in the transfer tax for electricity distribution utilities sold to other municipal utilities, or to Hydro One. Moreover, a number of LDCs were required to merge as a result of imposed municipal amalgamation during the late-1990s.

As a consequence of these policies, many LDC shareholders proceeded to sell their holdings, or amalgamate with other LDCs. Between 1998 and 2003 there was rapid consolidation in Ontario's distribution sector, with the number of LDCs (excluding private) falling from over 300 to 95. Hydro One took an active role in facilitating this consolidation wave with the acquisition of 90 LDCs. This accounted for nearly half of the entire consolidation activity.

In 2002, however, consolidation activity stalled with the expiry of the temporary tax exemption, and uncertainty over future directions for the sector. In 2003 this exemption, again applicable only to publicly owned utilities, was reintroduced for another two years through to March 28, 2005. Since its reintroduction, the only significant activity in the publicly owned LDC sector has been the amalgamation earlier this year of three York Region LDCs into PowerStream Inc., and the recently announced merger of Hamilton Hydro and St. Catharines Hydro.

It might be noted there has also been non-tax exemption-related acquisition activity of small, private distribution companies by FortisOntario, including the remaining 50 per cent of privately owned Canadian Niagara Power Company and Cornwall Electric in 2002, and Granite Power Corporation (since renamed Eastern Ontario Power) in 2003. Today there are over 90 LDCs in Ontario.

Recent indications suggest that some LDC shareholders are exploring options to sell their electricity distributors prior to the March 2005 deadline. For example, Haldimand County Council recently announced it would seek proposals to sell the assets or shares of its local LDC, Haldimand County Hydro.

Since 1998, LDCs have reorganized and restructured the way they do business as another means of maximizing return for their shareholders. A number of LDCs have established service affiliates or contracted out to unaffiliated third parties to deliver many services and functions which, previous to 1998, were delivered internally by local distributors.

Some of these service contracts have resulted in the LDC acting more like a holding company and retaining only a handful of employees, while the service affiliate becomes in essence the distributor. LDCs have also looked at how they might streamline their operations on a functional basis as a means of achieving greater efficiency and productivity.

Outsourcing is creating the potential for licensing and ratemaking challenges for the regulator. The original requirement to separate competitive activities from the monopoly wires business has been overtaken by marketplace and shareholder pressures. This has resulted in the transfer of some or many of the traditional functions and activities of the monopoly wires business into a service affiliate, thus distancing it from regulatory purview.

From a practical perspective, this means that to determine rates for LDCs, the regulator must assess whether costs contained in service agreements between distributors and affiliates or third parties are incurred prudently.

The Challenges

1. Furthering Efficiencies in Distribution

Today, Ontario's distribution system includes over 90 LDCs. Of these, more than 40 have fewer than 10,000 customers. However, as noted, the number of LDCs has declined significantly over the past five years, by nearly two-thirds, under a policy framework encouraging a voluntary approach to consolidation.

In moving forward, the government recognizes the differing views on the most appropriate next steps towards encouraging further efficiencies in the sector. Some stakeholders are advocating further efficiencies within the distribution sector. Some examples include:

- promoting more efficient system planning and investment;
- eliminating wasteful overlap and duplication of distribution assets;
- improving regulatory efficiency.

Others suggest opening more distribution system functions, currently undertaken by distributors or their affiliates, to greater competition.

The government seeks advice about the most practical way to allow the industry to gain further efficiencies that may be available through continuous improvements, and creative approaches to pooling of assets, activities, functions, and interests. Current government policy supports a voluntary approach to consolidation and functional efficiencies, preferring not to impose top-down solutions on the sector.

Issues Associated with Consolidation

The government is cognizant that the OEB held consultations earlier this year on distribution sector efficiencies and reviewed issues associated with consolidation. The OEB's summary report noted that consolidation provides the opportunity to realize significant efficiency gains in organizational structure; human resources; engineering functions; resource and cost management; simplification of service delivery; and financial flexibility.

Some examples of specific areas where consolidations can provide efficiency benefits include:

- system integration (combining or centralizing existing accounting offices, administrative systems, billing systems);

- streamlining administrative functions such as payroll, human resources, real estate management and other administrative functions, or contracting out to a separate service provider;
- savings through elimination of redundancies and overlaps;
- reduced fixed overhead costs and improved variable cost management;
- improved distribution system planning;
- increased investment in capital-intensive technology;
- improved customer service through better call center support.

However, recent experience suggests a number of potential drawbacks associated with LDC consolidations in Ontario.

- Amalgamations may not be required to achieve efficiencies. The same benefits may also be available to coalitions, cooperatives, associations and other groups of distributors where ownership changes may not be necessary.
- In the view of some stakeholders, it has been more difficult to obtain benefits from consolidation in remote areas, as the distance between LDCs tends to limit potential operational economies.
- LDC consolidation may be counterproductive from a cost perspective; for example, where employee wages migrate to the highest level.

Another important issue within the context of the discussion on consolidation concerns the optimal size of distributors.

At the OEB's consultations, some smaller LDCs indicated the benefits of being small, arguing that large companies are more difficult to control and tend to be less responsive to customers. They noted that small LDCs can avoid amalgamation costs and achieve same-scale benefits as amalgamated entities through associations, partnerships, and industry groups. Moreover, a smaller LDC may be able to implement change more easily than a larger organization. They also pointed out that some larger LDCs in Ontario have higher costs per customer than many of the smaller LDCs.

In assessing whether consolidation can help drive further efficiencies, it was pointed out during the OEB's recent consultations that no empirical evidence exists regarding the efficiencies gained from the recent consolidation experience in the Ontario distribution sector. Rather, the efficiency merits of consolidation appear to depend more on the particulars of the individual situation, and management skill in driving efficiencies post-amalgamation.

In developing policies for furthering distribution sector efficiencies, the government recognizes there are different viewpoints as to the merits of encouraging further structural consolidation as part of an overall strategy. There are clearly different views as to whether further consolidation will create economies of scale, cost savings, and improved service for customers.

Some argue there may be economies derived from amalgamations of bordering or contiguous LDCs, thus eliminating overlap and duplicative distribution assets. Others argue that amalgamating already large LDCs generates few, if any, incremental efficiencies.

Moreover, there are those who would argue there is scope for encouraging the development of new embedded distribution systems, such as for new condominium developments, within existing service territories. In the longer term, this could potentially result in the creation of more electricity distributors in Ontario.

The government notes the Board's February 27, 2004 decision regarding the amendment of licensed service areas, in particular the finding that applications for new embedded distribution systems are not generally in the public interest, as they may be economically inefficient. This finding, however, did not directly address the issue of distribution systems entirely embedded in private property, such as condominiums or commercial buildings.

Until now, the government's preferred approach has been to encourage voluntary consolidation, allowing the owners of distribution assets to make a purely business decision as to whether it makes sense to merge with another entity. This approach has worked well in Ontario. In going forward, the government recognizes that this remains an important issue for the industry. Indeed, many stakeholders continue to share the view that any policy towards consolidation should remain based on a voluntary approach.

The government also recognizes that business decisions as to investment in Ontario's distribution sector or consolidation of assets are more easily undertaken in the context of a stable policy and regulatory climate. There have been many changes in recent years in the electricity sector, and this government is strongly committed to a stable and positive investment climate. There are opportunities for investment in new infrastructure and emerging technologies that will enhance the efficiency of Ontario's distribution and transmission sectors.

Seeking Efficiencies

While consolidation activity has provided benefits to the sector, the government recognizes that distribution sector efficiency encompasses more than rationalization through consolidation or simply reducing costs. In recent years, Ontario's LDCs have pursued innovative ways to achieve greater efficiencies in their operations, and the government is supportive of these efforts.

Ontario's distribution sector must continue to seek innovative and cost-effective ways to deliver traditional distribution services, and new services that will be required to fulfill its role in implementing important priorities of conservation and demand-side management. LDCs will need to seek greater efficiencies in planning and designing their systems in order to reflect the growth in distributed and renewable generation. They will also require new technologies to more efficiently distribute electricity through their distribution networks.

The government is cognizant that the OEB examined the issue of furthering efficiencies in the distribution sector, beyond pursuing the route of consolidation. Industry stakeholders affirmed that key objectives of LDC management include implementing efficiency measures and undertaking continuous improvements.

Examples where LDCs have achieved efficiencies, without adversely affecting quality of customer service include:

- administration system integration (e.g. billing systems, call centers);
- sharing services or equipment with other distributors or with municipal owners (e.g. meter reading, asset management and services);
- integrated load forecasting and planning for system expansion;
- contracting out services (e.g., billing, meter reading, IT processing, tree trimming);
- formation of alliances, informal cooperatives and partnerships with other distributors or industry players for achieving economies of scale for procuring services, and training or sharing of ideas;
- amalgamation or creation of joint ventures that benefit from economies of scale;
- sharing of ideas and processes on how to increase overall performance and efficiency.

One important challenge facing the distribution sector is the lack of formal measurement of efficiency gains in the sector.

Stakeholders have suggested that the regulator should determine areas where efficiencies and inefficiencies exist and develop benchmarks, efficiency targets, and performance measures. In response, the OEB is exploring this issue through a variety of its ongoing processes, including preparations for 2006 distribution rates. There is also the issue of how LDCs might best be incented to achieve further efficiencies. The regulator is undertaking rate rebasing and cost allocation exercises, which are expected to serve as building blocks towards development of incentive-based regulation for Ontario's distribution sector.

The government recognizes that implementing such a regime in Ontario may be beneficial in helping to drive further distribution sector efficiencies, and promote a culture of continuous improvement. Incentive-based regulation would also help electricity sector investors and the regulator to more accurately assess and compare LDC performance across Ontario, helping to enhance regulation and promote investment in Ontario's distribution sector.

Opportunities for Functional Unbundling

When the ECA was passed in 1998, LDCs were revamped to deliver traditional monopoly wires services, while competitive activities, such as electricity retailing, would be undertaken by separate entities. Over the past six years, the wires business has evolved and many LDCs are no longer themselves delivering the full suite of traditional wires services, having opted instead to enter into service relationships with competitive affiliates and third parties.

Many LDCs function as wires service managers, or holding companies, that oversee service contracts with affiliates and third parties to actually carry out and deliver distribution services. For example, billing services have become a centralized function in Ontario, with most LDCs opting to farm out this function to billing system specialists. This has helped achieve activity or functionally based economies of scale, even though in name there are still more than 90 LDCs in Ontario.

Driven by new technologies and more sophisticated business practices and approaches to service delivery, the distribution sector continues to evolve. Given the success of some LDCs in achieving operational efficiencies by outsourcing certain of their functions, there may be new opportunities to further unbundle specific LDC functions and provide them competitively and not exclusively on a monopoly basis. For example, some customer care activities, such as account management and new connections, may be amenable to smarter business practices and increased competitive choices.

An important going-forward issue for the distribution sector is the need to further pursue opportunities for efficiency gains from a functional perspective. As noted above, LDC activities include investing and maintaining wires; customer care management; and billing technology (including metering services). Clearly, creative approaches to LDC metering function management will be explored as the province moves to a smart meter environment.

Further functional unbundling may pose regulatory challenges, however. As experience in the natural gas sector suggests, it may be more challenging to regulate a sector where previously combined functions are unbundled and carried out by a mix of incumbent providers, affiliates, third parties, and niche service providers.

Questions for Consultation

The issues and challenges identified in these sections need innovative solutions. A key consideration for government is how to encourage efficiency gains in distribution. To provide a framework to address issues of distribution sector efficiencies, the government is posing the following questions, which might serve as the basis for consultation and discussion with stakeholders:

1. Are there specific policy, legislative or regulatory barriers that impede potential efficiency gains?
2. Is there a role for greater regulatory incentive, for example, in the rate structure, to encourage LDCs to seek greater efficiencies in their operation? How might this best be implemented?
3. What are some of the implementation and operational challenges associated with geographic or functional consolidation? How could these challenges be overcome?
4. What scope may be available to encourage asset swaps and creative pooling arrangements between or among distributors to simplify the overall configuration of the distribution sector?
5. What specific functions currently carried out on a monopoly basis by distributors may be amenable to increased (or at least some partial form of) competition? What sorts of structures may be required to facilitate further functional unbundling?

2. Distributed Generation

Overview

As coal-fired electricity generation facilities are replaced and older nuclear facilities decommissioned, there will be a need to develop safe, reliable and environmentally sustainable replacement generation. It is expected that the emerging resource mix will include natural gas turbines, hydro, and other emerging clean and renewable technologies.

Some technologies provide the opportunity to locate a generation facility at or very near the customer load, thereby supplying power to the local distribution network directly or through lower-voltage transmission lines. As noted earlier, this is commonly referred to as “distributed generation.”

In Ontario, specific technologies that might be utilized include gas turbines, solar and fuel cells, biomass and, in some circumstances, micro hydro and windmills. Given their flexibility, distributed generation technologies are already a factor in a number of electricity markets (e.g. California, Netherlands, Germany), particularly for high-reliability applications, as a source of emergency capacity, or to defer the expansion of a local network.

The government recognizes that the development of a diversified, clean and renewable energy portfolio in Ontario lends itself to the development of distributed generation facilities. In his April 15, 2004 speech to the Empire Club, Energy Minister Dwight Duncan acknowledged the potential for distributed generation projects:

“Distributed generation, which is also attractive from a security perspective, holds significant promise for the environment, as it suggests an electricity system that minimizes massive transmission networks, and focuses resources only where they are absolutely necessary. Our desire is to help Ontarians unlock the potential for efficient electricity generation that is around them, and we will remove barriers, free up resources and bring new thinking and new ideas to the challenges that lie before us.”

Benefits

Distributed generation has important implications for the distribution and transmission network. Critically, distributed generation may add value to a power system by:

- delaying or avoiding the need for capital expenditures to upgrade a congested transmission or distribution network;
- offering local solutions to transmission constraints;

- reducing distribution and transmission system losses;
- improving the transmission and transformation system's load factor;
- increasing reliability at the LDC level;
- providing support or ancillary services to the local distribution network.

Distributed generation can provide some economic advantages to consumers. On-site power production may help offset transmission and distribution costs that can otherwise account for between 20 to 30 per cent of the cost of delivered electricity. Alternatively, however, the value of avoided transmission costs could be captured by the generator, rather than the consumer. Distributed generation may also be better positioned to use low-cost fuels, such as landfill gas.

As compared to larger central plants, distributed generation has the potential to respond to new supply needs in a shorter time frame. It may also:

- help reduce peak electricity prices and transmission charges;
- provide less financial, development, construction and operating risk for ratepayers because of smaller increments of investment;
- make more efficient use of fuel, particularly in cases where a facility produces both electricity and heat for industrial use or heating, ventilation and air conditioning uses in neighbouring communities.

Distributed generation is not without challenges, however, including:

- efficiency of fuel use in smaller conventional gas-burning facilities may not compare favourably to large plants;
- if not located carefully, distributed generation could worsen transmission load factors; and
- the location of many natural sources of distributed generation (e.g. landfill gas, wind, tidal, geothermal) may not be located near loads, limiting the possibility of avoiding transmission.

Barriers

In Ontario, however, there are a number of barriers to the development and growth of distributed generation.

Economic Barriers: Embedded legal, consultancy, and regulatory costs associated with developing a new distributed generation project may act as barriers to entry. The various approval processes required prior to establishing a generating facility in Ontario are often very time-consuming. Although these costs are similar for all new generation projects, the relative economic burden placed on small distributed generation entrants with fewer resources may be greater than that of a larger, well-established electricity producer.

Another economic barrier is that the per-unit cost of power generated from some distributed generation technologies is usually higher than that from the grid, which typically sources its power from lower-cost hydro, nuclear, and fossil fuel power. This is partially due to the fact that distributed generation has been closely associated with renewable generation technologies such as solar and wind, which tend to be more costly than traditional generation sources.

System Planning Issues: The distribution system was originally designed to receive electricity through a long distance transmission system and may now require some reconfiguration to facilitate the growth and expected investments in distributed generation.

Connection Barriers and Regulatory Issues: Distributed generation systems wishing to connect to the distribution system may have to address significant questions relating to assessment fees and upgrade costs which are not clearly set. The regulatory environment could play an active role in identifying and eliminating barriers and promoting investments in distributed generation.

For example, the regulator has indicated that it would consider making additional amendments to the Distribution System Code to address outstanding issues such as standardization of contracts beyond those pertaining to micro generation projects, ownership of high-voltage disconnection equipment, and liability-related issues. The OEB is considering the issue of how connection costs will be shared through the distribution system, particularly as distributed generation becomes more common.

Benefit sharing is another regulatory issue. Proponents of distributed generation are of the view that they should share in any potential benefits arising from load reductions as a result of their investment. On the other hand, others believe the benefit sharing approach offers an incentive to distributed generation that may result in customers paying a higher regulated tariff. It may also encourage the location of generation in areas that result in increased transmission congestion. The regulator is currently considering the issue of allowing distributed generators to share the benefits accruing as a result of their generation.

The Industry Task Force on Distributed Generation (DG Task Force) and The Association of Power Producers of Ontario (APPRO) have also identified some of these barriers. While stakeholders recognize that not all of these issues can be resolved in a single forum, they view the current 2006 rate rebasing exercise by the OEB as an opportunity to address some of these issues.

While many challenges still exist for distributed generation, work is underway to remove some of the barriers facing distributed generation. In response to a government directive to address new generation, the regulator has amended the Distribution System Code, introducing standard processes and technical requirements for the connection of new generation to the distribution system. The OEB has also introduced a Micro-Embedded Load Displacement Generation Connection Agreement as a standard contract agreement for connection of all micro generation (under 10 kW), and for a customer's own use to the distribution system.

However, the government recognizes the need for continued work, particularly in the regulatory domain, to facilitate the development of distributed generation. The government is committed to ensuring the expedient construction, start-up and operation of new clean and renewable generation sources.

Questions for Consultation

1. What are some key concerns, particularly for distributors and transmitters, arising from the emergence of, and expected increased reliance on, distributed generation in Ontario?
2. Are there any specific legislative, regulatory or institutional gaps or inconsistencies that might need to be addressed in order to facilitate distributed generation?
3. In light of increased deployment of distributed generation, are there longer-term strategies necessary to ensure safety and reliability, and efficient system planning?

3. Transmission Issues

A robust transmission system is a key element in the development of a well-functioning wholesale market. It is important that the transmission network is able to address the needs created by a more diversified supply portfolio, including clean renewable and distributed generation technologies, and on the possibility of increases in imported power from other jurisdictions, particularly in Canada.

Some of the emerging challenges include the need for new investment to service new supply; congestion; and the need to simplify the planning and approvals process.

Investment in Transmission

Ontario's transmission system is under stress because expansion of the transmission system has not kept pace with growing electricity demand, population growth and anticipated changes in the supply mix and generation technologies. There is a need to build and invest in new transmission networks. As Ontario phases out or retires existing coal facilities and depends on smaller-scale replacement generation, there will be increased pressure to make investments to:

- reconfigure transmission to service these smaller-scale new generation technologies;
- construct transmission connections with neighbouring jurisdictions;
- enhance and improve grid connections between northwestern Ontario and urban areas in southern Ontario.

The new Ontario Power Authority (OPA) will determine the need for new transmission investment requirements. It is expected that the owner of most of the grid, Hydro One, will play a major role in ensuring that new transmission lines are built.

Congestion

There is also a need to address congestion pressures on some segments of the transmission network in parts of southern Ontario. One of the alternatives is to invest in new transmission assets to serve rapidly growing service areas in the Greater Toronto Area (GTA), and to protect system stability and reliability following closure of coal generating facilities and reconfiguration of where power is generated in Ontario.

The Market Surveillance Panel has indicated concerns that these constraints are resulting in significant congestion payments, potentially hindering market efficiency, and limiting competition. The Market Surveillance Panel has identified there is:

- a lack of information to trigger new transmission investment;
- a need for clarification of the planning process and the role of the major players;
- a need to determine accountability for assessing and comparing the costs and benefits of new transmission projects that are geared to reducing congestion.

Planning and Approvals

Federal, provincial and local governments and agencies have a role in the planning and approvals for new transmission projects; therefore there is a need to ensure that the entire process is streamlined, coordinated and there is minimal duplication of effort.

Uncertain regulatory, siting, and approvals processes can be major barriers to investment in new transmission facilities. Federal, provincial and local governments, competing local interest groups, and First Nations are demanding an increased role in the planning and decision-making process. These factors can increase the complexity of the planning process making it increasingly difficult to build new transmission facilities, but ultimately may result in transmission projects that are more acceptable to local stakeholders.

Ontario's transmission companies, the OPA, the Independent Electricity System Operator (IESO), and individual municipalities all have planning roles. The OEB and, potentially, the National Energy Board (NEB) also have roles in plan approvals, and approvals of specific projects to implement those plans. There is also growing jurisprudence pointing to a role for First Nations who may be affected by transmission facilities.

Plans and projects may be also subject to approval under the Canadian Environmental Assessment Act. Ontario has recently entered into an agreement with the federal government to conduct co-operative Environmental Assessments. The Agreement establishes mechanisms, including the opportunity for joint review panels where necessary and appropriate, to guide federal-provincial co-operation where federal and provincial environmental assessment legislation applies to the same project.

With the passage of Bill 100, the OPA will be established as the single entity in Ontario with a clear and express mandate, in the context of developing its Integrated Power System Plan, for assessing power system needs, examining alternatives for meeting those needs, and identifying specific transmission solutions where they are most appropriate. The OEB will conduct a full and transparent review of the Plan to ensure it is economically prudent and cost effective.

Clearly, Bill 100 breaks significant ground towards clarifying and rationalizing transmission planning and approvals at the provincial level. This will help to eliminate unnecessary regulatory costs that result from current overlap and duplication. It is, however, only a first step. Individual transmission initiatives that continue to require approvals on a project-by-project basis also face the potential for duplication and unnecessary costs.

Ontario has already taken steps to streamline the project planning process under the *Environmental Assessment Act* for certain classes of transmission project. The Electricity Projects Regulation (O.Reg. 116/01) made under the *Environmental Assessment Act* specifies which transmission projects are not subject to Environmental Assessment requirements; which projects are subject to an Environmental Screening or Hydro One's Class Environmental Assessment for Minor Transmission Facilities (currently being revised and updated); and, which projects will be subject to an individual Environmental Assessment.

Under the *Environmental Assessment Act*, a proponent of a transmission project that requires an individual Environmental Assessment must establish the need for the undertaking, and consider alternatives to the undertaking. The definition of environment in the *Environmental Assessment Act* is broad and includes the socio-economic impact of an undertaking in addition to the natural environment impacts (air, land and water).

The individual Environmental Assessment process allows a proponent to submit a Terms of Reference to the Minister of the Environment for approval that could identify a direction from the OEB and the OPA as justification of the need for a proposal and for the choice of transmission solution over other methods of meeting electricity customer requirements. In making a decision to approve the Terms of Reference, the Minister of the Environment would need to be satisfied that the OPA, for example, had considered environmental sustainability and environmental protection when preparing its Integrated Power System Plan and deciding that transmission was an appropriate option for meeting particular electricity requirements.

The recognition within the Environmental Assessment process of prior approvals by the OPA and the OEB should be an important next step. It is therefore critical that environmental sustainability and environmental protection are factored into OPA planning for the Integrated Power System Plan.

The IESO's connection assessment process examines transmission proposals to determine the impact on the reliability of the IESO-controlled grid, and provides approval of the proposed facility under the Market Rules.

From a public policy perspective, there is an obvious need to ensure a fully coordinated and harmonized planning and approvals processes to increase efficiency, to ensure timely decisions and implementation of those decisions and to minimize costs for electricity customers.

Questions for Consultation

1. Once an Integrated Power System Plan has been approved by the OEB, what opportunities exist to further streamline subsequent approvals?
2. Should the OEB's decision on leave to construct explicitly authorize cost recovery through rates by avoiding/incorporating the need for Section 78 approval?
3. Should transmission companies be provided with financial incentives to encourage investment?

Could this be achieved by a new pricing regime that provides higher rates of return for new investment; rates based on levelized cost of capital recovery; or, a non-traditional depreciation schedule for new investment?

Could this be achieved through the concept of "franchise areas" and requirements to construct needed facilities within those areas? Are there other solutions?

4. What opportunities exist for harmonizing approvals between different levels of government?
5. With reference to any other transmission issues, are there specific legislative, regulatory or institutional gaps that might need to be addressed? If so, how best might these be addressed?

Process for Consultation

The government is seeking comments on this paper from interested stakeholders. Anyone wishing to provide comments or file a submission may do so electronically as per instructions provided on the Ministry's website at: www.energy.gov.on.ca

Those wishing to send written comments may do so by mail to:

Ministry of Energy
900 Bay Street
Hearst Block, 4th Floor
Toronto ON M7A 2E1

Only comments/submissions filed electronically will automatically be posted on the Ministry's website. Posting of written submissions may not be made available on the website due to practical constraints.

All comments must be received by 4:30 p.m. on February 28, 2005.

Comments should refer specifically to "Electricity Transmission and Distribution in Ontario – A look Ahead", and should also indicate the name of the commenting stakeholder(s), the party which they represent, and their contact information (address, e-mail address, fax number, etc.).

Any questions relating to this consultation may be directed to the Ministry's help line toll free 1-888-668-4636 or to the Ministry's e-mail address at: write2us@energy.gov.on.ca

Conclusion

This paper is intended to serve as a framework for consultations on the future of Ontario's distribution and transmission sectors. The focus is on:

- developing creative solutions and approaches to achieve greater efficiencies in the wires sector;
- improving the quality of service for consumers;
- minimizing regulatory barriers to promote investment in new generation and transmission facilities;
- fostering a culture of conservation and demand-side management.

This paper has reviewed issues associated with distribution sector efficiencies, the development of distributed generation and transmission planning and investment. Questions have been posed on each issue to help guide consultations, and encourage interested stakeholders to provide input and practical suggestions on steps that can and should be taken to support the future development of Ontario's distribution and transmission sectors as they assume new roles and responsibilities in helping to rebuild our electricity sector.

This government is committed to open and inclusive consultation. We want to ensure that Ontarians will have the opportunity to comment and provide input on developing approaches for guiding the future development and enhancing the efficiency of Ontario's transmission and distribution sectors.

The distribution and transmission sectors have an important role to play in helping deliver the government's vision for the electricity sector. In particular, LDCs can be agents of change at the local level to promote conservation, the introduction of new energy-efficient technologies, and to support the development of distributed generation. LDCs are extremely well-placed to advance the government's priorities in the communities they serve. Ontarians will need all their expertise, ingenuity and leadership to help promote investment in the electricity sector, to use renewable energy, and to build a conservation culture.