

Renewing Ontario's Electricity Distribution Sector: *Putting the Consumer First*



The Report of the Ontario Distribution Sector Review Panel

Message from the Chair

December 2012

In April 2012, the Ontario Minister of Energy established the Ontario Distribution Sector Review Panel to provide expert advice to the government on how to improve efficiencies in the sector with the aim of reducing the financial cost of electricity distribution for electricity consumers.

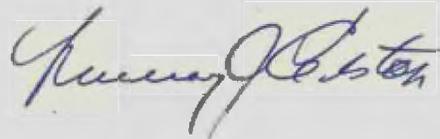
In this report, *Renewing Ontario's Electricity Distribution Sector: Putting the Consumer First*, the Panel has produced a thorough review of the sector. Our plan builds a new model for electricity distribution in Ontario, one that creates robust, efficient and well-resourced utilities that will reduce costs to the consumer and support the continued economic growth of this province.

From the start, the electricity distribution sector was helpful and supportive of our efforts, and their advice added immeasurably to our recommendations. We thank all those who met with us and provided written submissions.

We were ably supported by staff at the Ontario Ministry of Energy, especially Ken Nakahara, Kaleb Ruch and Elizabeth Farrelly. John McGrath supplied writing and editorial services, and Navigant Consulting provided the technical and financial analysis of the sector.

I personally wish to thank my fellow Panel members, Floyd Laughren and David McFadden, for their commitment, their hard work and their pragmatism.

It is now up to all the partners in the electric distribution sector, the government, utilities and their owners and the regulator to deliver on the challenge we have given them. Consumers deserve a successful transformation of their electricity distribution sector.



Murray Elston, Chair
Ontario Distribution Sector Review Panel

Member Biographies

Ontario Distribution Sector Review Panel

Murray Elston (Panel Chair)

Mr. Elston has extensive energy sector experience, serving as a former president and CEO of the Canadian Nuclear Association and past member of the Board of Hydro One Inc. He also sits on an Advisory Board for Samsung Canada. He is a current member and past Chair of the Canadian Nurses Foundation and a past Chair of the Board of the Walkerton Clean Water Centre. Mr. Elston was a member of the Ontario Legislature from 1981 to 1995, holding such roles as Minister of Health, Chair of the Management Board of Cabinet, Minister of Financial Institutions, and Chair of the Public Accounts Committee.

Floyd Laughren

Mr. Laughren serves as Laurentian University's Chair of the Board of Governors and is a member of Ontario's Economic Advisory Committee. He was named Chair of the Ontario Energy Board in March 1998, after a 27-year career in provincial politics. Mr. Laughren served as a member of the Ontario legislature from 1971 to 1998, holding such roles as Deputy Premier and Minister of Finance. He chaired the Policy and Priorities Board of Cabinet, the Treasury Board and sat on the Cabinet Subcommittee on Industrial Assistance.

David McFadden

Mr. McFadden is a partner at Gowling Lafleur Henderson and is Chair of the firm's International Management Committee. He has served as past Chair of the Toronto Board of Trade and its Task Force on the Electricity Industry, and was a member of the Ontario government's Electricity Conservation and Supply Task Force. Mr. McFadden is a member of the Smart Grid Forum of the Independent Electricity System Operator, the Energy Council of Canada and the Council for Clean and Reliable Electricity. Mr. McFadden served as a member of the Ontario legislature from 1985 to 1987.

Preface

Ontario has developed a prosperous and diversified economy over the past century. This has permitted the province to enjoy a high standard of living combined with quality health care, education and other public services. This would not have been possible without efficient and cost-effective infrastructure, ranging from roads and transit systems to the provision of electricity.

Investment in cost-effective infrastructure also improves Ontario's competitiveness with other jurisdictions in North America and around the world. In its most recent annual report, the Ontario government's Task Force on Competitiveness, Productivity and Economic Progress said Ontario has great strengths economically and has achieved solid economic results. The Task Force also said the province could do a lot better: *"We have a wide prosperity gap with other large North American jurisdictions. The source of this gap is our inability to be as innovative as we could be in our economic life."*¹

Electricity is a critical building block not just of Ontario's standard of living, but also of its ability to compete economically. In a highly competitive world, it is vital that electricity be delivered in the most efficient and cost-effective manner.

That is why the Ontario government appointed the Ontario Distribution Sector Review Panel (Panel) to review the province's local distribution companies (LDCs²). In order to ensure that Ontario's LDCs deliver power at the lowest possible cost and contribute to a strong economic future, the government³ asked the Panel to look at whether a restructured distribution system could lead to price stability, a more efficient and reliable system configuration, as well as fairness and value for money.

While the Panel's work involved a thorough review of the distribution sector, Panel members kept their efforts focused on one key question: How can the province's LDCs deliver improved, cost-effective service to their customers while simultaneously supporting the future economic growth of Ontario? Panel members recognized that their key responsibility was not to rearrange the pieces to deal with the issues of today, but to make sure the province's electricity distribution system puts its customers first, so that Ontario can prosper a decade from now and beyond.

The Panel members heard from close to 85 stakeholders including LDCs, associations, consumer groups, unions, municipalities, government ministries and agencies, financial and investment organizations and individuals from across the province. The Panel found that most presenters and submitters agreed that significant change is required if all the province's LDCs are to adopt the technological innovations that will enhance the safety and reliability of the electricity system, reduce its operating cost, and enable a renewed focus on the customer. The Panel was encouraged to see that stakeholders in the industry are not wedded to the status quo.

The Panel has also determined that Ontario's electricity distribution system will require significant additional resources if it is to replace aging equipment and provide new services. The current structure of electricity distribution is a barrier to this required investment and needs to be changed.

Ontario's distribution system got started when community and business leaders realized in the early 1900's that the economic well-being of their towns and cities depended on having electricity readily available at an affordable cost. The province faces a similar challenge today. In order to ensure the future well-being of Ontarians, the electricity distribution system must be able to adapt to the coming technological and economic challenges. This is the most significant test the distribution system has faced in one hundred years. Failure to meet the challenge will mean a diminished future for the people of Ontario.

¹ Task Force on Competitiveness, Productivity and Economic Progress, "Prospects for Ontario's Prosperity," November 2011, p. 4.

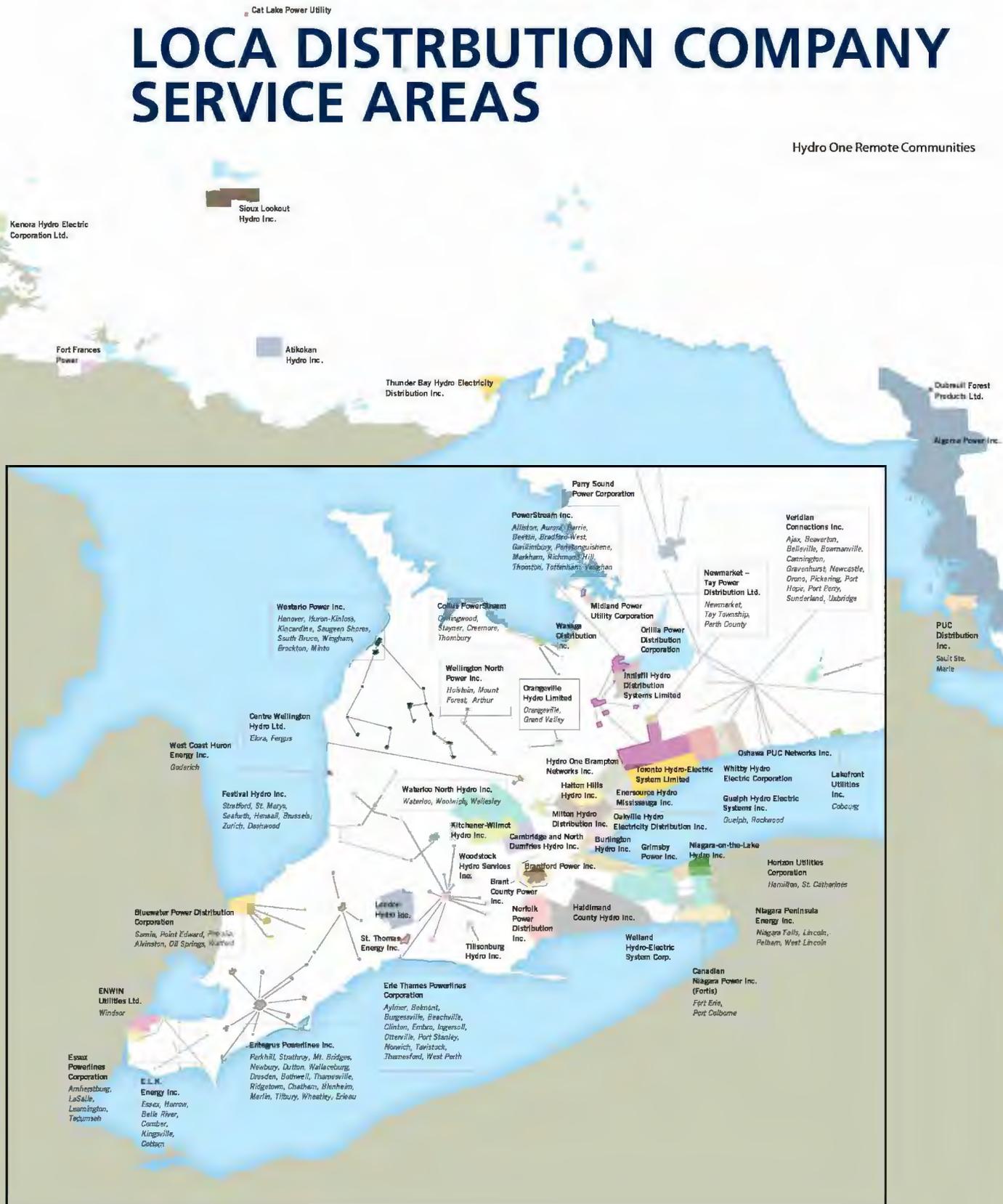
² Industry jargon provides a wealth of synonyms for a local distribution company (LDC): distributor, local or electricity distributor, utility, local utility, distribution company and so on. Though there has been an attempt to limit the number of times this occurs, please treat any such uses as completely interchangeable.

³ In this report, unless otherwise specified, references to 'government' and 'province' are taken to mean the Government of Ontario and the province of Ontario respectively.

ONTARIO'S ELECTRICITY DISTRIBUTION SYSTEM

LOCA DISTRIBUTION COMPANY SERVICE AREAS

Hydro One Remote Communities



Service areas shown here are approximate.

Table of Contents

Message from the Chair

Member Biographies

Ontario Distribution Sector Review Panel

Preface	Page 1
Chapter 1	
The Imperfect World – How We Got Here.....	Page 5
Chapter 2	
The New World of Electricity.....	Page 17
Chapter 3	
The LDC of the Future.....	Page 22
Chapter 4	
The Vision.....	Page 27
Chapter 5	
The Road Forward.....	Page 34
Chapter 6	
Recommendations.....	Page 39
Conclusion	Page 42
Appendix 1	
List of Maps, Charts and Graphs.....	Page 43
Appendix 2	
List of Presenters/Stakeholders.....	Page 44
Glossary	Page 46

Chapter 1

The Imperfect World – How We Got Here

Ontario's electricity distribution system is a product of its history. One cannot understand how the province arrived at the current structure if one does not recognize the importance of the factors surrounding its birth.

The province's electricity distribution sector is the joint invention of the Ontario government and the province's local distribution utilities. It was created in the early 1900's under pressure from business leaders and politicians in Toronto, Kitchener, London and other communities who understood that their communities needed an affordable supply of electricity in order to prosper.⁴

The towns and cities in Ontario at the beginning of the 1900's also knew they needed an assured supply of this new source of energy. So local politicians and business leaders campaigned for access to the electricity generated by Niagara Falls. The pressure grew to such an extent that in 1906 the Ontario government created the Hydro-Electric Power Corporation (HEPC) to transmit power from the Falls.⁵ HEPC and its successor Ontario Hydro established the generation and transmission facilities that supplied electricity to generations of Ontarians.

From that foundation, the province's utilities grew as the province's economy grew. At one point in 1923, Ontario had 393 different utilities supplying electricity to customers.⁶ Essentially, any municipality could create a distribution utility, and HEPC or Ontario Hydro would supply the power, both generation and transmission. This was basically the state of affairs until 1996, when a provincially appointed committee led by the Hon. Donald S. Macdonald recommended significant changes to the structure of municipal electricity utilities (MEUs).

The Macdonald Committee⁷ recommended that Ontario's 307 remaining MEUs be merged with the distribution systems then operated by Ontario Hydro to create shoulder-to-shoulder distribution utilities along regional and county lines. A shoulder-to-shoulder distribution system would have resulted in a smaller number of utilities with contiguous boundaries, and no distributors embedded inside another distributor's territory. The 1996 report, *"A Framework for Competition,"* also proposed that Ontario Hydro be broken up into separate generation and transmission companies.⁸

Two-and-a-half years later, the Ontario legislature passed the *Energy Competition Act (ECA)*, putting into place a number of the recommendations of the Macdonald Committee. The *ECA* created a new company for generating electricity (Ontario Power Generation) and another to take over Ontario Hydro's transmission and distribution assets (Hydro One Inc.). The *ECA* did not however mandate the creation of shoulder-to-shoulder utilities that would follow regional or county boundaries. While the *ECA* did confirm that municipal governments owned the electricity utilities, it required that they be transformed into business corporations under the *Ontario Business Corporations Act (OBCA)*, a departure from the past when local commissions were the norm.

⁴ N.B. Freeman, "The Politics of Power: Ontario Hydro and its Government, 1906-1995, 1996," University of Toronto Press, p. 10-13.

⁵ Ibid., p. 31.

⁶ "Sir Adam Beck," Dictionary of Canadian Biography Online. Accessed October 2012. See: http://biographi.ca/009004-119.01-e.php?id_nbr=7790

⁷ Formally referred to as the Advisory Committee on Competition in Ontario's Electricity System.

⁸ Advisory Committee on Competition in Ontario's Electricity System, "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. See Summary of Recommendations.

Even though the legislation did not mandate a wholesale consolidation of the province's MEUs, a flurry of mergers and acquisitions did occur during this period, reducing the number of utilities from 307 to 89.⁹

- Many utilities were sold by their municipal owners, who took advantage of a temporary lifting of a transfer tax to monetize the value of the assets. The transfer tax holiday eliminated a 33% tax that would have been levied on the proceeds of the sale.
- 88 of the smaller utilities were bought by Hydro One Networks, and absorbed into its distribution network; an 89th, Brampton Hydro, was purchased by Hydro One Inc. and set up as a separate subsidiary.
- Larger utilities were created when their municipal owners were amalgamated, such as Hydro Ottawa, Chatham-Kent Hydro, Greater Sudbury Hydro, Hamilton Hydro, and Toronto Hydro.
- Many other utilities merged with neighbouring utilities.

Since then, there have been a handful of further consolidations among LDCs, including PowerStream, Veridian Connections, Horizon Utilities, and Entegrus Powerlines. However, the pace of consolidation and rationalization of the distribution sector has slowed to a snail's pace. Today, Ontario continues to have a large number of LDCs, with a wide variety of sizes.

The Current Landscape

Ontario's fragmented system for distributing electricity is unique in Canada, a product of history rather than the outcome of rational planning. No other jurisdiction has chosen this structure as a desired outcome.

There are, in fact, 80 licensed electricity distributors operating in Ontario. While they are all licensed by the Ontario Energy Board (OEB), the OEB does not regulate the rates charged by three of them: Cornwall Street Railway Light & Power Company Ltd (Cornwall Electric) is exempt from rate regulation as it obtains its electricity from Quebec; Dubreuil Lumber operates mostly on company-owned land; and the distribution assets that serve the Cat Lake community are managed by Hydro One Networks.¹⁰

All the remaining utilities have their rates regulated by the OEB. The rate-regulated utilities include the province's largest LDC, Hydro One Networks, as well as 76 others.

The range and variety of the province's LDCs is remarkable and cannot be found in any other jurisdiction in Canada. One of the smaller utilities, Hydro 2000, serves just 1,208 customers in the eastern Ontario towns of Alfred and Plantagenet.¹¹ The largest distributor in the province, Hydro One Networks, has a thousand times as many customers.

The province's electricity distribution system is also notable for the large number of small LDCs.¹²

- There are 29 LDCs in Ontario that have fewer than 12,500 customers each.¹³
- These 'small' LDCs account for over a third of all the utilities in Ontario, but less than 4% of the province's electricity customers.

⁹ The reduction to 89 LDCs is based on an interview with Neil Freeman, author of *The Politics of Power* (see earlier references).

¹⁰ Hydro One Networks currently holds an interim electricity distribution licence issued by the OEB under section 59(2) of the Ontario Energy Board Act, 1998 under which Hydro One Networks has possession and control of certain distribution businesses serving the Cat Lake community.

¹¹ Data based on: Ontario Energy Board, "2011 Yearbook of Electricity Distributors," September 2012. Accessed October 2012. See: <http://www.ontarioenergyboard.ca/OEB/Industry/Rules+and+Requirements/Reporting+and+Record+Keeping+Requirements/Yearbook+of+Distributors>

¹² *Ibid.*

¹³ *Ibid.* Note that OEB Yearbook data does not include: the three First Nations-owned LDCs (Attawapiskat Power, Fort Albany Power and Kashechewan Power); the three non-rate-regulated LDCs (cited previously in this chapter); and Hydro One Remote Communities' customer numbers are included in Hydro One Networks' customer numbers.

- The median-sized LDC in Ontario has 19,885 customers.
- The average-sized LDC has 65,394 customers.

The fact that the median is so far below the average shows that there is a preponderance of small LDCs in Ontario.

Hydro One Inc. put it this way in its submission: *“When compared against other Canadian jurisdictions, Ontario has almost twice as many LDCs... as all of the remaining provinces combined.”*¹⁴

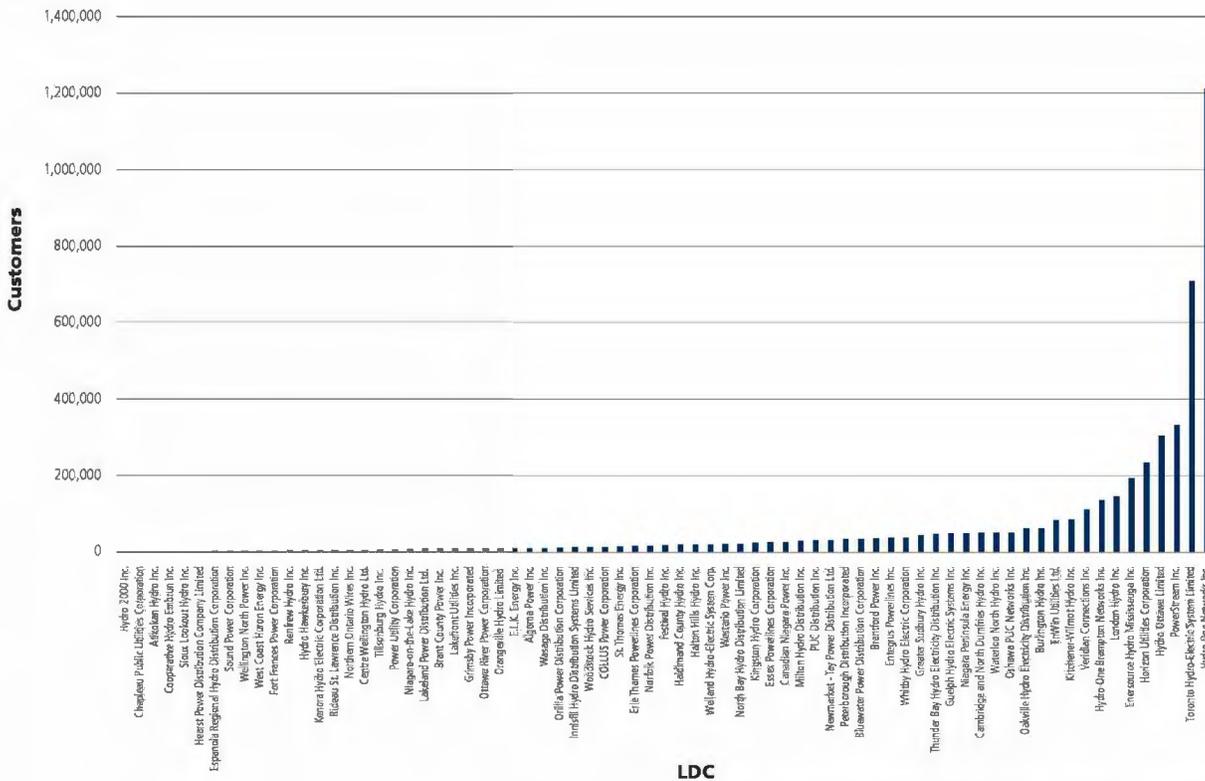


Figure 2: Total Customers by LDC in 2011

Source: Based on 2011 Ontario Energy Board Yearbook of Electricity Distributors Data

Sizes:¹⁵

Small Utilities:	Under 12,500 customers
Medium Utilities:	12,500 to 100,000 customers
Large Utilities:	100,000 to 500,000 customers
Extra-Large Utilities:	More than 500,000 customers

¹⁴ Quoted from Hydro One Inc.’s official submission to the Panel.

¹⁵ References to LDC sizes throughout this Report are based on these thresholds.

Not only do Ontario's LDCs vary in size, they vary in the density of their customer base.¹⁶

- Toronto Hydro, which serves the province's largest city, has an average of 71 customers for every kilometer of distribution line.
- Hydro One Networks, which predominately serves sparsely populated rural areas, has an average of just 10 customers for every kilometer of distribution line.

Ontario's distribution sector is unusual in another respect. The boundaries of many of the LDCs lack any coherence or consistency. A number of utilities serve a patchwork of widely separated areas with non-contiguous boundaries. They include for example, Veridian Connections, Erie Thames Powerlines, and Entegrus Powerlines. Fig. 3 shows the boundaries of one of them, Veridian Connections. In most cases the intervening territory between these non-contiguous areas is served by Hydro One Networks.



Figure 3: Veridian Connections Service Areas

Source: Veridian Connections website: http://www.veridian.on.ca/images/Map-of-Service-Territory_Sept-2011.jpg

At the same time, a number of municipalities have multiple distributors serving residents within their municipal boundaries. For example, residents and businesses in communities such as Ottawa, Hamilton, Chatham-Kent, Sudbury and Kingston are served by either Hydro One Networks or their local utility, depending on where they live. The boundaries of these LDCs are a remnant of the cities' pre-amalgamation borders and have not kept pace with change. The status quo also produces examples such as Thornton, a village near Lake Simcoe with 1,000 inhabitants, where the service areas of three separate LDCs converge, namely Hydro One Networks, PowerStream and Innisfil Hydro.

¹⁶ Based on: Ontario Energy Board, "2011 Yearbook of Electricity Distributors," op. cit.

Ownership

Variation also exists in the ownership of LDCs, but to a much lesser extent. Ontario's provincial and municipal governments own the vast majority of the province's distribution utilities. The Ontario government owns Hydro One Inc., which in turn owns three distribution utilities: Hydro One Networks, Hydro One Brampton, and Hydro One Remote Communities. Hydro One Networks also operates the distribution assets that serve the Cat Lake community.

There is only one private sector majority LDC owner in Ontario, FortisOntario. FortisOntario owns 100% of three smaller utilities in different parts of the province: Algoma Power; Canadian Niagara Power, which serves customers in Port Colborne, Gananoque and Fort Erie; and Cornwall Electric. However, FortisOntario and two investment firms also hold minority interests in a number of other LDCs. FortisOntario owns 10% of Westario Power, which serves communities in Bruce, Grey and Huron counties, as well as 10% of Rideau St Lawrence Distribution and Grimsby Power. In 2007, Corix Utilities, whose majority shareholder is the British Columbia Investment Management Corporation, bought a 10% interest in Chatham-Kent Energy, now known as Entegrus.

A number of pension plans have found electricity distributors to be very attractive investments, as the stable rates-of-return they earn from a regulated industry are ideal for their portfolio. In 2001, Borealis Infrastructure, the infrastructure investment arm of the Ontario Municipal Employees Retirement System (OMERS), bought a 10% stake in Enersource, which serves customers in Mississauga.¹⁷ Michael Nobrega, the President and CEO of OMERS, has said that the pension plan would like to increase its investment in Enersource, and invest in other larger utilities in the province, but the existing transfer tax imposes a financial penalty to do so.^{18,19}

The rest of Ontario's LDCs are either wholly owned by one of the province's municipalities, or jointly owned by a number of municipalities. The municipal ownership of LDCs makes itself felt in a number of ways. Municipal councillors are often appointed to the Boards of the local utility and municipal governments frequently use the dividends they receive to help pay for municipal services and capital projects.

How Others Do It

If Ontario was to set out to establish a new electricity distribution system from scratch, it is highly doubtful that it would choose to replicate the current structure. The arrangement of Ontario's distribution system cannot be found anywhere else in Canada. Many other provinces have only a single electricity distributor that is part of a vertically integrated utility handling both the transmission and the distribution of electricity.

Jurisdiction		Average Size (Customers)	Share of Customers Served by Small or Medium Utility
UK		2,921,429	0.0%
Australia	Queensland	989,443	0.0%
Australia	New South Wales	857,977	0.0%
Australia	South Australia	817,300	0.0%
Australia	Victoria	516,420	0.0%
USA	California	336,374	5.4%
Canada	Alberta	235,988	9.4%
Australia	Tasmania	271,750	0.0%
USA	New York	111,662	2.8%
Canada	Ontario	64,522	30.0%

Figure 4: Electricity Distributor Sizes – International Comparisons

¹⁷ According to Borealis' website. Accessed November 2012. See: http://www.borealis.ca/eng_enersource.htm

¹⁸ A provincial tax of as much as 33% is payable when a municipally-owned LDC transfers or sells assets to a private investor. When the Ontario government gave municipalities ownership of their MEUs, they were provided with a source of income and the potential to realize significant profits should they sell their utilities. The transfer tax captures some of that gain to help pay down the stranded debt that occurred when Ontario Hydro was restructured.

¹⁹ Quoted from OMERS' meeting with the Panel.

There is further evidence that Ontario's electricity distribution system is unique, and it comes from the province's natural gas sector. Ontario's two main natural gas distributors are Enbridge and Union Gas. Enbridge has 2 million customers, and Union has 1.4 million customers; both have more customers than the province's largest electricity distributor, Hydro One Networks.²⁰

The Cost to the Consumer

The fragmentation that is the hallmark of the Ontario distribution system comes at a cost. The Panel's research and analysis shows that the current approach to delivering electricity is costing families, farms and businesses more than it should.

- Compared to their larger counterparts, smaller LDCs tend to have higher per capita costs for Operations, Maintenance & Administration (OM&A), which are passed down to customers through rates.
- There is a duplication of equipment and facilities among neighbouring LDCs.
- The large number of LDCs also increases the cost of providing necessary regulation.
- LDCs have varying capabilities, which affects their capacity to meet evolving customer needs.

The key question for the Panel is whether there is a better way to manage the costs of delivering electricity to the consumer in Ontario.

As Fig. 5 shows, 22% of what a typical residential customer in Ontario pays for electricity goes towards distribution charges paid to LDCs.

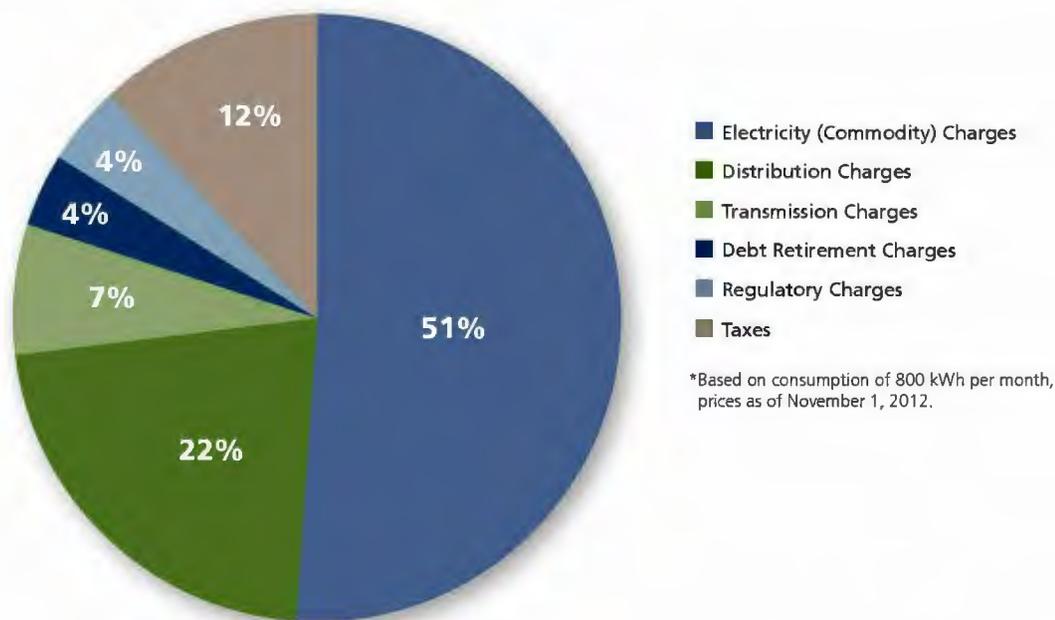


Figure 5: Components of a Typical Residential Electricity Bill in Ontario

Source: Ontario Energy Board

The province's distribution sector has been able to avoid a lot of attention from consumers because local distribution costs encompass a smaller proportion of a typical electricity bill. The Panel believes however that there are efficiencies to be found that will ease future costs to consumers.

Data show that there have been significant increases in the OM&A costs of the distribution sector. The OM&A expenses for utilities increased by more than 42% between 2005 and 2011. During the same time the number of customers served by LDCs saw an increase of just 7% and inflation was just 11.6%.²¹ Moreover, when compared to municipalities, LDCs' OM&A costs increased by 36% between 2005 and 2010, while the total operating costs of municipalities increased by just 26%.²²

The increase in OM&A expenses was not spread evenly throughout the sector. When one looks closer at individual LDCs, it is clear that OM&A costs per customer are generally higher for smaller LDCs.

As Fig. 6 and Fig. 7 shows, OM&A costs follow a general rule: the larger the LDC, the lower the OM&A costs per customer.²³

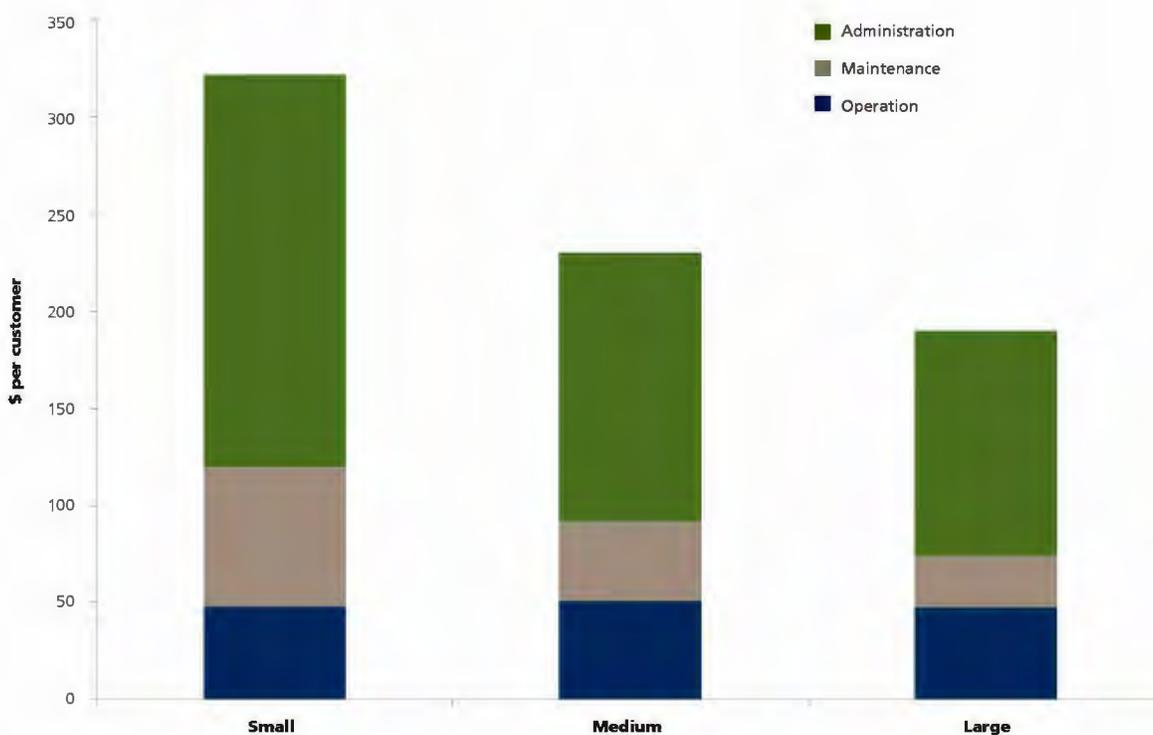


Figure 6: OM&A Costs per Customer for Small, Medium and Large LDCs

Source: Ontario Energy Board, 2011 Yearbook of Electricity Distributors Data

²¹ OM&A and customer analysis based on Ontario Energy Board Yearbook of Electricity Distributors from the years 2005 to 2011, inclusive, op. cit. Inflation analysis based on seasonally adjusted Total Consumer Price Index, taken from The Bank of Canada website. Accessed October 2012. See: <http://www.bankofcanada.ca/rates/price-indexes/cpi/>

²² Municipal cost increases based on Provincial Multi-Year Financial Information Return Review. Accessed November 2012. See: <http://csconramp.mah.gov.on.ca/fir/Welcome.htm>

²³ The OM&A costs of the two largest utilities in Ontario, Hydro One Networks and Toronto Hydro, are excluded from the charts in Fig. 6 and Fig. 7 because of their unique circumstances. Hydro One Networks has higher costs because its low overall customer density is spread out over a wide service area. Toronto Hydro also has unique cost pressures. Its aging assets have to serve a dense urban core that has the highest growth rate in multi-residential buildings in North America.

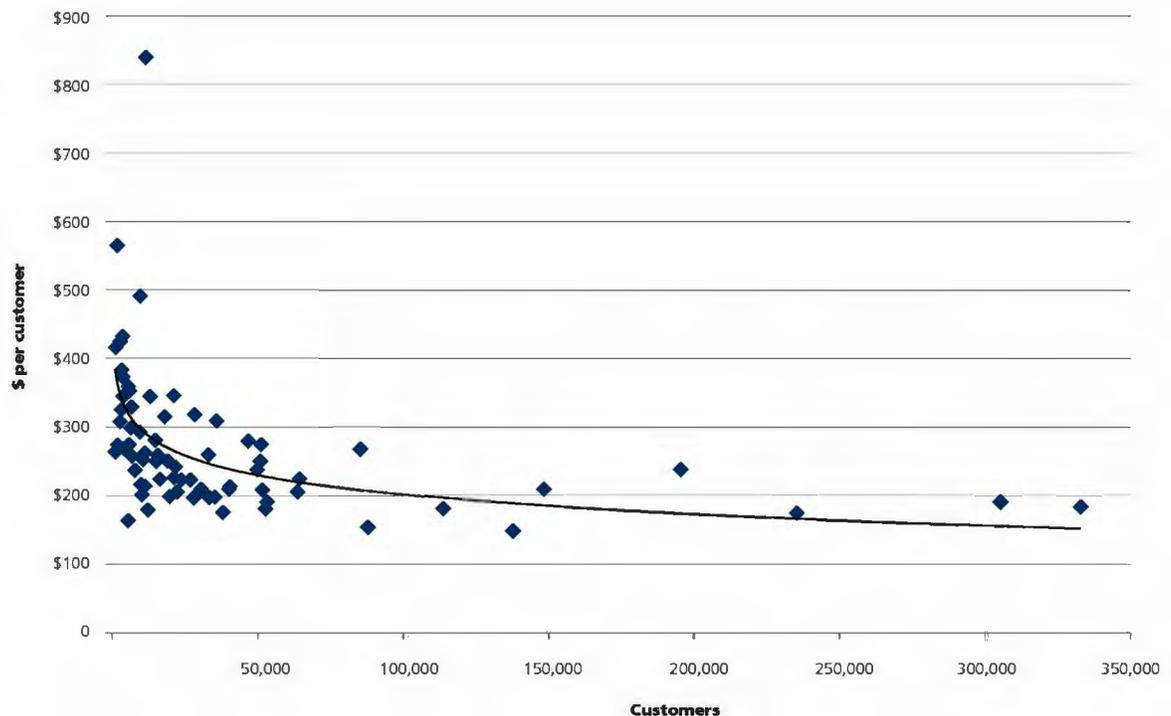


Figure 7: OM&A Costs per Customer by LDC Size

Source: Ontario Energy Board, 2011 Yearbook of Electricity Distributors Data

To put it another way, in 2011 OM&A costs per customer for small LDCs were, on average, 75% higher than for large LDCs.

This is in part driven by the fact that small LDCs on average have approximately 2.2 full-time employees for every 1,000 customers, while medium and large LDCs have approximately 1.7 full-time employees for every 1,000 customers. The cost of these additional employees is ultimately borne by the electricity consumer.

Even though the operating costs of small LDCs are generally higher, they would be even greater if they incorporated the full cost of distributing low-voltage power to customers.

- Some LDCs, such as Hydro One Brampton, Hydro Ottawa and PowerStream buy high-voltage power from Hydro One Networks, then run it through their own transformer stations to step down or reduce the voltage of the electricity before sending it to consumers.
- Some large LDCs and most small and mid-sized LDCs buy their power from Hydro One Networks but at a lower voltage after it has already been stepped down because they have no transformer stations themselves.
- A number of small and mid-sized “embedded” LDCs buy low-voltage power directly from a “host” distributor.

These are critical distinctions, as the small and mid-sized LDCs are charged for the use of the transformer stations and other distribution assets required to serve their customers. LDCs do not typically reflect these

charges in the standard operating and capital costs reported to the OEB, leading to understated OM&A totals, though they do ultimately pass these transformation and low voltage distribution costs on to their customers through a separate recovery mechanism. Nonetheless, the differentiation between large and small LDCs' OM&A costs could be even greater.

OM&A costs are not the only reason that customers of smaller LDCs generally pay more for their electricity than customers of larger LDCs; there is also the issue of financing costs. Smaller LDCs usually have to pay more to raise money and attract investment. As Fig. 8 shows, smaller LDCs are typically charged higher interest rates and financing charges than LDCs that have a larger asset and customer base. Larger LDCs generally have access to a wider variety of capital markets, and benefit from the best terms and lowest debt costs. These lower financing costs are passed on to their customers.

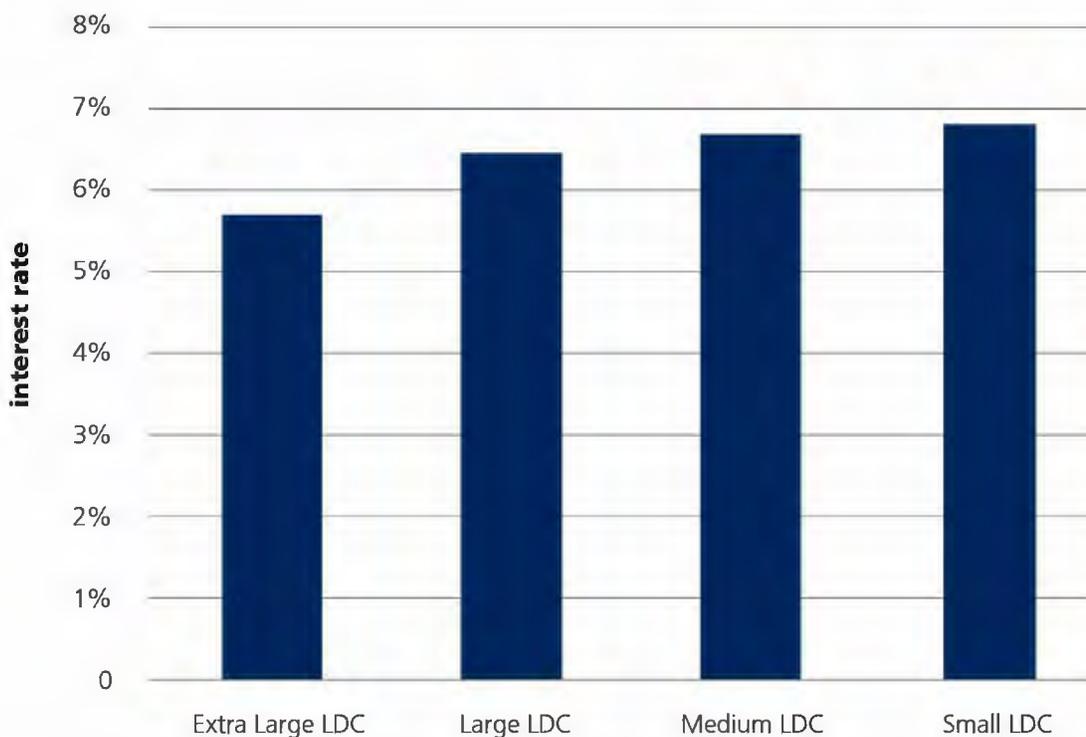


Figure 8: Average Financing Costs of Long-Term Debt by LDC Size

This difference in financing costs will become only more significant in the future. Utilities will need billions of dollars in additional investment to transform themselves into modern LDCs that use up-to-date technology and offer higher levels of service to their customers. This investment will be more easily secured by larger LDCs.

Currently, LDCs can turn to Infrastructure Ontario (IO) for loans. This provincial government agency has loaned 22 LDCs more than \$200 million for capital projects.²⁴ It charges LDCs between 3.2% and 3.3% for a 15-year loan.²⁵ There seems to be little public policy rationale for a government adding to its debt load for this purpose, when private financing is available.

²⁴ Infrastructure Ontario - October 2012.

²⁵ Infrastructure Ontario website. Accessed November 2012. See: <http://www.infrastructureontario.ca/Templates/RateForm.aspx?ekfrm=2147483942§or=ldc>

It is already a struggle for many small LDCs to meet the demands of renewing their networks and adding state-of-the-art technology and services. Fig. 9 shows that small LDCs have typically focused their expenditures on maintaining their existing asset base, while medium and large LDCs have undertaken more improvements and capital projects that have added new capacity and services. In addition, larger LDCs tend to reinvest the majority of their net income back into the business.

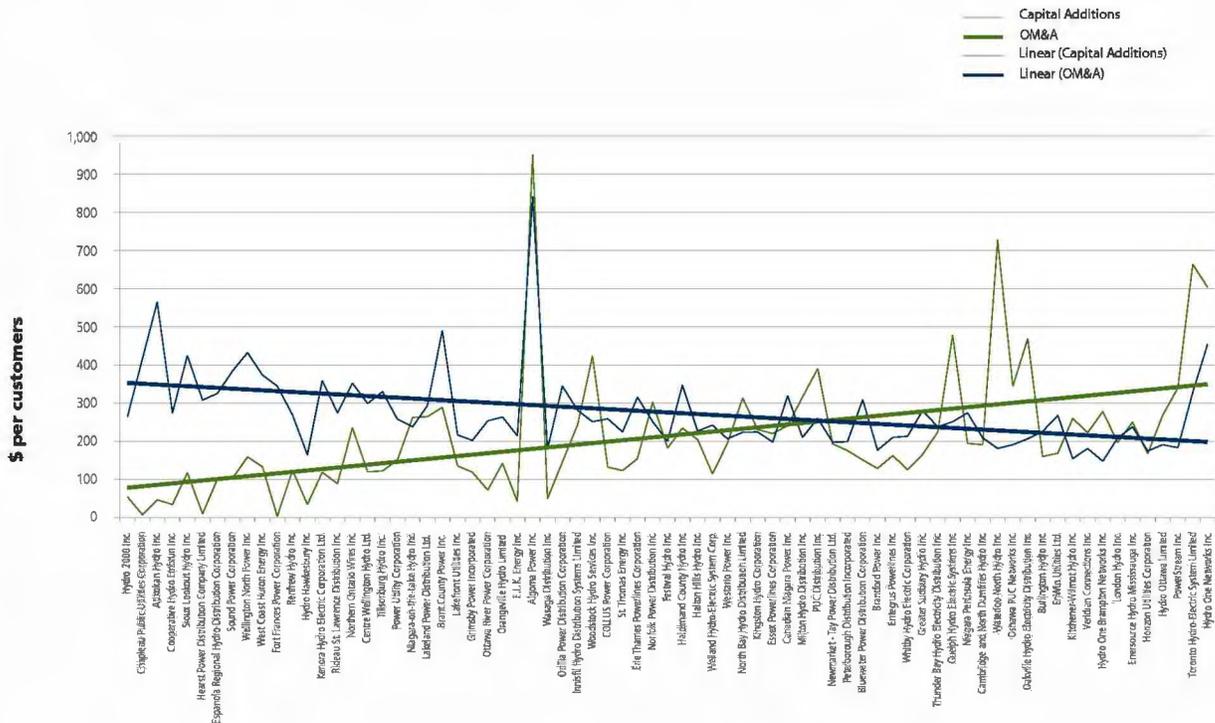


Figure 9: Capital and OM&A Costs per Customer by LDC

Source: Ontario Energy Board, 2011 Yearbook of Electricity Distributors Data

This pattern of investment is a concern for the future of the electricity system in Ontario, and the families and businesses that depend on it. Unless the entire distribution industry spends the money needed to modernize its equipment and offer new services, differences will continue to grow between two classes of electricity consumers: those who have the ability to control costs and obtain value-added services from their electricity distributor; and those without access to such services.

Unnecessary Duplication

As a result of the current structure of the distribution sector, there are more facilities and distribution equipment in Ontario than are needed to efficiently serve electricity customers. Hydro One Networks, for instance, has divided the province into 52 separate service areas for distribution. Each of these 52 service areas has its own operations centre. Often these centres are just down the road, or in the case of Orangeville, just across the street from the operations centre owned by the local distributor. One of Entegrus Powerlines' operations centres is just a few kilometers away from the Hydro One Networks' operations centre in Chatham-Kent.

Approximately half of these service areas, including Guelph, Peterborough, Kingston, Arnprior and Kapuskasing, have a Hydro One Networks operations centre as well as an operations centre for one or more LDCs within their boundaries.

Regulatory Efficiency

The OEB assumed responsibility for regulating the province's distribution utilities in 1998. One of its roles is to protect consumers by setting just and reasonable rates while providing reasonable financial returns for the industry.

The OEB's operating budget for 2012/2013 is \$34.97 million dollars.²⁶ The OEB recovers its costs from the utilities, agencies and retailers it regulates: approximately 80% of its revenue comes from the electricity sector; the other 20% is paid for by the natural gas sector.²⁷

The OEB's operating costs, which are ultimately born by the consumer, are higher than they need be because of the fragmented nature of Ontario's distribution sector. The large number of LDCs in Ontario requires more OEB resources to monitor their operations and adjudicate their rate applications than would otherwise be the case.

A review of the cost of regulation indicates that customers of small LDCs tend to pay more for the regulation of their utilities than customers of large LDCs. According to a 2011 report by Ontario's Auditor General, the cost of filing a full Cost of Service (COS) rate application for many small and mid-sized LDCs ranges from \$100,000 to \$250,000.²⁸ While the cost of filing a COS application for larger LDCs can be as much as \$1 million or more,²⁹ the cost per customer is actually much lower because of their larger customer base. The Auditor General's report noted that the cost of regulatory scrutiny can consequently be as high as \$40 per customer for smaller utilities, while it shrinks to about \$1 per customer for the largest utilities.³⁰

Workforce

The province's distribution workforce is "greying," and the wave of retirements expected over the coming decade threatens to cause a shortage of skilled labour in the province's LDCs.

Ontario's LDCs employ a little over 10,200 people.³¹ In 2008, a study for The Electricity Sector Council of Canada estimated that about 45% of the electricity distributors' employees across Canada were between the ages of 45 and 54, putting many of them now, four years later, on the edge of retirement.³²

According to this 2008 study the situation appears most critical for the highly skilled trades that are crucial to the safe and reliable operation of the electricity grid: 53% of power system operators across the electricity system were aged 45 to 54 years; 42% of power line workers were also in that age group; 74% of their managers and supervisors were 45 years of age or older.³³

²⁶ Ontario Energy Board, "2012-2015 Business Plan," August 2012, p. 24. Accessed October 2012.
See: http://www.ontarioenergyboard.ca/OEB/_Documents/Corporate/OEB_Business_Plan_2012-2015.pdf

²⁷ Ontario Auditor General, "2011 Annual Report of the Office of the Auditor General of Ontario," 2011, p. 67.

²⁸ Ibid., p. 69.

²⁹ Ibid., p. 76.

³⁰ Ibid.

³¹ OEB – November 2012.

³² The Electricity Sector Council of Canada, "Powering up the Future: 2008 Labour Market Information Study," 2008, p. 57.

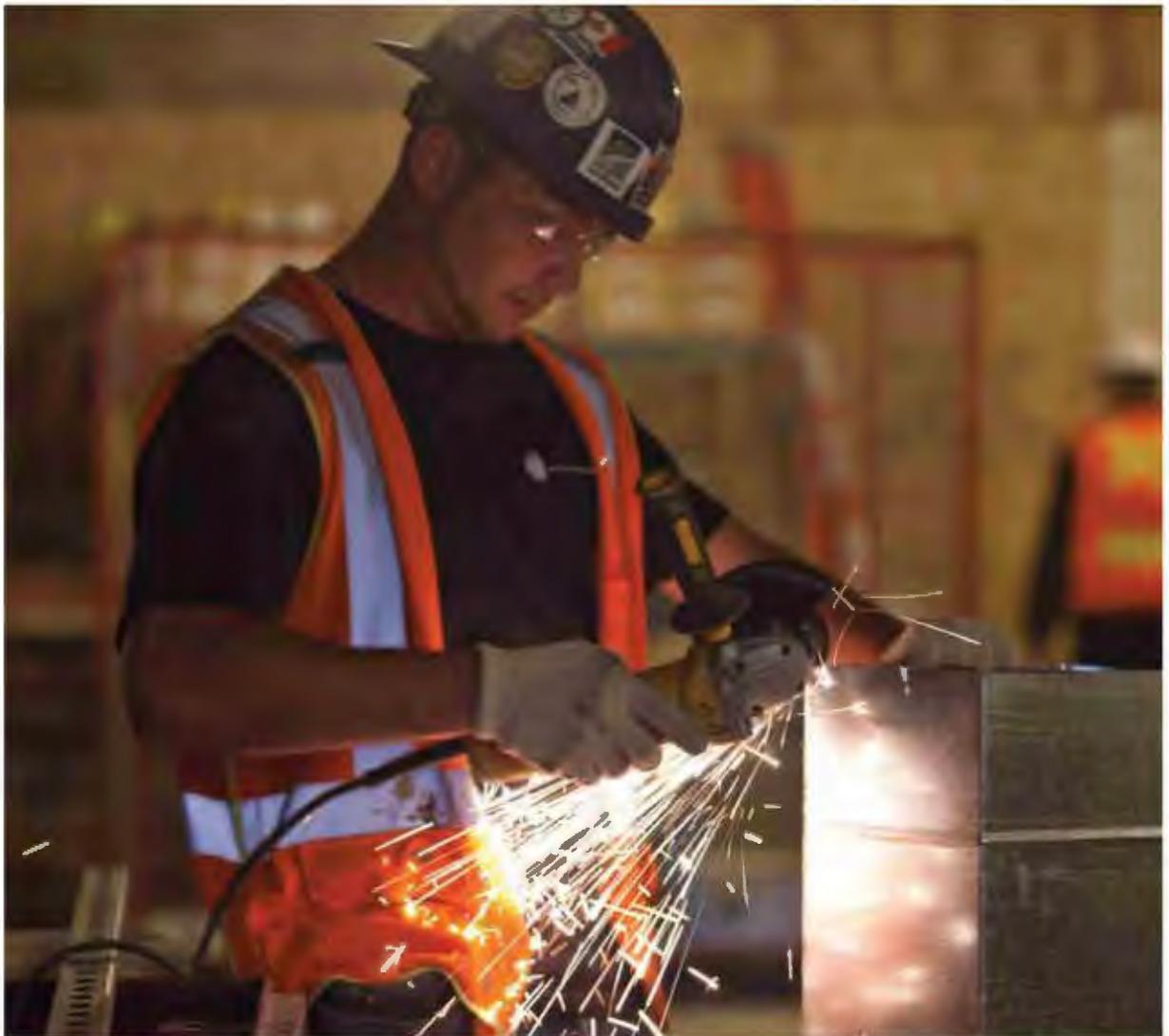
³³ Ibid., p. 58-61.

Many of these employees cannot be replaced quickly. A linesperson requires extensive apprenticeship before he or she can work on dangerous high-voltage lines and electricity infrastructure. Electrical engineers need significant training and experience to design and maintain systems. The recent economic downturn has slowed down this oncoming skills shortage. However, a wave of retirements is inevitable.³⁴

Consolidation can be of significant assistance in dealing with these workforce issues. Some of the job reductions that will come from the increased efficiency of the sector can be painlessly absorbed by retirements. There would also be a bigger talent pool in larger LDCs, making it easier to shift employees into vacant positions without the need for new hires. The next few years present a rare opportunity to rationalize the distribution system with a reduced impact on employees.

The Bottom Line

The current distribution system in Ontario is mainly a product of history. There is a real danger that the heavy hand of history will hold the sector back from contributing to the future economic well-being of the province. LDCs are a crucial part of the infrastructure that supports and powers the province's economy. Ontario needs to have them be creators, and not just observers, of its future economic growth.



³⁴ Ontario Energy Association, "Ontario Distribution Sector Review Panel Submission," July 2012, p. 28.

Chapter 2

The New World of Electricity

Around the world, dramatic changes are occurring to the way people generate and use electricity. Electricity distributors are having to rethink how they do business in order to stay ahead of the curve.

For decades, LDCs were relatively passive players in the electricity sector, delivering electricity that was generated elsewhere. They have been the brokers of a one-way flow of energy. The electricity would be produced at a central generation station using hydroelectric, coal, or nuclear energy, where it would then be transmitted, often over long distances, to local communities and then distributed to customers.

Jurisdictions everywhere are changing how they generate electricity and how they use it. Instead of mega-projects, they are building smaller-scale distributed generation closer to where the energy will be consumed. In order to reduce the greenhouse gas (GHG) emissions that come from the use of carbon-based fuels, industrialized nations everywhere are turning their minds towards new uses for electricity, such as emission-free electric vehicles. Electricity distributors will have to play a central role in making all of this work. This promises to be a far more complex and sophisticated role than Ontario's LDCs are used to currently.

At the same time, many countries are facing a second challenge: they have to replace the aging and outmoded infrastructure they use to distribute electricity. This cannot be done on a simple like-for-like replacement. Electro-mechanical switches that were once the backbone of the transmission and distribution systems are going the way of the typewriter. The future for electricity distribution is computerized and data-driven. If this were the recording industry, it would be like jumping from LPs to digital MP3 files.

Just as this new digital world shook up telephone companies and led to the creation of new consumer services, the advent of computerized switching and digital data in electricity distribution will present challenges for LDCs. Some of the larger ones, such as Hydro One Networks, Horizon Utilities and PowerStream have already taken advantage of the new technology to develop new services for customers. Others are in danger of being left behind.

The investment needed to transform the province's current electricity distribution system into one that uses modern technology to provide new customer services will cost billions of dollars. This investment is critical to ensuring the preservation of and the future economic prosperity of sustainable communities throughout Ontario.

With every challenge, there is an opportunity. The world of electricity is changing, and Ontario has the chance to harness these changes so that they enhance the province's economic competitiveness and the quality of life of its people. This cannot be done without a modern, high-tech distribution system. Ontario now has the opportunity to ensure that all utilities in the province are equipped to meet these future challenges and deliver the future to the electricity consumer as efficiently as possible.

Ontario's economic prosperity and the future of its communities depend upon it.

Smart Distribution Networks

Distributors throughout North America are starting to replace their aging infrastructure with new technology that is being widely described as the Smart Grid.

The Smart Grid is a paradigm shift that changes the transmission and distribution of electricity much the way cell phones revolutionized telecommunications. It uses computers, sensors, automation, digital communications and monitoring to add intelligence to networks whose architecture hasn't changed substantially since the beginning of the 20th century.



Figure 10: Smart Grid Illustration

Source: Ontario Ministry of Energy

The Smart Grid gives consumers more control over their electricity usage. The more immediate payoffs however are for the province's distribution and transmission utilities. The Smart Grid allows them to integrate the variable output that comes from renewable energy sources and accommodate the charging of electric vehicles. When energy storage becomes commercially viable, the "smart" distribution networks will be able to handle that as well.

Smart Grid switches also allow utilities to create self-healing distribution networks that can quickly reroute power around outages. The urgent need for this transformation was highlighted in the summer of 2012 by the widespread blackouts that hit millions of households in the northeast United States. Repair crews could not restore power quickly because there were no high-tech sensors to allow them to locate outages and reroute power to isolate the problems.

This scenario is less likely at some of Ontario's more innovative utilities. PowerStream for instance, which serves about 333,000 customers in York Region and Simcoe County, is one of the leaders in engineering computerized intelligence into the distribution network. Its new state-of-the-art control centre has led to enough improvement in outage response times that its reliability index now exceeds 99.99%. Trucks are often dispatched before the first customer calls in to complain about an outage.

This is just the first step in Ontario. As the government's *Long Term Energy Plan* described it, "we are moving toward a modern, smart electricity system that will help consumers have greater control over their energy usage – even when they're not at home... and make it easier for consumers to produce their own power."³⁵

Smart Homes

The first phase of this new world for energy consumers is occurring in the home. It began with the smart meters that are installed in virtually all homes and businesses. Following this, many homeowners applied for and received microFIT contracts that allowed them to install solar panels and wind turbines to feed electricity back into the grid.

Next, manufacturers developed stand-alone modules that allow homeowners to turn off lights and small appliances using a smart phone app. The same app can connect with a home thermostat, allowing homeowners to raise or lower the temperature on their furnace or central air conditioner.

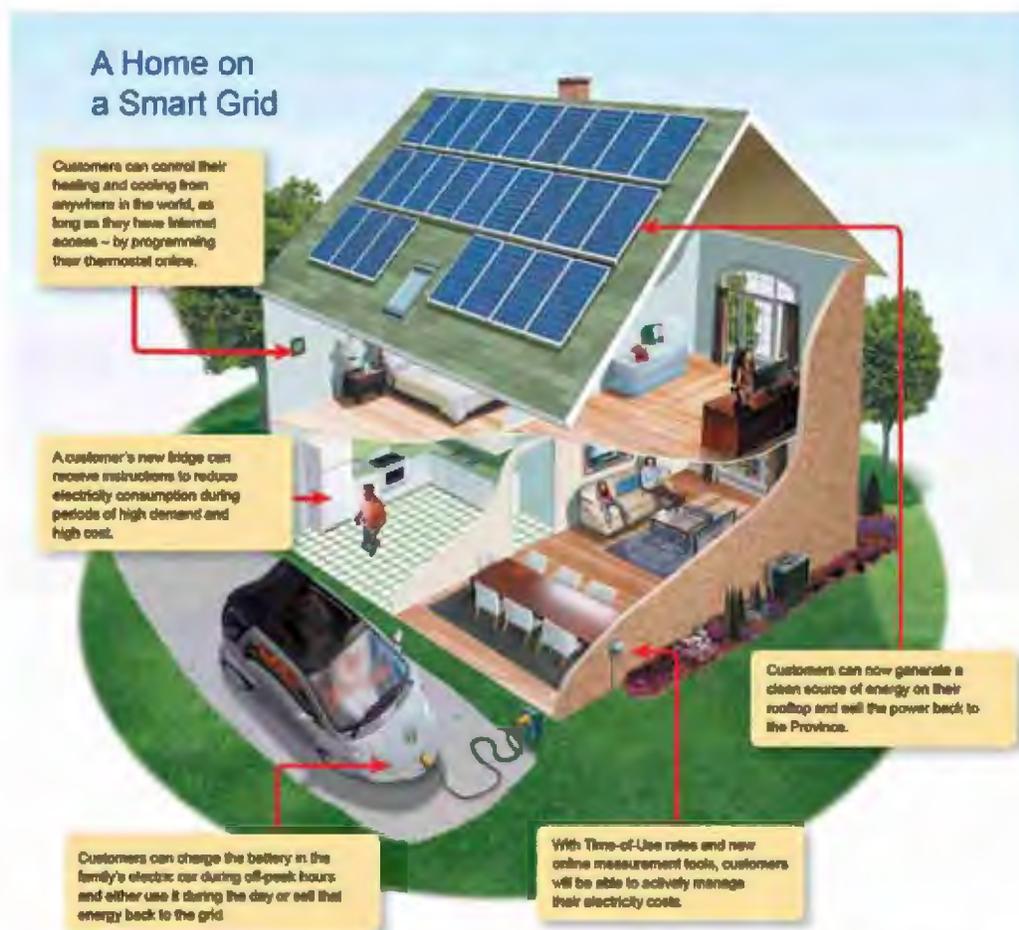


Figure 11: Smart Home Illustration

Source: Hydro One Networks

³⁵ Ontario Ministry of Energy, "Ontario's Long-Term Energy Plan: Building Our Clean Energy Future," 2010, Queen's Printer for Ontario, p. 3.

A number of major appliance manufacturers are now selling washer/dryers and refrigerators with built-in Wi-Fi connectivity. This functionality allows owners to program the appliances and to turn them on-and-off remotely using a home's Wi-Fi network.

These are just the first steps in the making of a "Smart Home."

As the "Smart Home" continues to develop, homeowners will have increasing opportunities to engage in their own energy management with easy-to-understand graphic displays of their moment-to-moment energy usage; program furnaces and air conditioners from anywhere that has the internet; and instruct fridges and dryers to reduce consumption during periods of high prices. They will also be able to use energy they generate from their own solar panels and heat pumps to power the house, feed back into the grid, or charge an electric vehicle.

Electric Vehicles

As the number of electric vehicles increase, they will have a number of significant impacts on the distribution system. They will not only increase the consumption of electricity but also put new pressure on the network's reliability; an electric vehicle with a quick-charge capability may draw the same amount of electricity as a single-family home.

Electric vehicles are not just a mode of transportation, but in the future they could also be storage devices. This would require an unprecedented sophistication in the distribution network. Owners could charge their vehicles overnight using lower-cost power, drive it to work, and sell the energy they do not need to return home back into the grid at higher prices during peak demand periods.

Distributed Generation

There is a new equation for delivering electricity to the customer. Instead of relying on large generating stations and transmitting the power over long distances, much smaller generators are being connected directly to distribution systems. Utilities around the world have found this an appealing alternative when faced with community opposition to large transmission lines. Distributed energy comes in many shapes and sizes: While the distributed energy of today is renewable energy, in the future it will likely include energy storage.

The increase in renewable energy generation has presented a challenge for many LDCs in Ontario. Wind-power and solar-power generation took off in Ontario after the Ontario government introduced the Feed-In-Tariff (FIT) and microFIT programs, which provide set prices for the production of renewable energy. This began changing the traditional one-way flow of electricity from central generating stations such as Niagara Falls or the Darlington nuclear station into a more decentralized, intermittent two-way flow of electricity. Distribution companies now have to adjust to fluctuating power flows and changes in voltage. Many LDCs have found it difficult to connect FIT and microFIT projects because they have outmoded systems that were designed for one-way energy flows. The problem is a critical one for the distribution sector, because the *Long-Term Energy Plan* forecasts an increase of approximately 9,000 megawatts (MW) in renewable power (excluding renewable power from hydroelectric) between 2010 and 2030.³⁶

This increase in renewable energy is just one aspect of a larger trend towards the decentralization of the power supply. Distributed generation would see smaller, cleaner sources of generation that reduce communities' dependence on power transmitted over long distances from large, centralized power

plants. Distributed generation includes other “close-to-load” technologies, such as combined heat and power (CHP) and district energy, which are expected to increasingly provide an alternative to the conventional generation/transmission/distribution paradigm.

Further off, but still expected, are improvements in energy storage. Wide-scale storage will fundamentally change the economics of electricity production, as it will allow the stockpiling of energy that previously had to be consumed as soon as it was produced. High engineering and construction costs currently stand in the way of extensive adoption of energy storage, but technologies are improving. Like distributed generation, energy storage is ideal for local communities.

Changing Customer Relationships

Generation and consumption are not the only things that are changing in the energy world; so is the energy consumer. It used to be said that people just wanted the certainty that lights would go on when they turned on the switch. This is no longer the case. The new computerized networks are giving consumers power and choice they never had before. Instead of being passive consumers, many want to have increased control over the electricity they use.

A recent study has shown there is a new emerging diversity of consumers with different needs and profiles. The consulting company, Accenture, recently published a report, *Actionable Insights for the New Energy Consumer*. Accenture proposes that there are now four broad types of electricity consumers:³⁷

- Consumers who want predictability, with a consistent, stable bill.
- Consumers who want the lowest possible price.
- Consumers who use the latest technology to control their consumption.
- Consumers who were willing to pay more for renewable energy.

Accenture suggests these last two consumer groups, the “*Save Time*” and “*Save the Planet*” customers will grow in importance over time, as they are found more often in the 18 to 34 age groups. As Accenture points out “*more than ever, consumers are seeking added value, personal connection and products and services that align with their lifestyles – all of which go beyond the traditional energy experience.*”³⁸

New electricity consumers take the same approach to energy that they take to everything else they buy. They are demanding more from the products and services they purchase. If they are not satisfied, they will go elsewhere.

Tomorrow’s LDCs must adapt to increased competition from other service providers such as telephone and cable companies if they hope to satisfy changing customer desires. They must master the new technologies and ways of doing business if they hope to survive as important players in the energy world.

There is a new era of electrification looming, and LDCs have to adapt, not just for their own sakes, but for their customers’ benefit as well. LDCs need to be an active contributor to an electricity system that will enhance the future competitiveness of the provincial economy, and provide a firm foundation for sustainable communities.

³⁷ Accenture, “Actionable Insights for the New Energy Consumer,” 2012, p. 20. Accessed November 2012.
See: <http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Actionable-Insights-New-Energy-Consumer.PDF>

³⁸ *Ibid.*, p. 3.

Chapter 3

The LDC of the Future

From the outset, the Panel's mandate required that it not just address the status quo, but also position LDCs so they can flourish a decade from now and, in doing so, enhance the economic competitiveness of the province. There will be increased demands for service, and increased requirements for investment to renew and transform the distribution network. Any electricity distributor of the future will need to meet a number of objectives if it is to serve its customers in the new era of electricity distribution.

The very idea of an LDC is going to change. When Ontario's distributors were born, they were the high-tech companies of their age and helped transform the economy. A lot has changed since then, but not in the distribution sector. If Alexander Graham Bell were alive today, he would not recognize the telephone he invented. Thomas Edison on the other hand, the father of the light bulb and electricity distribution, would feel quite at home with the current use of his inventions.

Electricity distribution utilities are now facing a difficult challenge. Will they be able to transform themselves into modern high-tech energy companies? Some have already started down that road. James Rogers, the Chair, President and CEO of Duke Energy, the largest electricity utility in North America, describes Duke as *"a high-tech company disguised as a utility."*³⁹

This future is not that far away; parts of it are already here. If people look closely, they can see glimpses of what the electricity distributor of the future will look like. The new era of electrification will involve more efficient utilities, with a stronger capital base that will enable them to modernize their equipment and have a renewed focus on the consumer.

Customer Focus

Customer service is being revolutionized around the world. Businesses know that good service brings added value to the customer and can establish a lasting relationship that will return dividends to the business in the future.

To start with, all electricity consumers should be able to access immediate and responsive service from their LDC, whether it is a large utility or a small one. Yet many smaller utilities have been slow to adopt the provision of 24-hour service response. Most of them do not have 24/7 control rooms to monitor and control their networks.

There is a varying capacity among LDCs to adopt new practices. It is fair to say that innovations in customer service come from larger utilities more often than smaller ones. Two of the province's larger utilities have used the comprehensive digital data they have obtained to develop new services that bring added value for the customer.

- Hydro One Networks has a Geographic Information System (GIS) that gives it data on the location of all of the poles, transformers and equipment on its distribution network. It has used this information to build a smart-phone app that not only tells customers the location of a power outage, but how many people are affected, whether crews are on site, and when power will be restored. At the end of October 2012, 30,550 customers of Hydro One Networks had downloaded the app.⁴⁰
- Horizon Utilities, serving Hamilton and St. Catherines, has pioneered efforts in “energy mapping.” In a pilot project with the Ontario Power Authority (OPA), it is combining customer data from smart meters with information obtained from the Municipal Property Assessment Corporation on a home’s size, date of construction, energy type, air conditioning, and whether it has a finished basement and a swimming pool.⁴¹ That allows Horizon Utilities to identify customers who stand to benefit the most from energy conservation programs. The aim is to develop a best practice that any LDC in Ontario can adopt.⁴²

The Drive for Efficiency

As Chapter 1 has shown, the distribution sector has plenty of room to moderate its costs for delivering electricity. Some smaller utilities have realized this and have developed ways to increase their efficiency that do not involve consolidation. The Cornerstone Hydro Electric Concepts Association (CHEC) is a group of 12 LDCs scattered from Prescott in eastern Ontario to Goderich in the west, and north to Huntsville. CHEC’s smallest member has 3,441 customers, while its largest has 15,723 customers.⁴³ Members of the CHEC Group have reduced their costs by jointly developing conservation and demand management (CDM) programs, sharing regulatory costs, and jointly purchasing smart meters and consulting services.

While the CHEC Group has achieved savings, the co-operative model is not stable enough to be used as a template for the transformation of the distribution sector. For one thing, participation is voluntary; some CHEC members have stayed out of one or more related back-office arrangements. This reduces the potential cost savings. Secondly, CHEC’s largest member, Collus Power, has entered into a partnership with PowerStream, to get the advantages that come from linking with a larger, innovative utility.

There has been another more commonly seen method for increasing efficiency, and that is through the merger or acquisition of nearby utilities. The evidence shows that these consolidations have resulted in significant cost savings and efficiencies:⁴⁴

- **Veridian Connections, 1999:** Veridian was created through the consolidation of the three neighbouring distribution utilities in Pickering, Ajax and Clarington. In the first three years of operation, Veridian reportedly achieved savings of 13% in OM&A expenses.
- **PowerStream, 2004:** PowerStream was created in 2004 with the voluntary merger of the distribution utilities of Markham and Vaughan and the acquisition of Richmond Hill’s LDC. That consolidation brought about \$6.9 million in annual cost savings
- **Veridian Connections’ purchase of Scugog and Gravenhurst Hydro, 2005:** As a result of the acquisition, the total cost of operating, maintaining and administering the combined utility decreased from \$21.1 million to \$18.8 million, an 11% reduction. This works out to savings of almost \$40 per customer per year.

⁴⁰ As of October 31 2012. Source: Hydro One Networks.

⁴¹ In developing this pilot, Horizon Utilities has followed the Ontario Information and Privacy Commissioner’s approach of “Privacy by Design.” For more on “Privacy by Design,” see <http://privacybydesign.ca/>

⁴² Horizon Utilities – November 2012.

⁴³ Based on: Ontario Energy Board, “2011 Yearbook of Electricity Distributors,” op. cit.

⁴⁴ Information compiled from a variety of sources, including the Panel’s own analysis.

- **Chatham Kent Hydro's Purchase of Middlesex Power Distribution, 2005:** The consolidation of each utility's administrative functions resulted in annual savings of \$450,000. Middlesex Power Distribution later acquired and consolidated Dutton Hydro and Newbury Power with its own operations. In 2012, the operations of Chatham Kent Hydro and Middlesex Power Distribution were merged into one new utility, Entegrus Powerlines. Entegrus Powerlines says the consolidations brought about annual savings of \$1.3 million. *"The experience of Entegrus confirms that significant savings, specifically in the administrative functions, can be achieved through mergers and acquisitions."*⁴⁵
- **PowerStream's merger with Barrie Hydro, 2009:** The two utilities achieved \$6.2 million in annual cost savings through their consolidation. Residential electricity consumers in Barrie typically saw distribution rate reductions of 11.5% in 2010 and, according to PowerStream, were expected to see another 5% decrease in 2013. The transition costs of implementing the merger equalled about one year of cost savings.

It is clear from the results of past mergers and acquisitions that further consolidation is a way to achieve added efficiencies. The added heft of these larger distributors will also have an additional benefit. It will make it easier for LDCs to attract the investment that all utilities are going to need in the future.

Increased Investment

As if the ongoing challenge of efficiently delivering electricity and energy services is not enough, LDCs are facing an additional financial challenge: persuading the consumer to pay for the renewal and transformation of the distribution networks upon which they depend.

As the province's Task Force on Competitiveness, Productivity and Economic Progress noted in its 2011 annual report, some of the money will be needed to make up for past under-investment: *"Ontario businesses have under invested in machinery, equipment and software relative to their counterparts in the United States, so that the capital base that supports workers in Ontario is not as modern as that of their counterparts in the peer states."*⁴⁶

Many LDCs in older downtowns will have to spend billions of dollars to upgrade their assets in order to maintain safety and reliability. Utilities everywhere will also need to invest heavily in innovative technology in order to meet the challenges of the future. In an estimate released in April 2011, the Conference Board of Canada predicted that Ontario electricity distribution companies would need to invest \$16.6 billion over the next 20 years to maintain their current networks, and an additional investment of close to \$4 billion to grow and serve new customers, new requirements, and new territories.⁴⁷

The Conference Board of Canada report acknowledges that this is only a preliminary picture of the financial demands facing distributors. The report anticipates three additional pressures will add to its \$20.6 billion estimate of needed distribution investment.⁴⁸ The first is the additional investments that will be required to connect more distributed generation and renewable energy. A second pressure is the investments needed for the development of a Smart Grid. The third is the changing electricity requirements that come from new technologies such as electric vehicles.

Despite this need for new investment, LDCs are restricted in their ability to attract new financing. Municipal governments face legal barriers that make it difficult for them to make additional investments in the LDCs they own. Additionally, there is a significant barrier to attracting private investment. If the utility sells or transfers assets to a private investor, a transfer tax of up to 33% is paid to the province

⁴⁵ Quoted from Entegrus Powerlines' official submission to the Panel.

⁴⁶ Task Force on Competitiveness, Productivity and Economic Progress, op. cit., p. 20.

⁴⁷ B. Baker, L. Coad, T.A. Crawford, I. Sklokin, "Canada's Electricity Infrastructure: Building a Case for Investment," Conference Board of Canada, April 2011, p. 23.

⁴⁸ Ibid.

on the fair market value of those assets. While the transfer tax does serve an important function of protecting payments made by distributors in lieu of taxes (PILs), it is also a major deterrent for private sector investment in the sector.

Innovation

The mantra for modern business is “Innovate or Die.” In its 2011 annual report, the Ontario government’s Task Force on Competitiveness, Productivity and Economic Progress said improving innovation has to be the province’s priority for the coming decade: *“When economists observe that productivity in Canada and Ontario is lagging, they are seeing the results of a sub-standard innovation record among our businesses.”*⁴⁹

The Smart Grid is just the beginning of what can be done with the digital sensing that will soon be the backbone of all distribution networks. Similar computerized intelligence is already being transferred to the home, allowing a thermostat, for instance, to sense when a family has left the home and reduce the level of heating or air-conditioning in order to save money.

A number of LDCs say it can be difficult to be innovative in the current regulatory environment. They cite a recent OEB decision that prevented Guelph Hydro from recovering the costs of a pilot program for electric vehicles, or the costs of including additional technology in its smart meters to enhance communication with in-home displays and appliances.⁵⁰ While the OEB said it might allow the recovery of the additional smart meter costs in the future, the decision has persuaded many LDCs that innovation is too risky. The expectations and requirements of the LDCs and the OEB need to be aligned if innovation is to be encouraged in Ontario’s distribution sector.

Contiguity

The results of previous consolidations have shown that a reduction in the number of utilities can result in significant cost savings. It is important to acknowledge however that the consolidations of the past may understate the extent of possible savings in the future. That is because many of the consolidations were accomplished by amalgamating two utilities that were distances apart and did not have any adjoining boundaries.

Four of the five examples of consolidations cited in this chapter did not eliminate any boundaries. The existing boundaries were maintained; only the administration and operations were merged. Additional savings can be achieved when the boundaries themselves are erased, consolidating neighbouring utilities into one new larger LDC with one contiguous boundary. Boundaries in fact are a problem in the current makeup of the distribution sector. There are too many of them.

Boundaries are an obstacle because they inhibit the efficient use of capital and resources. With fewer boundaries between utilities, they would be able to install new switches and sub-stations so that they serve a wider area. In addition, physical plants can be rationalized, eliminating the need for multiple control rooms in favour of one advanced system control centre with computerized monitoring and controls. There will also be fewer instances of the oft-heard complaint that crews from one LDC must pass through another LDC’s service area in order to attend to its own customers, requiring trucks to drive further than what ought to be necessary – a clear example of inefficiency.

Fewer boundaries and fewer LDCs will also mean better planning. Currently there is a perverse incentive for a utility to build up its own capital base, rather than share equipment owned by another utility.

⁴⁹ Task Force on Competitiveness, Productivity and Economic Progress, op. cit., p. 12.

⁵⁰ See Ontario Energy Board’s Decision and Order on February 22, 2012 regarding EB-2011-0123.

LDCs earn revenue in part based on the assets they own. As a result, the Panel has heard of instances where some LDCs have found it in their interest to install new equipment at their boundaries instead of leveraging assets owned by an adjacent utility. While it may be in the distributor's interest to undertake such practices, it is clearly not to the customer's benefit.

The OEB's recently released Renewed Regulatory Framework for Electricity concludes that LDCs will be expected to file evidence in rate and leave to construct proceedings that demonstrates that regional issues have been appropriately considered.⁵¹ This requirement is itself an acknowledgement that the fragmented nature of the distribution system in Ontario is an impediment to the cost-effective planning and development of electricity infrastructure in the province. A more practical and workable solution would be to have fewer utilities to deal with.



⁵¹ For more on the OEB's Renewed Regulatory Framework for Electricity, see: <http://www.ontarioenergyboard.ca/OEB/Industry/Regulatory%20Proceedings/Policy%20Initiatives%20and%20Consultations/Renewed%20Regulatory%20Framework>

Chapter 4

The Vision

A new world of electricity distribution is emerging, and it will look a lot different from what Ontarians see today. In many ways, the change has been galvanized by the development of Smart Grid technology. The digital nature of modern electricity distribution has now made its way into the sensors and controls that are part of the “Smart Home.”

The next steps will include the adoption of electric vehicles, the spread of energy storage and an increase in distributed energy. Over the next decade, Ontarians will be changing the way they generate, manage and consume electricity. This presents a big challenge for the province’s LDCs, the biggest challenge many have ever faced. Ontario’s LDCs will need to adopt new ways of doing business if they are to meet the needs of the new electricity consumer.

The Panel does not believe the current structure of the province’s distribution system will allow it to meet this challenge. The LDC of the future must have a stronger balance sheet, and the capacity to adopt new technology and offer advanced services in a cost-effective manner. This requires “*shoulder-to-shoulder, robust, well-resourced, and efficient LDCs,*” to borrow a phrase from the Electricity Distributors Association (EDA).⁵²

The Panel is supporting consolidation not as an end, but as a means to an end. The current fragmented nature of Ontario’s electricity distribution system, with its large number of small distributors, is a barrier to the innovation that is needed in the sector, and that its customers deserve. It is also an obstacle in the way of the most cost-effective delivery of electricity.

The Panel agrees with what The Conference Board of Canada said in its 2012 report, *Needed: A Comprehensive Growth Strategy for Ontario*: “...Ontario firms and organisations will have to step up their own commitments to strengthen productivity growth and competitiveness. They can enhance their commitment to research and development in the province and work to build an innovation culture within organizations of all sizes and types, one that places high value on new ideas and constant refinements to products and process.”⁵³

There is a strong consensus in the industry that consolidating the province’s LDCs will not only encourage innovation but also result in a less costly and more efficient delivery of electricity. This is the view of the Ontario Energy Association: “...now is the ideal time for the Ontario government to move decisively to eliminate costly inefficiencies in the LDC sector to the benefit of ratepayers, and unlock the value of each company for its shareholder. Rationalization of LDCs would bring economic benefit to all Ontarians – especially important given the province’s fiscal challenges and the broader economic landscape.”⁵⁴

A number of electricity customers share this opinion. In its presentation, the Retail Council of Canada (Council) said the current distribution system “causes extra administrative costs for retailers in multiple service areas, costs that have no return on investment.”⁵⁵ The Council also said it “increases the cost

⁵² Electricity Distributors Association, “The Power to Deliver: Recommendations for the future of electricity distribution in Ontario,” August 2012, p. 5.

⁵³ G. Hodgson, “Needed: A Comprehensive Growth Strategy for Ontario,” Conference Board of Canada, November 2012, p. 4.

⁵⁴ Ontario Energy Association, “Ontario Distribution Sector Review Panel Submission,” July 2012, Cover Letter.

⁵⁵ Quoted from the Retail Council of Canada’s official submission to the Panel.

⁵⁶ Ibid.

and administrative burden of participation in distributor-level conservation programs.”⁵⁶ Many LDCs and stakeholders who made submissions or appeared before the Panel also felt that Ontario could be better served by a smaller number of larger utilities.

This is supported not just by the experience of prior mergers and acquisitions in the Ontario distribution sector, but also by numerous international studies. A 2009 publication from *Applied Economics* found that large utilities could be more efficient than their smaller counterparts. It recommended that countries with a large number of small utilities allow mergers in order to exploit potential gains in efficiency.⁵⁷

A similar study published in 2007 in *The Energy Journal* stated a 16% reduction in expenses could be achieved by merging smaller utilities into large ones.⁵⁸ A Spanish study in 2009 by the *Fundacion de Estudios de Economia Aplicada* found that company size is an important issue in the evolution of the industry’s productivity, and that technological advances can bring more benefits to larger firms than smaller ones.^{59,60}

While most of the existing academic studies support the argument for consolidation, the research is not unanimous. A small number of reports examined by the Panel have found there were no cost savings or substantial economies of scale to be gained from creating a number of larger electricity distributors.⁶¹ However, the analysis of the experience in Ontario done by the Panel shows that there are cost savings that can be achieved.

In Ontario, the report of The Commission on the Reform of Ontario’s Public Services supports the consensus view that consolidation is a way to reduce costs. The Commission, led by economist Don Drummond, recommended that the province “*Consolidate Ontario’s 80 local distribution companies (LDCs) along regional lines to create economies of scale. Reducing the \$1.35 billion spent on operations, maintenance and administrative costs for Ontario’s LDCs would result in direct savings on the delivery portion of the electricity bill.*”⁶²

In its presentation to the Panel the EDA, the voice of the province’s LDCs, recognized that the consolidation of fragmented service areas was one of the ways to improve the efficiency of electricity distribution.

“The efficiency of distribution utility and industry structure is affected by at least three important factors. The first is contiguity. The wires business requires a single utility to serve all customers within a contained area and for this reason service franchises have prevailed since the early years of electrification.” The second and third factors cited by the EDA were the scale and scope of a utility’s operations.⁶³

The EDA recommended the Panel consider a series of changes that would end with the creation of shoulder-to-shoulder, robust, well-resourced and efficient LDCs:

*“One of the principles which underlies this model is the potential for gains arising out of economies of contiguity. The technology of electricity distribution is such that it is more efficient to service customers that populate a contiguous self-contained area.”*⁶⁴

⁵⁷ C. Growitsch, T. Jamasb, M. Pollitt, “Quality of service, efficiency and scale in network industries: an analysis of European electricity distribution,” *Applied Economics* 41 (2009), no. 20, p. 2555-2570.

⁵⁸ N. Bagdadioglu, C.W. Price, T. Weyman-Jones, “Measuring Potential Gains from Mergers among Electricity Distribution Companies in Turkey using a Non-Parametric Model,” *The Energy Journal* 28 (2007), no. 2, p. 109.

⁵⁹ B. Tovar, F.J. Ramos-Real, E.F. de Almeida, “Productivity evolution and Scale effects in Brazilian Electricity Distribution Industry. Evidence from 1998-2005 period,” *Fundacion de Estudios de Economia Aplicada* 4 (2009), p. 2.

⁶⁰ *Ibid.*, p. 19.

⁶¹ See, for example: A. Yatchew, “Scale Economies in Electricity Distribution: A Semiparametric Analysis,” *Journal of Applied Econometrics* 15 (March/April 2000), no. 2, p. 187-210.

⁶² Commission on the Reform of Ontario’s Public Services, “Public Services for Ontarians: A Path to Sustainability and Excellence,” February 2012, p. 331

⁶³ Electricity Distributors Association, *op. cit.*, p. 37.

⁶⁴ *Ibid.*, p. 84.

As noted in Chapter 1, the structure of the electricity distribution sector in Ontario is unique. No other jurisdiction in Canada has the number or share of small LDCs that are evident in Ontario's distribution sector.

While there was a general understanding that the status quo was no longer appropriate, there was also a surprising amount of agreement on what should replace the currently fragmented distribution system: a dramatically reduced number of LDCs.

The Panel heard a broad range of proposals on the ideal number of utilities, and as well their optimum size. One stakeholder suggested that only one distribution utility was needed to serve the entire province. Others suggested there should be 6 to 7 LDCs, each with 500,000 to 800,000 customers apiece. Another participant felt Ontario should have 8 regional distributors centered on an urban hub, each with at least 500,000 customers and a rate base of at least \$1 billion.

In the end, Panel members agreed with this general direction. So it is recommending **the consolidation of Ontario LDCs into 8 to 12 regional distributors that are large enough to deliver improved efficiency and enhanced customer focus, while at the same time maintaining connections with local communities.**⁶⁵

The Panel's recommendations will not apply to all LDCs in Ontario. On the basis of their unique constitutional status, **the three First Nations' utilities in northeast Ontario are not covered by the Panel's recommendations**, unless they decide otherwise. **The three non-rate regulated utilities in Ontario, Cornwall Electric, Dubreuil Lumber, and the assets serving the Cat Lake community will also be exempt** unless they choose to join in. Cornwall Electric is exempt because it buys its electricity from Quebec; Dubreuil because it operates mainly on private property; and the distribution assets that serve the Cat Lake community are exempt because they are under the control of Hydro One Networks under an interim electricity distribution licence. **Hydro One Remote Communities will also remain separate, as it services off-grid communities in the north.**

The new regional distributor will be anchored by one or more urban centres and will have to provide service to customers in its territory regardless of the costs of service.

Northern Ontario needs to be treated differently because of the smaller number of customers spread out over longer distances. **There should be two regional distributors in the north, one serving the northeast part of Ontario, and the other serving the northwest.**

This would leave the rest of the province to be served by between 6 and 10 regional distributors. Of the existing LDCs, the Panel expects only one, Toronto Hydro, will remain unchanged as it is already large enough and has contiguous boundaries. It can thus be considered as one of the 6 to 10 regional distributors in southern Ontario. **Each new regional distributor in southern Ontario should have a minimum of 400,000 customers.**

The Panel feels that the existing LDCs should be encouraged to voluntarily merge their distribution assets and create the new regional distributors within two years. While there was intense consolidation and sale activity in the years immediately following the passage of the *ECA*, the situation has been relatively stagnant in recent years. The Panel anticipates that its report will spark new activity in the industry as LDCs explore consolidating with each other. Since consolidation is a proven method to curb costs, ensure the broadest adoption of technological innovation and make the necessary funding available at the lowest price, inaction is not in the best interests of the consumers or the province.

⁶⁵ Texts in bold face are summaries of the Panel's recommendations. The formal recommendations can be found in Chapter 6.

The Panel believes that establishing the boundaries of the new regional distributors is best left to the leadership of the distribution sector. **However boundaries should follow the existing structure and architecture of the distribution system, and take into account the existing Hydro One Networks service areas.**

The Panel understands that some stakeholders might prefer a more tangible depiction of what the new map of distribution might look like. So, for discussion purposes only, the Panel has prepared a map (Fig. 12) to illustrate what the future could look like with 8 regional distributors.

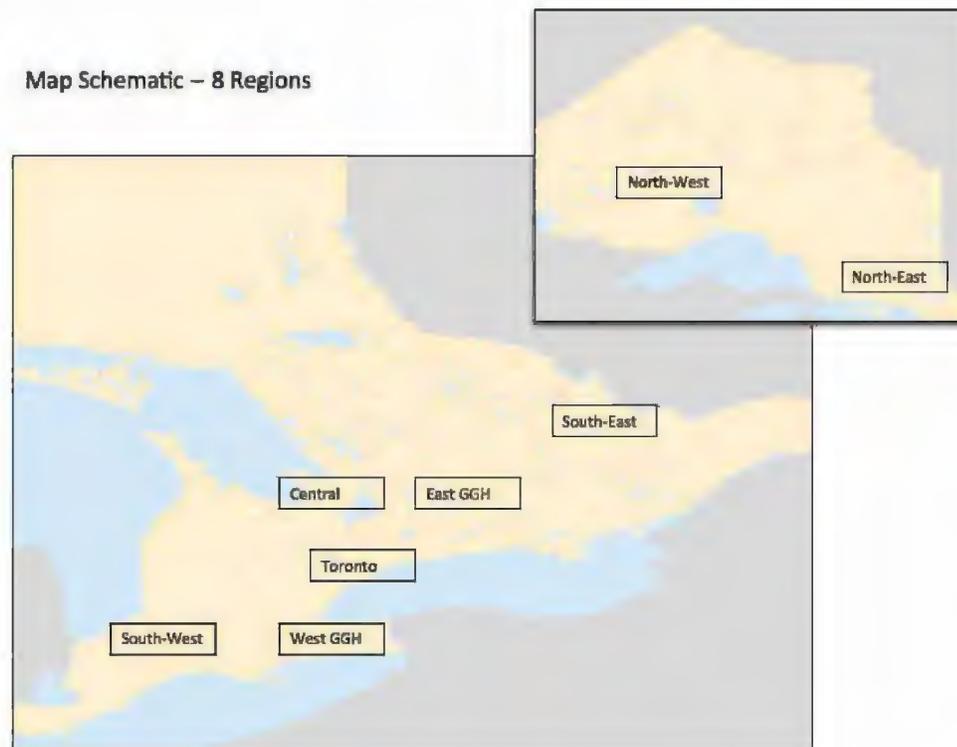


Figure 12: Illustration of 8 Regional Distributors⁶⁶

While the eventual number of utilities remains to be determined, there are additional principles the Panel feels are essential if the province is to have an electricity distribution sector that supports the economic well-being of its citizens.

Exempted utilities aside, there should only be regional distributors. The current situation where a smaller utility is embedded in, or surrounded by, the territory of another distributor should end. **The new regional distributors must have boundaries that are contiguous and stand shoulder-to-shoulder.**

There should be no across-the-board sale of Hydro One Inc.'s distribution assets (of its Networks or Brampton subsidiaries). The creation of the new system of regional distributors should be facilitated by the merger of its assets with those of existing distributors. As the shareholder of Hydro One Inc., the government benefits from the revenue streams it receives from its distribution businesses. Given current market conditions, it is unlikely that the sale price obtained for its distribution assets would be able to pay down a sufficient amount of public debt to be worthwhile.⁶⁷ A sale of Hydro One Brampton and Hydro One Networks' distribution assets would almost certainly hurt the province's fiscal position.

⁶⁶ 'GGH' is an abbreviation for Greater Golden Horseshoe.

⁶⁷ Commission on the Reform of Ontario's Public Services, op. cit., p. 406. See discussion on Asset Transactions.

The recommendation to merge and not sell Hydro One Networks' distribution assets is in line with a recommendation from the Drummond Commission: *"Do not partially or fully divest any or all of the province's government business enterprises – Ontario Lottery and Gaming Corporation, Liquor Control Board of Ontario, Ontario Power Generation and Hydro One – unless the net, long-term benefit to Ontario is considerable and can be clearly demonstrated through comprehensive analysis."*⁶⁸

Cost Savings and Benefits

The Panel is convinced that consolidating the applicable rate-regulated LDCs into a smaller number of considerably larger utilities will significantly curb costs and generate benefits for the industry. The following are realistic efficiency targets that the Panel believes are achievable by the new regional distributors:

- In the first ten years after consolidation, \$1.7 billion in costs at net present value can be removed from the electricity distribution sector.⁶⁹ After allowing for \$500 million in transaction and transition costs, it is expected that cost savings of \$1.2 billion at net present value would be achieved across the sector over the first ten years for the benefit of customers and shareholders. This would be equivalent to approximately \$70 per year for every electricity customer by the end of the tenth year.
- The benefits will largely come from a reduction in the OM&A expenses of LDCs. Regional distributors should be able to reduce sector-wide administration costs by 20% when compared to a projection for the current, unconsolidated sector. Efforts to increase administrative efficiency should focus on customer care, billing and collections, facilities and facilities maintenance and administrative salaries and expenses.
- Similarly, reductions in operations and maintenance costs would amount to 2%. Benefits accrue from curbing operating expenses, the number of service and control centres, and supervision and engineering costs.
- Consolidation will allow LDCs to avoid \$1.3 billion in infrastructure investment over the first ten years resulting in a 5% reduction in depreciation and return on capital when compared to the continuation of the status quo – worth over \$300 million in present terms. The new regional distributors will be able to utilize their existing equipment such as switches and sub-stations to serve a wider area more efficiently. In addition, duplicate service and control centres can be eliminated. There will also be improved economies of scale for facilities and transportation, and for advanced computer software such as customer information systems.

Fig. 13 and Fig. 14 illustrate the source and timeframe for costs savings in the ten years following consolidation versus a projection of the status quo. The savings will continue to increase beyond ten years, with relatively more of the savings accruing from avoided infrastructure investments and the resulting reductions in the regulated asset base over time.

Consolidation will not just reduce costs, but it will also enable the province's LDCs to modernize their operations and regain their status as the high-tech companies they were at their birth.

- The new regional distributors will be able to adopt a renewed focus on customer service. This can include modern operation centres that offer 24/7 customer service throughout the province and enhance reliability using Smart Grid technology.

⁶⁸ Ibid., p. 407.

⁶⁹ Assumed annual discount rate of 6%.

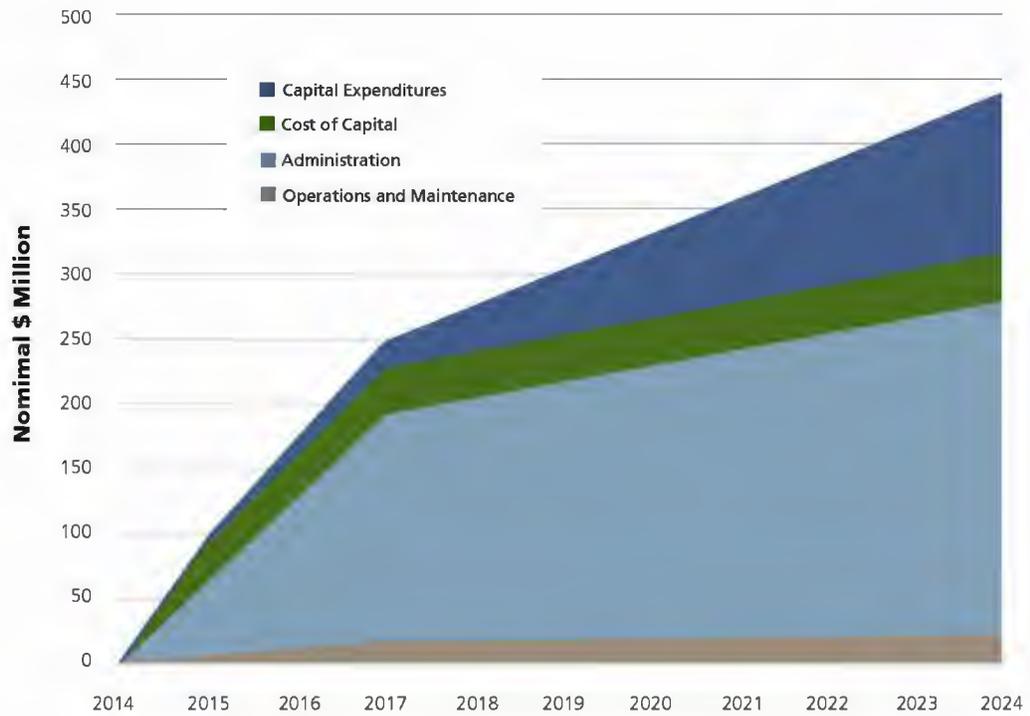


Figure 13: Estimated Benefits from LDC Consolidation (First 10 Years)

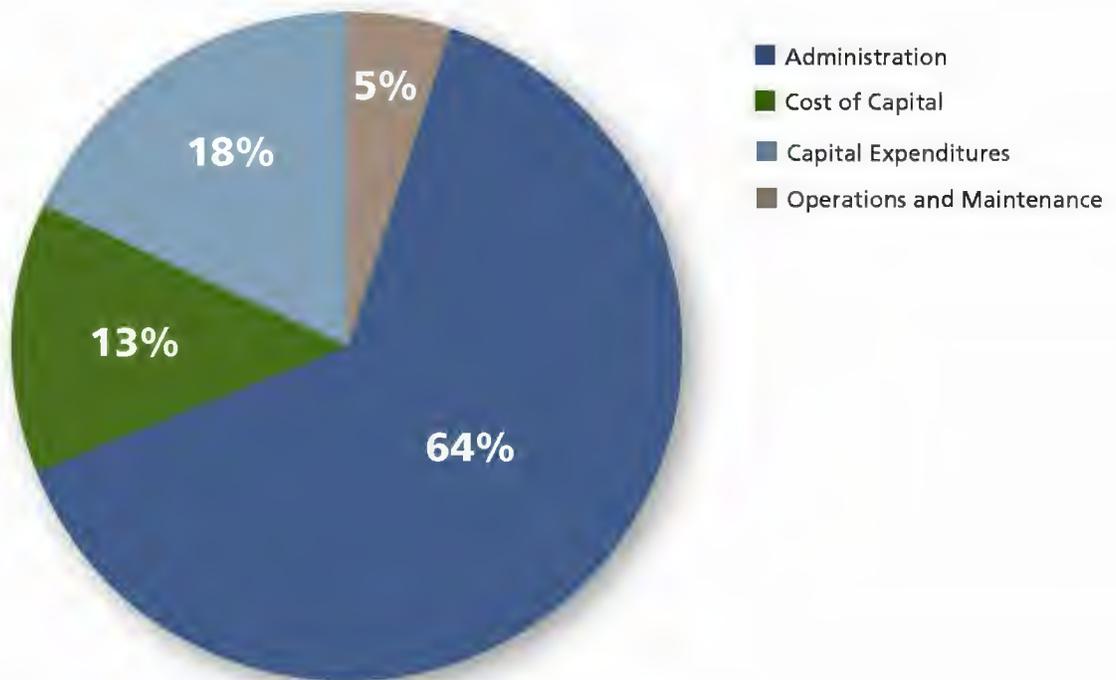


Figure 14: Breakdown of \$1.7 Billion (Net Present Value) in Cost Savings

- Larger distribution utilities will have the resources and capacity to deal with the impending changes in electricity generation and consumption, including distributed generation, energy storage and electric vehicles. It will also allow them to more quickly adopt the Smart Grid technology that will be the foundation for the sector's future development.
- They will have the capacity to adopt and share best practices from other utilities, not just in Ontario but from around the world. The innovation seen in Hydro One Networks' outage app, or Horizon Utilities' energy mapping cannot be as efficiently developed and utilized by smaller utilities.
- Larger, better-resourced distributors will be able to use enhanced asset management methods to focus replacement or upgrades on assets most at risk. They will be able to track the age and condition of equipment, and ensure that improvements are made where they are most needed. This will increase reliability and reduce the risk of power outages.
- Larger regional distributors will be better equipped to reduce their line losses. Right now distributors lose about 4% of the energy they purchase due to technical matters and theft.⁷⁰ Technical line losses are caused primarily by magnetic losses in transformers and by the electrical resistance inherent to sending lower-voltage electricity over long distances. Line loss has historically been higher for smaller LDCs with older equipment than for larger newer ones, and this cost is passed on directly to consumers.
- Regional Planning will be easier. As noted previously, the OEB's Renewed Regulatory Framework for Electricity concludes that LDCs will be expected to file evidence in rate and leave to construct proceedings that demonstrates that regional issues have been appropriately considered and, where applicable, addressed in the utility's capital budget or infrastructure investment proposal. After consolidation, a lot of the work of planning the optimal investment in infrastructure at the lowest possible cost will be done as a matter of routine by the new regional distributor.
- Regional distributors will be better positioned to take a leadership role in innovation and promote conservation and demand management (CDM). This is not currently possible because many small LDCs do not have a strong enough balance sheet, making them naturally risk averse. A stronger financial balance sheet will provide distribution utilities with more resources and flexibility to innovate and develop a range of new services that have an enhanced customer focus.
- There will be savings in regulatory costs. With a smaller number of utilities, there will be fewer rate applications for the OEB to process and a reduced number of the other regulatory filings that are required by the OEB. Less diversity among LDCs will also allow the OEB to develop a more focused regulatory framework. These changes will have two benefits: It will allow the OEB to streamline operations and reduce its cost of regulation, thus saving customers money; and since the per customer cost of regulatory filings is less for large utilities than small ones, consumers will receive a second, more immediate benefit.
- Financing costs will be lower. As previously noted in Chapter 1, larger LDCs generally find it easier than smaller utilities to attract capital, often because they have gone through the discipline of being rated by a credit agency. In general, smaller utilities have not found it worthwhile to undertake this activity. The cost of capital will be increasingly important in the future, as the electricity distribution sector requires billions of dollars of additional infrastructure investment to renew and transform its distribution networks.

⁷⁰ Based on: Ontario Energy Board, "2011 Yearbook of Electricity Distributors," op. cit.

Chapter 5

The Road Forward

Ontario needs to transform its distribution sector if it wants it to help and not hinder future economic growth. The Panel believes a system of much larger regional distributors will deliver increased efficiency and economies of scale, and create a potential for innovation and customer focus that is currently lacking in the industry as a whole.

This will require a change in the attitudes and policies of a number of the players currently involved in the province's electricity sector. Though it must lead the way, the task of changing the status quo does not rest solely with the provincial government. Everyone, from the LDCs and municipalities to the provincial government and the OEB, must work together to ensure this new vision of distribution takes root and flourishes in Ontario.

Consolidation

Substantial efficiencies will not occur unless Hydro One Networks is part of the solution. This single distribution company serves 25% of the 4.8 million electricity customers in Ontario. Without its cooperation, it will be impossible to realize the savings that will result from contiguous, shoulder-to-shoulder regional distributors.

The Panel recommends that **the Ontario government, as the shareholder of Hydro One Inc., should give it clear, unambiguous direction to lead and engage in fair, market-value based discussions with LDCs in order to create the new regional distributors. Hydro One Inc. should put all of the distribution assets of its subsidiaries on the table in order to enable transactions that can result in the shoulder-to-shoulder consolidation of the industry as envisioned in Chapter 4.**⁷¹

In order to protect their investments, **the current owners of the LDCs to be consolidated will receive equity in the new regional distribution utilities in proportion to the valuation of their assets used to create each of the new regional distributors.** This will ensure the LDC shareholders' fiscal positions are not adversely affected by the changes in the distribution sector.

Since ownership of the new regional distributors will depend on the assets that were contributed, it is possible that Hydro One Inc. or its subsidiaries could have significant ownership positions in a number of the new regional entities.

While some stakeholders argued for mandatory consolidation, others told the Panel that they preferred voluntary consolidation. **The Panel's preference is for voluntary consolidation, but action must be swift. The Panel recommends that licence applications of all new regional distributors be submitted to the OEB within two years of the government adopting the recommendations of this report.**

⁷¹ Note that Hydro One Remote Communities and the distribution assets in the Cat Lake community are considered out of scope.

Transition Advisor

Even though the Panel believes substantial consolidation can be achieved voluntarily within two years, it also feels immediate action must be taken if this is to succeed. Therefore, **the Panel is recommending that the government appoint a Transition Advisor to monitor the process of consolidation.** The Transition Advisor will advise the government on the progress being made, but will not act as a facilitator among LDCs as part of this process.

Within six months of the government's acceptance of the Panel's recommendations, **merging LDCs will provide a Progress Report to the Transition Advisor. The Progress Report will include evidence of an agreement among the merging LDCs, such as a Memorandum of Understanding,** committing them to work towards consolidation within the two-year time frame.

After receiving a Progress Report, the Transition Advisor may advise LDCs of any conflicts that would inhibit the achievement of the Panel's vision for the sector, such as mergers that may not result in efficient, contiguous regions, or that may result in stranded service territories. LDCs may then submit a revised Progress Report based on further negotiations before the end of the initial six months.

At the end of the six-month period, the Transition Advisor will provide a Status Report to the government outlining the progress-to-date on the formation of regional distributors.

- **The Transition Advisor will provide advice on the formation of contiguous and shoulder-to-shoulder regional distributors.**
- **The Transition Advisor will notify the government of mergers that may not result in efficient, contiguous regions as envisioned in Chapter 4, or that may result in stranded service territories.**
- **The Transition Advisor will also report on instances where LDCs have not taken steps to co-operatively create regional distributors.**

After consideration of the Status Report, if any of the proposed regional distributors need more time to finalize their voluntary agreements, the government may permit them up to three additional months to finish their work. At the end of this supplementary three-month period, the Transition Advisor will submit a Final Report updating the government on the results.

Where it is clear, after consideration of the Transition Advisor's Status Report, or in the event that the government has sanctioned an additional 3 months, the Final Report, that formation of regional distributors cannot be completed through voluntary means, the Panel recommends that the government introduce legislation at that time to ensure consolidation is successfully completed.

Fig. 15 illustrates the actions the Panel is proposing to ensure Ontario's distribution sector is consolidated within its two-year time frame.



Figure 15: Timeline for Consolidation Illustration

Incentives

Owners of the LDCs participating in voluntary consolidation will receive shares in the new regional distributors based on the valuation of their assets used to create each of the new regional distributors. LDCs that do not voluntarily agree to a merger and are amalgamated through mandatory mechanisms should have their assets assigned to the new regional distributors assessed at book value.

Utilities that successfully form a voluntary agreement during the initial six to nine month period, and submit a licence application for the new regional distributor to the OEB within two years, should be allowed to recover their prudent transaction costs, which may include the costs of a third-party facilitator.

In order to facilitate consolidation, LDCs involved in any merger should not be required to go through the OEB process for assessing mergers as it is currently operated. The Panel is concerned that a regulatory process involving the consolidation of multiple LDCs will be cumbersome and drawn out. Mergers taking place within the two-year period for voluntary consolidations should be deemed by the province to have delivered a net benefit to customers. Consumers will still be protected, as the OEB will have regulatory oversight over any rate applications filed by distributors in the post-merger period.

Principles

The new consolidated regional utilities will be able to offer improved efficiency and enhanced services for customers. In previous consolidations, the municipal shareholder often kept the funds that came

from the sale of buildings or property that were no longer required by the new utility. The Panel feels the money should stay in the distribution system. **Any shareholder gains from the disposal of excess utility assets prior to the merger are expected to be reinvested in the regional distributor to strengthen the system, and not used for dividends or other non-electricity purposes.**

Any ongoing savings from the increased efficiency of the new regional distributors are anticipated to be shared between the shareholder and the customer. As the Panel has heard from many stakeholders that significant capital investment will be required over the coming years, **the Panel expects that much of the savings accruing to the shareholder will be reinvested in the electricity distribution system.**

Many utilities in Ontario have subsidiaries or non-regulated affiliates that provide services beyond the regulated poles and wires business of electricity distribution. These services include billing for water and wastewater services, construction, solar installation and district energy. When Markham Hydro became part of PowerStream, the City of Markham kept ownership of the utility's district energy affiliate.

Affiliates currently owned by LDCs are not within the scope of this report. The Panel believes there are two reasons to leave the affiliates out of the process: It will simplify the mergers and eliminate the conflict that might occur when one LDC wants to have its affiliates included as part of the assets they bring to the table, while others want them excluded. Secondly, the Panel feels the consolidations that will create the new regional electricity businesses will take the full and uninterrupted attention of the new regional electricity distributors' managers, and that they should not be distracted by any unregulated business affairs. Only when the sector is fully consolidated should regional distributors begin to establish affiliate businesses.

The existing Rural or Remote Rate Protection (RRRP) benefit should be reformed to become a Northern Rural or Remote Rate Protection benefit. Under RRRP, all electricity customers in Ontario pay a small charge to cushion the high-cost of electricity distribution for hard to serve rural or remote customers. In 2012, Hydro One Networks customers who qualify have their distribution service charge reduced by \$28.50 a month. The Panel believes the RRRP will no longer be needed in southern Ontario because unlike the present situation, the contiguous, shoulder-to-shoulder regional distributors will have a mix of both urban and rural customers, allowing them to balance urban and rural rates within each region. This change is not expected to affect customers of First Nations' LDCs, Hydro One Remotes Communities, or qualifying customers in areas of northern Ontario currently covered by the RRRP.

Investments and Governance

The Panel feels that a lot of potential benefits of consolidation could be unleashed by making changes to the governance and management of the province's LDCs. Strengthening managerial capacity was one of the recommendations of the Ontario government's Task Force on Competitiveness, Productivity and Economic Progress. *"Strong Management is important for sizing up competitive challenges and threats, assessing consumer behaviour for business opportunities, putting in place the necessary resources and capabilities, and building skills and talents in the organization."*⁷²

Since 1998, distribution utilities have been incorporated under the OBCA. The Panel feels it is time to treat the province's LDCs as the commercial enterprises they are; this will require municipal shareholders to adopt best practices in the stewardship of the LDC assets in order to ensure strong operating performance.

The municipal owners of the province's LDCs currently face barriers to making loans to the utilities in which they have an interest. This is a deviation from accepted practice, whereby shareholders of a corporation are responsible for ensuring it is adequately capitalized. **The Panel believes the distribution sector should be treated the same as other corporations in Ontario, and**

⁷² Task Force on Competitiveness, Productivity and Economic Progress, op. cit., p. 41.

recommends the government eliminate the restrictions that prevent municipalities from making loans to distributors.

Many municipalities hold promissory notes from their LDCs that were taken out at the time of the utilities' transformation into corporations under the OBCA. These notes have frequently continued to bear the higher interest rates that were common at the time. **Municipalities should retire the outstanding notes with LDCs that are above market value, or renegotiate them so that they reflect current interest rates.**

Many stakeholders told the Panel that the current transfer tax acts as a barrier to the consolidation of the province's distribution sector. **The Panel recommends that Ontario enter into discussions with the federal government on a tax agreement that would facilitate the removal of the transfer tax on the sale of LDC assets.**

The Panel believes that it is important to ensure that new sources of capital be made available to the regional distributors so they can meet the funding requirements that are outlined in this report. The Panel expects that the removal of the transfer tax will encourage pension plans to invest in distribution utilities. The investment by pension funds will not only help Ontario's utilities meet their financing needs, but also provide a source of stable and secure income to the funds and their pensioners, and help pension funds deal with the market challenges they currently face. Investing in Ontario's distribution utilities should, for Ontario-based pension plans, be a valuable alternative to investing in utilities in other countries.

Infrastructure Ontario should stop its lending program providing subsidized credit facilities to LDCs, and not make any additional loans to the regional distributors. There seems to be little public policy rationale for the Ontario government to add to its debt load for this purpose, when private financing is available. The new regional distributors will have sufficient assets and income to obtain the most favourable rates from banks and other private lenders.

Given the importance of electricity distribution to the province's economy, it is important that the Boards of Directors of the regional distributors display a high standard of corporate governance. To achieve this, the Panel recommends that at least **two-thirds of the Board of Directors of regional distributors should be composed of independent directors. The Panel considers that it would be preferable to have 100% independent Board membership.** This has worked with the merged utility of Bluewater Power Distribution, and would help to overcome conflicting local priorities.

The Boards should be adequately sized to have directors with an appropriate range of skills and experience, and be populated on the basis of directors' qualifications to meet the management and oversight requirements of an electricity distribution utility. Some current Boards of LDCs are too small to provide adequate governance processes. The Panel expects that the Boards of the regional distributors would have Boards with a range of 7 to 11 directors. **Regional distributors should also encourage their Board members to acquire proper training in the areas of governance and the roles of Boards.**

Business Issues

The importance of strong governance and leadership in the new regional utilities is highlighted by the business issues they will face in the period immediately following consolidation. The utilities will have to work through a number of issues such as the differing pension plans, labour rates and accounting standards that currently exist among the LDCs. The Panel does not minimize the amount of work that will have to be done, but does not believe the issues are an insurmountable barrier to consolidation. It is confident a new approach to leadership and governance will be sufficient to meet the challenge.

Chapter 6

Recommendations

Regional Distributors

The 73 LDCs that are the focus of this report should be consolidated into 8 to 12 larger regional distributors that are large enough to deliver improved efficiency and enhanced customer focus, while at the same time maintaining a strong connection with their local communities.

There should be two regional distributors to serve the north, one serving the northeast part of Ontario, and the other serving the northwest, leaving 6 to 10 regional distributors in southern Ontario. Any new regional distributor in southern Ontario should have a minimum of 400,000 customers. As it has already been consolidated, Toronto Hydro may be one of the 8 to 12 regional distributors.

The three rate-regulated First Nations' utilities, and the three utilities that are not rate-regulated (Dubreuil Lumber, Cornwall Electric, and Hydro One Networks Inc./Cat Lake Power Community) will be exempt from this consolidation, unless they decide they want to join in. Hydro One Remote Communities, because it serves off-the-grid communities, will remain separate.

The new regional distributors must have boundaries that are contiguous and stand shoulder-to-shoulder. Boundaries should follow the existing structure and architecture of the distribution system, and take into account the existing Hydro One Networks service areas.

Consolidation should be completed within two years of the Government's acceptance of the recommendations of this report.

Hydro One

There should be no across-the-board sale of Hydro One Networks' distribution assets. The creation of the new system of regional distributors will be facilitated by the merger of Hydro One Networks' assets with those of the other existing distributors.

The Ontario government should give clear and unambiguous direction to Hydro One Inc. to lead and engage in the discussion of the merger of its distribution assets with the appropriate interested utilities. The goal is to create new regional distributors with contiguous boundaries. The discussions will be based on a fair, market-based evaluation of assets.

The owners of the current LDCs will get shares in the new regional distributors they voluntarily create in proportion to the valuation of the assets they contributed. LDCs that are amalgamated through mandatory mechanisms will have their assets valued at book value.

Ontario Government

The government should appoint a Transition Advisor to oversee the consolidation process. The Transition Advisor will advise the government on the progress of achieving complete consolidation. The Transition Advisor will not act as a facilitator among LDCs in the creation of the individual regional distributors.

Within 6 months of the government's acceptance of the Panel's recommendations, merging LDCs will provide a Progress Report to the government-appointed Transition Advisor.

- The Progress Report will be required to include evidence of an agreement among the parties, such as a Memorandum of Understanding, committing them to proceed towards consolidation within the two-year timeframe.
- Upon receipt of a Progress Report, the Transition Advisor may indicate to a proposed regional distributor where the merger may not result in an efficient, contiguous region or may result in stranded service territory. Merging LDCs may then submit a revised Progress Report to the Transition Advisor before the end of the initial 6-month period.

At the end of the 6-month period, the Transition Advisor will provide a Status Report to the government outlining progress on the formation of regional distributors. The report will provide information on the status of regional distributor formation; indicate which proposed mergers do not result in efficient, contiguous regions, or create stranded service territories; and identify LDCs that have not been taking steps to create a regional distributor.

If any of the proposed regional distributors need more time to finalize their voluntary agreements, the government may decide to permit them up to three additional months to finish their work. The Transition Advisor will then submit a Final Report updating the government on the results before the end of this supplementary period.

Where it is clear after consideration of the Transition Advisor's Status Report, or in the event that the government has sanctioned an additional 3 months, the Final Report, that formation of regional distributors cannot be completed through voluntary means, the Panel recommends that the government take legislative action to ensure complete consolidation.

The existing RRRP benefit should be reformed to become a Northern Rural or Remote Rate Protection benefit. Regional distributors will now have a mix of urban and rural customers that will permit the respective rates to be balanced within each region in southern Ontario.

The Ontario government should enter into discussions with the federal government to facilitate removal of the transfer tax on the sale of LDC assets to private investors.

Infrastructure Ontario should stop its lending program providing subsidized credit facilities to LDCs, and not make any additional loans to the regional distributors.

Ontario Energy Board

LDCs that reach a successful voluntary agreement during the initial six to nine month period and submit a licence application for the new entity to the OEB within two years should be allowed to recover their prudent transaction costs. This may include the costs of any third-party facilitation.

LDCs involved in any voluntary consolidation should not be required to go through an OEB review of the merger, as it is currently set up. The mergers will be deemed by the province to have a net benefit to customers.

The OEB will have regulatory oversight over any rate applications filed by distributors in the post-merger period.

Cost Savings

The Panel anticipates that any funds from the disposal of excess utility assets would be re-invested in the regional distributors in order to strengthen the system, and not used for dividends or other non-electricity purposes.

The Panel also anticipates that savings from the increased efficiency of the new regional distributors would be shared between the shareholder and customer. Given the requirement for significant capital investments, it is expected that much of the savings accruing to the shareholder will be reinvested in the electricity distribution system.

Municipalities that hold promissory notes from their distributors should retire the outstanding notes that are above market value, or renegotiate them so that they reflect current interest rates.

Governance

Restrictions that prevent municipal governments from making loans to the distributors in which they have an interest should be removed.

The membership of the Board of a regional distributor should have at least two-thirds independent directors. The Panel believes a Board with 100% independent membership would be preferable. The Boards should be adequately sized to have directors with an appropriate range of skills and experience, and be populated on the basis of directors' qualifications to meet the management and oversight requirements of an electricity distribution utility. Utilities should ensure that their Board members have adequate training in governance and the roles of Boards, and represent an appropriate range of skills and experience.

Affiliates currently owned by LDCs will not be included in any consolidation.



Conclusion

Ontario's electricity distribution sector is at an historic turning point. The work that LDCs have been doing for the past century is undergoing a dramatic transformation: the nature of electricity generation is changing, and computers are turning electricity distribution into a digital, high-tech endeavour.

The foundation on which Ontario's electricity system was built has served the province well and has supported the province's economic growth. It is not suitable, however, for the challenges and the opportunities of the future. This province needs a stronger, more innovative distribution system that can meet the changing needs of the consumer and the province.

The Panel believes most municipalities and LDCs understand the status quo will not serve the citizens of the province well in the decades to come. Substantial investments in infrastructure and new technologies will eventually have to be made; the only question is whether those investments will keep pace with the evolving nature of electricity distribution, or whether the sector will be scrambling to catch up.

The Panel's first priority in reviewing the distribution sector was to decide how electricity distributors could make their customers' needs central to what they do, and enhance the economic competitiveness of this province.

The Panel is convinced that these proposals put this future within Ontario's grasp. The Panel is confident the leaders of the distribution sector have the vision and the skills to forge a new era in the distribution of electricity in Ontario.

Appendix 1

List of Maps, Charts and Graphs

Fig. 1	LDC Service Areas in Ontario	Page 2
Fig. 2	Total Customers by LDC in 2011	Page 7
Fig. 3	Veridian Connections Service Areas	Page 8
Fig. 4	Electricity Distributor Sizes – International Comparisons	Page 9
Fig. 5	Components of a Typical Residential Electricity Bill in Ontario	Page 10
Fig. 6	OM&A Costs per Customer for Small, Medium and Large LDCs	Page 11
Fig. 7	OM&A Costs per Customer by LDC Size	Page 12
Fig. 8	Average Financing Costs of Long-Term Debt by LDC Size	Page 13
Fig. 9	Capital and OM&A Costs per Customer by LDC	Page 14
Fig. 10	Smart Grid Illustration	Page 18
Fig. 11	Smart Home Illustration	Page 19
Fig. 12	Illustration of 8 Regional Distributors	Page 30
Fig. 13	Estimated Benefits from LDC Consolidation (First 10 Years)	Page 32
Fig. 14	Breakdown of \$1.7 Billion (Net Present Value) in Cost Savings	Page 32
Fig. 15	Timeline for Consolidation Illustration	Page 36

Appendix 2

List of Presenters and Submitters

Organisations

- Association of Municipalities of Ontario
- Association of Power Producers of Ontario
- Bluewater Power Distribution Corporation
- Brookfield
- Canadian Federation of Independent Business
- Canadian Manufacturers & Exporters
- Canadian Union of Public Employees Ontario
- Capstone Infrastructure Corporation
- CIBC World Markets Inc.
- City of Barrie
- City of Cambridge
- City of Hamilton
- City of Port Colborne
- City of Sault Ste. Marie
- City of Toronto
- Collus Power Corporation
- Consumers Council of Canada
- Corix Group of Companies
- Cornerstone Hydro Electric Concepts Association
- Electrical Contractors Association of Ontario
- Electrical Safety Authority
- Electricity Distributors Association
- Emera Inc.
- Enersource Corporation
- Entegrus Powerlines Inc.
- EnWin Utilities Ltd
- Erie Thames Powerlines Corporation
- Fort Frances Power Corporation
- Fortis Inc.
- FortisOntario Inc.
- Greater Sudbury Hydro Inc.
- Guelph Hydro Inc.
- Halton Hills Hydro Inc.
- Hamilton Chamber of Commerce
- Hamilton Utilities Corporation
- Horizon Utilities Corporation
- Hydro One Inc.
- Hydro Ottawa Holding Inc./Hydro Ottawa Group of Companies
- Independent Electricity System Operator
- International Brotherhood of Electrical Workers
- Lakefront Utilities Inc.
- KPMG
- London Hydro Inc.
- Low-Income Energy Network

- Ministry of Labour
- Ministry of Municipal Affairs & Housing
- Northeast Utilities Group
- Oakville Hydro Corporation
- Ontario Chamber of Commerce
- Ontario Energy Association
- Ontario Energy Board
- Ontario Financing Authority
- Ontario Municipal Employees Retirement System
- Ontario Power Authority
- Oshawa PUC Networks Inc.
- Peterborough Distribution Inc.
- Power Workers' Union
- PowerStream Inc.
- RBC Capital Markets
- Retail Council of Canada
- School Energy Coalition
- Simul/UtilityPULSE
- The Common Voice Northwest Energy Task Force
- The Federation of Northern Ontario Municipalities
- The Northwestern Ontario Municipal Association
- The Society of Energy Professionals
- Toronto Hydro-Electric System Limited
- Town of Collingwood
- Town of Fort Frances
- Town of Niagara-on-the-Lake
- Township of North Dumfries

- Utilities Kingston/Kingston Hydro Corporation
- Utilities Standards Forum
- Utility Collaborative Services Inc.
- Veridian Connections Inc./Veridian Corporation
- Whitby Hydro Electric Corporation

Individuals

- Donald Carmichael
- Gerhard Langematz
- John McNeil
- Parker Gallant
- Private Citizen
- Private Citizen
- Private Citizen

Other

- Anonymous Submitter

Glossary⁷³

Contiguity: A boundary without any breaks or interruptions. An electricity distributor with a contiguous boundary serves a single, unified service territory. Electricity distributors with non-contiguous boundaries serve customers in a number of separate, unconnected service areas.

Distribution: A distribution system carries electricity from the transmission system and delivers it to consumers. Typically, the network would include medium-voltage power lines, substations and pole-mounted transformers, low-voltage distribution wiring and electricity meters.

Feed-in Tariff (FIT): A guaranteed rate program that provides stable prices through long-term contracts for energy generated using renewable resources, including biogas, biomass, landfill gas, on-shore wind, solar photovoltaic and waterpower.

Greenhouse Gas (GHG): Gases that contribute to the capture of heat in the Earth's atmosphere. Carbon dioxide is the most prominent GHG, in addition to natural sources it is released into the Earth's atmosphere as a result of the burning of fossil fuels such as coal, oil or natural gas. Widely acknowledged as contributing to climate change.

Intermittent Power Generation: Sources of electricity that produce power only during certain times such as wind and solar generators whose output depends on wind speed and solar intensity.

Infrastructure Ontario (IO): A crown corporation wholly owned by the Province of Ontario, the remit of which includes the provision of financing for infrastructure purposes to municipalities and eligible public organizations. LDCs as municipal corporations are eligible to apply for an IO loan for capital expenditures.

Kilowatt (kW): A standard quantity of power in a residential-size electricity system, equal to 1,000 watts (W). Ten 100-watt light bulbs operated together consume one kW of power.

Kilowatt-hour (kWh): A standard unit of electrical energy in a residential-size system. One kWh (1,000 watt-hours) is the amount of electrical energy produced or consumed by a one-kilowatt unit during one hour. Ten 100-watt light bulbs, operated together for one hour, consume one kWh of energy.

Local Distribution Company (LDC): An entity that owns a distribution system for the local delivery of energy (gas or electricity) to consumers. The focus of this report is solely electricity LDCs.

Megawatt (MW): A unit of power equal to 1,000 kilowatts (kW) or one million watts (W).

Megawatt-hour (MWh): A measure of the energy produced by a generating station over time: a one MW generator, operating for 24 hours, generates 24 MWh of energy (as does a 24 MW generator, operating for one hour).

MicroFIT: Ontario residents are able to develop a very small or “micro” renewable electricity generation project (10 kilowatts or less in size) on their properties. Under the microFIT Program, they are paid a guaranteed price for all the electricity they produce for at least 20 years.

Municipal Electricity Utility (MEU): An infrequently used term for a LDC which faded from usage after 1998, when MEU’s were converted into corporations under the OBCA. The term is still used in some legislation to describe LDCs.

Ontario Power Authority (OPA): An Ontario government agency that assesses the long-term adequacy of electricity resources in Ontario, plans and procures electricity supply, and coordinates province-wide conservation efforts.

Operations, Maintenance and Administration (OM&A): The cost of operating, maintaining and providing the back-office administration of a business. OM&A expenses typically include salaries and equipment required to provide regulated services and maintain a state of good repair.

Payments in Lieu of Taxes (PILs): In Ontario, electricity utilities that are at least 90% publicly-owned are exempt from corporate taxes. Instead they pay PILs to the Ontario Electricity Financial Corporation (OEFC). PILs which replicate federal and provincial corporate taxes and property taxes payable by private sector companies, are used to help pay down the stranded debt of the former Ontario Hydro.

Peak Demand: Peak demand, peak load or on-peak are terms describing a period in which electricity is expected to be provided for a sustained period at a significantly higher than average supply level.

Rate Setting: The OEB sets an LDC’s rates to enable the LDC to recover the forecasted costs which it will prudently incur to provide regulated services. Once every four years, an LDC undergoes a comprehensive Cost of Service (CoS) application where the OEB uses one year forecasted cost and revenue information submitted by the LDC to determine a base revenue requirement and the “base” rates that are set to recover that revenue requirement. In the intervening years, as part of the Incentive Regulation Mechanism (IRM) those base rates are adjusted annually according to an OEB-approved formula that includes components for inflation and the OEB’s expectations of efficiency and productivity gains. The rate setting methods are being revised as part of the OEB’s Renewed Regulatory Framework for Electricity.

Rural or Remote Rate Protection (RRRP): Rural or Remote Rate Protection was established by the Ontario government to keep distribution rates in rural and remote parts of the province at levels similar to those paid by the rest of the province. The cost of the RRRP benefit is recovered through a regulated charge on all Ontario electricity customers approved by the OEB. In 2012, this charge was set at 0.11 ¢/kWh.

Scale of Operations: The size of an LDC’s customer base and service area. A large utility has a larger scale of operations than a small one.

Scope of Operations: The extent to which an LDC also owns and operates other utility-like services. An LDC that also provides natural gas and water and wastewater services has a larger scope of operations than a utility that restricts its operations to electricity distribution.

Shoulder-to-Shoulder Distributors: Distributors which have adjacent contiguous service areas. See contiguity.

Smart Grid: A Smart Grid delivers electricity from suppliers to consumers using digital technology with two-way communications to control appliances at consumers' homes to save energy, reduce costs and increase reliability and transparency.

Structure and Architecture: The existing configuration of transformer stations and distribution and transmission lines that provide the framework and skeleton of the province's electricity system. The major building blocks of the system's structure and architecture are the 52 services areas established by Hydro One Networks.

Transmission: The movement or transfer of electricity over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other, separate electric transmission systems. Transmission of electricity is done at high voltages; the energy is transformed to lower voltages for distribution over local distribution systems. Ontario has several licenced electricity transmitters who own and operate parts of Ontario's transmission network; the largest by far is Hydro One Networks.

ISBN 978-1-4606-0669-8 Print

ISBN 978-1-4606-0670-4 HTML

ISBN 978-1-4606-0671-1 PDF