# HYDRO ONE TRANSMISSION AND DISTRIBUTION: SHOULD THEY REMAIN COMBINED OR BE SEPARATED?

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**Report to the Electricity Distributors Association**

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## EXECUTIVE SUMMARY

This report analyzes whether the continued retention of both distribution and transmission functions within Hydro One would be appropriate or whether the two functions should be separated. The analysis covers a number of issues and factors relating to competition, regulatory oversight, efficiency of regulation, capital investment decisions, efficiency benefits from economies of scope and retail competition. In doing so it looks at the experience of other jurisdictions as well as Ontario.

The report notes the guiding principles that seem to have underlain reform of the electricity industry internationally. It also notes the need for further restructuring that has arisen when insufficient steps have been taken initially, and the difficulties of doing this. In many respects the policy adopted in Ontario is consistent with these underlying principles and with initial developments elsewhere. However, this does not seem to be the case with the proposed retention of both transmission and distribution functions within Hydro One.

Our conclusion is that continued retention of both these functions within Hydro One would be likely to involve disadvantages on all of the issues identified. Specifically, it would:

- impact adversely on the process of setting price controls, distort the competitive capital market for distribution companies and make it more difficult for smaller distribution companies to grow by acquisition within the Province;
- complicate the process of cost and revenue allocation and increase the conflicts of interest, which would necessitate greater regulatory oversight and intervention, slow decision-making and increase cost;
- create the possibility of intended or unintended cross-subsidies between transmission and distribution, with possibly unjustified redistribution

of income, and distortions of output and location decisions, that could lead to higher costs;

- provide greater opportunity and incentive to distort the capital investment decisions of the transmission and distribution systems, which would again increase costs;
- jeopardise the achievement of internal cost efficiencies that could more than outweigh any savings from economies of scope; and
- give rise to an unnecessary concern that the combined company might decide to re-engage in retail supply and even generation at a later date, thereby threatening the independence of the transmission function.

In light of the above findings, our view is that it would be more appropriate to separate completely the functions of transmission and distribution than to continue to combine them within a single company. It would not be sufficient to try to secure such separation by means of accounting, management or legal separation within the ownership of a single company. Given the nature of the concerns identified, the separation should be complete, requiring each of the two main functions of the present company to be placed in separate ownership.

The possibility of some further division of the distribution side of Hydro One, and alternative forms of ownership and regulation of the interties, both seem to merit further consideration. However, both analyses would require more detailed consideration than is possible within the scope of this report.

## Table of Contents

## 1. Introduction

For most of the last century, Ontario Hydro was the primary generation and transmission company serving Ontario. Distribution to urban areas was provided by numerous municipal authorities, with Ontario Hydro responsible for providing distribution to rural areas. In recent years, the Government of Ontario has undertaken a series of steps to restructure the electricity industry, and potentially to privatise it. In the course of this process, Hydro One Inc. ("Hydro One") has been created to take over the transmission and distribution systems previously belonging to Ontario Hydro.

In April 2002 the Electricity Distributors Association (EDA) of Ontario commissioned us to assess and report on certain issues relating to the separation of electricity transmission and distribution. Specifically, the EDA requested us to determine whether the continued retention of both distribution and transmission functions within Hydro One would be appropriate or whether the functions should be separated. The EDA specified a number of issues and factors that should be examined, relating to competition, regulatory oversight, efficiency of regulation, capital investment decisions and efficiency benefits from economies of scope. The EDA also requested general recommendations for future policy in this area. The full Terms of Reference are as follows:

*Terms of Reference*

**Background:** The Province of Ontario has a large number of distributors of varying size, some of which provide other services. The largest distributor is Hydro One, serving approximately 1.2 million customers. Hydro One is also the main transmission company within the province. The Provincial Government presently owns Hydro One and the Government recently indicated its intent to transfer ownership to the private sector through an initial public offering.

In Ontario the regulator (the Ontario Energy Board) has indicated that the distribution sector would likely be regulated on a yardstick basis in the next PBR regime, which will in effect create competition between distributors to be the most efficient.

**Purpose:** The objective of this analysis is to determine whether the continued retention of both distribution and transmission functions within Hydro One is appropriate or whether the functions should be separated. The analysis should incorporate the following:

- Issues relating to the creation of a level playing field amongst distributors within the Province, in order to have fair, efficiency-promoting competition between distributors under a yardstick PBR regulatory regime and the potential impacts on evolution of the distribution sector.
- Issues relating to the regulatory oversight required on a joint distribution-transmission company in order to promote fair competition practices.
- Issues relating to efficient regulation of distribution services within the Province.
- Potential impacts on capital decisions in transmission and distribution made by Hydro One and distribution investments by distributors.
- Potential efficiency benefits from economies of scope resulting from retention of both functions within one entity.

**Output**: The consultant will produce a report that answers the question of whether the continued retention of both distribution and transmission functions within Hydro One is appropriate or whether the functions should be separated. The conclusions should be based on a broad analysis of factors and draw upon the experiences of other jurisdictions. The report will provide general recommendations for future policy and regulations governing the combination of distribution and transmission in Ontario.

*Organization of This Report*

This report is organized as follows. Section 2 briefly summarizes the history, development, structure and regulation of the electricity industry in Ontario, including recent proposals for further reform. Section 3 notes that the introduction of competition, private ownership and regulation in the UK, US, Australia, New Zealand, Scandinavia and many other countries in Europe and Latin America has transformed the electricity sectors there. It sets the Ontario proposals in the

context of the underlying principles of reform, and of policy developments internationally. Sections 4 through 9 analyse the implications of retaining the existing integrated structure of Hydro One or alternatively separating out the transmission and distribution activities. They consider in turn the issues and factors specified in the Terms of Reference, as well as another factor – retail competition - that seems potentially relevant. The analysis draws upon experience in other jurisdictions. Section 10 summarizes the conclusions and makes recommendations for future policy.

## 2. The Electricity Industry in Ontario

*Background*

Historically, almost all electricity infrastructure in Ontario was in public hands. Ontario Hydro was the principal generation and transmission company in the Province. It owned and operated a wide array of hydro-electric, nuclear and fossil generation facilities. It owned and operated almost all the high voltage transmission lines in the Province, to which numerous distribution systems and large industrial customers were directly connected, and it owned and operated the many inter-ties with neighboring electricity systems in Canada and the US.

Electricity distribution to urban areas was provided by municipal distributors. However, Ontario Hydro was charged with the responsibility for bringing electricity to those areas of the Province not served by municipal distributors. By the latter part of the 20$^{th}$ century there were some 300 municipal distributing utilities, which collectively served about 75% of the residential, commercial and industrial customers in the Province. Ontario Hydro served the remaining 25 % of these customers.

From the 1970's onward, the Ontario Energy Board (OEB) was given the responsibility of reviewing Ontario Hydro wholesale rates, with some attention also to the rates to large industrial customers and to Ontario Hydro rural customers. The Board was charged with recommending, but not prescribing, changes in such rates. For its part, Ontario Hydro bore the additional responsibility of regulating the retail rates of municipal distributors.

*Recent reforms*

In the mid 1990's the Provincial Government initiated a series of steps aimed at restructuring the electricity industry with the goal of bringing about competition in the generation and supply segments of the industry. In 1995 it established an Advisory Committee on Competition in Ontario's Electricity System to the Ontario Minister of Environment and Energy, (the "Macdonald Commission"). It was asked to "Make recommendations on the structural, legislative, regulatory and, potentially, ownership reforms required to ensure Ontario Hydro and the provincial electricity system are poised to meet the competitive challenges of the 21st century." [1] The Macdonald Commission made extensive recommendations on restructuring of each segment of the industry. Among them it recommended that the distribution network owned at that time by Ontario Hydro (and inherited by Hydro One) "be absorbed into the local distribution system". The Commission recommended that this be achieved by the expansion of existing municipal utilities along county and regional lines.[2]

In 1997 the Provincial Government issued a paper describing its plan to restructure the industry and to "..introduce full competition into Ontario's electricity system…". [3] The Government passed enabling legislation in 1998, (the Energy Competition Act) and formed a Market Design Committee which filed its final report in early 1999.[4]

During 1999, Ontario Hydro was reorganized into five distinct corporations:

- Hydro One Inc. which inherited Ontario Hydro transmission, distribution and related functions;

[1] *A Framework for Competition*, The Report of the Advisory Committee on Competition in Ontario's Electricity System to the Ontario Minister of Environment and Energy, May 1996, Appendix A.
[2] *A Framework for Competition*, as above, p.v, 3, 70-82.
[3] *Direction for Change*, Charting a Course for Competitive Electricity and Jobs in Ontario, Ontario Government, November 1997.
[4] *Final Report of the Market Design Committee*, January 29, 1999.

- Ontario Power Generation Inc. (OPG) which presently owns approximately 75% of generation capacity in the Province;
- Independent Electricity Market Operator Inc. which acts as the dispatcher of power and will be operating the forthcoming electricity market;
- Electrical Safety Authority Inc. which performs the electricity installation inspection function;
- Ontario Electricity Financial Corporation Inc. which, as the continuation of Ontario Hydro, is charged with managing and retiring Ontario Hydro stranded debt and obligations not allocated to the other successor companies.

Certain other provisions were put in place with a view to creating a more competitive market. For example, a condition of OPG's operating licence is that it transfer to potential competitors 4,000 MW of price setting fossil capacity within 42 months of market opening. In the interim it faces revenue caps. Within ten years of market opening it must transfer control of sufficient capacity so that only 35% of the available supply options are under its control.[5] Reportedly, OPG has made progress towards meeting these conditions.

Another provision is that distribution companies must not themselves continue to engage in retail supply. They may, however, do so by means of affiliates. These are subject to an Affiliate Relationship Code, issued by the Ontario Energy Board, that seeks to limit preferential treatment and to minimize the potential for cross-subsidy of competitive activities.

[5] *Backgrounder*, Ontario Power Generation, "Reducing Market Dominance – Generation Assets", April 30, 2001.

*Hydro One Corporate Structure and Lines of Business*

Hydro One operates several lines of business, related primarily to transmission and distribution. Its corporate structure consists of a number of subsidiaries. The two of particular interest here are:

- Hydro One Networks Inc. which operates transmission and most Hydro One distribution facilities;
- Hydro One Brampton Inc. which distributes electricity to the city of Brampton.

There are numerous other Hydro One subsidiaries. Hydro One Network Services Inc. supports transmission and distribution by providing services related to forestry, line and station maintenance and engineering. Hydro One Remote Communities Inc. delivers electricity to isolated or distant parts of the Province. Hydro One Delivery Services Inc. constructs transmission and distribution infrastructure in Ontario and elsewhere. Hydro One Telecom Inc. provides telecommunications capacity. Ontario Hydro Energy Inc. engages in competitive retail sale of energy.

Hydro One's transmission business operates the main transmission grid in Ontario. It transmits electricity to its own distribution networks, to 55 local distributors most of which are municipally owned, and to 67 large industrial customers directly connected to the transmission system. During 2001, the system transported about 147 TWh of electricity, which was about 90 per cent of the electricity used in the Province. In addition, the transmission business owns and operates 17 synchronous interties linking Ontario with New York, Michigan, Manitoba and Minnesota, and nine non-synchronous interties with Quebec.

From the late 1990s onward there has been considerable consolidation of the distribution sector in the Province. A series of mergers and acquisitions has

reduced the number of distributors by over two thirds, from over 300 in the early 1990s to 97 today. Excluding Hydro One, distributors range in size from a few thousand customers to Toronto Hydro which serves 650,000 customers in that city.

Hydro One acquired no less than 88 Ontario distribution utilities in 2000 and 2001.[6] Its distribution business now serves 1.2 million urban and rural customers. They are divided between the two subsidiaries Hydro One Networks and Hydro One Brampton. Hydro One Networks supplies mainly rural areas with low population densities. It also serves 42 local distributors not directly connected to the transmission system and 41 large industrial customers.[7] Hydro One Brampton was recently acquired by Hydro One, and is an urban utility serving about 90,000 customers. In total, Hydro One has been distributing electricity to about 30 % of Ontario's approximately 4 million customers.

*Regulatory Environment*

Under the Ontario Energy Board Act (1998), the Ontario Energy Board has been assigned broad powers over the electricity market. These include licensing, regulation of rates and market supervision. The Act establishes a series of objectives by which the Board should be guided in carrying out its responsibilities:

> "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.

[6] *Preliminary Prospectus*, March 28, 2002, Hydro One Inc., p.49.
[7] These are in addition to the 67 large customers connected directly to Hydro One's transmission system.

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."

The OEB has established a performance based regulatory framework for distributors. Instead of simply passing through actual or projected reasonable costs, the methodology sets an initial rate level, then relates allowed changes in rates to changes in the cost of capital, labor and materials, an annual productivity improvement and extraordinary expenditures. This approach is currently under review and the OEB has indicated that it may in the future contain a yardstick component.[8] Yardstick regulation typically requires comparison of a given utility's cost performance with those of other utilities. Since utility characteristics can vary widely, the regulator must first establish reasonable comparators and/or adjust utility costs to account for differing characteristics of each distributor. Thus it is particularly beneficial from the regulator's point of view to have data on many utilities whose costs can then be compared.

The OEB has also indicated that it plans to regulate transmission rates using performance based methodologies and it has instructed Hydro One to prepare a five-year rate proposal on this basis.[9]

*Retail Competition*

The OEB has also been given primary responsibility in overseeing a smooth transition to the opening of the electricity market, which took place on May 1, 2002. As of that date, all residential, commercial and industrial customers have the option of selecting their supplier. Indeed, many have entered into contracts that became effective upon market opening. Customers who have not chosen a

[8] *Electricity Distribution Rate Handbook*, Ontario Energy Board, March, 2000.
[9] *Preliminary Prospectus*, March 28, 2002, Hydro One Inc., p.70.

supplier will automatically receive electricity at a default rate based on spot market prices.

On April 25, 2002, Hydro One announced the sale of its retail assets to Union Energy Inc. Hydro One said that this was consistent with its strategy to focus on its core wires business.[10] The nature and implications of this are discussed further in section 9 of this report.

*Privatisation*

In December 2001, the Province announced its intent to privatise Hydro One. To this end, Hydro One issued a Preliminary Prospectus on March 28, 2002.

The way forward is not entirely clear since on April 19th 2002 a provincial court ruled that, under existing legislation, the Province does not have the right to sell Hydro One. The Government has stated that it intends to continue with the privatisation and that it will appeal the court decision. In addition, the Government plans to proceed with enabling legislation and a public consultative process. [11] Latest press reports suggest that a long term lease of Hydro One might be considered as an alternative to privatisation.[12]

[10] "Hydro One Selling Its Retail Energy Business", *Toronto Star*, April 26, 2002.
[11] Attorney General David Young has indicated that the appeal is necessary in order to clarify for the future who can sue the Government over policy issues. The Hydro One suit was brought by two unions, neither of which directly represents Hydro One employees. "Hydro One Hearings to Delay IPO Until Fall, Bankers Say", *Globe and Mail*, April 25, 2002.
[12] "Hydro One Sale In Doubt", *Globe and Mail*, May 1, 2002.

## 3.The Policy Context and International Experience

The restructuring presently envisaged in Ontario reflects a significant pattern of change in electricity sectors worldwide. In many major countries of the world - notably in Western and Eastern Europe, in North, South and Central America, in Australasia and India, and prospectively in Russia, China and parts of Africa - there has been a dramatic change of approach. There has also been increasing evidence of beneficial results, but full discussion of this is beyond the scope of this report. This section sets out the main principles behind this change of policy, with focus on the kinds of restructuring to which the principles and subsequent experience have led. The section is illustrated with examples from the UK and elsewhere.

### *Guiding Principles*

The way in which the policies are expressed differs from one country to another, but the guiding principles and motivating factors are essentially the same. They reflect certain common perceptions:

- A recognition that substantial parts of the electricity industry were not necessarily a monopoly, and could be operated under conditions of competition allowing choice to buyers and sellers. Economies of scale were no longer significant in generation, and many competing generators could be envisaged. Also, enabling generators and other retail suppliers to have access to the transmission and distribution systems would enable competition in retail supply to final users. Such forms of competition could be expected to provide more efficient generation and better and more innovative customer services. These prospectively competitive parts of the electricity sector typically accounted for half or more of the total cost of producing and supplying electricity. (In Ontario,

generation costs historically constituted some 60%-70% of the price paid by end-users.)

- A recognition that private ownership, properly introduced, offers potential advantages of greater productivity and innovation than does public ownership. Private entities could be more independent of the kinds of government intervention for political and macroeconomic purposes that hindered efficient management. Private ownership could offer better access to funds for capital investment, thereby releasing public funds for investment elsewhere.
- A recognition that costs are not independent of the forms of price and profit control applied to the monopoly networks. Revised forms of incentive regulation could encourage transmission and distribution businesses to find new and more efficient ways of running their activities, to the potential benefit of users of these systems as well as the owners.
- A recognition that independent regulation of the electricity sector had an important and continuing role to play in the new arrangements. This would typically include setting and revising the rates to be charged by the transmission and distribution network companies, and setting and monitoring their standards of performance. But it would also include monitoring the state of competition, taking whatever actions were needed to bring about effective competition, and considering the scope for further extensions of competition to areas hitherto considered monopolies. The regulator typically has a crucial role in protecting the interests of customers, and in listening to and responding to the concerns expressed by all parties in the industry, including all the market participants, large and small.

*The Need for Restructuring*

To achieve the full potential benefits of competition and incentivised private ownership typically requires significant changes to the inherited structure of the electricity sector. It is increasingly recognized that the large horizontally and

vertically integrated electric utilities that typified provision during the twentieth century are unlikely to be the most appropriate method of providing supply during the twenty first century. They may have had advantages in ensuring universal service at cross-subsidized rates. But universal service has now substantially been achieved in most developed countries.

The efficient and low cost provision of energy has become of increasing importance. This is no less the case if environmental considerations are likely to increase generation costs in future. Competition is now seen as a more effective way to control costs. And the large integrated utilities are not best suited to a competitive market with competing privately owned firms. Indeed, the inherited organizational structures in electricity sectors are likely to be positively unhelpful in achieving greater efficiency by means of competition. A single monopoly does not constitute competition in generation or retail supply. It is possible to encourage new entry over time, but a monopoly incumbent is inimical to this, and to the development and functioning of a competitive market. An incumbent that integrates generation and transmission and distribution constitutes an additional and perhaps overwhelming hurdle for a potential new entrant into generation or supply. New entrants cannot be expected to render themselves vulnerable to an incumbent that controls some of the key determinants of their own success.

Moreover, the previous integrated utilities are not likely to be conducive to effective incentive regulation. The activities and costs of larger more integrated companies are less transparent and more difficult to regulate effectively and even-handedly than smaller more specialised ones.

All these factors may be especially problematic when one or more companies are transferred to private ownership, or even when there is an expectation or possibility that they will be so transferred at some stage. A private company generally has a more direct financial incentive in using whatever advantages it has

to exercise power over other market participants and to limit the effectiveness of regulation.

*Typical Initial Restructuring*

The ways in which the guiding principles have been implemented in terms of initial restructuring naturally vary from one country to another, depending upon local circumstances. Nevertheless the main features of the initial restructuring of the industry are remarkably uniform. They usually include:

- The separation of the ownership and operation of the transmission system from that of generation interests. This provides an important reassurance that the terms of access to the transmission system will not be biased against any particular competitor, or against new entrants.
- A related separation of the ownership and operation of the high voltage transmission system from that of the low voltage distribution systems. In most cases some or all of the distribution systems will also be competing retail suppliers, at least initially. This separation helps to assure that the owner of the transmission system is not biased towards the distribution and/or retail supply activities that it owns.
- Division of the generation sector into several competing companies or plants. This is necessary in order to induce competition among the companies, and to prevent the exercise of market power at the expense of customers. It is also conducive to the development of related competitive markets in hedges and financial contracts. This in turn facilitates new entry into generation.
- Dividing (or maintaining a division of) the distribution side into several different companies. This facilitates comparison of costs and therefore effective incentive regulation. Insofar as distribution companies may also be the initial retail suppliers, it also facilitates competition in retail supply.
- The creation of a Pool or central market and a transmission system operator. These institutions complement and implement competition in

generation. They variously provide mechanisms for determining which plants actually run at any time, for evaluating the costs of incremental additions or reductions in demand or generation, for efficiently adapting the generation schedule to meet the minute-to-minute changes in the demand schedule so as to maintain the system in balance, and so on.

- The introduction of a regulatory body, independent of the regulated entities and of government, with duties and powers specified in statute or other legislation. The regulator typically has a duty to protect customers and, in contrast to traditional utility regulation, to promote competition.
- The sale to private investors, by means of a public flotation or trade sale, of some or all of the successor companies created by restructuring.

*Subsequent Restructuring By Regulation*

Although governments typically restructure the electricity sectors at the time of privatising or deregulating them, experience suggests that, for one reason or another, it is not always possible to make all the appropriate changes initially. Regulatory bodies often have to take steps to bring about further restructuring thereafter. Sometimes this is envisaged, sometimes not. It is generally more difficult for a regulator and government to restructure a private company than a public one, particularly after assurances may have been given to investors.[13] All such unanticipated changes are necessarily problematic for the companies involved, for their investors, and for other market participants. But they have been considered necessary to deal with the even more unacceptable conditions that had previously come about. So it is more sensible to try to get the structure right before privatisation than to deal with the problems afterwards.

[13] "Public ownership has at least the advantage of making possible far-reaching structural reforms that become difficult if not impossible once the industry is privately owned". D.Newbery and R.Green, "Regulation, Public Ownership and Privatisation of the English Electricity Industry" in *International*

Some examples from the UK (strictly speaking, from England and Wales) may be helpful. Some countries privatising after the UK have learned from these lessons, and taken steps to avoid the problems by restructuring more thoroughly in the first instance. Others have not. A few examples from other countries will illustrate this too.

*Examples from England and Wales*

At privatisation, the Government took the transmission system out of the Central Electricity Generating Board, to avoid its control by generating companies, and created a new National Grid company. Because it was considered premature to try to sell to investors an independent transmission company with no financial track record, National Grid was put into the joint ownership of the regional distribution companies. Subsequently, the regulator took the view that this limited the efficiency and independence of the transmission company, and took steps to encourage its sale as an independent company. The Government agreed and this was achieved within a few years.

The Government anticipated that it would be sufficient to split the generating plants of the Central Electricity Generating Board into three successor companies. In the event, that did not prove sufficient to enable effective competition. The regulator later had to take steps to require the major incumbent companies to divest generating plant to competitors, to prevent mergers by these incumbent companies, and later to secure further divestment as a condition of merger.

It was envisaged that the Electricity Pool created at the time of privatisation would be conducive to a competitive generation market. Although it served its purpose, it proved not to be sufficiently flexible. The regulator later took steps

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*Comparisons of Electricity Regulation*, R. Gilbert and E. Kahn, editors, (Cambridge University Press: 1996).

(along with the Government) to replace it by New Electricity Trading Arrangements (NETA).

At the time of privatisation it was envisaged that retail competition would eventually be implemented for all customers. For reasons primarily related to the coal industry this competition was introduced in three phases over eight years. Over that period the regulator had to instigate and coordinate several significant changes in industry practice and IT systems in order to make competition possible for smaller and residential customers. These changes, based in part on experience and in part on more clearly anticipated problems, were more radical and extensive than had initially been foreseen.

This was particularly true of the structure of the regional distribution companies. The Government initially allowed each company to own and operate a variety of different businesses under a single licence, including distribution, retail supply, appliance retailing, and other activities. The Government initially envisaged that it would be sufficient to require the distribution companies to keep separate accounts for their various separate businesses. In the event, the regulator (and later the Government) deemed this insufficient to ensure effective retail competition at the residential level. The regional companies were therefore required to separate their staff and assets between their distribution activities and their retail supply activities, and to put these different activities into separate legal companies with separate licences.

*Examples From Other Countries*

Initially, New Zealand did not restructure its electricity industry to create a competitive generation market. However, lack of competition and concerns by customers led the Government to impose a series of subsequent divestments on the large incumbent generator. Nor did it enforce sufficient separation between

distribution and retail supply activities. However, concerns about the potential problems of retail competition led the Government subsequently to prohibit companies from engaging in both distribution and retail supply in any area. Each company therefore had to divest either its distribution or retail supply activities. Yet other concerns about how the system was working led to a wide-ranging investigation and report.[14] The recommendations of this report has in turn led to the introduction of further significant changes, including thresholds for transmission and distribution charges.

In contrast, Argentina and Victoria (Australia) took steps to split up their generation sector thoroughly, in many cases selling generation plant individually. These countries have experienced no significant problems on that score. Italy did not do so, and is presently going through the same process as the UK and New Zealand did. The main incumbent Enel is being required to divest plant to competitors.

It might be suggested that California restructured its generation sector significantly but still encountered subsequent problems in respect of generation prices. However, these problems seem to have stemmed from several factors, notably the lack of new entry (in turn due to environmental and other restrictions, and the regulatory limitations on forward contracting). Generation prices in California do not at present seem to reflect a lack of competition in generation or inappropriate or excessive restructuring of that sector.

Many countries (including, Norway, Sweden, Italy, New Zealand and much of Australia) have already followed England and Wales in separating transmission from other activities. Where this has not been done there have been some problems. For example, there have been widespread concerns in the US about systems run by incumbent utilities. A major aim of policy by the Federal Energy

[14] *Inquiry into the Electricity Industry: June 2000 Report to the Minister of Energy*, chaired by the Hon. David Caygill, Ministry of Economic Development, Wellington, New Zealand.

Regulatory Commission (FERC) is to replace these combined systems by more independent and specialized regional transmission operators. (As discussed below, Hydro One sees itself as playing an important role in regional transmission.) There have also been concerns in Scotland about the fact that the two vertically integrated companies there (Scottish Power in the south, and Scottish and Southern in the north) combine the various activities of generation, transmission, distribution and retail supply. The regulator's latest proposals, backed by the Government, are to introduce an independent transmission system operator and to extend the trading system recently introduced into England and Wales.

In Germany, a major problem has arisen over lack of access to the transmission systems of the incumbent utilities. There is also a concern that the vertically integrated structures of these utilities make it difficult to ascertain what actual costs are, what efficient costs would be, and what reasonable access charges should be. The lack of an independent regulatory system compounds the problems. The main integrated utilities are presently under investigation by the Federal Cartel Office as a result of complaints about their charges, and the non-transparent process by which these are set.

*Commercial Restructuring*

Although the changes described above have typically been prompted or enforced by regulators and governments, international experience suggests that restructuring is not simply a matter of pressure by these agencies. A significant amount of restructuring derives from mergers and acquisitions instigated by companies themselves – and also from demergers by such companies.

A fully competitive market implies the ability of companies to enter the market and to grow in various ways. For example, generators can do so not only by

building new plant on a “greenfield site”, but also by buying existing plant from existing operators. Similarly, distribution companies from one country have typically moved into the market in another country by acquiring existing distribution companies there. The same is true of retail supply. The leading UK electricity supplier is the former *gas* supplier Centrica that bought existing electricity supply companies in order to enter the market, as well as built up its own new customer base.

In the UK, and to some extent in most other countries, there is an active market in electricity companies of different kinds. This facilitates new entry, and also facilitates exit – which in turn means that the businesses tend to be run by more efficient or innovative managements. The ability to exit is also conducive to new entry because it reduces the risks associated with entry. Indeed several overseas companies that once entered the UK market have subsequently sold out and left.

In parallel with the process of entry and exit has been a process of discovery by electricity companies. They have had to ascertain the business at which they are most effective, and to determine the most economic scope for their activities. For example, the successor generation companies have stayed with generation, but several have also moved into retail supply. There is a perception that these competitive activities blend well together, though this is not to underestimate the scope for retail suppliers and generators to operate independently, using the competitive wholesale market to buy their inputs and sell their outputs.

In contrast, the regional companies were initially engaged in both distribution and supply, but have increasingly questioned whether it is sensible to remain in both activities. There is an increasing feeling that these are inherently different activities, and that it is not possible to be fully efficient at both. The once-alleged economies of scope between distribution and supply seem on further investigation not to have been so significant. Some former regional companies have therefore decided to specialize in retail supply, and have acquired generation plant or

contracts to facilitate this. Other former regional companies have decided to specialize in distribution. In both cases there have been sales of the businesses no longer required, and sometimes acquisitions of additional businesses in the preferred line of activity.

There has been similar experience in the natural gas sector. The dominant incumbent British Gas was initially privatised as a single entity. Subsequently, under pressure from the regulator, it separated its transmission and distribution business from its downstream supply business. Both businesses later declared themselves better off as a result of not being held back by the other. The next step was that the transmission company decided voluntarily to split off its upstream gas exploration activities. It considered that these had a higher value operating separately.

These views about the advantages of specialization rather than integration are not held universally in the UK or elsewhere, and some companies continue to believe that an integrated approach is more profitable. However, the pressures of competition and efficiency do seem to be leading, over time, in the direction of more specialization. This is particularly the case in the UK, where there was pressure from the companies as well as from the regulator for the Government to change the Electricity Act to enable the different parts of these businesses to have separate licences, and thereby to operate in separate ownership structures. But the direction of change can also be observed internationally, including in the US.

*Implications for Ontario*

This survey has been brief but nonetheless suggests a number of lessons potentially relevant to Ontario. Across the world, countries have typically taken significant steps to restructure their electricity industries prior to introducing competition and private ownership and/or deregulation. In numerous cases these

steps turned out to be insufficient, and the regulator (generally with the government) needed to take further steps to bring about a more satisfactory situation.

Investors are increasingly aware of this. They know that regulators and governments need to be concerned about, and responsive to, the concerns of all participants in the competitive market. Investors are therefore increasingly reluctant to put money and effort into buying or operating companies that seem to have a dominant position initially, but that may need to be broken up subsequently because of an inconsistency with the competitive market.

Companies themselves are also active in restructuring from a purely commercial perspective. Rather than simply continuing to operate with the structure and activities that they happened to inherit from times past, they are looking afresh at what makes most sense for them. They are increasingly skeptical of the economies of scope over different activities, and increasingly see the advantages of specialization in what they do best.

For these various reasons, a market consisting of smaller and more specialized companies is more conducive to competition, new entry and innovation in the electricity sector. It therefore seems to be a more sensible and efficient place to start.

Many aspects of Ontario's proposals are consistent with this policy framework and international experience. These include the reorganization of Ontario Hydro into various separately owned corporations, particularly the separation of power generation from transmission and distribution, the creation of an independent market operator, and the separating out of the safety monitoring activities. Another consistent step was the augmentation of the powers and responsibilities of the Ontario Energy Board.

The creation of a single successor generating company Ontario Power Generation (OPG) with about three quarters of the generating capacity in the Province is potentially more problematic. This may impede or slow the development of a competitive market in generation despite the provisions that have been put in place to promote a limited amount of divestiture over a rather long period of time. It is also questionable whether an obligation on distribution utilities to offer wholesale spot prices as a "default" rate is conducive to competition and customer satisfaction. [15]

These issues are largely beyond the scope of the present paper, except to the extent that they indicate the degree to which Ontario's plans are consistent with international thinking and experience. The following sections now examine the structure of the Hydro One transmission and distribution company against the background of the policy framework sketched out above. The Terms of Reference require us "to determine whether the continued retention of both distribution and transmission functions within Hydro One is appropriate or whether the functions should be separated." The analysis should incorporate five specified issues and factors, but is not thereby limited to those. The report takes the specified issues in turn.

[15]Stephen C Littlechild,. "Why we need electricity retailers: a reply to Joskow on wholesale spot price pass-through", WP 21/2000, Judge Institute of Management Studies, and WP 0008, Department of Applied Economics, University of Cambridge, (August 22, 2000); "Wholesale spot-price pass-through" 15 (April 2002) *Journal of Regulatory Economics* (forthcoming).

## 4. Competition Between Distributors

> "Issues relating to the creation of a level playing field amongst distributors within the Province, in order to have fair, efficiency-promoting competition between distributors under a yardstick PBR regulatory regime and the potential impacts on the evolution of the distribution sector."

There seem to be two main issues here. The first is the implications for competition under a yardstick PBR regime. The second one concerns the potential impacts on the evolution of the distribution sector.

*The Nature of Competition Between Distribution Companies*

It is generally held that there is little scope for direct competition between distribution companies in the product market. That is, the ability of distribution company A to distribute electricity efficiently, at a low price and with good quality and reliability of service, within its own area A, does not represent an alternative for a customer or supplier that wishes to distribute electricity in area B. The customer and supplier have little alternative but to purchase the distribution service from company B who operates the system in that area.

However, at the margin, there may be scope for such competition – for example, in attracting new customers to a low-cost high-reliability system, or retaining existing ones. Some would maintain that there is such competition internationally – or at least that price and reliability of electricity supply is one relevant factor in a newly-locating customer's decision. The possibility that prices can influence choice in this way is discussed further in section 6 below.

The more immediate concern here is with competition of a different kind between distribution companies - that is, competition in the capital markets. Companies compete for the funds of investors by offering superior performance. Those companies that succeed see their share prices increase, they get funding at lower rates, and they can expand. Those companies that fail see their share prices fall, they may have difficulty in raising funding and they may have to contract. Eventually such companies may be taken over by more effective owners and managers.

It is worth noting that similar considerations apply to private companies that are not quoted on the stock exchanges and, indeed, may apply to municipal distribution companies. Their ability to expand or contract, or to raise investment funds, or to attract and retain good quality staff, or to provide the necessary distribution services, may well depend on their financial performance relative to other distribution companies whether municipal or private.

Key determinants of financial performance include profit levels and growth rates, along with other factors such as stability and predictability of earnings. In turn, profits depend on the one hand on costs, and on the other hand on revenues. Broadly speaking, costs are within the control of the companies – at least, it is here that the effects of superior or inferior management are mainly to be found. And in unregulated competitive markets, revenues too are determined by the effectiveness of the companies relative to their competitors (and relative also to other factors such as growth in market demand). In contrast, in a regulated monopoly market revenues are largely determined by the nature of the regulatory constraints.

The decisions of the regulator consequently have a significant effect on the financial performance of the company, and hence on the nature of competition between regulated companies. It is therefore of the utmost importance to

companies operating in regulated industries that competition between them is facilitated, and not distorted, by the actions of the regulator.

*Performance Based Ratemaking*

This issue is of particular relevance where Performance Based Ratemaking (PBR) is to be adopted. PBR has at least four major objectives:

- to create strong incentives for cost minimization subject to maintaining appropriate quality of service;
- to promote efficient capital expenditures;
- to promote productivity improvements and innovation;
- to enable recovery of reasonable costs and an adequate return on such investment.

PBR is increasingly adopted because it can achieve these objectives more effectively than traditional forms of rate making. But all these objectives are achieved more readily if the regulator has access to adequate information. The organizational structure of the industry can critically influence this.

If the regulator follows traditional approaches, and simply determines revenues by essentially approving costs as incurred, with an allowed rate of profit, then it is of less significance to a company what a competitor's costs might be. But where PBR is adopted, prices are set for a period of time ahead, based on an assessment of what reasonable or efficient costs should be. Performance then depends more crucially on the levels of allowed prices and the reported patterns of costs.

To ensure that the regulatory framework does not distort competition between distribution companies, the regulator must have access to the information needed to regulate effectively and even-handedly as between companies. In particular, it

must not be possible for one or more companies to use their position or status or actions to bias the regulator's decisions on allowed prices and price controls.

*Potential for Cost and Revenue Misallocation in Combined Companies*

There are likely to be several respects in which a regulator would be faced with greater difficulty in setting prices when dealing with a combined transmission and distribution company than when dealing with such companies separately.

In a larger company covering more activities, more decisions have to be made about where to attribute and allocate costs and revenues.[16] Even with the best intentions, costs can be misallocated. Where there may not be the best of intentions, there is greater scope for deliberate or misleading misallocation of costs. In a smaller more specialized company the narrower focus of the company's activities themselves constrain how far costs can be misallocated.

What are the likely forms of such misallocations in the case at issue? A variety of top management costs, that cannot easily be attributed to a particular activity, might be allocated arbitrarily or artificially to transmission or to distribution. Such costs might include advertising and marketing, research and development, board salaries and expenses, the costs of setting up and maintaining a share register, and so on.

Larger misallocations could occur with capital expenditures, for example if a transmission line were extended to support a particular distribution network but its costs were imposed on all users of the system through transmission charges.

[16] The term "attributed" is sometimes used to refer to the classification of those costs and revenues that can be associated more or less directly with particular activities or products. The term "allocated" then refers to the classification of those more general costs and revenues, like many overheads, that cannot be so directly associated. For simplicity this report generally refers to allocation alone. Similarly, the discussion focuses on the allocation of costs although analogous concerns often arise with respect to the allocation of revenues.

Some expenditure allocations as between transmission and distribution necessarily entail an element of judgement that would be exercised by the combined company, and may or may not seem reasonable. It might take considerable time and effort by the regulator to investigate these.

Other costs could be similarly blurred. For example, a company might or might not keep separate records and accounts for different transformers or cable, and for the allocation of time and transportation costs in procuring and using such equipment. Indeed, if an avowed aim of a combined company is to exploit economies of scope by physically integrating transmission and distribution activities, it might see the keeping of separate records and the separate allocation of time and costs as artificial, costly and unhelpful.

*Potential Distortions Caused By Misallocation*

What are the likely consequences of such misallocations of costs and revenues? The main concern in this section is with the potential impact on competition between distribution companies via the impact on the price control process. There are potential impacts both before and after the price control is set.

If a combined company were to allocate a significant set of costs to distribution instead of to transmission *before* the price control is set, the costs of running its distribution business would appear higher than they otherwise would. Similarly, if the company were to allocate revenues to transmission instead of to distribution, the revenues of the distribution business would appear lower than they otherwise would. Either or both of these misallocations might induce the regulator to allow a higher price for the combined company's distribution business than would otherwise have been the case. The combined company would therefore be advantaged in the capital markets relative to distribution-only companies.

There are also potential distortions thereafter. If the combined company were to reallocate its costs and revenues *after* the price control has been set, but in the opposite directions, then the combined company's distribution business would appear to be making greater profits, via improved cost and revenue performance, than it otherwise would. Again, the combined company could receive favoured treatment in capital markets relative to a distribution-only company that has no scope to reallocate its costs and revenues in this way.

It might be argued that the regulator would stop this kind of thing. Certainly the regulator would be concerned at any systematic manipulation of accounting data, and might lay down requirements or guidelines as to how costs and revenues should be allocated. However, to monitor the implementation of such requirements is costly and time consuming and may become unduly interventionist. Moreover, there are many ways in which misallocation can be effected, some of which are not obviously objectionable at the time, and as fast as a regulator stops one type of misallocation a company might devise another. Typically a regulator might engage in a thorough assessment of cost and revenue allocation at the time of a price review, but might well have other more pressing concerns in the period between such reviews.

It might be objected that, even if a reallocation of costs and revenues of the kind described should favor the distribution part of the business, it must adversely affect the transmission part of the business by about the same amount. That is, if costs appear higher in distribution they will appear correspondingly lower in transmission, and conversely. So any gains on the swings are lost on the roundabouts. On this argument, capital market performance would not be affected if there is a misallocation of costs and revenues.

There is some force in this argument, but it ignores two factors. First, it cannot be assumed that a regulator will be able or willing to set controls that precisely cancel each other out in this way. For example, the two types of price control may

be set at different times (as they were in the UK during the first ten years). And various factors may assume different importance in setting transmission as opposed to distribution controls. For example, in the UK different costs of capital were associated with the two businesses.

Second, such an argument ignores the potential adverse effect on other companies. Suppose other distribution companies are disadvantaged in the setting of their price controls relative to the distribution business of a combined distribution and transmission company, or in their perceived performance after the price control has been set. It is little consolation to them that evaluation of the combined company as a whole might be unaffected, or that one part of the combined company might be perceived as more or less efficient than it otherwise would have been.

*Implications of a Yardstick PBR Regime*

The concerns about misallocation of costs and revenues, and the effect on price controls set and results reported, apply whatever kind of PBR is envisaged. They are likely to be more serious if a form of yardstick control is adopted. Under this approach, the rates allowed to one company depend not just on that company's projected costs but also, or instead, on the actual or projected costs of other comparable companies in the industry. The allocation of costs within a combined company could then influence not only the reported costs of its distribution business but also the yardstick applying to other distribution companies. This could have serious effects on comparisons and capital market competition.

Developing a yardstick PBR regime in Ontario is a challenging task. There is evidently a great disparity in the sizes of the distribution companies quite apart from Hydro One, and separating the ownership of the latter's transmission and distribution businesses will not reduce that disparity. The other large utility,

Toronto Hydro, has about half the customers and is at the other end of the spectrum from Hydro One's distribution business in terms of density. So the ability to find suitable comparators for all the distribution companies may be limited.

Nevertheless, Hydro One's distribution costs may be relevant in a yardstick calculation, for example when assessing costs of other utilities with low customer density or when attempting to assess the impacts of density on costs. It will also give some indication of the possible extent of economies of scale. So the distribution costs exhibited by Hydro One, however derived, are likely to be of interest to the regulator in setting price controls, with or without a yardstick or whatever form of yardstick is found appropriate. Hydro One's cost allocations could therefore have an impact on the allowed revenues, perceived performance and competitive position of other distribution companies. It follows that the transparency of these costs, and any increased possibility of their misallocation, is a valid source of concern to other distribution companies, as well as to the regulator.

*Impacts on Evolution of the Distribution Sector*

The previous discussion in this section has explained how the existence of a combined company could adversely impact on the nature of competition via its influence on the setting of price controls, especially under a yardstick PBR regime. This in itself could handicap other distribution companies with respect to the evolution of the distribution sector. However, the potential impact of the combined company on evolution is likely to go beyond this.

As a result of its initial size and control of strategic industry assets, Hydro One would tend to dominate, or at least exercise an undue influence on, the Ontario

electricity market. It has indicated its intention to expand further in distribution.[17] It would have the resources to do this. There must be fears that by virtue of the resources at its disposal, not least its transmission business revenues, it will distort the market in distribution companies – for example, by overpaying for acquisitions, thereby making it difficult for another smaller distribution company to grow by acquisition within the Province.

*Advantages of Consolidation?*

It might be suggested that the further acquisition of small distribution companies by Hydro One would be desirable in terms of efficiency, even if it did impact adversely on competition. Some might argue that amalgamations and acquisitions contribute towards rationalization and therefore cost reduction in the distribution segment of the industry. For example, there has been some pressure for mergers in the UK, on the basis of projected efficiency improvements. Five of the original 14 distribution companies are now owned by five of the other distribution companies.

On the other hand, studies of Ontario and other jurisdictions where there have been multiple distributors (in particular, New Zealand, Norway and Switzerland) suggest that in these contexts minimum efficient scale in distribution can be achieved by utilities of relatively modest size.[18] A possible reason for this is that many of the smaller utilities were contracting out various functions. Many of the distribution companies in Ontario are above the minimum efficient size, and Hydro One's existing distribution business is far above it.

[17] *Preliminary Prospectus*, Hydro One, March 28, 2002, p. 49.
[18] See Giles, D. and N.S. Wyatt, (1993), "Economies of Scale in the New Zealand Electricity Distribution Industry", in *Models, Methods and Applications of Econometrics*, ed. P.C.B. Phillips, Blackwell, 370-382; Salvanes, K. and S. Tjotta (1994): "Productivity Differences in Multiple Output Industries", *Journal of Productivity Analysis*, 5, 23-43; Filippini, M. (1996): "Economies of Scale and Utilization", *Applied Economics*, 28, 543-550.and Yatchew (2000), "Scale Economies in Electricity Distribution: A Semiparametric Analysis", *Journal of Applied Econometrics*, 2000, p.187-210.

Scale economies in distribution may be changing over time – for example, with changes in information and other technologies. However, it is not clear at this point that further acquisitions by Hydro One would significantly reduce the costs of distribution in Ontario. Furthermore, the scope for cost savings in aggregate is rather limited. Though there are 97 distributors in Ontario, most customers are served by sizeable utilities, and the proportion served by very small utilities is rather low.

*Disadvantages of Consolidation*

There may be detrimental effects of consolidation. As the number of distributors declines there are fewer comparators, which in turn impairs the ability of the regulator to make useful cost comparisons. This would be an even greater concern if the Ontario Energy Board decided to implement yardstick regulation. In the UK, the electricity regulator (following the water regulator) has put a price on mergers of distribution companies, requiring a tightening of the price controls of the merged businesses by some £32 million over five years to offset the disadvantages of such lost comparators.[19]

Consolidation between smaller distribution companies might be less problematic insofar as it might create or maintain more distribution companies of comparable size to one another. Acquisition by Hydro One would exacerbate the present severe differentials. The greater ability of Hydro One to grow by acquisition within the Province could therefore have a twofold adverse effect: by reducing both the number and the quality of comparators available for price controls.

[19] "Mergers in the electricity distribution sector: policy statement", 1 May 2002, Ofgem website at http://www.ofgem.gov.uk/public/pub2001.htm,

*Other Forms of Expansion*

Hydro One has indicated an interest in expanding its operations outside the Province. This is not in itself undesirable, and may indeed represent an attractive opportunity. It would therefore be unfortunate if a combined company were to use its dominant position in the market to exploit such opportunities – or be perceived to do so - at the expense of generators, distributors and customers within the Province. This issue is explored further in section 10 below.

The discussion so far has focused on distribution activities per se. However, distribution companies in Ontario may also engage in retail supply and in generation, via affiliate companies. Some are intending to, others are not. In selling its retail assets, Hydro One has indicated its intention to focus on its core wires business. However, Hydro One is not precluded from returning to this activity in the future. Nor is it precluded by law from acquiring interests in generation assets, though regulatory approval may be required. Such vertical integration has occurred in other jurisdictions. If this were the case in Ontario, there would be further fears as to the nature of competition in the market, as discussed in section 9 below. This would have potentially serious implications for the evolution of the distribution sector broadly defined.

## 5. Regulatory Oversight of a Combined Distribution-Transmission Company

> "Issues relating to the regulatory oversight required on a joint distribution-transmission company in order to promote fair competition practices."

*Additional Rules for Cost Allocation*

It has already been noted that the regulator will need to monitor the attribution and allocation of costs and revenues for purposes of price control setting. For all distribution companies, the regulator will need to monitor the allocation within each business – for example, as between capital and revenue expenses. With a combined company it will be necessary, in addition, to monitor the allocation as between the transmission and distribution businesses. Monitoring here may not simply be a matter of checking that specified rules have been followed. It may also necessitate continually or periodically reviewing the appropriateness of those rules, and in some cases taking steps to modify them.

A combined company would thus impose extra work on the regulator, involving the specification of additional rules and the provision and examination of additional information. Given the greater scope for misallocating costs within a larger and more varied business, and the possible self-interest of the company in allocating costs in one way rather than another, there would need to be a greater degree of skepticism on the part of the regulator of a combined company. The rules for allocation would probably need to be more rigorously and extensively specified, tested and enforced.

A greater regulatory burden would be more costly. This has been observed elsewhere. The annual budget of the gas and electricity regulatory bodies in the UK has increased by fivefold over the past eight years or so. Concerns are now

expressed about the size and expenditure of the utility regulatory bodies. Suggestions have been made that regulation is too extensive and intrusive, and should be reduced.[20]

*Conflicts of interest*

A second area of concern and regulatory oversight with respect to a combined company would relate to possible conflicts between the duties and interests of the transmission business and those of the distribution business.

Transmission and distribution companies in a competitive market typically have duties or responsibilities not to discriminate between market participants. This is true in Ontario.[21] The regulator, with the additional duty "to facilitate competition in the generation and sale of electricity, and to facilitate a smooth transition to competition", must ensure that the companies discharge their obligations in ways that are consistent with this.[22] Each company must ensure that whatever processes and terms it adopts, these must enable new participants to enter the market. Potential entrants must not be held back or disadvantaged relative to the incumbents, and the network systems should look for ways of assisting them to participate in the market.

However, the focus of this attention will differ as between the activities of the transmission business and those of the distribution businesses. For example, the transmission system will need to focus on non-discrimination as between entrant and incumbent generators while distribution companies will need to focus on non-

[20] E.g. John Blundell and Colin Robinson, *Regulation Without the State … The Debate Continues*, Institute of Economic Affairs, Readings 52, London, September 2000. Better Regulation Task Force, *Economic Regulators*, London, July 2001.
[21] *The Electricity Act* 1998, Subsection 26(1) states "A transmitter or distributor shall provide generators, retailers and consumers with non-discriminatory access to its transmission or distribution systems in Ontario in accordance with its licence."
[22] In the UK, the transmission business, and more recently the distribution businesses, themselves have duties to facilitate competition.

discrimination as between its own affiliates and other generation and retail supply businesses.

There is some commonality of issues facing all wires businesses, such as the need to project future demands and balance quality and price. However, there are also some significant differences – for example, in technology, in the nature of growth and changing demand, and in the nature of the problems faced. For example, transmission reliability is typically very high, whereas interruptions to supply are commonplace in distribution networks. (The latter have long accounted for almost all the interruptions to supply in the UK.) The contrast in interests is accentuated if the distribution company has generation and/or retail affiliates, which it will want to protect and promote.

A combined distribution-transmission company has to balance all these considerations in the light of its overall commercial (or governmental) objectives. There may be many issues where there is no conflict, but there are bound to be many others where conflicts do arise. For example, there may be limitations on the total funds available for investment at any time, or alternative ways of setting transmission tariffs, or alternative procedures for adding connections to the system.

All companies have to take into account their own commercial, governmental or municipal objectives as well as their statutory or licence obligations. The regulator has to ensure that the latter are not sacrificed to the former. With a combined company, the regulatory problem is greater. To the extent that the formal duties might conflict, the regulator has to check that the combined company has taken a reasonable decision or approach, and may need to take steps to reverse that decision or approach if it seems unacceptable.

The more serious and more ubiquitous problem is not so much a conflict of formal duties but a possible conflict between the interests of the distribution

business and the duties of the transmission business. For example, where funds are limited, there might be a suspicion that projects for reinforcing one network might get priority over the other, or that reinforcing the transmission network in the region of the distribution business (or with positive impacts on it) might get priority over reinforcement in or for other regions.

Since there is less potential for conflict of interest in a transmission-only company, a regulator of such a company might feel able to rely on it to a substantial extent to discharge its formal duties. In contrast, the regulator of a combined company might feel it necessary to engage in a greater degree of oversight and "second-guessing". There might be a need to specify in more detail what the company should do instead of leaving more issues to the company's discretion. This would tend to slow down decision-making, reduce innovation and flexibility, and increase cost.

## 6. Efficient Regulation of Distribution Services

> "Issues relating to efficient regulation of distribution services within the Province."

It has been argued above that a combined company has scope, which a separate company would not have, to allocate costs or to take a wide variety of decisions or approaches that might favour one component of the combined company at the expense of the other. Previous sections have explored the potential impact of this on the financial performance and hence competitiveness of the distribution companies, and on the regulatory burden. This section looks at the potential impact on the efficiency of resource allocation.

*Cross-subsidy and Resource Allocation*

A combined company could have scope to balance its charges or other terms in favour of or against one of its component businesses. To the extent that these charges were not reflective of costs, this would constitute cross-subsidization. What effect could this have on decisions made by the customers of those businesses, the users of those two systems?

In some circumstances it might be in the interests of a combined company to use its distribution business as a source of funds for assisting its designs in expanding its transmission activities. Whether this is likely given the relative sizes and prospects of the Hydro One businesses is unclear. It will therefore be of more interest to illustrate the argument with the opposite assumption, that transmission is used to support other activities.

Suppose, then, that a combined company artificially increased the charges for using the transmission system in order to reduce charges for using distribution systems generally. This might be an indirect way of favouring the combined company's own distribution business, or it might reflect other objectives of the combined company, or political or other pressures on it. The precise impact of such a cross-subsidy would depend on the precise rules for charging costs to users. However, in general heavier users of the transmission system would tend to suffer at the expense of light users. For example, large industrial customers with direct connections to the transmission system would suffer relatively to residential customers, and to smaller industrial customers connected to distribution systems. To the extent that importing and exporting of electricity in and out of Ontario required heavier use of the transmission system, customers that depended on imports and generators that hoped to export would be harder hit.

Whether it is desirable to give a company the power to redistribute income in this way seems dubious. Why should one customer over-pay to benefit another?

To the extent that customers responded to the levels of charges there could also be an adverse impact on the use of resources. This could potentially increase costs and reduce the value of output – effectively reduce incomes – for many users in this sector of the economy. For example, large customers and new generators often have some choice about which region to locate in. They may also be able to decide whether to locate on or near the high voltage transmission system, or instead to locate within the low voltage distribution system. They have to consider a variety of factors here, including the costs of transforming the electricity voltage up or down to meet their needs, the costs of connecting their plant or factory to the system, the availability or otherwise of suitable existing connections, and the price and reliability of the service provided, and so on. The relative levels of transmission and distribution charges are only one factor, but at the margin they are likely to have an impact on the user's decision. Uneconomic location of plant and factories will increase costs, which are ultimately paid by customers.

The extent of such impact is difficult to predict, and will no doubt depend on the local circumstances. However, a concern for such impacts has certainly driven policy elsewhere. The aim of revising transmission charges in the UK has been to influence location decisions of new generators, and this seems to have been a factor in several decisions. It seems plausible that the level and structure of transmission charges could similarly influence location and output decisions in Ontario, especially to the extent that the Province is potentially well placed to participate in trade in power in the region around it.

*Rural Rate Assistance*

To the extent that a combined company used its position to favour its own distribution business, rather than distribution businesses generally, the effects on the users of that distribution system would be more localized. Customers and generators in that area would tend to benefit at the expense of customers and generators elsewhere. Customers newly locating in that area would tend to be favoured at the expense of others.

It might be argued that this could be a good thing. In the case at issue, Hydro One's distribution business is predominantly rural. It might be argued that the costs of this business are likely to be higher than those of other distribution companies, and should be supported by revenues from the transmission business. Indeed, the President of the Power Workers Union has drawn attention to "the special challenges Hydro One faces with respect to their distribution network when compared to other Local Distribution Companies. These include significantly lower density, almost no underground lines, large geographic areas for travel, significantly greater tree trimming activities and the requirement to do most work on live lines due to limited alternate service lines."[23] This is part of

[23] Don MacKinnon, "Power Workers President Explains the Importance of Investment in Hydro One", *Canada NewsWire, Electricity Industry News,* Toronto, April 24, 2002.

the basis of his argument for retaining the transmission and distribution networks within the same company.

Arguments such as these have underlain the rural rate assistance program that has existed in Ontario for many years. We note that the program continues upon market opening and the Independent Electricity Market Operator is responsible for collecting charges associated with it.

The cost factors outlined above can be valid considerations in principle, and have been advanced by the more rural distribution companies in the UK at times of price control reviews. However, it is fair to say that regulators, and companies in less rural locations, have been less convinced of the magnitude of these cost differences than some of the rural company proponents. Moreover, urban companies would draw attention to the costs of operating networks in big cities. For example, higher density urban networks may involve greater difficulty and cost of travel, and higher cost of labor and sites. Underground lines may require less maintenance and repair, but they are significantly more costly to install and to repair in the event that a problem does occur.

Conclusive evidence on efficient costs is yet to emerge. It would not be surprising if cost differences between efficient companies in future, whether urban or rural, turned out to be lower than cost differences may have been in the past.

Nonetheless, if it is accepted for the sake of argument that there is some difference in cost between companies, this does not in itself necessitate a combined company to deal with it by internal cross-subsidy or otherwise. For one thing, some have argued that a cross-subsidy may not be called for. The principle of regional cross-subsidy has not been accepted within England and Wales, where the more rural companies generally charge a higher amount to cover their higher distribution costs to the extent that the regulator deems these justified. And if there is to be a subsidy - for remote communities, say - it is not obvious that a

cross-subsidy from other electricity users is preferable to an explicit subsidy from government.

However, if there is to be a cross-subsidy or some form of rural rate protection or attenuation, as there is in Ontario, there is no need for a combined company in order to give it effect. A levy on a separate transmission company payable to the users of a specified distribution company is equally effective and indeed more transparent, particularly if it applies to other distributors that encompass rural areas. [24]

*Financing Wider Activities*

The illustrative analysis has so far examined the possibility that a combined company might increase transmission charges in order to cross-subsidize distribution charges generally, or those of the combined company's customers in particular. Another possibility is that the combined company might instead use higher transmission charges to fund additional activities by itself. These might include purchase of further distribution companies, construction or strengthening of interties, extension of activities into generation, or other activities including the general development of the company and the extension of its activities on a broader canvas, perhaps internationally.

Whether any or all of these activities are or are not desirable is not the main issue here. The question is how they should be appraised and financed. Should they be financed or facilitated by the ability of a large combined company to use its aggregate revenues to fund a broad range of strategic goals, subject only to the

[24] Another example is one found in Scotland, where the Electricity Act provides for the lower costs of hydro generation in the north of Scotland to be used to keep the transmission and distribution charges in that area down to the level in the south of Scotland. The regulator approves the implementation of the scheme at each price control review. Although the costs of hydro generation, transmission and distribution in the north of Scotland were initially within the same company, the scheme was modified

company's ability to persuade or bypass the regulator? Or should each company have to decide what to finance out of the prospective revenues that its own activities might be expected to yield? The general presumption must be that the latter would be more likely to lead to shrewder decisions, more efficient allocation of resources, and better protection for electricity users generally.

in order to allow for the eventuality that the company might dispose of one or more of these businesses. The scheme would therefore be workable whatever the pattern of ownership.

## 7. Capital Investment Decisions

> "Potential impacts on capital decisions in transmission and distribution made by Hydro One and distribution investments by distributors."

Because the overall incentives of a combined company will in general be different from those of a distribution-only company, this may influence the investment decisions that it takes. Because of the interdependencies between transmission and distribution, this could have an impact on the investment decisions by other distribution companies, and indeed by generation companies and others. To the extent that combined ownership seriously distorts the pattern of investment, this could increase the costs incurred by some or all of the market participants.

To explain, transmission and distribution systems are continually reviewing and maintaining their assets to deal with expected future demands on these systems. But these demands are not independent of each other, nor of the charging and other policies adopted by each system. This may be particularly the case as the electricity sector enters a time of change, with the development of competition and also active discussion about the future nature of generation and distribution in response to environmental concerns.

Reinforcements to one system can to some extent be a substitute for reinforcements to the other. One route from A to B might be via a direct transmission line, another might be via strengthening the system of the intervening distribution companies. There might also be complements: strengthening the transmission system might only be worthwhile if the distribution systems at either end are strengthened, and conversely.

With the development of competition and multiple owners in generation, local generation bottlenecks – due to an excess or shortage of generation in a particular

area, relative to the capacity of the network - are nowadays an area of some concern. There are different ways to solve the problem. There are tradeoffs between investment in local generation in a particular area and investment in transmission capacity to minimise the effect of the local bottleneck.

Another issue involving alternative capital investments is the choice between large traditional power stations connected to the transmission grid and smaller generation plants, possibly using renewable energy, connected to the local distribution systems. Each kind of generation has different implications for distribution investment.

The concern in all these cases is that combined ownership would provide greater opportunity and incentive to distort the investment pattern of the transmission system and/or the distribution systems, than would be provided by separate companies. The consequences of such a distortion could include higher costs for market participants and/or unnecessary investment in one or more of the network systems. And unlike some assets in some other industries (such as aircraft and ships), transmission and distribution assets installed in the wrong place or at the wrong time cannot generally be uprooted and used elsewhere.

Some might argue that interdependencies of the kind discussed make a case for a single integrated company to evaluate all the possible combinations and implement the optimal one. This was a view widely taken internationally for much of the last century. But the disadvantages of such a single integrated company have already been mentioned. The preferred view more recently is that there is greater advantage in having independent entities forming their own views about the situation, and where necessary debating the options and/or coordinating the solution. There is of course a need to ensure that the competitive and regulatory framework is adequately developed. This kind of coordination has been necessary in Ontario in the past, and will in any case continue to be necessary in future, given the existence of independent distribution companies.

Retaining a combined company would thus not solve a particular problem with respect to capital expenditure decisions. Nor would creating two or more separate companies instead of a combined company create a new problem. On the contrary, the combined ownership of a transmission company and one distribution company might complicate the situation in the different circumstances of the future. It would raise concerns about the motives of the transmission company, in a context of competition and possibility privatisation, where it is imperative that the transmission company not be suspected of favouring any particular market participant.

## 8. Economies of Scope

> "Potential efficiency benefits from economies of scope resulting from retention of both functions within one entity."

The term "economies of scope" refers to lower costs from engaging in two or more activities within the ownership of a single company, compared to the costs that would be incurred if separate owners undertook the activities. It used to be assumed that there are economies of scope in all or most of the different activities in the electricity sector, but this is no longer widely accepted.

An argument has recently been put for the existence of such economies with respect to the transmission and distribution activities of Hydro One:

> "With the creation of Hydro One, significant efficiency measures that included the physical amalgamation of transmission and distribution functions and the reduction of work locations, assisted in allowing Hydro One to keep the costs of low density distribution customers under control while meeting shareholder-directed cost increase ceilings.
>
> It is important to understand that whatever the ownership or investment model finally adopted, dismantling this integrated effort would have significant economic impacts. A separation of activities shared between transmission and distribution would lead to increased costs estimated at $100 million annually after an initial $25 million separation cost. With a full physical separation, these additional costs could easily double. To place this in perspective, the conservative $100 million figure is equivalent to

> about a 10% increase in Hydro One rates associated with distribution customers…
>
> In summary, the synergies between transmission and distribution are essential to ensure cost and reliability and safety – both worker and public – is not compromised."[25]

We have not been able to examine any study on which these numbers may be based. However, experience elsewhere puts this argument into context. It should be emphasized first that there is no evidence of which we are aware that separation of transmission and distribution has compromised or might tend to compromise reliability and safety. The many changes in the structure and ownership of the UK electricity sector have been associated with higher standards of both reliability and safety, and we are not aware of different outcomes in other countries. The issue is therefore one of potential cost savings.

There may indeed often be scope for savings from combining various activities. In some circumstances distribution and transmission may be such an example.

However, the more important questions are how significant these economies are likely to be compared to other sources of potential gain, whether combining the activities in this way could prejudice the achievement of such other gains, and whether any such economies of scope offset the other potential disadvantages of combined operation.

[25] Don MacKinnon, as above.

*Evidence for Economies of Scope?*

There have been various studies of vertical economies in the electric power sector.[26] However, these have typically combined transmission, distribution and retail supply into a single downstream stage, and compared costs with and without upstream generation.

We are not aware of any empirical studies that specifically examine the extent of economies of scope from combined versus separate operation of transmission and distribution.

It is of interest that "the transmission and distribution functions were physically separated when they were part of Ontario Hydro."[27] Evidently neither the company nor the then-regulatory body considered the potential savings from physically combined operation to be sufficiently worthwhile to outweigh the disadvantages.

The two Scottish companies, Scottish Power and Scottish and Southern, are each responsible for both transmission and distribution in their own areas. In 1995 one of these companies, Scottish Power, merged the two activities into one division. It would no doubt argue that it could operate at lower cost by virtue of combining these two activities - for example, by exploiting synergies in terms of overheads and planning. Nevertheless, transmission and distribution still retain separate control centers within Scottish Power and the workforces are likely to continue to need somewhat different skills.

How far potential economies of scope would be achievable within Hydro One is surely debatable. Its situation is rather different from those of the two Scottish companies. They are each responsible for all the distribution in their area, not

[26] See, e.g., J. Kwoka, "Vertical Economies in Electric Power: Evidence on Integration and its Alternatives", *International Journal of Industrial Organization*, 2002, 653-671 and references therein.

merely the more rural quarter of it. How far would it be sensible to merge the planning and control functions of such different activities as transmission and rural distribution? Even if the rural distribution network is radial and sparse, requiring the ability to deploy work crews and machinery over broad expanses of territory, how much savings would there be from physical amalgamation and reduction of work locations that could not be achieved in other ways?

*Combined Operation with Other Services*

There is some evidence that Ontario electricity distributors that provide other services such as water and sewage have lower costs than distributors that do not provide these other services.[28] This may suggest to some that economies of scope between transmission and distribution would also be plausible.

UK experience on this point is instructive. Several electricity and water companies actively considered the possibility of mergers or acquisitions in order to secure cost savings from combined operation, particularly with respect to customer servicing activities. In the event, only two such mergers took place. Both have since been unwound. Experience suggested that any savings from combined operation were more than offset by the difficulties of managing two different enterprises. Investors were not convinced that their resources, and the time and effort of top management, were best spent trying to run both activities. There was greater gain to be secured from concentrating on activities that the firms knew best.

It is also relevant to note that the Ontario Energy Board has required separation of these functions for regulatory purposes despite any evidence of economies of scope. It is indeed questionable how far it would be possible simultaneously to

[27] Don MacKinnon as above.
[28] See A. Yatchew (2000), as above.

achieve the economies from fully merged activities in transmission and distribution at the same time as maintaining the separation needed for regulatory purposes.

*Other Ways of Improving Efficiency*

There is now incontrovertible evidence, particularly in the UK, that there are considerable savings to be obtained from more efficient operation of transmission and distribution taken separately. For example, after an initial pause, distribution company operating costs in the UK have declined rapidly (approximately 25 per cent from 1994/5 to 1997/8) and this is continuing. (This has not been at the expense of quality of service: during the same period quality of service has improved.)[29] The National Grid transmission company has achieved a similar record.

A substantial amount of savings has been secured by contracting out the activities of these companies, sometimes to companies formed by previous employees. Initially this covered such activities as transport and trenching and meter-reading, subsequently it has extended to IT systems, back-office facilities such as payroll, and more recently to call centers and even network planning. There is an increasing market in such services in the UK. Electricity and water companies use them and some have begun to provide these services to other companies.

To the extent that UK distribution companies consider they are exhausting the economies in their own businesses, some have acquired other distribution businesses and others are looking to do so. It is not yet clear how far any savings from merger reflect economies of scale as opposed to the introduction of superior knowledge and experience at a given scale of operation. However, there has been

[29] *Pipes and Wires*, National Audit Office, HC 723, Session 2001-2002, London: The Stationery Office, 10 April 2002.

no suggestion in England and Wales that combining the two activities of transmission and distribution would yield significant savings.

It is plausible that there could be significant scope for savings in a hitherto publicly operated organization like Hydro One that might in future be faced with competitive market pressures and possible privatisation. But this would be the case quite apart from any economies of scope. If the transmission and distribution businesses were in separate ownership, productivity improvements of various kinds, including contracting out, could still provide a means to "keep the costs of low density distribution customers under control while meeting shareholder-directed cost increase ceilings."

Combined operation would thus not be crucial to achieving significant savings within Hydro One. Indeed, it could be harmful. For each business to concentrate on running its own activities more efficiently could well yield a bigger and faster payoff than attempting to combine two different activities. An insistence on combined operation could put at risk or jeopardize the achievement of internal cost efficiencies that could more than outweigh any savings from economies of scope.

## 9. **Retail Competition**

The terms of reference do not explicitly draw attention to retail competition and generation. This is understandable if Hydro One is not involved in these activities and could not be so involved in future. However, this is not yet clear. If there were to be a change of policy the potential impact of a combined company on this aspect of the present and future electricity market cannot be ignored.

*The Retail Market*

The retail market opened to competition on 1 May 2002. Reportedly, some 20% of customers had already signed contracts with electricity retailers.[30] This is a high proportion for the opening of an electricity market. Nonetheless, it shows the likely extent of change ahead. Experience elsewhere confirms this. UK experience shows that higher proportions of switched customers are plausible within a short time. [31] The rate of customer switching in New Zealand seems to be about the same as that in the UK at present, namely net switching away from the incumbent supplier at the rate of about 1 % per month. The switching figures in most of the US states except Pennsylvania are relatively low. Early figures from the Texas residential market suggest a higher rate there, at least as high as the UK.

The possibility of losing or gaining customers at this rate, and the possibility of enhancing that rate by purchasing or selling entire supply businesses, means that distribution companies will need to consider carefully how to respond. Indications to date are that some will opt out of the retail business and others will opt in, as has indeed proved the case in the UK and elsewhere. Indeed a number of the

[30] "Watchdog Jolts 2 Energy Firms", *Toronto Sun,* April 27, 2002. According to the article, some 858,000 customers have made such arrangements.

larger municipal utilities in Ontario have already formed retail affiliates and have actively sought to subscribe customers. Such affiliates are governed by regulations that prohibit special dealing and try to minimize the potential for cross-subsidy. The Affiliate Relationship Code is sensible as far as it goes, though experience in the UK suggests that more complete legal and financial separation may be needed in due course to provide more adequate assurance of non-discrimination.

In the UK and elsewhere, most generators have decided to move into the retail market, and most retail suppliers have felt the need for some ownership or contractual association with generators, in order to reduce transactions costs or share risks, and to compete more effectively with other suppliers. How retail affiliates will secure these goals in Ontario remains to be seen, given the dominant size of the incumbent Ontario Power Generation Inc. for the foreseeable future. But one can envisage that those suppliers most active in the market will seek some kind of affiliation with generation.

*Hydro One's Policy*

What is Hydro One's position in all this, and how might it impact on the pros and cons of combined or separate operation of transmission and distribution? Early on, Hydro One formed a subsidiary (Ontario Hydro Energy Inc.) to engage in the competitive retail sale of energy. As noted earlier, on April 25th it announced the sale of its retail assets to Union Energy, a wholly owned subsidiary of EPCOR Utilities Inc. Commenting on the sale, Eleanor Clitheroe, President and CEO of Hydro One stated: "This agreement is consistent with Hydro One's strategy to focus on our core wires business….This focus on our core business will

[31] In the UK, around 80% of large industrial consumers are now with another supplier. For medium sized customers the figure is about 66 per cent. For residential customers the proportion has steadily increased since the market began to open in 1998, and is now over 30 per cent.

strengthen Hydro One as we continue towards our goal of becoming one of North America's top electricity delivery companies.".[32]

It is not entirely clear what the sale covers. On the one hand the press release quotes the CEO of EPCOR as referring to "the purchase of Ontario Hydro Energy's retail customer base". On the other hand the headline refers explicitly to the purchase of "retail assets". It says that Union Energy "has reached an agreement to purchase a total of 395,000 electricity, natural gas and water heater customer contracts and rental agreements from Ontario Hydro Energy." Reportedly these 395,000 contracts consist of 196,000 electricity contracts, 14,000 natural gas contracts and 185,000 contracts for water heater rental.[33] 196,000 electricity contracts seem to correspond to about one sixth of Hydro One's customer base of 1.2 million. It may be that many of the remaining customers are "default" customers who have not chosen another supplier, and are to be supplied at wholesale spot price.

Reportedly the transfer includes the billing system, call center and related systems developed by Hydro One.[34] This suggests that it is indeed Hydro One's present intention to move out of active retail supply. Its policy in this respect would be in line with international trends discussed.

However, the proposed transaction is still subject to approval by the federal Competition Bureau. Moreover, the concept of default supply at wholesale spot price proved extremely problematic in San Diego, and was subsequently withdrawn along with retail competition generally. The inability or disincentive on suppliers to contract ahead is now agreed to have been one of the main factors causing the problems in California, and there have been no subsequent proposals

[32] *Hydro One News Release,* Toronto, April 25, 2002.
[33] Hydro One Selling its Retail Energy Business", *Toronto Star,* April 26, 2002.
[34] *Toronto Star,* April 27, 2002

to reintroduce default supply at spot prices[35]. How the situation develops in Ontario remains to be seen.

*Avoiding Potential Concern*

A key principle in most competitive electricity markets has been to establish a transmission system that does not have financial interests in either side of the market – that is, in generation and retail supply. A transmission system that is independent of particular interests, and is seen to be above suspicion in this respect, is central to the achievement of a competitive market. This is equally true for Hydro One, even though it does not have Market Operator functions, because its other powers and responsibilities in the transmission business yield substantial scope for influencing the market, either deliberately or inadvertently.

A transmission-only company would presumably not be allowed to engage in generation and retail supply. A distribution-only company would be allowed the same freedom as any other such company. In contrast, Hydro One as presently constituted could potentially be involved in retail supply and even generation in addition to transmission and distribution. The possibility of this must be a concern to all other market participants. The formation of separate companies would avoid this concern.

[35] See Littlechild (2000,2002), footnote 15 above.

## 10. Conclusions and Policy Recommendations

*Conclusions*

The EDA has asked us to consider whether the continued retention of distribution as well as transmission functions within Hydro One is appropriate or whether these two functions should be separated.

The report has noted the guiding principles that seem to have underlain reform of the electricity industry internationally. It has also noted the need for further restructuring that has arisen when insufficient steps have been taken initially, and the difficulties of doing this. In many respects the policy adopted in Ontario is consistent with these underlying principles and with initial developments elsewhere. However, this does not seem to be the case with the proposed retention of both transmission and distribution functions within Hydro One.

The report has examined in turn the issues identified in the terms of reference. In doing so it has taken into account experience in other jurisdictions. The main findings on these issues may be summarised as follows.

*1. Competition Between Distributors*

While distributors compete directly against each other only to a limited degree, they do compete for funds in capital markets. To ensure that the regulatory framework does not distort such competition, the regulator must have access to the information needed to regulate effectively and even-handedly. In a larger company, covering more activities, there is greater scope for intentional or unintentional misallocation of costs and revenues. This in turn can lead to inappropriate price controls for distribution companies relative to a combined

transmission-distribution entity, and to unfavourable access to capital markets. This is particularly the case where the regulatory framework uses a yardstick Performance Based Ratemaking approach, as mentioned by the Ontario Electricity Board.

As a result of its size and control of strategic industry assets, Hydro One would tend to dominate, or at least exercise undue influence on, the Ontario electricity market. By virtue of the resources at its disposal, it could distort the market in distribution companies by making it difficult for other smaller distributors to grow by acquisition in the Province. Furthermore, its dominant position in Ontario could be further strengthened if it decided to expand into other segments of the market. It could therefore distort the evolution of the distribution sector of the industry in Ontario.

*2. Regulatory Oversight of a Combined Transmission-Distribution Company*

The presence of both transmission and distribution within one entity would complicate the regulatory process. In addition to monitoring allocations of costs and revenues within each business, the regulator would need to monitor allocations between transmission and distribution. The regulatory rules would need to be more rigorously and extensively specified, tested and enforced. This would be more costly and time-consuming.

A second area of concern that would not be present if transmission and distribution were separated relates to possible conflicts between the duties, priorities and interests of the two businesses. A combined company would necessitate more regulatory oversight and "second-guessing", which would slow down decision-making and again increase cost.

*3. Efficient Regulation of Distribution Services*

The proposed combined company structure creates the possibility of cross-subsidy between Hydro One's transmission and distribution businesses. This could mean an unjustified redistribution of income between market participants. It could also lead to price signals that distort output and location decisions by other industry participants such as small and large generators and larger customers. This in turn could increase the costs of power supply in the Province.

Moreover, there is no necessity of having a merged transmission and distribution company in order to collect funds for and continue the administration of the rural rate assistance program.

*4. Capital Investment Decisions*

Transmission and distribution systems are continually reviewing and maintaining their assets to deal with expected future demands on their systems. But these demands and decisions are not independent of each other. Combined ownership would provide greater opportunity and incentive to distort the investment pattern of the transmission system and/or the distribution system. The consequences of such distortions could include higher costs for market participants and/or unnecessary investments in one or more of the network systems.

*5. Economies of Scope*

We are not aware of any empirical studies that explicitly examine the economies of scope from combined operation of transmission and distribution. How far significant economies are achievable is surely debatable. It is also questionable to

what extent the operations could be merged at the same time as maintaining the separation needed for regulatory purposes.

There is now incontrovertible evidence that sizeable savings can be obtained from more efficient operation of transmission and distribution within separate companies. Operating cost reductions in the U.K. averaged about 25% over the three years 1994/5 to 1997/8 and are still continuing. A substantial amount of savings has been secured by contracting out the activities of these companies. Combined operation would thus not be crucial to achieving significant savings within Hydro One. Indeed, an insistence on combined operation could jeopardize the achievement of internal cost efficiencies that could more than outweigh any savings from economies of scope.

*6. Retail Competition*

A key principle in most competitive electricity markets has been to establish a transmission system that does not have financial interests in either side of the market – that is, in generation and retail supply. Hydro One has very recently announced the sale of its retail customer base and its intention to focus on its core wires business, though the precise implications are as yet unclear. However, under present rules, Hydro One is not precluded from returning to retail operations in the future or even from owning generation. The risk of this happening while Hydro One is a combined company will understandably concern other market participants. Forming separate companies would avoid this concern.

*Recommendations for Policy*

The terms of reference ask that the report "provide general recommendations for future policy and regulations governing the combination of distribution and transmission in Ontario".

In the light of the above findings, our view is that it would be more appropriate to separate completely the functions of transmission and distribution than to continue to combine them within a single company. It would not be sufficient to try to secure such separation by means of accounting, management or legal separation within the ownership of a single company. Given the nature of the concerns identified, the separation should be complete, requiring each of the two main functions of the present company to be placed in separate ownership.

The existence of distribution in two separate subsidiaries - Hydro One Networks and Hydro One Brampton – raises the possibility of some further division of the distribution side of Hydro One. That could enable more effective competition among distributors and more effective regulation via a larger number of relevant comparators. However, to analyse the situation in detail would require further work, including on costs and other considerations that lie beyond the scope of the present report

Ownership and regulation of the interties seems to merit further consideration. They are presumably available at present to all potential users on a non-discriminatory basis. However, separation of intertie ownership from Hydro One could potentially provide a competitive check on transmission and one or more additional sources of information for the regulator and market participants generally. This might enable them to be treated as players in the competitive market, similar to unregulated (or more lightly regulated) generators (as with entrepreneurial interconnectors in Australia). However, this analysis too would require more detailed consideration that is beyond the scope of this report.

*Successful Development of the Market in Ontario*

As noted earlier, the present proposals and developments in Ontario go a significant part of the way towards setting the framework for a competitive market. But they do not go all the way. The combination of transmission and distribution in a single company is liable to cause difficulties. (So too is the proportion of generation embodied in a single successor company, at least in the short term.)

Experience elsewhere suggests that companies are liable to be restructured if concerns arise about their compatibility with a competitive market. Consequently, it is likely to be more difficult to find buyers for successor companies, or even partners willing to lease them - if potential investors fear this kind of outcome. It is therefore more attractive for companies to start from a position where their growth is to be encouraged rather than one where they are viewed with suspicion and opposition.

When we began this study, our impression was that within Hydro One there were at least three quite different types of business trying to get out. Evidently, one of them – the retail business – is already in process of departing. This leaves transmission and distribution.

Hydro One has indicated a wish to create one of North America's larger electricity hubs in Ontario. It suggests that it is in a position to do so because of its proximity to large electricity markets in the northeastern and midwestern United States and its control of a transmission system that runs the length of the Great Lakes.[36] Given this objective, it may be that Hydro One's interests, and the interests of market participants generally, are better served by focusing its attention on this and other *transmission*-related projects rather than by dividing and diluting its corporate energies across transmission, distribution and other

[36] *Preliminary Prospectus*, Hydro One Inc., March 28, 2002, p.2,3, 47-49.

activities. As a transmission-only company it would find less opposition from concerned parties within the Province.

Hydro One's other main expertise is in distribution, with a present emphasis on rural areas, though not exclusively. Subject to any decisions on further division of this activity, there seems a sound business to be developed here, focusing on bringing ever more efficient, economical and reliable distribution systems to Ontario, and in due course elsewhere. The business would aim to compete effectively in terms of the yardsticks established by the regulator, unhampered by any suspicion of favoured treatment by the transmission business.

The two different activities require different expertise and, importantly, each requires the full focus of a committed management to develop successfully. To create separate businesses initially would therefore seem to offer better prospects of success. Investors would be clearer where they stand. There would be more attractive opportunities for potential senior executives. There would be alternative sources of information, ideas and innovation. This would be particularly useful for the regulator, and for market participants generally. Importantly, separation would help to dispell concerns about the dominance of a large successor company in the electricity industry of Ontario.

Any potential advantages of a combined company would not seem to outweigh the disadvantages that would be entailed, and the advantages of separation.

For all these reasons, we take the view that the full ownership separation of Hydro One's transmission and distribution businesses would be preferable to the continued combination of these activities within a single company.

*Summary of Conclusions and Recommendations*

This report has analyzed whether the continued retention of both distribution and transmission functions within Hydro One would be appropriate or whether the two functions should be separated. The analysis covers a number of issues and factors relating to competition, regulatory oversight, efficiency of regulation, capital investment decisions, efficiency benefits from economies of scope and retail competition. In doing so it has looked at the experience of other jurisdictions as well as Ontario.

The report has noted the guiding principles that seem to have underlain reform of the electricity industry internationally. It has also noted the need for further restructuring that has arisen when insufficient steps have been taken initially, and the difficulties of doing this. In many respects the policy adopted in Ontario is consistent with these underlying principles and with initial developments elsewhere. However, this does not seem to be the case with the proposed retention of both transmission and distribution functions within Hydro One.

Our conclusion is that the continued retention of both these functions within Hydro One would be likely to involve disadvantages on all of the issues identified. Specifically, it would:

- impact adversely on the process of setting price controls, distort the competitive capital market for distribution companies and make it more difficult for smaller distribution companies to grow by acquisition within the Province;
- complicate the process of cost and revenue allocation and increase the conflicts of interest, which would necessitate greater regulatory oversight and intervention, slow decision-making and increase cost;
- create the possibility of intended or unintended cross-subsidies between transmission and distribution, with possibly unjustified

redistribution of income, and distortions of output and location decisions, that could lead to higher costs;

- provide greater opportunity and incentive to distort the capital investment decisions of the transmission and distribution systems, which would again increase costs;
- jeopardise the achievement of internal cost efficiencies that could more than outweigh any savings from economies of scope; and
- give rise to an unnecessary concern that the combined company might decide to re-engage in retail supply and even generation at a later date, thereby threatening the independence of the transmission function.

In light of the above findings, our view is that it would be more appropriate to separate completely the functions of transmission and distribution than to continue to combine them within a single company. It would not be sufficient to try to secure such separation by means of accounting, management or legal separation within the ownership of a single company. Given the nature of the concerns identified, the separation should be complete, requiring each of the two main functions of the present company to be placed in separate ownership.

The possibility of some further division of the distribution side of Hydro One, and alternative forms of ownership and regulation of the interties, both seem to merit further consideration. However, both analyses would require more detailed consideration than is possible within the scope of this report.

## APPENDIX: AUTHOR QUALIFICATIONS

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Stephen Littlechild is Honorary Professor, University of Birmingham Business School, and Principal Research Fellow, Judge Institute of Management Studies, University of Cambridge. He was formerly Professor of Commerce and Head of the Department of Industrial Economics and Business Studies, University of Birmingham 1975-1989. He was a Visiting Professor at Stanford, New York University and the University of Chicago 1979/80.

Professor Littlechild proposed the RPI-X approach to price controls in 1983, while advising the Government on the privatisation and regulation of British Telecom. He also advised ministers on the regulatory regimes for the water and electricity industries. He was the first UK Director General of Electricity Supply (DGES) and Head of the Office of Electricity Regulation (OFFER) 1989-98.

Professor Littlechild was formerly a part-time consultant to the Treasury, World Bank and various companies, and a member of the Monopolies and Mergers Commission 1983-9. Since January 1999 he has been a policy adviser to governments, regulators and companies internationally, on matters of privatisation, competition and regulation in electricity, telecoms and utilities generally. He was an expert advisor to the Government Inquiry into the New Zealand electricity industry, Spring 2000, and adviser to Ofwat on common carriage in Spring 2000, a director of LECG Ltd 2000-1, and is presently a member of the Ofgem Panel of Economic Advisers. He has also advised in the US, Mexico, the Philippines, India, Australia, New Zealand, South America, Thailand, Brazil, Poland, Romania, Ireland, Japan, South Africa and Saudi Arabia, as well as in the UK.

He gave the Wincott Memorial Lecture on Privatisation, Competition and Regulation in October 1999. He received the Zale Award for Scholarship and Public Service, Stanford University, May 1999, and the UMS Group PACE Catalyst Award for outstanding accomplishments in regulatory reform, October 2000. In July 2001 Birmingham University awarded him an Honorary Doctor of Science degree.

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His publications include *Operational Research for Managers*, *The Fallacy of the Mixed Economy*, *Elements of Telecommunications Economics*, *Energy Strategies for the UK* (with K G Vaidya), *Regulation of British Telecommunications' Profitability*, *Economic Regulation of Privatised Water Authorities*, and *Privatisation, Competition and Regulation in the British Electricity Industry with Implications for Developing Countries*, and over 60 articles in learned journals.

His most recent publications include:

*Privatisation, Competition and Regulation*, Wincott Memorial Lecture, IEA, Feb. 2000.

A Review of UK Electricity Regulation 1998-2000, *CRI Regulatory Review 2000/1*.
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PROFESSOR ADONIS J. YATCHEW, B.A., M.A., PH.D.

Since receiving his Ph.D. from Harvard University in 1980, Adonis Yatchew has been a member of the Economics Department at the University of Toronto. He has also taught at the University of Chicago. In 1988 he received the social science undergraduate teaching award at the University of Toronto.

His principal areas of research are theoretical and applied econometrics with a special interest in applications in energy economics. Since 1995 he has been Joint Editor of the *Energy Journal*.

Professor Yatchew has prepared numerous analyses and studies of the electricity industry in Ontario. He has prepared short term market assessments and forecasts of the cellular telephone industry; coauthored studies on oil pipeline cost allocation; and been involved in studies or analyses of the natural gas, gasoline and airline industries, among others.

His publications include:


Yatchew, A. 1995, "The Distribution of Electricity on Ontario: Restructuring Issues, Costs and Regulation", *Ontario Hydro at the Millennium*, University of Toronto Press, 327-342,353-354.

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His upcoming book entitled *Semiparametric Regression for the Applied Econometrician* which contains applications in industrial organization, labor, development, urban and financial economics as well as in energy economics will be published by Cambridge University Press.