

**Ontario Energy  
Board**  
P.O. Box 2319  
2300 Yonge Street  
26th Floor  
Toronto, ON M4P 1E4  
Telephone: (416)481-1967  
Facsimile: (416)4407656

**Commission de l'Énergie de  
l'Ontario**  
C.P. 2319  
2300, Rue Yonge  
26e étage  
Toronto, ON M4P 1E4  
Téléphone: (416)481-1967  
Télécopieur: (416)4407656



Ontario Energy Board Staff Discussion Paper

## **Review of Further Efficiencies in the Electricity Distribution Sector**

**February 10, 2004**

## Table of Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Background .....</b>	<b>2</b>
2.1 Historical Development .....	2
2.2 Current State.....	4
<b>3. Conceptual Framework.....</b>	<b>6</b>
3.1 Types of Efficiency Factors.....	6
3.2 Consumer Benefits: Economic, Service and Other Benefits.....	11
3.3 Barriers and Incentives to Enhancing Efficiency .....	12
<b>4. Experience Elsewhere .....</b>	<b>13</b>
4.1 Great Britain .....	13
4.2 Australia .....	14
4.3 Switzerland.....	14
4.4 South Africa.....	15
<b>5. Policy Objectives and Evaluation Criteria .....</b>	<b>17</b>
<b>6. Option to Consider and Issues for Discussion .....</b>	<b>19</b>
6.1 Further Consolidation.....	19
6.2 Efficiency Incentives (PBR).....	20
6.3 Load Serving Entities .....	21
6.4 Distribution System Planning .....	22
6.5 Technological Innovation .....	23
<b>7. Next Steps.....</b>	<b>24</b>

## 1. Introduction

On January 21, 2004, the Ontario Energy Board issued to stakeholders a notice to review further efficiencies in Ontario's electricity distribution sector. In particular, the Board's objective is to consider if further efficiencies are available, and if so, how to achieve them.

The purpose of this discussion paper is to build on the Board's initial letter and examine the economic, service and other potential benefits that can be gained from achieving further efficiencies in the electricity distribution sector. In addition, the paper identifies approaches available to the Board to drive further efficiencies in the electricity distribution sector.

To assist in preparing oral presentations and written submissions, participants in the consultation process are encouraged to not only comment on issues raised in this paper but also to raise other related issues that may result in further enhancing the efficiency and performance of the electricity distribution sector.

## 2. Background

In the past few years, the Ontario electricity distribution sector has experienced major structural development and other challenges. This section briefly examines the historical development and current state of the sector in regard to structural changes and efficiency. It is intended to provide a historical context to the discussions of future changes and ensure a common understanding of the current position of the industry.

### 2.1 Historical Development

For nearly the entire 20<sup>th</sup> century, Ontario Hydro was the dominant force in Ontario's electricity sector. Through the *Power Corporation Act*, Ontario Hydro regulated and set the rates for both the wholesale and retail markets. Over this period over 300 distributors, which were known as municipal electricity utilities, hydroelectric or public utilities commissions, were formed and provided distribution services within specific geographical boundaries.

The Ontario government's decision to restructure the electricity market was due to a number of factors. The most significant factor was the financial and operational performance of Ontario Hydro over the 10 year period to the mid-1990s. Ontario Hydro's financial performance was in part related to problems with the nuclear generation assets and the related debt that could not be serviced by Ontario Hydro without impacting electricity rates.

Ontario's electricity industry restructuring commenced with the development of two blueprint documents—the 1996 Macdonald Report entitled “Advisory Committee on Competition in Ontario's Electricity System” and the 1997 White Paper entitled “Direction for Change: Charting a Course for Competitive Electricity and Jobs in Ontario”. These documents provided a number of recommendations on the type of reforms that should be implemented. Recommendations that were specific to the distribution sector included:

- the separation of the competitive business from the monopoly business;
- open and non-discriminatory access to the distribution system;
- creation of a cost competitive distribution sector;
- geographic rationalization/amalgamation of the more than 300 distributors and the adoption of “best practice” methods;
- commercialization/corporatization of distributor businesses;

- the requirement to make payments in lieu of taxes (PILs) to retire the stranded debt and create a level playing field; and
- the opportunity to earn a normal rate of return on distributor businesses.

Following the White Paper, the Ontario Government passed the *Energy Competition Act, 1998* (ECA) to govern a widespread restructuring of the electricity industry. The ECA repealed the *Power Corporation Act*, which provided Ontario Hydro with the jurisdiction to set retail electricity rates for distributors, and implemented the *Electricity Act* and *Ontario Energy Board Act* which gave the Ontario Energy Board (OEB) the regulatory oversight for distributors and other market participants.

The ECA required distributors to “corporatize” their businesses by November 7, 2000. This meant distributors had to transfer all of their assets and liabilities into a new entity incorporated under the Ontario *Business Corporations Act*. To operate on a commercial basis, distributors had to create new strategic and business plans, recapitalize their assets and create commercial capital structures. The OEB mandated the commercial capital structure and rate of return on assets for distributors. The ECA also required that municipalities initially be the sole shareholders for the distributor businesses.

As a result of the ECA, distributors and their municipal shareholders had a number of options available to them including, but not limited to:

- retaining and restructuring the business for participation in the new market;
- selling the entire business and its assets;
- acquiring, merging/amalgamating with other distributors;
- entering into a lease agreement; and
- entering into shared services or outsourced arrangements for a portion of their business.

Distributors that chose to retain the electricity distribution businesses and participate in the new market were required to prepare for a competitive market for electricity supply and ensure compliance with the codes, rules and regulations specified by the OEB and the newly created Independent Electricity Market Operator (IMO).

Distributors that were deemed to be exempt from taxation under the *Income Tax Act* were required to ensure compliance with the tax requirements (PILs) specified in the ECA and imposed by the Ministry of Finance.

For distributors that chose to sell, acquire, or merge with another distributor, the *Electricity Act* also imposed a transfer tax of 33% on the fair market

value of the property. Section 94(1) of the *Electricity Act* specified that distributors were subject to a transfer tax on the transfer of real or personal property used in the distribution of electricity.

Distributors that were deemed to be tax-exempt entities (as per the *Income Tax Act*) and the Ontario Hydro successor companies were provided with an exemption to the transfer tax for any transactions that took place prior to November 7, 2000. Exemptions were further extended to include transactions where an application was submitted to the OEB before November 7, 2000 and awaiting approval and transactions where an agreement between the two parties was in writing.

The Ontario distribution sector has undergone significant structural change in recent years. For example, since 1996 the number of distributors has reduced by over 200 through mergers and acquisitions. Hydro One alone acquired 88 distributors. The acquisitions, mergers and amalgamations that occurred during this period were spurred by the transfer tax exemption period referred to above.

## 2.2 Current State

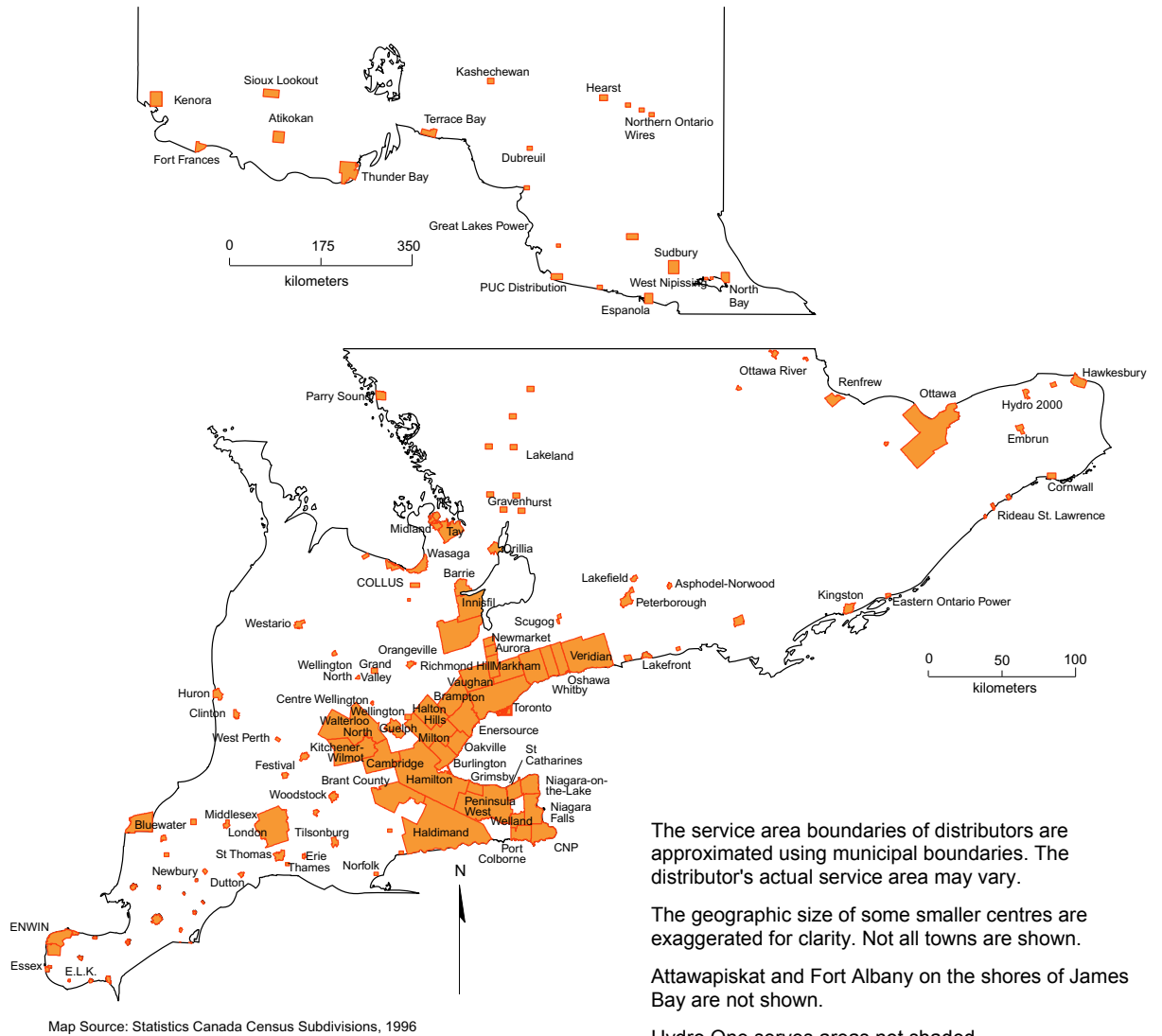
In March 2003 the government has provided another transfer tax exemption period; however, there has not been significant further consolidation in the industry. Other municipal government objectives, existing labour agreements, integration costs, and the impact on asset values of political and regulatory uncertainty within the sector may have hindered further consolidation.

Currently, there are 100 licensed distributors serving Ontario's 4.4 million customers. Of the 100 distributors, four are privately owned, five belong to a First Nations corporation, and Hydro One and Hydro Remote are provincially owned. The balance, 89, are municipal-owned distributors. Outside of the Golden Horseshoe, Hydro One assets cover the majority of Ontario (see Figure 1).

On average these 100 distributors serve approximately 44,000 customers each, and based on preliminary PBR filings, approximately 42 distributors serve fewer than 10,000 customers.

Over the last few years, progress has been made in Ontario in achieving economies of scale through shared services, outsourcing and similar service arrangements. These arrangements have enabled smaller distributors to take advantage of economies of scale through a third party. Ontario distributors have used outsourced bill production, meter reading and mailing services for several years. Wholesale settlement service offerings are another alternative service delivery example.

Figure 1. Approximate service territories of Ontario electricity distributors



Should the government pursue new policy initiatives, the coming years will continue to be a period of transition for the industry. Indications that further evolution of the industry may be expected include the release of the Report of the Electricity Conservation and Supply Task Force on January 14, issues raised in the Board's consultation on demand-side management and demand response, the issues raised in the Board's recent proceeding addressing electricity distributor service area amendments, the IMO's Market Evolution Program and the current review of Ontario Power Generation.

### 3. Conceptual Framework

This section discusses several conceptual issues that participants may wish to consider and address in their comments. The analysis of any policy challenge is driven in large part by the way in which parties view the problem. Participants may therefore wish to comment on the way these conceptual issues are viewed in this paper. Participants are also encouraged to identify further conceptual issues that should be recognized explicitly as policies and mechanisms for identifying and furthering efficiencies in the Ontario electricity distribution sector.

The issues discussed in this section are:

1. the different types of efficiency drivers that may need to be addressed when developing policies and measures for furthering efficiencies;
2. the types of consumer benefits that should be recognized, in addition to cost reductions, in assessing the impacts of policies and measures for furthering efficiency; and
3. the impact that specific barriers, as well as specific incentives, to furthering efficiencies have on policies and measures that may be adopted.

#### 3.1 Types of Efficiency Factors

In examining alternatives for enhancing efficiency in the Ontario electricity distribution sector, it is helpful to distinguish among the following three different types of efficiency.

- Operational efficiency
- Controllable structural efficiency
- Uncontrollable structural efficiency

##### **Operational Efficiency**

Operational efficiency relates to the level of costs incurred by a distributor in providing service to its customers. Operational efficiency can be said to improve if a distributor reduces its costs while providing the same level of service to its customers. Distributors can achieve these improvements in many ways, including:

- working “smarter” so that the same work can be done with fewer resources; and



- contracting out selected activities that can be performed by an external specialist at lower cost than internal resources (which may lack the scale or specialization to perform the same activity as efficiently).

Operational efficiency is a target of efficiency enhancing policies and measures. The goal is to reduce total distribution costs without noticeably affecting the safety and reliability of the distribution system, customer service or any other features of distribution service that are valued by customers.

The challenge is to avoid focusing purely on costs. While easily measured, striving to solely lower costs creates an environment in which important quality aspects of the distribution system are sacrificed. Efficiency involves more than just the level of costs incurred by a distributor.

The easiest way to reduce costs is often to reduce service. If cost reductions are accomplished by eliminating call centre staff, for example, without improving the efficiency of individual customer representatives, then waiting time and customer frustration may increase. Further, if emergency calls are handled more slowly, public safety may be compromised. As this example illustrates an incentive that focuses exclusively on the total costs of distributors can be counter-productive. A cost reduction of \$1 million does not benefit consumers if the savings result in a loss of \$2 million in the value of service due to deterioration in safety, reliability and quality of service. It is recognition of this concern that leads to the inclusion of service quality indicators in most PBR regimes that use cost reductions as a proxy for efficiency gains.

Economic efficiency<sup>1</sup> implies striking a balance between the level of service and distributor cost. Hence, changes in service levels may be consistent with the goal of furthering efficiencies. It is therefore desirable to develop mechanisms that encourage distributors to strive to be responsive to customer perceptions of the trade-off between price and standards of service.

Economic efficiency, in terms of optimally balancing the service level and cost, is complicated by the reality that consumers are not homogenous. Some are more willing to pay a higher price for higher service levels than others. This aspect of efficiency is addressed in competitive markets through choice: consumers are able to choose among a variety of price-quality alternatives in the marketplace. Policies and measures that enhance choice,

---

<sup>1</sup> In the economic literature, operating (or technical) efficiency is one aspect of economic efficiency. Economic efficiency also includes allocational efficiency and dynamic efficiency. The Discussion Paper uses the term operational efficiency to refer to the aspects of economic efficiency that can be enhanced without changing the structure of a distributor or the Ontario distribution industry.

while recognizing the constraints on choice that are inherent in network industries, can result in enhanced market efficiency. For example, it may be possible to address this aspect of efficiency in the distribution sector by developing a variety of price-service offerings.<sup>2</sup>

For these reasons, the assessment of policies and measures in terms of their impact on furthering the efficiency of distributors should consider the impact on service levels and consumer choice, as well as the direct impact on distributor costs.

### **Controllable Structural Efficiency**

A significant issue in most analyses of the efficiency of the electricity distribution sector is the potential for efficiency gains through restructuring (e.g. sharing of services, contracting out and/or consolidation). This issue recognizes that even if every distributor were to exploit every opportunity to improve its operational efficiency, the distribution sector as a whole would not necessarily be operating at minimum cost.

A comprehensive examination of the policies and measures that would result in further efficiencies must include an examination of the structural factors that affect the costs of distributors. In developing policy, it is helpful to distinguish between those structural factors that are controllable and those that are not controllable.

The most obvious example of a structural efficiency factor that is controllable is economies of scale. Empirical studies show that distributors below some minimum efficient scale tend to have higher costs than larger distributors<sup>3</sup>. This empirical observation appears to reflect scale economies in some distribution functions. Of course, the minimum efficient scale may not be the same for all functions that exhibit scale economies. Furthermore, there may be some functions that exhibit scale diseconomies beyond some maximum efficient scale.

The most obvious approach to furthering efficiency through exploiting scale economies is through industry consolidation. Consolidation of distributors in other jurisdictions (also referred to as industry rationalization) has been achieved through both mandatory restructuring<sup>4</sup> and through voluntary

---

<sup>2</sup> See for example, Littlechild, Stephen "Assessment of Price Service Offerings". Evidence prepared for Energex Limited. Available at [http://www.energex.com.au/pdf/about\\_energex/QCA\\_Attach7.pdf](http://www.energex.com.au/pdf/about_energex/QCA_Attach7.pdf).

<sup>3</sup> Yatchew, A. (2000) "Scale Economies in Electricity Distribution: A Semiparametric Analysis," *Journal of Applied Econometrics*, 15: 187-210.

<sup>4</sup> As discussed in section 4, this approach was used in Australia and underway in South Africa.

restructuring. The effectiveness of a voluntary approach will, of course, depend on how effectively the policies and measures establish an environment that both rewards distributors and their owners for furthering efficiency through restructuring, and exposes them to the consequences of failing to exploit opportunities to enhance their structural efficiency.

While the voluntary approach has the disadvantage of allowing distributors to retain an inefficient scale, it has the advantage of allowing them to achieve functional scale economies through a variety of corporate strategies.

- Distributors would be able to determine consolidation partners based on business and management factors such as the compatibility of existing business operations (to minimize the cost of integrating operations and to exploit the potential scale economies), the consistency of the objectives of owners, similarity of service areas, etc. A mandated approach to consolidation in other jurisdictions has focused primarily on geographic considerations.
- Distributors would be able to achieve functional scale (and scope) economies without consolidation through strategies such as establishing alternate service arrangements (e.g., contracting out, collaborating to perform functions with scale economies jointly, etc.). These types of strategies would allow distributors to remain independent, where that is important to the owners, while also enabling the distributors to enhance their structural efficiency.
- In areas where operational contiguity generates efficiency gains, distributors would be able to restructure their operations so as to exploit the opportunities.

### **Uncontrollable Structural Efficiency**

As is noted above, some structural efficiency factors are beyond the control of distributors, their regulators and policymakers. Empirical studies of distribution costs show, for example, that the costs of distributors are determined in part by factors such as:<sup>5</sup>

- **Economies of output density:** Unit cost tends to decline as energy throughput increases, all other things being equal (including size of service area, number of customers, load factor, etc.).

---

<sup>5</sup> For example, see Filippini, Massimo "Are Municipal Electricity Distribution Utilities Natural Monopolies?" *Annals of Public and Cooperative Economics* 69:2 (1998), pp. 157-174.

- **Economies of customer density:** Unit cost tends to decline as the number of customers increases, all other things being equal (including size of service area, load factor, etc.).

These uncontrollable structural efficiency factors give rise to cost differences among distributors. It is unrealistic, however, to expect a distributor with higher costs due to low output density or low customer density to create further efficiency by increasing its output and/or customer density. Certainly a distributor with low customer density could increase its average density, and reduce its average cost per customer, by consolidating with another distributor with higher customer density and lower costs. However, such a merger would not result in improved structural efficiency because total costs would not be lower with the consolidation than without it, unless there are efficiency gains related to factors other than output or customer density.

This observation does not imply that uncontrollable structural efficiency factors can be ignored when developing policies and measures for enhancing efficiency. Failing to recognize inherent cost differences would result not only in inequities, but could also lead to inefficiency. For example, a PBR regime that uses benchmarking across distributors to assess performance could include adjustment factors that recognize uncontrollable structural efficiency differences.

There are many additional factors that conceivably could be identified as uncontrollable cost drivers (e.g., load factor and geography). In developing policies and mechanisms for enhancing efficiency, it will be important to determine which uncontrollable cost drivers are significant enough to justify being explicitly taken into account. For those uncontrollable cost factors that are explicitly recognized, it will be necessary to quantify their impact on Ontario electricity distributors. That may not always be an easy or inexpensive task.

It is important to recognize the differential impact uncontrollable cost drivers have on distributors. However, it is equally important that this not foreclose opportunities - where they exist - for the introduction of mechanisms for improving efficiency.

The foregoing discussion highlights the importance of clearly distinguishing between efficiency factors that are controllable and those that are not controllable. In particular, a benchmarking regime that fails to accommodate explicitly the higher costs that are the result of lower output and customer density may inappropriately penalize distributors with low density. On the other hand, a benchmarking PBR regime that creates reference groups based on scale, without regard to customer density, for example, could create two types of inequities. First, it could treat largely urban distributors as

being comparable to largely rural distributors by benchmarking them against each other.

Second, if small distributors are grouped together for benchmarking purposes, and few of them address scale economies through sharing of services, contracting out, consolidating, or other means, they will be able to earn attractive returns while remaining unnecessarily inefficient.

### **3.2 Consumer Benefits: Economic, Service and Other Benefits**

As noted above, there is more to furthering efficiency than simply reducing costs. From the consumers' perspective, cost reductions that result in lower prices are important. However, consumers are interested in a broader concept of "value" that encompasses various features of a product or service (safety, reliability, convenience, customer service, environmental impacts, and so on) in addition to price.

Regulatory regimes generally recognize the interplay between a distributor's cost of service and various aspects of service quality. For example, capital expenditures that are necessary to maintain public safety and service reliability usually receive high priority in the regulatory forum, as do capital expenditures that are intended to reduce overall costs. Expenditures that are related to more discretionary aspects of customer service tend to receive more scrutiny regarding the "value" of improvement in service standards. That is, interveners and the regulator may closely examine whether service benefits justify the rate impact.

Similarly, under PBR regimes, costs that relate to safety and reliability may be treated as exogenous factors that are outside of the cost-reduction incentive. These essential costs could be passed through in rates so as to avoid creating an incentive for a distributor to defer or avoid incurring safety related expenses, thereby earning a higher return as a "reward" for compromising safety, for example. The use of exogenous factors, therefore, ensures that the regulated distributor does not pursue cost reductions through reductions in safety, reliability and service standards, but focuses instead on true efficiency gains.

For this reason, when developing policies and measures for furthering efficiency in the electricity distribution sector, consideration should be given to the likely impact of options being considered on the determinants of value other than price. All other things being equal, policies and measures that further the efficiency of the distribution sector by increasing customer value, rather than just reducing distributor costs, may be preferred.

### 3.3 Barriers and Incentives to Enhancing Efficiency

Regulatory experience consistently demonstrates that effective mechanisms for furthering efficiencies in the electricity distribution sector must take into account both reducing barriers to enhancing efficiency and establishing incentives to pursue efficiency gains through a wide range of strategies including:

- cost reduction;
- revenue enhancement; and
- restructuring.

As a first step in developing policies and measures that further efficiency, it is important to identify existing barriers and significant opportunities.

Some of the barriers that may impede the adoption of efficiency enhancing initiatives are:

- non-economic objectives such as local control;
- absence of discipline applied to under-performing distributors and managers;
- regulatory rules that create a bias against technological innovation and risk-taking, such as the asymmetrical treatment of innovations with uncertain benefits (for example - rebasing rates to reflect the benefit of successful cost saving initiatives in rates combined with cost disallowances when cost saving initiatives are not successful); and
- poor access to information on methods of enhancing distributor efficiency (i.e., management of distributors may have difficulty “keeping up” on best practices in the absence of effective processes to disseminate industry knowledge and experience to even the most remote and small scale distributors.)

Impediments to enhancing efficiency are not necessarily undesirable in all instances. Efficiency is not the only objective of policy. It is nevertheless important to identify barriers to furthering efficiency that are unnecessary and can be removed. It is also important to identify barriers that cannot be removed so that the policies and measures for furthering efficiency can be designed to accommodate other policy objectives and to mitigate the detrimental efficiency impacts of conflicting objectives.

## 4. Experience Elsewhere

The section reviews the industry structures and experiences in structural reform in four jurisdictions:

- Great Britain
- Australia
- Switzerland
- South Africa

### 4.1 Great Britain

Great Britain was one of the first jurisdictions in the world to implement a dramatically different approach to its electricity industry. In 1989, fourteen electricity boards were replaced with 14 privately owned Public Electricity Suppliers (PESs).

Fifteen years later, while the geographical areas of these former PESs remain unchanged, the industry structure is much different.

Distribution remains a monopoly business and under the Utilities Act 2000 it is now a licensed activity. Each distribution company holds a separate licence for each area they cover and they are strictly governed by the terms of that licence.

Distribution companies are now known as DNOs (Distribution Network Operators) and as part of the legislation within the Utilities Act 2000 they have an obligation to be non-discriminatory in all aspects of their business. Additionally, they must maintain an efficient, cost effective, and coordinated system to distribute electricity.

The regulator grants licences and as the DNOs are effectively monopolies they are regulated through a price control mechanism, which is reset every four or five years.

The 14 DNOs in Great Britain (12 in England and Wales and 2 in Scotland) are licensed to serve the country's 26 million electricity customers.

While the number of distribution licences remains unchanged since privatization, the entire British electricity industry is going through a period of consolidation and the ultimate owners of the individual DNOs continue to change. Following several significant transactions, there are now nine separate DNO owners of the 14 licenses. Six of these owners are foreign companies.

## 4.2 Australia

Electricity sector reform in Australia has occurred at both the national and state levels. The national level provided overall guidance for reform while at the state, there was flexibility for implementation. In Australia, electricity reform started in 1991 with the decision by various state and territorial governments to establish a competitive electricity market in the southern and eastern regions of Australia. The reforms of the two most populous states, New South Wales and Victoria were the most significant.

In October 1993, the state of Victoria began its reform with the separation of the State Electricity Commission of Victoria into generation, distribution, and transmission businesses. The 29 electricity distribution companies that existed were amalgamated and restructured into five separate companies. The amalgamation occurred because it was the government's intention to privatize these companies. In 1995, the five electricity power distribution companies (United Energy, Solaris Power, Eastern Energy, Powercor, and Citipower) were sold through an auction process.

In May 1995, New South Wales electricity reform policy was announced in an Electricity Reform Statement. In terms of the distribution sector, the Government decision was to restructure the sector from its then current level of 25 distributors into a smaller number of companies that would be corporatized and operate in a commercial environment. Of the 25 distributors, one accounted for 40% of the market while 21 rural distributors each had 1% of the market. The government studied the optimal economies of scale in the sector and concluded that to achieve economies of scale, the number of distributors needed to be reduced. By October 1995, the government amalgamated the 25 distributors into six. In July 2001, there was a further amalgamation into three distributors.

## 4.3 Switzerland

Switzerland represents one of the most extreme cases of a fragmented distribution sector. Although its population is about two thirds of Ontario's and its area is only four percent of Ontario's, there are over 900 electricity companies supplying power<sup>6</sup>. As in Ontario, there is a wide disparity in the size of firms: the 40 largest distributors supply more than 60 percent of demand; the 500 smallest companies supply only 10 percent.

Most of the Swiss electricity companies are government owned: at present, the federal government, cantons and municipalities hold 72.4% of the share

---

<sup>6</sup> There are approximately 900 "rural" distributors plus a number of national and regional distributors serving other areas, similar to Hydro One in Ontario.



capital, while 15.1% is in private hands and 12.5% is held by foreign investors. Municipal distributors are typically responsible for other activities, such as water, gas and district heating.

An initiative to reform the Swiss electricity market (Electricity Market Law) was rejected in a national referendum in September 2002; however, the Department of the Environment, Transportation, Energy and Communications (DETEC) appointed an expert commission in March 2003 to develop the basic form for a new electricity industry structure by early 2004. The intention of the Swiss Government is to engage in a consultation process on the proposal in 2004 and to implement liberalization of the Swiss electricity market by 2007 when the unified European electricity market is scheduled to take effect.

#### **4.4 South Africa**

The South African electricity distribution industry is comprised of the distribution business of Eskom, the vertically integrated state owned electricity utility, and over 200 municipal distribution businesses. The industry currently serves around 7 million customers.

Since 1994, there has been a degree of consolidation of local government in South Africa that has seen the number of municipal distribution businesses reduce from around 350 at the introduction of democracy, to around 200 now. However, a number of significant problems within the industry remain, including:

- The fragmented structure of the industry is financially unviable.
- The industry has difficulty funding electrification.
- Municipal ownership impacts upon the resources being made available to the distribution businesses.
- The fragmented structure is difficult to regulate.
- The structure has resulted in a large number of tariffs within the industry and uneven quality of service.
- The structure is incompatible with the introduction of an electricity market.

Consequently, in 1995 the government released a study that recommended the creation of approximately five of Regional Electricity Distributors (REDs) by dividing Eskom's distribution business and merging each of these divisions with a number of municipal distribution businesses. A subsequent study of international precedents and fixed cost drivers (related to network management and customer management) within the South African industry

suggested that each RED required approximately one million customers to be viable.

Over the past few years there has been a large volume of debate and subsequent analysis and there is now considerable consensus—and political acceptance—for the creation of six REDs.

Last year, the EDI Holding Company was created and tasked with implementing the creation of REDs. Despite its name, EDI Holdings is a project management vehicle and will not own assets in the industry (this approach to transition was rejected as it would involve a double transfer of distribution businesses.)

## 5. Policy Objectives and Evaluation Criteria

The *Energy Competition Act, 1998* (Act) radically restructured both the Ontario electricity market and its regulatory environment. Because electricity distribution companies are natural monopolies, the Act gives the Ontario Energy Board (OEB) responsibility for regulating distribution rates. In doing so, the Government enshrined in Section 1 of the Act the following policy objectives that guide the OEB in its regulatory activities.

1. To facilitate competition in the generation and sale of electricity and to facilitate a smooth transition to competition.
2. To provide generators, retailers and consumers with non-discriminatory access to transmission and distribution systems in Ontario.
3. To protect the interests of consumers with respect to prices and the reliability and quality of electricity service.
4. To promote economic efficiency in the generation, transmission and distribution of electricity.
5. To facilitate the maintenance of a financially viable electricity industry.
6. To facilitate energy efficiency and the use of cleaner, more environmentally benign energy sources in a manner consistent with the policies of the Government of Ontario.

Part V of the OEB Act specifies that the Board's approach to regulation of electricity should be in keeping with these objectives. While the fourth and fifth objectives are most directly relevant to the Board's concern with achieving further efficiencies in the electricity distribution sector, participants in the consultation should be mindful of the Board's overall legislative objectives.

In addition to regulating rates for distribution (and transmission) service<sup>7</sup>, the Board licenses participants in the electricity market, including the IMO, transmitters, distributors, generators, wholesalers and retailers.<sup>8</sup> It may impose conditions in a licence, including conditions "to address the abuse or possible abuse of market power...."<sup>9</sup> In approving rates, the Board is

---

<sup>7</sup> S. 78

<sup>8</sup> S. 57

<sup>9</sup> Ss. 69(5)

responsible for implementing rural and remote rate protection requirements as set out in the Act and its regulations<sup>10</sup>.

The Board must be notified of proposed acquisitions of interest in generation facilities by transmitters, distributors or their affiliates, and may require these proposals to undergo detailed review and Board approval<sup>11</sup>. A Board order granting leave to construct is required to construct, expand or reinforce electricity transmission lines,<sup>12</sup> and leave of the Board is required if distributors or transmitters wish to sell, lease or dispose of their transmission or distribution systems or parts thereof necessary to serve the public. Hence, the Board is in a position to review merger, acquisition, amalgamation and divestiture activities that may proceed in the distribution sector.

The Filing Requirements for Acquisitions, Divestitures and Amalgamations (Section 86 under the Ontario Energy Board Act 1998) require all applicants to provide information pertaining to the Board's objectives as set out in Section 1 of the Act. Part II of the Filing Requirements explicitly requires information related to the following seven headings:

- Facilitate Competition
- Non-Discriminatory Access to Transmission and Distribution Systems
- Protect Interests of Consumers
- Promote Economic Efficiency
- Financial Viability
- Facilitate Energy Efficiency and Use of Environmentally Benign Energy Sources
- Other

Participants in the consultation may wish to comment on the completeness and relevance of these criteria to all policies and measures that might be undertaken to further efficiency in the electricity distribution sector.

---

<sup>10</sup> S. 79 and O.Reg. 442/01.

<sup>11</sup> S. 81.

<sup>12</sup> S. 92.

## 6. Options to Consider and Issues for Discussion

This section provides a preliminary overview of some of the key issues that relate to the process of furthering efficiencies in the Ontario electricity distribution sector. The following comments are intended to assist participants to structure and focus their comments in making their oral presentations and in providing written comments.

Parties may wish to identify and comment on other issues that they consider relevant to furthering efficiencies.

### 6.1 Further Consolidation

Figure 2 shows the average scale (i.e., customers per distributor) for a sampling of jurisdictions across North America and internationally. There are jurisdictions with both significantly greater and significantly smaller average scale than Ontario. There is also a spread between the smallest and largest distributors that is not revealed in the average numbers.

Despite the consolidation that has taken place in Ontario in recent years, there continues to be a few large distributors and many that are quite small. Currently, 42 Ontario distributors serve fewer than 10,000 customers. Empirical estimates of LDC minimum efficient scale range from 20,000 customers on up.

Participants in the consultation may wish to comment on:

- The extent to which distributors have already achieved scale efficiencies in those functions with scale economies through the sharing of services, contracting out, and other initiatives.<sup>13</sup>

**Figure 2. Average number of customers per distributor**

Jurisdiction	Customers /Distributor
Greece	6,239,000
Quebec	2,800,000
Spain	1,830,000
Great Britain	1,771,000
Ireland	1,376,000
Portugal	1,197,000
British Columbia	868,000
Netherlands	254,000
France	174,000
Italy	137,000
Belgium	127,000
Alberta	118,000
Texas (ERCOT)	117,000
<b>Ontario</b>	<b>45,000</b>
Germany	42,000
Austria	28,000
Denmark	27,000
Finland	24,000
Sweden	21,000
Norway	12,000
Luxembourg	9,000

<sup>13</sup> The data in Figure 2 are drawn from several sources that are not entirely consistent in methodology. While the figures are not perfectly comparable, the data

- Policies and measures that would remove barriers to consolidations or provide an increased incentive to consolidate in situations where increased scale economies would result.

## 6.2 Incentives

At the present time in Ontario and many other jurisdictions, the primary regulatory mechanism providing an incentive for distributors to achieve further efficiencies in their operations is the Performance Based Regulation regime. The PBR incentive results from the ability of distributors to earn higher profits by constraining increases, or achieving decreases, in their operating costs. In addition, if a distributor's costs increase by more than is allowed in the PBR formula, it will earn a sub-standard return. Hence, the PBR regime embeds both a "carrot" and a "stick" to provide an incentive for pursuing further efficiencies.

Explicit incentive regulation is not the only means of encouraging further efficiencies. The Board has the authority to develop codes and rules that bind distributors and govern their activities. For instance:

- **The Distribution System Code** sets out a procedure that allows distribution customers to obtain alternate bids for connections and expansions (section 3.3); and specifies distributors' responsibilities, many of which facilitate efficiency within the sector (section 6)
- **The Transmission System Code** establishes the procedures for the economic evaluation of new or modified connections (section 9)
- **The Affiliate Relationships Code for Electricity Distributors and Transmitters** addresses matters such as the degree of separation, sharing of services and resources, transfer pricing, financial transactions with affiliates, equal access to services in a manner that facilitates efficiency with the sector, among other things.

Participants in the consultation may wish to comment on:

---

indicates that there are jurisdictions with both significantly larger and significantly smaller average scale. Furthermore, except where there is only one distributor in the jurisdiction, the averages mask the significant range of size that exists not only in Ontario but also in many other jurisdictions. European data is based on: Filippini (2001) "The New Swiss Electricity Market Law and the Regulation of Distribution Prices" EARIE, Ireland

- The effectiveness of a PBR regime as an incentive to pursue further operational efficiencies and also further structural efficiencies (see the discussion of efficiency concepts in section 3).
- Any detrimental effects that a PBR regime has for the public interest (see the discussion of objectives and evaluation criteria in Section 5).
- Other policies or measures in codes that could provide further efficiency incentives.

### 6.3 Load Serving Entities

Section 3.2 of the Electricity Conservation and Supply Task Force Final Report indicates that the “consumers’ need for stable and affordable electricity prices” could be addressed through the creation of “a central agency to organize the procurement of default supply in the short term.” The Report then indicates:

Over time, we believe there is an opportunity for other entities (load serving entities) to emerge to take on the responsibility for default supply, leaving the central agency as the default supplier of last resort. These load serving entities could be local distribution companies, energy wholesalers or new commercial partnerships.

The proponents of load serving entities envision them providing default supply with some form of price surety. If a load serving entity were to buy power on the spot market and sell that power to its customers at a fixed price, it should face financial risk associated with both price and volume risk.

However, it would be feasible for distributors to be load serving entities provided they were able to mitigate their price and volume risks. Price risk can be mitigated by purchasing power at a fixed price through entering into bilateral contracts or by using financial hedges. Volume risk could most easily be managed by introducing explicit or implicit fixed-term contracts for default customers that limit customer mobility, as is suggested in the Task Force Report. However, even with fixed-term contracts there will be some residual risk due to variances in customers use, caused by weather and other factors, and uncertainty as to total customer count. Larger distributors may be in a better position to take on the credit requirements and risk associated with residual price and volume risks.

Also, a prerequisite for entering into the risk mitigating contracts discussed above is a high standard of credit worthiness. Some LDCs may not currently be able to reach this standard acting on their own. This raises the question of whether further consolidation or joint venturing would be required for these LDCs to get started in the load serving entity role.

Finally, to the extent that financial risk cannot be mitigated entirely, load serving entities would need to have adequate financial resources to manage the business.

Participants in the consultation may wish to comment on:

- The capability of Ontario distributors, as they are currently structured, to take on the role of load serving entities, given the energy trading expertise required, the inherent financial risks, and the need for a high standard of creditworthiness. Consideration could be given to structural features such as ownership, scale and staff resources.
- The implications of distributors acting as load serving entities for consolidation and other issues being raised in this consultation.

#### **6.4 Distribution System Planning**

Electricity distributors are currently responsible for planning the development of their distribution systems over time, taking into account anticipated growth in customers and the demand for power. Forces such as industry restructuring and customer growth occurring on boundaries between distributors indicate that a more integrated approach to system planning might produce efficiency benefits.

For example, there have been several applications in the past year for service area amendments, reflecting competition to serve new customers, particularly along the fringe areas between distributors. In some cases, there may be as many as four distributors that could provide service to new customers on a reasonably economic basis. Rules to ensure that service is provided in the most efficient manner have yet to be determined.

Consolidation would be one means of broadening the scope of the system planning performed by distributors; however, increased collaboration among neighbouring distributors could be an alternative.

Participants in the consultation may wish to comment on:

- The extent to which a more integrated approach to system planning would result in further efficiencies in the electricity distribution sector.
- The advantages and disadvantages of consolidation and other means of achieving geographically integrated system planning to minimize system costs.



## 6.5 Technological Innovation

Technological innovation is a key contributing factor in achieving dynamic efficiency—that is operations that are economically efficient through time. For operations to be dynamically efficient, distributors should adopt new technologies on a timely basis. That means that, in some instances, it will be efficient to discontinue use of old technologies that remain physically useful, and that may not be fully depreciated, but are not as economical to use as newer technology.

In part, the appropriate adoption of new technologies can be guided by careful analysis of best practice across the industry.

The state of the business processes and supporting information technology systems of the distributors can have a major impact on costs and operational success. Key processes and systems that could be evaluated are financial back office systems, customer information systems and asset management systems. Customer information systems are of particular concern as they hold the service and accounts receivable information for the companies. Due to the many changes made through the industry restructuring process, these systems tend to be difficult to manage, maintain and alter. The computer technology itself and, more importantly, the related business processes may be key drivers of operational improvement. Also, savings in the areas of parts, asset replacement and work performed may be driven from these systems. Information technology is one of the areas that is most often considered in a shared services arrangement.

Participants in the consultation may wish to comment on:

- Any barriers that may exist in the current regulatory mechanisms that discourage the adoption of new economic technologies.
- The need for improved access to information on the actual performance of new technologies in the Ontario distribution sector.
- The effectiveness of alternate incentive structures for furthering the adoption of new technologies that will further efficiency in the distribution sector.

## **7. Next Steps**

This Discussion Paper provides an overview of key issues that may be relevant to the comments of participants in the OEB's Consultation to Review Further Efficiencies in the Electricity Distribution Sector. Stakeholders will be able to provide their reactions and comments on the specific issues raised in this Paper, and they should also provide views on additional issues that should be considered when addressing the efficiency of Ontario's electricity distribution sector.

Participants have the opportunity to provide written representations and also to make oral presentations during the consultation. The views of stakeholders will be of critical importance in the preparation of the Staff presentation to the Board.