



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

**Ministry of
Environment
and Energy**

Advisory Committee
on Competition in Ontario's
Electricity System

**Ministère de
l'Environnement
et de l'Énergie**

Comité consultatif sur la
concurrence au sein du secteur
de l'électricité de l'Ontario



May, 1996

Dear Minister,

In late 1995 the Government authorized the appointment of an advisory committee to study and assess options for phasing in competition in Ontario's electricity system. Over the past five months, we have immersed ourselves in studying the electricity system in Ontario, having regard to changes that are occurring outside the province.

In our review, we adopted the principles set out in the Terms of Reference from the Government of Ontario — which emphasized affordable electricity rates, provincial competitiveness, financial soundness, and quality of life.

We are pleased to submit to you our report. Our report includes recommendations that affect the provincial electricity system — Ontario Hydro, electric distribution utilities, power producers, energy marketers, energy service providers, and customers. We have set out our findings and recommendations on the structural, legislative, regulatory and ownership reforms that we believe are required to ensure reliable and affordable electrical power, to remove barriers to growth, and to respond to the changing technology and international economic trends in the electricity system.

We have entitled our report *A Framework for Competition*. This is not the last word on the subject ... in our minds, this is only the beginning. In the body of our report, we list the recommendations of the Advisory Committee. Highlights of these recommendations are outlined below.

PART I

In Chapter 1 we set out the background for our review. We outline the existing structure of the electricity system in Chapter 2. The major institution is, of course, Ontario Hydro. Ontario Hydro dominates both generation and transmission in Ontario. It also has a pivotal role in the distribution of electricity — both as the regulator of more than 300 electricity distributors, and as a distributor itself.

In Chapter 3 we discuss the major economic, technological and public policy trends that are creating pressures for change in the structure of Ontario's electricity system. We feel that the *status quo* is not acceptable. The pressures are too strong. While recognizing that Ontario Hydro and the provincial electricity system have served Ontario well for most of the 20th century, we recommend significant changes that will enable Ontario to meet the challenges of the 21st century. Ontario must move forward.

PART II

Part II is the backbone of our report. Chapters 4 to 14 present our recommended reforms — reforms that we consider necessary to introduce competition into Ontario's electricity system. Fundamental to our recommendations is the termination of Ontario Hydro's monopoly control.

After addressing our policy objectives in Chapter 4, we discuss our recommendations for a new electricity system in Ontario.

Access to the Electricity System

Our recommendations are based on empowering all customers — large and small — to choose their supplier of both electricity and energy services. We are recommending a phased process that leads to a competitive electricity system.

In this light, the first stage would be **wholesale competition** — where electricity generators compete to supply power to electricity distributors and other large customers that demand 5 MW of power or more at one site. After a competitive wholesale power market is established and reliability is ensured, we recommend moving to **retail competition** — where electricity suppliers compete to supply power to all customers, including residential users.

The Marketplace for Electricity

The core of a competitive system is an electricity marketplace in which **buyers** and **sellers** of electricity have an opportunity to strike the best deals.

The roles of the **system operator** and the **electricity exchange** are described in Chapter 6. These are the independent, objective instruments that will work with the marketplace participants to ensure a healthy, competitive and vibrant electricity market. They are essential to our *Framework*, and the infrastructure for their functions is currently in place within the existing structure of Ontario Hydro. To move to a competitive system, these functions must be separated from Ontario Hydro's vertically-integrated organizational structure.

Transmission

The provincial transmission system must be open to all suppliers. The only control on access to the system should be technical and financial competence and the market. The system operator will ensure non-discriminatory access.

Electricity Generation

We feel strongly that Ontario Hydro's monopoly in generation should be dissolved. Competition should be introduced into the generation sector as soon as possible.

We recommend a number of structural and fiscal reforms to assist the opening up of the market to electricity suppliers. To advance the benefits possible in a competitive system, we also support the introduction of some private equity in the generation sector.

We see the nuclear generation and the hydroelectric facilities at Niagara Falls remaining in public ownership, but feel that these generating assets should begin to compete with each other. Private equity should be introduced into the remaining hydroelectric and fossil fuel generation assets. We do not divine a final configuration of the generation assets because we believe that the market will ultimately dictate the best form for competition.

The Electricity Distribution System

Reforms are necessary in every sector of the electricity system — and the distribution system is no different. While the distribution system is the immediate link to the customer, some of the services distributors currently provide should be offered under a competitive umbrella. Such services should not be part of the monopoly structures that continue to own and operate the distribution wires.

The local distribution systems must be open to suppliers and purchasers. Access must be open and non-discriminatory.

We recommend that the present entities that make up the existing distribution system should rationalize themselves not only to be fewer in number, but also to expand their territories to ensure that service is provided to all Ontarians, including those retail customers of Ontario Hydro. In addition, distributors should be directed to keep separate their competitive and non-competitive activities — to ensure the best service and products for consumers in the non-competitive businesses.

Legislation and Regulation

The restructuring of the electricity system requires new legislation and a regulatory scheme. We recommend replacing the current governance structure of the electricity system. The main legislative undertaking will be replacing the *Power Corporation Act*. A regulatory scheme for electricity must be established where none has existed before. The regulatory structure will need to regulate the monopoly parts of the electricity system, and, in the beginning, to monitor the introduction of competition in generation.

Financial and Electricity Rate Impacts

We end Part II with an analysis of the impacts of reforms in the electricity system. We are pleased to report that the results of a restructured electricity system are favourable to both the ratepayer and the taxpayer. We expand on our findings in Chapter 14 with a detailed paper set out as Appendix E.

PART III

In Part III we address the issues that we heard during the consultative process.

The consultative process formed a central part of our review. We met with numerous individuals and organizations, and received many written submissions. Comments raised throughout the process greatly assisted our understanding, assisted our deliberations, and influenced our decisions.

To all those who took the time to either write or meet with us, we express our appreciation and gratitude for their public service.

PART IV

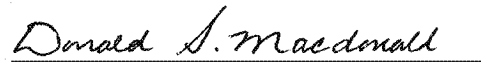
Part IV of our report provides a skeletal outline of the transitional steps required to introduce changes in all segments of Ontario's electricity system.

That there is an urgent necessity to introduce changes, we are all in agreement. That this change must be introduced through an orderly transition process is equally essential. Ontario Hydro was not built in a day — nor should it be dismantled in a day.

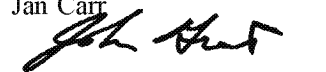
We end this project with sincere appreciation to the Government for giving us a role in this monumental task. We hope that this report contributes to the Government's undertaking to provide the very best electricity system for all Ontarians.

While our mandate has come to an end, you have a challenging task before you. We applaud the Government's commitment to look to the future. We will continue to follow with great interest as changes are introduced to move Ontario forward to a new era in electricity.

Respectfully submitted,

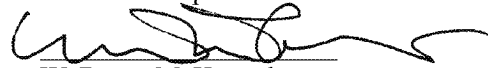

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SECRETARIAT

We would also like to express our genuine appreciation to the Secretariat, the public servants who supported the work of the Advisory Committee. Although few in number, their spirit, energy and dedication to the task made it a much easier one for all of us.

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SUMMARY OF RECOMMENDATIONS

ACCESS TO THE ELECTRICITY MARKET

The Advisory Committee recommends the establishment of wholesale competition, followed by the phased introduction of full retail competition, for the supply of Ontario's electricity.

The Advisory Committee recommends the introduction of a system of wholesale competition for the supply of Ontario's electricity — in which electricity generators compete to sell electricity to distribution utilities and other large customers that demand 5 MW of power, or more, at one site.

The Advisory Committee recommends that full retail competition be phased in to Ontario's electricity market as soon as practicably possible.

THE MARKETPLACE FOR ELECTRICITY

The Advisory Committee recommends that an independent agency, the System Operator, be established. The System Operator would dispatch electricity over the transmission system, oversee the delivery and coordination of electricity supplies in the province, and ensure security of supply.

The Advisory Committee recommends that the System Operator be an independent non-profit agency, with the ability to recover justifiable costs incurred in the course of its business.

The Advisory Committee recommends that an Electricity Exchange be established. Members should include all those entities — generators, energy service companies, specified purchasers, agents, brokers and marketers — that wish to supply or purchase electricity through the Ontario transmission system.

The Advisory Committee recommends that the Electricity Exchange be a non-profit entity, with the ability to recover justifiable costs incurred in the course of its business.

The Advisory Committee supports the use of bilateral financial contracts, but recommends that bilateral physical contracts be prohibited.

The Advisory Committee recommends that a futures market for electricity be established within the Electricity Exchange.

THE TRANSMISSION SYSTEM

The Advisory Committee recommends open, non-discriminatory access to Ontario's transmission system.

The Advisory Committee recommends that the current transmission assets of Ontario Hydro be set up as a Transmission Grid Company under the Ontario *Business Corporations Act*.

The Advisory Committee recommends that the Transmission Grid Company be responsible for maintaining and managing Ontario's high-voltage transmission grid.

The Advisory Committee supports a constraint-related charge being levied on generators to reflect the costs of transmitting electricity from a specific generation location to demand locations.

The Advisory Committee recommends that consumers continue to see "postage-stamp" rates for transmission across the province.

The Advisory Committee supports the use of a constraint-related charge that reflects congestion in the transmission system to enable the planning of new transmission facilities.

The Advisory Committee supports using the transmission system as a convenient point for collecting levies that support important public policy objectives.

ELECTRICITY GENERATION

The Advisory Committee recommends that Ontario Hydro's current monopoly in electricity generation be eliminated.

The Advisory Committee recommends that Ontario Hydro's generation assets be separated and established as distinct, competing operating entities.

The Advisory Committee recommends that Ontario Hydro's nuclear generation stations have a single owner, and that they operate as four distinct, competing entities.

The Advisory Committee finds that Ontario Hydro's hydroelectric facilities should be grouped by river system.

The Advisory Committee finds that Ontario Hydro's fossil fuel generation assets could be operated as distinct operating entities.

The Advisory Committee recommends that Ontario's electricity generation facilities be sufficiently separated to prevent any one company, or any group of companies acting together, from being able to exercise undue market power.

The Advisory Committee recommends that all electricity generators, including out-of-province suppliers, be able to compete on equal terms to supply electricity to the Ontario market.

The Advisory Committee recommends that the necessary reforms be undertaken to create a level playing field for electricity generators in Ontario.

The Advisory Committee believes that the introduction of private equity into the ownership of Ontario Hydro's generation assets should be undertaken to enhance the introduction of competitive forces in Ontario's electricity system.

The Advisory Committee recommends that private equity be introduced into the fossil fuel and hydroelectric generation assets that are currently held by Ontario Hydro.

The Advisory Committee recommends maintaining under public ownership the hydroelectric generation assets on the Niagara River that are currently held by Ontario Hydro. These assets should be set up as a corporate body under the Ontario *Business Corporations Act*.

The Advisory Committee recommends maintaining under public ownership the nuclear generation assets that are currently held by Ontario Hydro. These assets should be set up as a corporate body under the Ontario *Business Corporations Act*.

The Advisory Committee believes that our recommendations for generation will provide the basis of an evolution for competitive forces in Ontario's electricity generation sector, while respecting the unique features of the province's system.

DISTRIBUTION OF ELECTRICITY

The Advisory Committee recommends that the Government of Ontario affirm its ownership of Ontario Hydro at the outset of the restructuring process to conclude debate on this issue.

The Advisory Committee finds that the dismantling of Ontario Hydro will require a complementary restructuring of the distribution system to ensure the efficient distribution of electricity in Ontario.

The Advisory Committee recommends that the distribution sector be restructured based upon the following three principles:

- that Ontario Hydro Retail be absorbed into the local distribution system;
- that there be fewer distribution utilities; and,
- that each distribution utility keep separate its monopolistic wires business from its competitive electricity sales and energy services activities.

The Advisory Committee recommends the shoulder-to-shoulder structure, following county/regional lines and not just local municipal boundaries. The overriding principle in any restructuring of boundaries should be that no serviced area will be left without service.

The Advisory Committee recommends that Ontario Hydro Retail be absorbed into the local distribution system.

The Advisory Committee recommends that the remote communities not attached to the transmission grid be served by community-based entities.

The Advisory Committee recommends that distribution utilities be given all the powers of a corporate body under the Ontario *Business Corporations Act*.

The Advisory Committee recommends that each distribution utility be directed to keep separate its monopolistic wires business from its competitive electricity sales and energy services activities as soon as possible.

The Advisory Committee recommends that a level playing field be created for all energy services entities.

OTHER ACTIVITIES

The Advisory Committee recommends that private equity be introduced into the ownership of Ontario Hydro Technologies.

The Advisory Committee recommends that Ontario Hydro International Inc. be offered for sale to the private sector.

The Advisory Committee recommends further study of the regulation of electrical inspection — to ensure that this necessary activity continues to focus on public safety while being carried out in the most effective and efficient manner possible. In the meantime, we recommend that this activity be undertaken by the Transmission Grid Company.

ENVIRONMENT

The Advisory Committee believes that there is an important role for the Government in advancing society's environmental objectives.

The Advisory Committee believes that the process of restructuring Ontario's electricity system must be accompanied by consideration of the most appropriate regulations or other instruments to secure the protection of the environment and specifically, to support energy efficiency and the introduction of renewable energy technologies.

PUBLIC POLICY ISSUES

The Advisory Committee recognizes that there are a number of public policy issues that require examination and resolution in the context of reforming Ontario's electricity system — including, but not limited to, the following: Aboriginal issues, labour issues, the *Assessment Act*, windfall municipal taxes, and water power rentals.

LEGISLATION AND REGULATION

The Advisory Committee finds that a regulatory scheme for electricity must be established where none has existed before.

The Advisory Committee recommends new legislation to replace the *Power Corporation Act* and necessary amendments to other statutes, particularly the *Public Utilities Act* and the *Ontario Energy Board Act*.

The Advisory Committee recommends that the new legislation setting out the framework for Ontario's electricity system be of a policy nature only. The existing Ontario Hydro monopoly control over the generation and transmission of electricity in the province, and regulatory control over the distribution of electricity, would be removed.

The Advisory Committee recommends that the regulatory system set out in the legislation be of a generic type, and that the regulator be given the authority to forbear.

The Advisory Committee recommends that the Ontario Energy Board be given the responsibility for regulating the electricity industry in Ontario.

The Advisory Committee recommends that the *Ontario Energy Board Act* be amended to reflect a regulatory process that is suitable for the 21st century.

The Advisory Committee recommends that incentive regulation be implemented as a generic control mechanism. Regulatory judgement is required to ensure that any productivity gains and cost savings are shared by both the regulated entities and their customers, as would occur in a competitive market, rather than by the shareholders alone.

The Advisory Committee recommends that the Province ensure that responsive regulatory tools are in place in the early years to oversee and ensure fair competition in electricity generation.

The Advisory Committee recommends that incentive regulation be implemented for transmission pricing.

The Advisory Committee recommends that incentive regulation be implemented for distribution pricing.

The Advisory Committee recommends that the Ontario Energy Board have a residual discretion to audit, and hear and determine complaints from users about the interpretation and application of the rules by the System Operator.

The Advisory Committee believes that there will be a need for a body to provide regulatory surveillance over the Electricity Exchange.

The Advisory Committee recommends that agents, brokers, and marketers be licensed.

FINANCIAL AND ELECTRICITY RATE IMPACTS

Under conservative assumptions, the Advisory Committee's analysis shows that its recommendations for a competitive generation market are likely to result in future wholesale electricity rates that are lower than those which can be expected by maintaining the current system. Moreover, these electricity price benefits can be achieved without imposing a burden on Ontario's taxpayers.

The Advisory Committee's analysis shows that in the five scenarios tested, it would be possible to defease fully the Ontario Hydro debt by 2005, while reducing the stranded asset charge and the wholesale price from year-to-year. By 2006, the stranded asset charge would no longer be needed, and its elimination would further reduce wholesale electricity prices at that time.

The Advisory Committee believes that a competitive market for electricity generation will result in significant pressure to reduce the prices paid to generators, which in turn will reduce the prices paid by electricity consumers.

The Advisory Committee recommends that non-utility generators be offered a partial buy-out of their remaining contractual obligations, so that they can actively participate in the competitive market for electricity generation.

MANAGING THE TRANSITION TO COMPETITION

The Advisory Committee believes that an orderly transition to a competitive electricity system will require a phased process in which the necessary reforms can be planned, developed and implemented.

The Advisory Committee believes that the changes recommended in this report are appropriate, and that they will set in motion the competitive forces that will shape Ontario's electricity system in the 21st century.

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I

THE CURRENT SYSTEM

The last decade has been a period of rapid economic and technological change — in Ontario, in Canada, across North America and around the world. The shifting economic environment has had a significant impact throughout the developed world, as businesses, communities, individuals and governments struggle to adapt to the realities of profound structural change.

As part of an increasingly global and integrated economy, Ontario has also been forced to meet the many challenges of change, adapting its economic and social structure to a new era of free-flowing capital, liberalized trade and intense international competition. It was this rapidly-changing economic climate that prompted the Government of Ontario to appoint an advisory committee to examine the potential benefits of, and recommend ways to move toward, a more competitive electricity system.

A

REFERENCE FROM THE ONTARIO GOVERNMENT

On November 1, 1995, the Government authorized the appointment of an Advisory Committee on Competition in Ontario's Electricity System. The electricity system in Ontario consists of many players — Ontario Hydro, the municipal electric utilities,

privately-owned utilities, non-utility generators and energy service companies.

The Advisory Committee was asked to examine the economic, technological and public policy trends facing Ontario Hydro and the provincial electricity system, and to make recommendations on structural, legislative, regulatory and, potentially, ownership reforms to ensure that the province's electricity system is poised to meet the competitive challenges of the 21st century. In this context, the Advisory Committee's task was to investigate and assess options for phasing in competition in Ontario's electricity system. The Terms of Reference are provided in Appendix A.

B

THE CONSULTATION PROCESS

The Minister of Environment and Energy appointed the Chair of the Advisory Committee on November 2, 1995, and named six members to the Committee at the end of that month. See Appendix B for the list of members. A Secretariat to support the Advisory Committee was established by mid-December.

The Terms of Reference asked the Advisory Committee to consult broadly, and to consider the views and concerns of all interested stakeholders and citizens when

preparing its recommendations. To initiate this consultative process, the Advisory Committee circulated a working paper in December 1995 that invited public comment on a wide range of issues relating to Ontario's electricity system.

We adopted a process that would enable our deliberations and research to be complemented by wide-ranging input from the Ontario public. Our goal was to hear what different individuals and groups believed to be the most important priorities for the electricity system, their views on the need for change, and their opinions on what those changes should be.

From January through April, the Advisory Committee endeavoured to reach out to as many diverse groups of stakeholders and Ontario residents as possible. We benefitted from the views of key players in the electricity supply and distribution sectors, labour, environmental groups, the financial community — and the full range of customer interests, from residential consumers, to Aboriginal and First Nation communities, to businesses and industries. We also toured Ontario Hydro's Clarkson System Control Centre, and visited the municipal electric utilities in Waterloo and North York.

Our consultation activities included:

- the distribution of our working paper to more than 200 organizations and individuals, all members of the Ontario

Legislature, and all municipal electric utilities;

- a two-stage process for forwarding written submissions, of which a total of 223 were received;
- six public meetings around the province in February and March, during which we heard a total of 73 presentations, complemented by 53 meetings with interested groups and experts, and reports and information received from many more throughout the process; and,
- receipt of almost 300 letters, comment sheets, and telephone calls from individuals or groups.

Public involvement was encouraged through newspaper advertisements, news releases, media interviews and the Environmental Register. Written submissions to the Advisory Committee were also made available for viewing by the public.

Part III of this report discusses the comments brought forward to the Advisory Committee through this public consultation process. See Appendix C for the individuals and organizations that participated in the consultation process.

The Advisory Committee was asked to complete its review and to deliver its final report to the Minister of Environment and Energy. Having concluded our five-month review, we are presenting in this report our recommendations for Ontario's electricity system.



SETTING THE CONTEXT

For more than 80 years, Ontario has benefitted from a high-quality, reliable electricity system that has served the people of the province well and assisted the province's economic development. Today, many jurisdictions around the world are considering how they can best adapt to meet new pressures in a global market which is changing at an unprecedented rate. Ontario is no different, and one of the pressures for change that Ontario must deal with includes an emerging North American marketplace for electricity.

The Advisory Committee found that while some aspects of Ontario's existing electricity system are working well, there are many opportunities for change that would bring about greater efficiencies and benefits for consumers. The vertically-integrated monopoly structure in place today, with Ontario Hydro as the dominant player in electricity generation and transmission, is no longer suited to moving Ontario forward.

The *status quo* is not an option. As outlined in Chapter 3 of this report, many pressures for change in Ontario's electricity system already exist, and other pressures are likely to be brought to bear in the years ahead. The forces for change are in place.

It was clear from the submissions we read that many felt there was a need for change, although there was no agreement on the types of change needed. The task at hand is to ensure that the province benefits in the years to come from an electricity system that operates efficiently and effectively.

Recognizing that Ontario's existing monopoly structure is not appropriate to take the province into the future, the Advisory Committee has attempted to make recommendations that will introduce the necessary flexibility into the system so that it might respond to the realities of a new, and rapidly changing, environment in the 21st century.

The Advisory Committee was given a formidable task. Assessing options for introducing competition in the province's electricity system involved issues that go far beyond traditional economic and commercial considerations. Our recommendations could not simply mirror the approaches taken in deregulating other industries.

Electricity is unlike other commodities and services because of the integral supporting role it plays in all our lives. With our economy and our lifestyles highly dependent on electricity supply, reliability cannot and must not be put at risk in market restructuring. The development of a framework for Ontario's electricity system required a careful balancing of interests and a responsiveness to a

great many diverse objectives across Ontario.

Many other jurisdictions have initiated restructuring processes or restructuring studies, and Ontario can benefit from the lessons learned by others. However, it must be recognized that electricity restructuring is in an early phase in all jurisdictions. While some courses have been charted, not all impacts are known, and not all implementation details resolved. It is, in many respects, a learning experience for all.

While there are some valuable lessons to be learned from other jurisdictions, the Advisory Committee has developed its recommendations with a view to Ontario's unique characteristics. The structure of Ontario's current electricity generation, the size of the province, the geographic dispersion of our population, the industrial base, and the reliability and quality to which we have become accustomed, are all factors that figured prominently in our deliberations.

The restricted timelines for the Advisory Committee's mandate necessarily constrained the scope of our review. We devoted our time to developing a framework for a new vision for Ontario's electricity system. While we have set out a transition approach in Part IV, it must be emphasized that we have not attempted to develop detailed recommendations on implementation. Similarly, some public policy issues will require further consideration by the Government.

Our aim was to recommend a framework for reform to assist the Government of Ontario in laying the foundation for competition in the province's electricity system. We have sought reforms that will enable the electricity system to respond to growing pressures in the most efficient way, as market forces play a greater role in guiding economic decisions. Finally, we have endeavoured to ensure that Ontario's electricity consumers will enjoy the benefits made possible from enhanced competition in electricity supply.

A

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

In June 1902, a group of local businessmen and municipal representatives gathered in the small Ontario city of Berlin — now called Kitchener — for a day-long meeting and lunch at the popular Walper House. The purpose of the meeting was to discuss the possibility of bringing cheap long-distance electric power from Niagara Falls to about a dozen municipalities in southern and southwestern Ontario. Just eight years later, on October 11, 1910, Berlin was the fitting choice as the first city to host a series of “switch-ons”, which ultimately introduced millions of consumers throughout the province to the opportunities of the new electrical age.

In 1906, the Government created a new public organization, the Hydro-Electric Power Commission of Ontario (HEPCO). Adam Beck, a Minister without Portfolio and leading supporter of public power, was appointed as its first chair. In the same year, the Government introduced *An Act to Provide for the Transmission of Electrical Power to Municipalities*, legislation that enabled consenting municipalities to buy power from HEPCO.

Initially, HEPCO built transmission lines from Niagara Falls to Toronto and a dozen other municipalities in southwestern Ontario, purchasing power under contract from the private sector. By 1914, the Commission was providing power to a total of 104 municipalities, and had built its first generating station on the Severn River. As well, plans were under way at HEPCO to develop a large hydroelectric plant on the Queenston Heights at Niagara Falls.

HEPCO's critics had worried that the public utility's intensive capital expansion plans would drag Ontario down into a bottomless pit of debt. But it soon appeared that the province's appetite for electricity was virtually insatiable. Except for the early years of the Great Depression of the 1930s, the demand for electricity

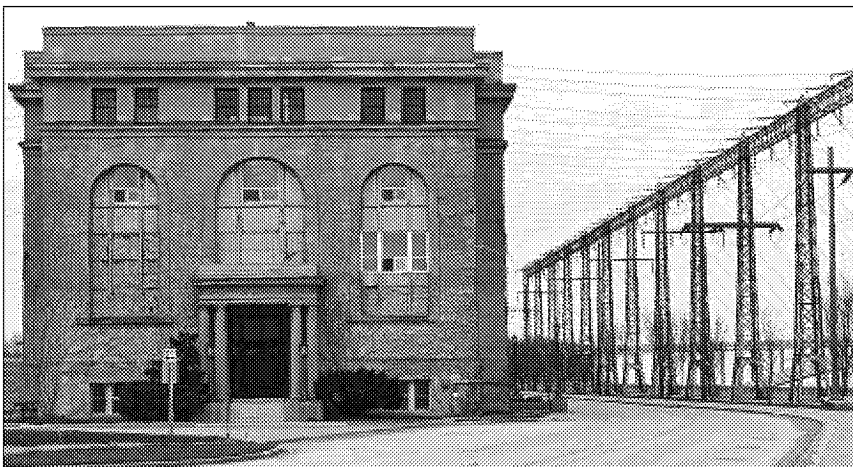


Photo courtesy Gail Benson

Sir Adam Beck No. 1 Generating Station

in Ontario grew constantly until the 1980s. See Chart 1.

Sir Adam Beck was knighted for his public service in 1914, and remained as chair of HEPCO until his death in 1925. The facility that bears his name — Sir Adam Beck Number 1 Generating Station at Niagara Falls — began producing power in 1921, but was not fully completed until 1930. The station is still in service today.

HEPCO built the extensive generation and transmission facilities that now make up the majority of Ontario's electricity system. First, the Commission developed or purchased all the larger cost-effective hydroelectric sites that were available. Later, in the 1950s and 1960s, coal-fired generating stations were added to the system. In the 1970s and 1980s, nuclear generating stations were added to the mix.

In 1972, the Government of Ontario enacted the *Power Corporation Act*, which gave HEPCO a more modern corporate structure and clarified its role and responsibilities. The legislation also gave the Commission a new name — Ontario Hydro — the publicly-owned utility that dominates the electricity scene in Ontario today.

Electricity is now so common, so simple to use, and so reliable, that few people in Ontario ever give it much thought. But the fact is, producing and delivering electricity to millions of customers is a highly complex

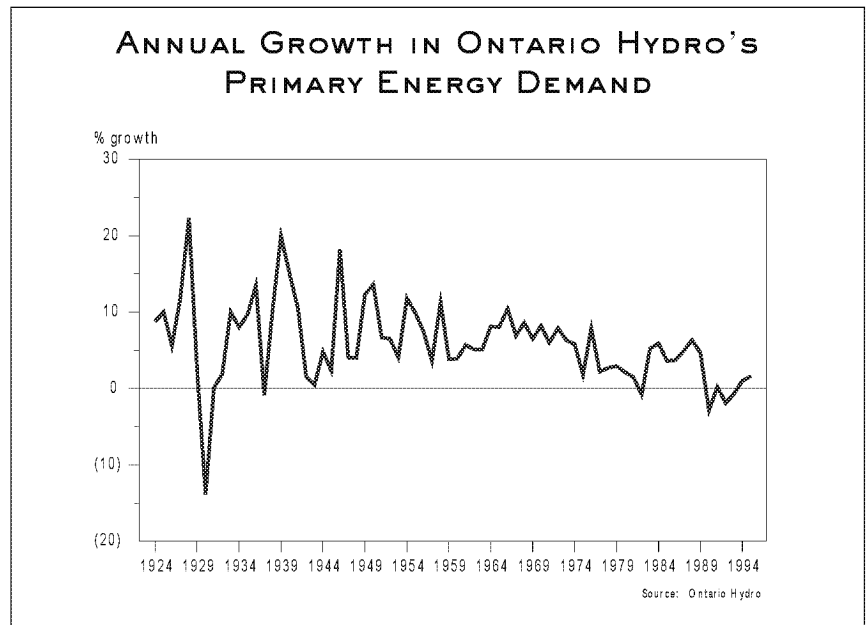


Chart 1

business that depends on an equally complex system of generation, transformation, transmission, distribution, supply, finance and administration.

B

ELECTRICITY SUPPLY AND DEMAND

Almost everyone in Ontario uses electricity — usually every hour of every day. But the demand for electricity varies widely at different periods of the day, week, month and year.

During a typical 24-hour period, electricity demand starts to rise about 6 a.m. as households awake and businesses open. The demand remains high through the day, with two broad peaks at 11 a.m. and 6 p.m. It then falls rapidly after 9 p.m., reaching a low point at about 4 a.m. As well as the daily cycle, there is a

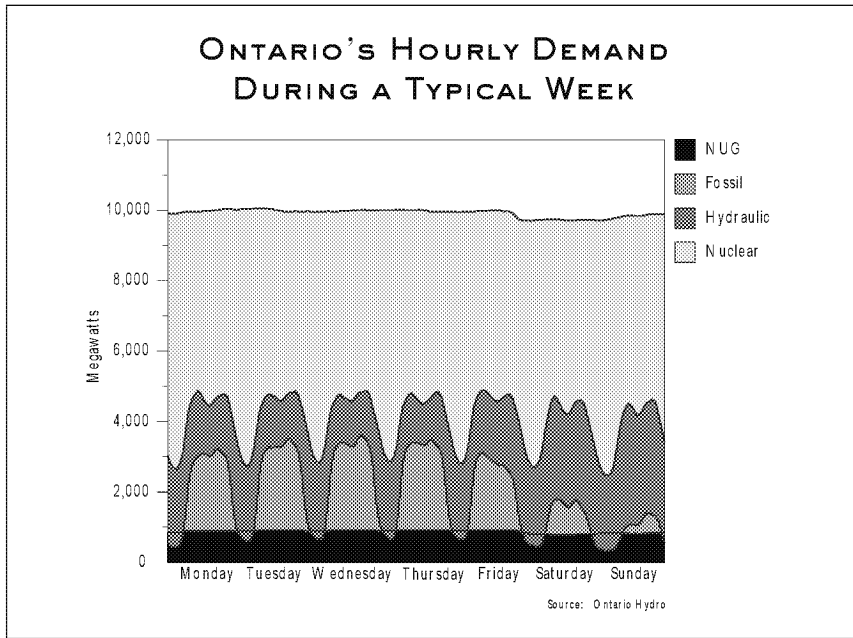


Chart 2

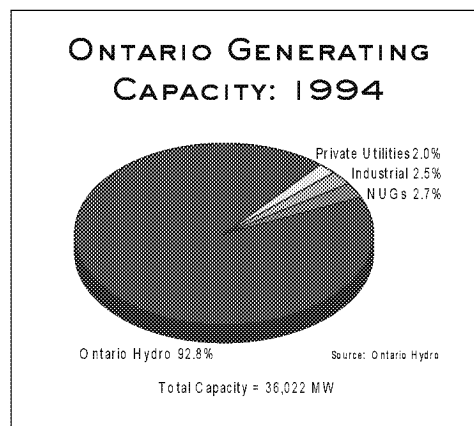


Chart 3

weekly electricity consumption pattern in Ontario. Power use rises from Monday to Wednesday, then drops slightly until Friday. Demand is lower on Saturday than on weekdays, and lower still on Sunday. See Chart 2.

There are also two seasonal peaks. The winter peak is usually on the coldest day of the year and reflects heating and industrial demand, while the summer peak occurs during heat waves, when air conditioning is working to full capacity.

A wide range of other factors also affect electricity demand — from the Stanley Cup playoffs or other special events to a storm knocking out transmission lines and forcing operators to re-route power from elsewhere. In 1995, the highest demand registered for a one-hour period was 22,842 megawatts (MW), and the lowest was 10,207 MW. The all-time peak demand was 24,700 MW, reached on a cold day in January 1994.

In 1994, the total installed generating capacity from all sources in the province was about 36,000 MW. Of this, Ontario Hydro accounted for more than 90 per cent, with more than 33,000 MW of generating capacity (in-service and out-of-service stations), plus 981 MW through contracts with non-utility generators (NUGs). See Chart 3.

In 1994, Ontario Hydro's in-service generation and contracted facilities had 5,400 MW, or 22 per cent, more capacity than was needed to meet the all-time peak demand. Chart 4 shows Ontario Hydro's capacity margins over the last 25 years.

Ontario is part of a larger North American power grid. This means that when demand peaks in neighbouring jurisdictions differ from those in Ontario, there is an opportunity to export electricity. In 1994, Ontario Hydro sold some \$349-million of surplus power to neighbouring utilities — including 4,000 MW of generating capacity on the day when demand in Ontario reached its all-

time peak. Ontario Hydro is a net exporter of electricity, and is an active participant in the northeastern North American power market.



GENERATION

Each type of electricity generation has its own distinct operating characteristics, so different technologies play different roles in generating Ontario's power.

For example, nuclear plants are best suited to steady operation. They have very low fuel costs, and are relatively expensive and time-consuming to throttle up and down. For this reason, nuclear plants are used to supply Ontario's base electricity load — the amount of electricity that is constantly in demand. The base load is also provided by some non-utility generation because the terms of existing contracts oblige Ontario Hydro to pay for this power regardless of whether or not it is used.

Ontario Hydro's hydroelectric plants supply intermediate and peak loads, as well as base loads, because they are versatile, and the power they produce is inexpensive. The only drawback to hydroelectric stations is that there are variations in the water supply that can significantly affect the amount of electricity they can produce.

Fossil stations — fired with coal, oil or natural gas — take longer to bring to full capacity than hydroelectric, and generally have higher fuel costs

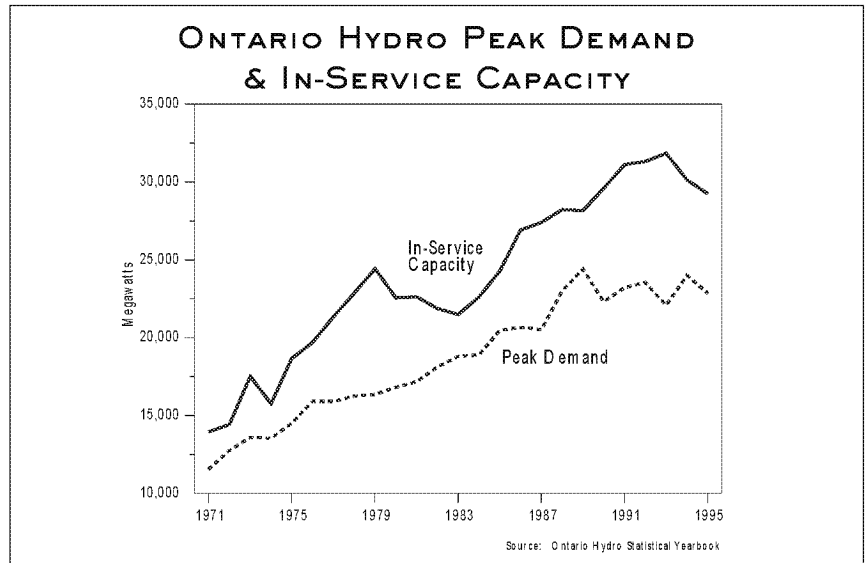


Chart 4

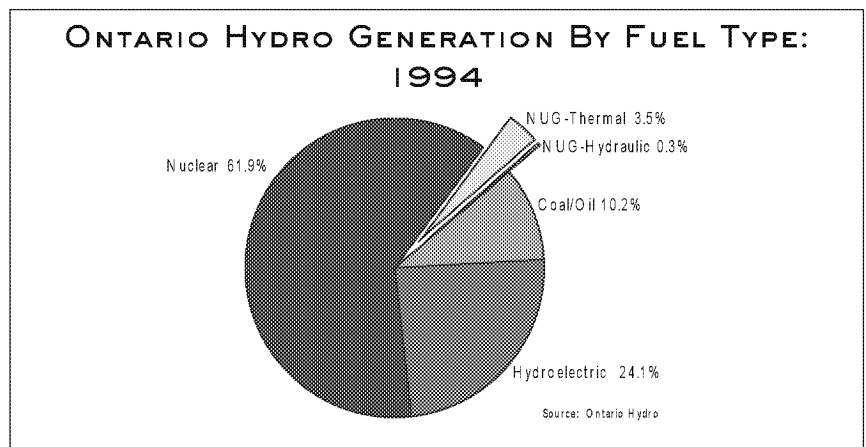
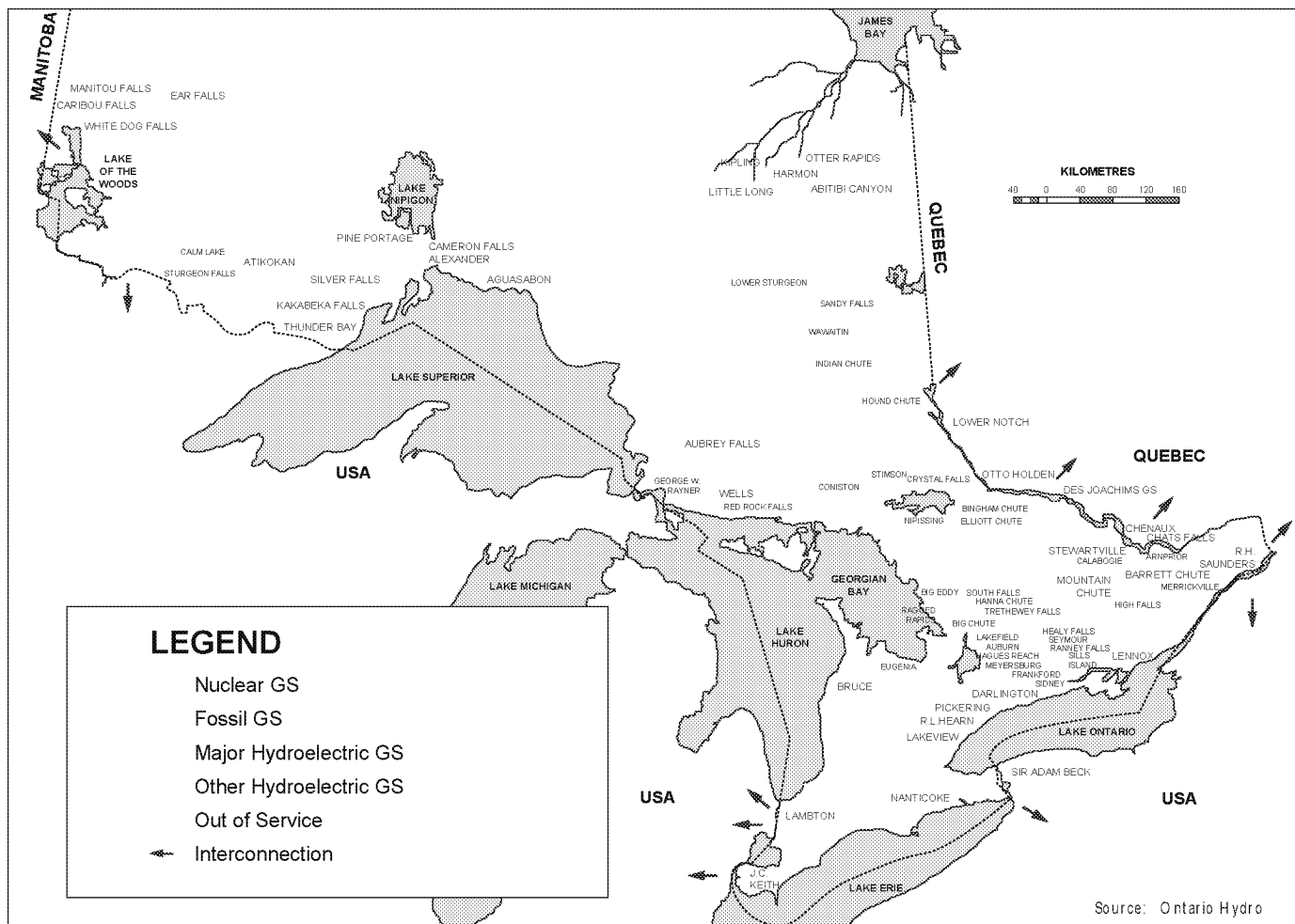


Chart 5

than nuclear or hydroelectric stations. But fossil stations are very flexible for meeting daily, weekly and seasonal variations in demand, and Ontario Hydro typically employs them for that purpose.

The unique nature of the electricity generation technologies used by Ontario Hydro is reflected in the percentage of electricity they provide. See Chart 5.

With many sources of power at the supply end of the system, and



millions of electricity users at the other, a delicate balancing act is needed to ensure that the provincial power grid stays in-tune. It is important that the amount of power available at any given time be sufficient to meet demand because electricity cannot be stored.

This requires both automatic controls throughout the system that balance the supply and demand on a second-by-second basis, and manual procedures that enable system operators to make adjustments when necessary. Ontario Hydro's electricity exchange at the Clarkson System

Control Centre is the nerve centre for this activity. Staff there also arrange supply contracts — some lasting as long as a year, others for the next day — between the Ontario Hydro business units that produce power and its transmission grid.

1) NUCLEAR GENERATION

Ontario Hydro operates 20 nuclear generating units in southern Ontario at three sites: Pickering (A and B), Bruce (A and B) and Darlington. The Pickering and Darlington stations are located on Lake Ontario, east of Toronto. The Bruce stations are on

Lake Huron, near Kincardine. These facilities represent an investment of some \$30 billion, and have a total installed generating capacity of about 14,000 MW.

The first unit at Pickering went into service in July 1971; Bruce A went into service in 1977, Bruce B in 1984, and Darlington in 1990. Over the next 30 years, the power output of the stations is expected to decline gradually as a percentage of Ontario's total electricity demand. All existing nuclear facilities are expected to reach the end of their life cycle by 2035. See Chart 6.

Nuclear operations are governed by the federal *Atomic Energy Control Act*, which is administered by the Atomic Energy Control Board (AECB).

While nuclear facilities must have provincial permission to operate, the AECB has jurisdiction over safety evaluation, licensing and inspection of all nuclear power plants in Canada.

II) HYDROELECTRIC GENERATION

Ontario Hydro operates 69 hydroelectric generating stations, which have a total combined capacity of 7,134 MW. The hydroelectric stations together have 261 generating units, ranging in size from one MW to 135 MW. The stations are located throughout Ontario, and operate in conjunction with 247 dams on 27 different watersheds. The average age of Ontario Hydro's hydroelectric stations is 59 years.

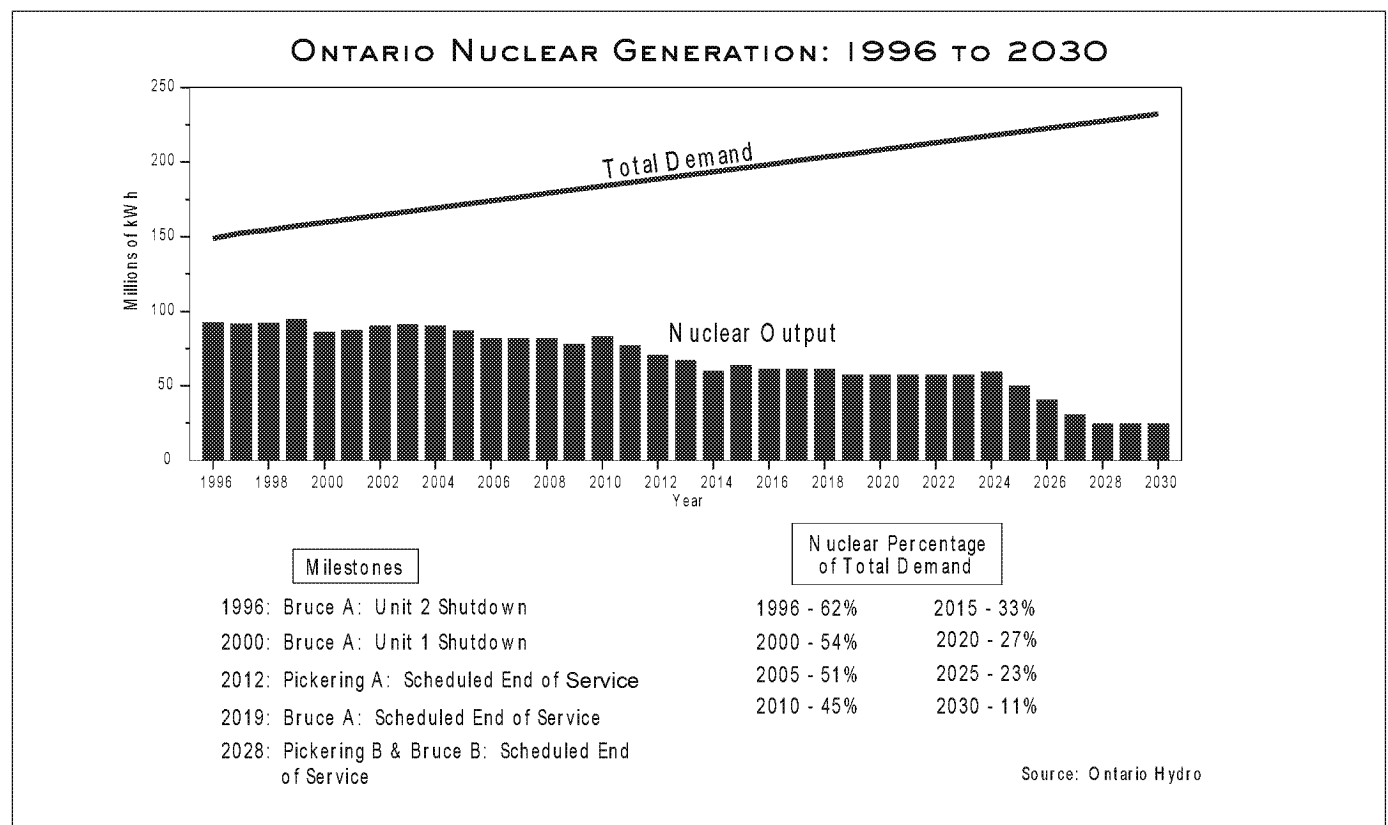


Chart 6

Ontario Hydro owns 17,000 hectares of land, and leases an additional 880,000 hectares to operate the 49 hydroelectric stations situated on public lands. Ontario Hydro has five water rental agreements, including a master agreement with the Province of Ontario. Hydroelectric operations are subject to many different international, federal and provincial laws and regulations.

III) FOSSIL FUEL GENERATION

Ontario Hydro owns eight fossil fuel generating stations, which together have a total installed capacity of 12,391 MW. However, two of these stations — the R.L. Hearn station in Toronto and the J.C. Keith station in Windsor — are out of service. In 1995, the total in-service capacity of Ontario Hydro's fossil fuel generation was 8,194 MW. Five of the six fossil fuel plants currently in service burn bituminous coal or lignite imported either from western Canada or the United States. The sixth station — Lennox GS near Napanee — is an oil-fired facility.

The average cost of power from fossil fuel stations is largely a function of the cost of the fuel and the capacity factor of the plant. Ontario Hydro's fossil fuel plants generally operated well below their maximum capacity in 1994. Since the plant operations include fixed costs that do not drop if production is lower, the average cost of electricity they produced was relatively high.

IV) PRIVATELY-OWNED UTILITIES

There are three privately-owned utilities in Ontario that generate, transmit, distribute, buy and sell power. In 1994, the total installed generating capacity of the private utilities was 724 MW.

Canadian Niagara Power Company, Limited is owned by Niagara Mohawk Power Corporation, a New York utility. It is an integrated utility that generates, transmits and distributes power. In 1985, it entered into a 20-year franchise agreement with Fort Erie to supply all residential requirements. Canadian Niagara supplies power to Cornwall Electric and sells surplus power to Niagara Mohawk.

Gananoque Light & Power Ltd. (GL&P) serves Gananoque and the area between Gananoque and Kingston. GL&P owns and operates generating stations and also purchases power from Ontario Hydro.

Great Lakes Power Limited, based in Sault Ste. Marie, is a vertically-integrated private utility that owns generation and transmission facilities and also buys power from Ontario Hydro. The company supplies power to Sault Ste. Marie and distributes power to 11,000 rural customers in the surrounding area.

V) INDUSTRIAL GENERATION

A number of major industries in Ontario also generate electricity for their own use and sell surplus power

to Ontario Hydro. Many large companies produce steam or direct heat for use in industrial processes. In many cases, it is cost effective to generate electricity concurrently through a process known as cogeneration. Other companies produce electricity by burning natural gas.

In 1994, the total installed generating capacity of Ontario industries was about 900 MW, from a combination of hydroelectric, steam, and combustion turbine facilities. The total electrical energy produced by industry in Ontario during 1994 was 3,400 gigawatt hours (GWh), about two per cent of the provincial total.

VI) OTHER GENERATION

Ontario Hydro began to seek new generating capacity from non-utility generators (NUGs) in 1987 and, in anticipation of a significant increase in electricity demand, committed to a number of contracts. By 1992, the decline in electricity demand and new capacity from the Darlington nuclear station combined to reduce the need for new generation. Ontario Hydro, however, is obligated to take delivery of the contracted power from NUGs. It has negotiated with many NUGs to downsize their projects and reduce power purchase prices.

Ontario Hydro currently has NUG contracts in place for 1,053 MW of generation, with an additional 511 MW expected to be in service by the end of 1997. This will bring the total capacity supplied by NUGs to 1,564

MW. By the year 2000, Ontario Hydro's existing contracts require it to purchase up to 11,500 GWh of power from NUGs, representing close to eight per cent of the total supply that Ontario Hydro forecasts will be needed.

Of Ontario's 71 NUG facilities, five use either wood waste, landfill gas or landfill waste, 52 are hydroelectric stations, and 14 use natural gas as a fuel. The renewable and hydroelectric stations are relatively small, however, and supply just 15 per cent of the total NUG generation.



TRANSMISSION

When electric power is produced at a generating station, it is sent through wires from the generating station to a nearby transformer station. At the transformer station, the electricity coming from the plant is boosted to very high voltage so it can be moved long distances over transmission lines with minimal power losses. When the high-voltage electricity nears a distribution point, it enters another transformer station, where the voltage is reduced for local distribution.

Ontario Hydro has built an extensive provincial transmission grid consisting of lines, towers, transformers, rights-of-way and land. The utility owns 29,000 kilometres of transmission lines and 250 transformer stations. Other utilities also own small portions of the Ontario transmission system.

Although Ontario's transmission system is highly reliable, about half the system is more than 40 years old. Ontario Hydro expects to spend \$200-million in each of the next ten years to upgrade and rehabilitate the grid.

Transmission grids have limits on the amount of power they can carry without overloading the system. In Ontario, power loads can generally be dispatched in a way that relieves the constraints that exist.

The Ontario grid is connected to Manitoba, Michigan, New York State and Minnesota, and has the potential to be similarly connected to Quebec. The interconnections currently have the capacity to enable approximately 4,000 MW of power to flow between jurisdictions. Since Ontario's peak use is in the winter, the ability to move power out of the province is lower in the winter than in the summer.

E

DISTRIBUTION

Electricity is delivered in Ontario through a network of local distributors and Ontario Hydro Retail. The local distribution systems and Ontario Hydro Retail differ in customer density, size of customer base, geographical spread, and financial base.

Electricity distribution involves two distinct businesses: the distribution wires and infrastructure, and the electricity sales and energy services business.

D MUNICIPAL UTILITIES

Electricity service can be provided by a municipal council established under the *Municipal Act* or by a separate commission. Municipalities, regional municipalities, townships and police villages have statutory authority to arrange for the supply of electricity in their respective jurisdictions.

The Municipal Franchises Act gives municipalities the right to control the furnishing of utilities (including electricity) to its residents. The giving of this right constitutes the granting of a franchise, and the terms and conditions of the arrangement are approved by the Ontario Municipal Board. (A gas franchise is approved by the Ontario Energy Board.)

A municipality, township or police village is not required to purchase power from Ontario Hydro. Once a municipal council enters into a contract with Ontario Hydro to purchase power, the municipality is precluded under the *Power Corporation Act* from granting another franchise. The municipality must create a commission, and Ontario Hydro acquires regulatory authority over the utility commission.

Municipal utilities are publicly-owned, not-for-profit organizations, established by local governments. Utility commissions consist of elected or appointed persons charged with the responsibility of administering electricity service to customers within a municipal boundary, generally at

the local level although some utilities do not extend their service area to their municipal boundary. The utility commission oversees the activities of the utility, and will have a reporting relationship with both its owner — the municipal council — and with Ontario Hydro if it purchases power from Ontario Hydro. A municipal utility is financed by the revenues received from the electricity services it provides.

A municipal corporation has authority and liabilities with respect to the financial matters of its utility commission. Any liabilities of the utility are the responsibility of both the utility commission and the municipal council. The utility commission must keep separate books and financial statements. It uses its net revenues to retire debt and, if there is any profit, it will go to the municipality — unless Ontario Hydro supplies the power, in which case the profit stays with the utility commission.

A municipal electric commission provides only electrical services, while a public utility commission (PUC) provides other services as well, such as water and sewage. About one-third of the utilities in Ontario are PUCs, although all are generically referred to as municipal electric utilities (MEUs).

There are 307 MEUs in Ontario and they differ in composition, size, customer mix and load, geographical profile, commercial sophistication, and business activity. MEUs range in size from 113 to 220,000 customers.

More than three-quarters of the MEUs serve fewer than 5,000 customers, and the 10 largest MEUs average 125,000 customers. These large MEUs serve half of the MEU load. In total, the MEUs serve 2.8 million customers, representing 75 per cent of all the customers served and 70 per cent of all the power sold in Ontario.

The rates charged by the MEUs also vary due to a number of factors — line losses, debt load, customer density and mix, diversity, load factor, daily and seasonal use patterns, local generation, history, age and maintenance requirements of the system and capital contribution practices.

II) UTILITY COMPANIES

Cornwall Electric is a city-owned public utility company that serves the City of Cornwall. The utility does not purchase power from Ontario Hydro. Rather, it has purchased power from Cedar Rapids Transmission Company, Canadian Niagara Power Company, Limited, Niagara Mohawk Power Corporation, and Hydro-Quebec.

There are three privately-owned companies distributing electricity in the province: Canadian Niagara Power Company, Limited; Gananoque Light & Power Ltd.; and Great Lakes Power Limited.

III) ONTARIO HYDRO RETAIL

Ontario Hydro has an internal business unit referred to as Ontario Hydro Retail. This unit includes 13

regional offices, electrical inspection and retail services, and 48 operating centres, 44 of which are within five kilometres of MEU centres.

Ontario Hydro Retail is the province's "residual" distributor, responsible for supplying customers in areas where there is no local distributor, as well as for rural and remote distribution. It distributes 30 per cent of the power sold in Ontario, serving one million customers, all of which are in one cost pool.

Ontario Hydro Retail serves over 100 large direct customers — defined to mean customers with average power demands greater than 5 MW — who generally take their power directly from the transmission grid.

Ontario Hydro Retail also provides power to remote communities that are not served by the transmission grid. There are 33 electrical power systems in remote communities in Ontario; of these, 23 are operated by Ontario Hydro and ten by First Nations.

To serve isolated communities, Ontario Hydro requires that the community must have road or rail access or an airstrip, and have at least 35 year-round residences. There must be an agreement with the Province outlining responsibilities and obligations and provisions for the use of land to provide electrical services. To serve an isolated First Nation community, Ontario Hydro also requires a band council resolution requesting that the federal

government sign an agreement with Ontario Hydro to provide electrical services; an agreement with the federal government outlining responsibilities and obligations; and a land use permit to use reserve lands to provide the electrical services.

The factors Ontario Hydro Retail considers in deciding whether to serve a community on or off the grid include: closeness to grid connection, cost of grid connection, cost of diesel system, and other alternatives to diesel. In 1994, the average kWh cost of serving remote, off-grid communities was 34.4 cents, ranging from 18.3 to 54.2 cents per kWh.

F

POWER AT COST

1) THE POWER CORPORATION ACT

Ontario Hydro is a statutory corporation, owned by the people of Ontario and responsible to the Government of Ontario. It operates under the authority of the *Power Corporation Act* (PCA), which was enacted in 1972. Parts of the PCA affect municipal electric utilities, private utilities and independent power generators.

The PCA is divided into six parts and 127 sections. The *Act* deals comprehensively with Ontario Hydro's operational and other business activities, including:

- corporate structure and accountability;

- water rentals, property acquisition and the construction of public works;
- business operations, finances and corporate tax status;
- powers and obligations of municipalities in contracting with Ontario Hydro;
- rural power distribution; and,
- regulatory authority over municipal electricity rates and financial activities.

In addition to the *PCA*, Ontario Hydro's activities are subject to a number of other statutes, including provincial and federal labour legislation and laws that regulate nuclear facilities, the environment, electricity rates and exports. Other electricity producers in the province are also subject to federal and provincial statutes. A range of this legislation is provided in Appendix D.

Under the *Power Corporation Act*, Ontario Hydro has a legislative mandate to provide power at cost to its municipal and direct industrial customers. The power-at-cost mandate is a carry-over from the original legislation in 1906. The Government's intent was to keep prices low by having a publicly-owned utility produce, transmit and sell electricity without including a price mark-up for profit.

11) HOW ELECTRICITY RATES ARE SET

Today, wholesale (i.e., bulk) electricity rates in Ontario are determined by Ontario Hydro's Board of Directors. In practice, Ontario Hydro calculates its costs, including administration, then sets electricity rates that allow it to recover these costs.

Ontario Hydro sets wholesale electricity prices on a "power pool" model. Total costs, covering generating stations, the transmission system, staff salaries and other fixed and operating costs, are pooled. Average bulk power prices are determined by dividing total costs by expected power sales, based on load forecasts. Wholesale customers in each class — municipal electric utilities, direct industrial and rural — pay the same bulk electricity rate independent of geographical location.

The Minister of Environment and Energy is required to submit Ontario Hydro's proposed rate changes to the Ontario Energy Board (OEB) for review. The OEB convenes a public hearing to study the rate proposal, and invites recommendations from interested parties. At the end of August, the OEB presents its findings and makes recommendations to the Minister. Ontario Hydro is not required to follow the OEB's recommendations.

Ontario Hydro also plays an important role in setting retail electricity rates, which are the rates

charged to Ontario Hydro Retail customers and customers of the MEUs and private utilities that buy bulk power from Ontario Hydro. Municipal and private electric utilities must develop annual retail rate proposals and submit them to Ontario Hydro for approval. Final retail rates include recovery of the costs to build and maintain local distribution systems and services.

III) ONTARIO HYDRO SUBSIDIES

Ontario electricity rates are based on a cost for power that includes subsidies absorbed by all electricity users, and subsidies provided by Ontario taxpayers.

One example of a cost to all customers is the rural rate assistance program. Under Section 108 of the *Power Corporation Act*, Ontario Hydro is required to maintain the difference between the weighted average bill for a year-round rural residential customer to no more than 15 per cent above the weighted average municipal bill. The funds required to provide discounts to qualifying customers are recovered from all electricity users.

The forecast of the cost of the rural rate assistance in 1996 is \$127-million. Ontario Hydro bases the discount on forecasted data, and there is no reconciliation between the forecast and the actual cost. The full cost of assistance is not recovered, and the level of the rural rate assistance is actually \$165-million. The \$38-million difference is paid by

Ontario Hydro Retail customers who do not qualify for assistance.

Electricity customers benefit at the expense of taxpayers generally because Ontario Hydro is a publicly-owned corporation. The utility pays no income or corporate taxes. Ontario Hydro may also borrow by using the Province of Ontario's credit rating, and its debt is backed by the provincial Government.

Ontario Hydro does pay grants in lieu of municipal taxes and a debt guarantee fee to the Province, as well as water rental levies.



ELECTRICAL INSPECTION

Ontario Hydro has the authority to enforce the *Ontario Electrical Safety Code*. It operates an inspection department, which has been on a full-cost recovery basis since 1993. There are 260 employees, 170 of whom are inspectors, located in five territories. Territory managers report to the provincial inspection manager, who reports to Ontario Hydro Retail.

An advisory committee with representatives from all parts of Ontario's economy — including electrical contractors, utilities, manufacturers, utilities, consumers and farmers — supports Ontario Hydro in its review of the *Code*.



ONTARIO HYDRO TECHNOLOGIES

Ontario Hydro Technologies (OHT) is a business unit within Ontario Hydro and was created from Ontario Hydro's research division. Ontario Hydro established its first laboratory in 1912. The division focused on research and development work related to the utility's core business, developing technologies to help avoid unnecessary costs. While it sometimes took on work for other organizations, it had no mandate to commercialize technologies or earn a profit.

Recognizing that its research division had the potential to become a profitable international technology business, in 1993 Ontario Hydro created OHT. OHT has a two-fold mission:

- to support Ontario Hydro in achieving its mission by ensuring it has available, at all times, the most efficient, sustainable, safe and reliable technologies; and,
- to become a leading global source of sustainable and advanced energy-related technology, products and services, generating new wealth, business and job opportunities.

Although OHT is part of Ontario Hydro, it has its own board of directors. OHT's core business is to seek contracts with Ontario Hydro or external organizations in order to undertake electricity-related research and development projects, providing

technical services and carrying out testing, certification and training.

Half of the work undertaken at OHT in 1994 was on nuclear technology, and a good portion of that was done as part of the CANDU owners group research and development program.



ONTARIO HYDRO INTERNATIONAL INC.

Ontario Hydro International Inc. (OHII) is a wholly-owned subsidiary of Ontario Hydro. It was created in 1993 from the utility's new business ventures division, and is responsible for marketing Ontario Hydro's expertise abroad.

OHII operates in accordance with Ontario Hydro's corporate standards, but maintains an arm's length relationship from the utility. Its core business activities include consulting services, isotope sales, project development and investment management. OHII is active in North America, as well as Asia, Europe, the Middle East, Africa and Latin America.

The company's mission is to:

- employ Ontario Hydro's expertise and products internationally for profit;
- use investment in electric power and related projects to increase sales, utilizing Ontario Hydro staff;
- create Ontario export opportunities; and,
- demonstrate international leadership in sustainable development.

This chapter of the Advisory Committee's report discusses the major economic, technological and public policy changes that are creating pressures for change in the structure of Ontario's electricity system.

A

THE COMPETITIVE CLIMATE

Ontario's electricity system has served the province well for most of this century, and was a major factor in helping to build the province's existing industrial and manufacturing base. But today, Ontario's economy is facing the same rapid and significant change being experienced throughout the developed world, and our electricity system must be prepared to change to keep in step.

One of the dominant themes of the shifting global economic environment is increasing competition. Greater competition is occurring in most markets, and at the local, regional, national, continental and global levels — in all economic sectors, and even between divisions within the same company.

Operating in a competitive market forces firms to be more efficient. They must keep their operating and production costs as low as possible to ensure that the goods or services they produce are not over-priced,

compared to those of their competitors. Ultimately, consumers benefit from greater competition, because the most efficient companies with the lowest overall production costs can offer lower prices for products and services.

Greater competition also drives suppliers to be more innovative and to enhance existing or offer new products. When suppliers have to compete for business, and work hard to retain it, their customers generally benefit by having more choices and greater flexibility in the products and services they buy.

Around the world, more and more jurisdictions are turning to competitive markets to ensure that individual products and services are delivered — and whole economies are run — as efficiently as possible. In Canada, this trend led to deregulation in a number of economic sectors that were either protected or operated through monopolies, including the long-distance telephone, natural gas, airline and trucking industries.

In some parts of the world, there has also been a recent trend toward deregulation of the electrical supply industry, as jurisdictions increasingly look to competition to improve the financial integrity and efficiency in how electricity is produced in their economies.

Currently, large electricity users, governments and individual consumers alike are questioning many of the traditional aspects of the electricity business — including regulations on rate-setting and rate structures, cross-subsidization between customer classes, and the use of electric utilities as delivery mechanisms for broader social policies such as income redistribution and regional economic development. Potential competitors also question Ontario Hydro's involvement in broader electricity services, given the power-at-cost mandate, as well as the utility's ability to cross-subsidize the competitive services.

B

INDUSTRY REQUIREMENTS

In 1995, Ontario's largest retail customers together spent more than \$1-billion on electricity, accounting for more than ten per cent of Ontario Hydro's total primary energy sales. So while all electricity users have an interest in keeping rates as low as possible, it is an especially important issue for the agricultural community and large, electricity-intensive industries, such as mining or pulp and paper that must compete in the global marketplace.

The Advisory Committee heard from some industries that electricity rates can be a major deciding factor in corporate decisions about where to locate new plants, or whether to enhance existing ones. Such decisions

obviously have a direct impact on Ontario's economic growth and employment levels, as well as on the province's overall standard of living.

For many years, Ontario's electricity rates compared favourably with those in competing jurisdictions. On average, Ontario Hydro still offers more competitive rates than many U.S. utilities, but the differential has narrowed significantly since the mid-1980s. See Chart 7.

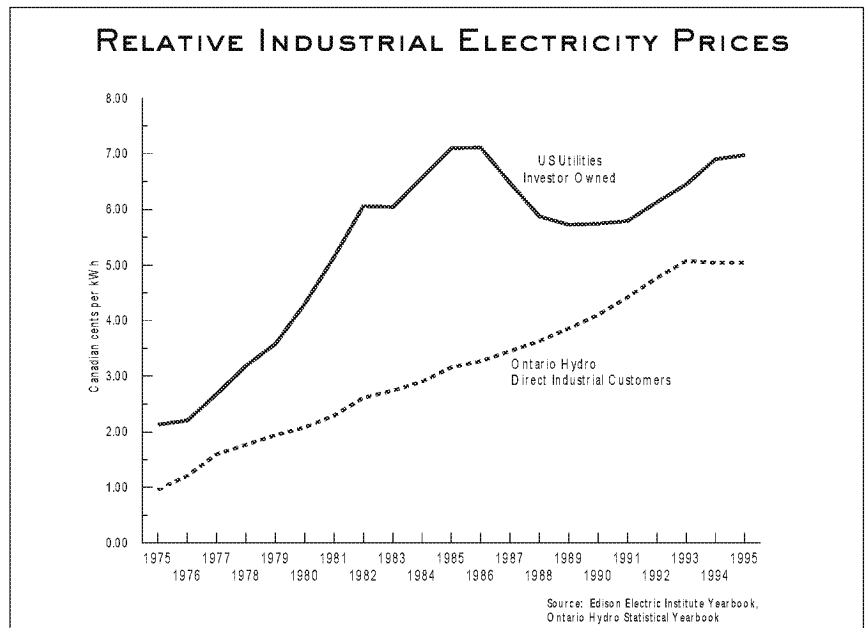


Chart 7

Industry representatives told the Advisory Committee that they are concerned that Ontario firms will find themselves at a disadvantage if competitors in other jurisdictions obtain reductions in electricity rates. They pointed out that the surplus of generating capacity in the United States has already caused many U.S. utilities to introduce special rates to

selected industries to attract or retain customers.

If U.S. states move to adopt retail electricity competition — a market in which power users can buy electricity from competing suppliers — power costs for U.S.-based businesses could well come down. Further, if the U.S. electricity market becomes more competitive than the market in Ontario, businesses throughout the province could lose an important strategic advantage.

Some analysts expect that the entire North American electricity market will ultimately be transformed into an open, competitive marketplace. Where utility companies in the U.S. and Canada compete head-to-head for industrial customers, electricity rates would be an important factor when companies choose suppliers.

Currently, customers seeking lower electricity rates can generate their own power or develop a partnership with an independent power producer. This would result in revenue losses that would reduce Ontario Hydro's ability to pay down its debt. As well, an exodus of large customers would create "stranded assets" — facilities and equipment that could not be fully utilized, but which would still cost money to finance and maintain. These costs would have to be borne by Ontario Hydro's remaining electricity customers or taxpayers.

To address these concerns, Ontario Hydro recently implemented a load

retention and expansion rate option, which allows it to negotiate a preferential rate with a company that can prove it has viable alternative supply options. However, these rates involve high administration costs and contribute to an uneven playing field. Moreover, these rates are negotiated without the benefit of a public process.

The price of electricity is not the only consideration for industry. As companies turn to higher value-added equipment, they also require a high-quality electricity supply that provides uninterrupted power at constant voltage, and fast service response when problems occur. In some operations, brown-outs and black-outs can cause considerable costs and damage. Plants using technology such as robotic equipment can be very sensitive to service interruptions and voltage fluctuations.

Competitive rates and reliable electricity, therefore, are important for Ontario's future prosperity, particularly when it comes to maintaining and expanding the province's industrial and manufacturing base. To keep pace with competing firms in other jurisdictions, Ontario industries need access to competitively-priced electricity. For large businesses, access to inexpensive power, on flexible terms tailored to meet their specific requirements for reliability, price, financing and other factors, is a key determinant of their future success.



TECHNOLOGICAL CHANGE

For many years, the most cost-effective way to generate the large amounts of electricity needed by Ontario's growing economy was to build huge, central generating stations. This involved a centralized planning process, which made all major decisions about the system. Today, the commercial availability of low-cost, small-scale electricity generation equipment has undermined the traditional advantage of large fossil fuel or nuclear generating plants.

During the 1980s and 1990s, the economies and efficiency of new generation plants improved, reflecting technological advances in combined cycle generation and lower natural gas prices. Cost-effectiveness can now be achieved with smaller generating units that can usually be financed, designed and built within two to five years, compared to the decade or more needed for large, coal, nuclear and hydroelectric plants.

The prices of electricity produced by different technologies are difficult to predict since they may be affected by trends in natural gas prices and other factors. In the future, however, we can expect to see more decentralized, smaller-scale plants that are sited close to local markets — in many cases, right next to their major loads. Shorter lead times also reduce the need to plan new generating capacity

far into the future, based on long-term estimates of demand which are not always reliable.

The shorter lead times and lower capital costs involved with small-scale power generation mean that many more companies can afford to enter the electricity generation business — producing power for themselves, and selling surplus electricity. With more potential suppliers of the same commodity, there is greater opportunity for competition — and competition generally leads to lower consumer prices.



ELECTRICITY GENERATION IS NOT A NATURAL MONOPOLY

A monopoly can be beneficial if the cost of having many firms provide the same service would be prohibitively high. It only makes sense to have one natural gas pipeline and one sewer system. These are said to be natural monopolies since the high costs of developing competing systems would drive up prices for all users.

Ontario Hydro operates as a monopoly, both horizontally and vertically, since it not only controls Ontario's electricity generation, but it also controls how power is transmitted and sold throughout the province.

Electricity generation is not a natural monopoly. Today, there is no longer a need for a single large supplier to

invest in massive generating stations. Economic and technological changes have ushered in a new era, in which it is possible — and beneficial — to have competition among electricity suppliers.

No longer does Ontario need to double its electricity system capacity every ten years. There is lower growth in demand, as all users — from single households to large manufacturers — work to find ways to be more efficient and reduce their costs. This low growth in electricity demand is expected to continue for some time.

E

DEMANDS FOR ACCESS TO THE TRANSMISSION SYSTEM

The transmission of electricity is an example of a natural monopoly. It was a key part of Ontario Hydro's vertically-integrated monopoly, during the time when demand was increasing as Ontario was electrified. It would be neither cost-effective, nor in the public interest, if competing companies built duplicate transmission grids.

However, in a competitive electricity generation market, the transmission monopoly must be totally independent to allow fair access to all generators and all customers. Ontario Hydro's vertical integration, coupled with a lack of regulation over its activities, represents a significant barrier to the development of a competitive electricity generation market in Ontario.

F

CUSTOMER NEEDS ARE CHANGING

Most consumers — large and small — support increased choice and flexibility in products and services, as well as efficient and accountable rate structures, all of which generally come with competition. The right to choose the company or supplier with whom we do business is becoming a more frequent demand as our economy matures and consumer needs become more sophisticated.

The trend towards increased competition is already having an impact on Ontario's electricity market. There is an increase in the number of electricity services and products that are available. These innovations range from time-of-day metering that allows customers to change their consumption habits to save money, to new energy-efficient technologies. More new energy products and services are likely to appear in the future to meet this demand.

With the emergence of new information technologies and markets, consumers' electricity needs will likely become more demanding and complex. Large companies, hospitals and apartment buildings alike will seek to minimize their operating costs — for example, through simplified billing procedures — or seek agents who will broker the best possible rates or mix of services with competing utility companies.

Ontario's electricity system must be in a position to respond to customers' needs and to participate in this dynamic and changing environment.

New metering technologies also will allow suppliers to track and anticipate consumption patterns more closely and to better meet the needs of their customers. The emergence and refinement of more sophisticated information, billing and metering technologies will allow greater differentiation of supply, according to characteristics such as time-of-use and interruptibility.



THE ENVIRONMENT

Mounting environmental pressures are expected to have more dramatic and direct impacts on the world's energy-producing sectors in the future. As we move into the next century, Ontario will be forced to meet its electricity needs against the backdrop of increasingly strict environmental requirements. This means that wherever possible, the province's electricity system will need to incorporate the best available environmentally-sustainable technologies and practices.

Structuring Ontario's electricity system to respond efficiently and cost-effectively to rising environmental concerns is a key consideration in shaping the system's future direction.



FINDING THE TRUE COST OF ELECTRICITY

In 1906, the Government of Ontario created the world's first publicly-owned electric utility, and gave it a mandate to transmit and produce power to its customers at cost. At the time, this represented a unique and highly successful approach to keeping electricity costs as low as possible.

Ontario Hydro still delivers power at cost, but there is some question about the factors that make up this "cost" — and whether the inclusions in, or omissions from, the formula are still appropriate.

As a publicly-owned corporation, Ontario Hydro is not required to pay income or corporate taxes. It pays grants in lieu of property taxes to municipalities that are considerably lower than those paid by private generation companies. Although Ontario Hydro pays water rentals to the province to operate its hydroelectric generating stations, some have argued that these payments do not reflect a fair return on the resource.

While it may be said that these advantages allow Ontario to enjoy lower-cost electricity, the question must be asked: "Why should provincial or municipal taxpayers subsidize electricity rates by forgoing tax or fair value for their resources?"

In addition, Ontario Hydro has an unfair advantage over competitors that face full taxation. The advantages that accrue to Ontario Hydro by virtue of its public ownership distort the true (i.e., market-based) cost of electricity, and frustrate the introduction of fair competition between independent power generators and Ontario Hydro.

There are numerous examples — past and present — where Ontario Hydro has been used by the Government of Ontario as an economic development tool, or to deliver social or economic programs. One example is Elliot Lake, where the Government encouraged Ontario Hydro to buy uranium at prices above those charged on the world market. Then, when Ontario Hydro cancelled its uranium contracts, it was asked to help cushion the economic blow to the community.

Ontario Hydro can recover all the in-house costs it deems reasonable through its bulk electricity rates. Some critics argue that this allows Ontario Hydro to undertake activities that either have little to do with the cost of producing or delivering electricity, or offer limited returns — such as international investment. Setting rates that are determined by the revenue required, without sufficient regulatory oversight, is not acceptable — and is not compatible with a competitive market.



THE NEED FOR MARKET DISCIPLINE

Market-based pricing is shaped by the needs, desires and financial constraints of consumers, which in turn dictate the investment and operating patterns of companies operating in the market. In competitive markets, supply and demand in the market set the price, and companies control only their own costs.

The market price is established by the marginal or incremental cost of the last unit needed to satisfy demand. A business that can manufacture and sell its product below the marginal cost will be competitive and profitable. A business with marginal costs higher than that determined by the market will go out of business, unless it reduces its operating costs.

Ontario Hydro does not face this dilemma. If its costs rise, it can simply increase its wholesale electricity rate. Without competition, then, it is impossible to determine how much electricity should cost in Ontario.

Ontario currently has excess electricity generating capacity, a situation which is forecast to continue for several years. Over half of Ontario Hydro's existing generating plant, however, will have to be replaced or rehabilitated by 2025. Clearly, new electricity generation facilities in Ontario

should be of the size and type that can best respond to the province's needs, while allowing suppliers to participate in a more open, competitive electricity market.

A competitive system has the best chance of ensuring that the most efficient and beneficial investment decisions are made. Market discipline will direct important decisions with respect to future investment in electricity supply.

J

MOVING TO A LEVEL PLAYING FIELD

The legislation in Ontario creates an uneven playing field for electricity suppliers, and the current rules also limit the ability of electricity suppliers to compete. While the system has been in place for many years, it is out-of-step with current trends toward the competitive environment in which Ontario businesses operate today.

A more competitive electricity generation sector will allow electricity suppliers in Ontario to compete in what is destined to become an open, integrated power market. With the prospect of this free-flowing trade in electricity just around the corner, the time is right for Ontario to take action to prepare for that coming market.

An important step is to identify and remove the legislative and other barriers so that all participants — public or private — face the same

external costs and operate under the same set of rules. Ontario Hydro's preferential access to capital markets by virtue of the provincial debt guarantee, and its tax-exempt or tax reduction privileges, compared with privately-owned utilities, are major obstacles to achieving a level playing field in the electricity industry in Ontario.

K

FALL FROM GRACE

Until the 1980s, Ontario Hydro could point to its record with justifiable pride. Ontario residents had ample supplies of reliable electricity, at prices that compared favourably with neighbouring jurisdictions. Ontario Hydro continued to plan for expansion, confident that the past trend of steadily rising demand would continue uninterrupted into the future.

In the late 1980s, Ontario Hydro was still predicting rapid growth in electricity demand, and planning significant expansion to its facilities. By 1992, however, it became clear that Ontario did not need any new generation capacity — and that this situation would continue for some time.

The recession of the early 1990s hit Ontario's manufacturing sector particularly hard, causing rapid changes and restructuring efforts throughout the provincial economy. With a changing market and hundreds of businesses closing their doors forever, Ontario Hydro lost

many customers. At the same time, new generation capacity from the Darlington nuclear generating station came on-line, and the costs of the station — which were significantly higher than original estimates — had to be factored into electricity rates.

The timing for successive increases in the price of electricity was unfortunate. Between 1990 and 1994, increases in the Consumer Price Index — one of the indicators often used to assess the general direction of prices throughout the economy — declined from close to five per cent to less than two per cent per year. Over the same period, Ontario Hydro's rates went up by almost 40 per cent. Ontario's rates seemed out of step with cost pressures in the rest of the economy and with electricity price trends in other jurisdictions.

Ontario Hydro's high debt and debt-servicing costs contributed to the public concern during the early 1990s. In the years following the Second World War, the utility's debt-equity ratio was less than 50 per cent, which means less than 50 cents' worth of debt for every dollar's worth of assets. But the ratio grew over the next four decades. By the early 1990s, Ontario Hydro's debt-equity ratio had risen to nearly 85 per cent. Subsequent events would push this financial indicator even higher.

In 1992, Ontario Hydro increased rates by nearly 12 per cent, electricity sales declined by two per cent and

the outlook was for further rate increases as the investment in the Darlington nuclear generating station entered the rate base. Generation capacity exceeded peak demand by 50 per cent in 1992 and future investments to expand capacity came under close scrutiny. Ontario Hydro's customers were alarmed by the prospects of additional rate increases (1993 rates went up by nearly eight per cent), and some began to actively explore options to the current system for their electricity supply. Ontario Hydro was facing the prospect of spiralling costs and a shrinking customer base.

To address this situation, Ontario Hydro introduced major changes in 1993, leading to significant reductions in its planned capital expenditures and total staff. The utility's operating divisions were restructured into individual business units with more autonomy, and a measure of internal competition was introduced to put pressure on management to pursue cost reductions.

Ontario Hydro later committed to an overall rate freeze for the balance of the decade.

Ontario Hydro's changes may allow it to adapt to the evolving business climate, but they are unlikely to secure its long-term viability in an openly competitive electricity market. A new approach is needed — one that adopts new institutions, regulations and behaviours, which can nurture the emergence of a competitive electricity market.

ONTARIO HYDRO FINANCIAL POSITION: 1994 AND 1995

(\$, million)

	1994	1995
ASSETS		
Total Fixed	39,907	39,299
Current	2,084	1,803
Other	2,109	1,882
	<u>44,100</u>	<u>42,984</u>
LIABILITIES		
Long-Term Debt	30,202	28,726
Current	6,659	6,128
Other	3,327	3,590
	<u>40,188</u>	<u>38,444</u>
EQUITY		
	<u>3,912</u>	<u>4,540</u>
	<u>44,100</u>	<u>42,984</u>

Source: Ontario Hydro

Note: Ontario Hydro's **total** long-term debt (including bonds and notes payable within one year) was about \$33-billion at the end of 1994, and \$31.5-billion at the end of 1995. In our report we use \$33-billion as we did not have early access to the 1995 figure.

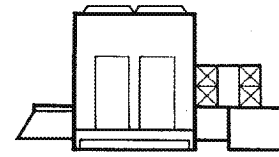
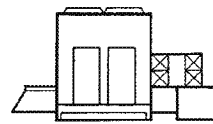
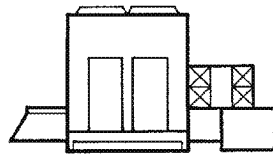
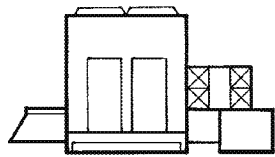
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A FRAMEWORK FOR COMPETITION

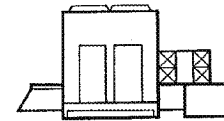
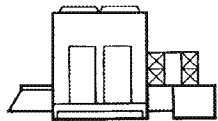
II

A FRAMEWORK FOR COMPETITION

THE FRAMEWORK

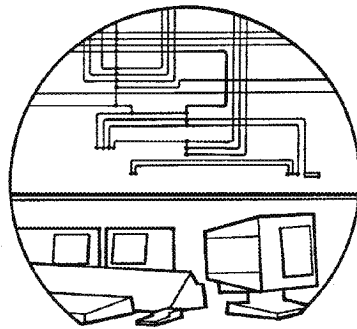


Generation



The Marketplace

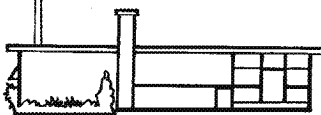
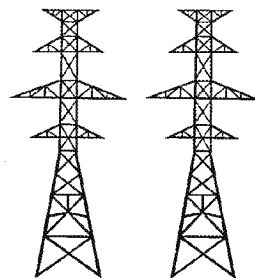
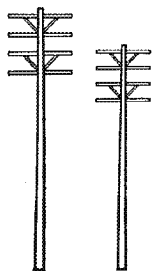
System
Operator



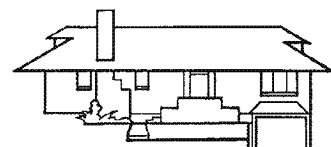
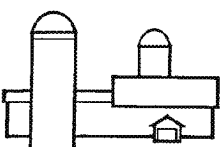
\$	MW	TIME
31.76	100	0900
32.35	120	1030

Electricity
Exchange

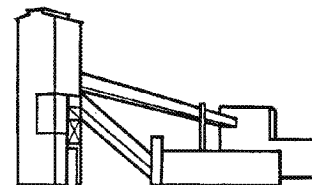
Transmission System



Distributors

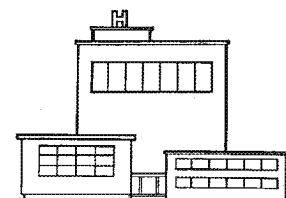


Customers



Agents
Brokers
Marketers

Energy Service Companies



In Part II, we outline our recommended reforms to introduce competition into Ontario's electricity system. The reforms that we are proposing will lay the foundation for competition in the generation and distribution sectors.

The Advisory Committee is recommending an end to Ontario Hydro's monopoly control over the generation and transmission of electricity in the province, and reforms in the distribution sector.

Central to introducing competition is open, non-discriminatory access for all generation companies selling electricity in the Ontario market. We are recommending that control over the **transmission system** be moved out of Ontario Hydro to an independent company.

The core of our framework is the establishment of a **marketplace** that would bring together the buyers and sellers of electricity. Electricity prices will be set by market forces, as generators compete to supply the Ontario market.

Purchasers can buy at the spot market price, enter a bilateral financial contract with a generator, or use other financial instruments to stabilize their supply. Similar financial tools will be available to suppliers. A **System Operator** will ensure equitable access to the transmission system for suppliers and purchasers. While the System Operator serves as the objective gate-keeper for physical access to Ontario's transmission system, an **Electricity Exchange** will be an equally objective agency responsible for the system's financial integrity. The Electricity Exchange will settle financial accounts between sellers and purchasers, as well as operate the futures market.

Separating Ontario Hydro's **generation** assets into competing entities is an essential step in opening up the electricity supply market. Nuclear generation and the hydroelectric facilities associated with Niagara Falls would become separate, publicly-owned companies. While Ontario Hydro's nuclear generation stations

would have a single owner, we recommend that four distinct, competing entities be established. We are recommending that a number of other new companies be formed from Ontario Hydro's remaining hydroelectric and fossil fuel generation facilities, and that private equity be introduced into the ownership of these assets. It is necessary that reforms be undertaken to create a level playing field between publicly- and privately-owned electricity generation entities.

Reforms include restructuring the **distribution** sector. We are recommending that Ontario Hydro Retail be absorbed into the local distribution system and that there be fewer distributors. In addition, each distributor should keep separate its monopolistic wires business from its competitive electricity sales and energy services activities. Our recommendations for this sector are necessary to ensure retail competition in both electricity and energy services.

New **legislation** is recommended to replace the *Power Corporation Act*, along with necessary amendments of other relevant statutes. This would formalize the legal uncoupling of Ontario Hydro, create a new system of regulation, and set in motion a competitive process for the electricity system in Ontario.

An orderly transition to a competitive electricity system will require a **phased process** in which necessary reforms can be planned, developed and implemented. The first stage prepares the way for wholesale competition, whereby municipal electric utilities and large users would be able to purchase their electricity directly. The final stage of reforms includes the introduction of full retail competition, whereby all consumers of electricity, large and small, purchase their energy needs directly.

All reforms should be undertaken with the stated purpose of ensuring a safe, reliable and secure electricity system.

A

GUIDING PRINCIPLES

The Terms of Reference for the Advisory Committee set out the principles for our review:

1. *In support of its commitment to remove barriers to growth, the Government of Ontario has identified the need to examine potential changes at Ontario Hydro to bring it back to its proper role of providing reliable and affordable electrical power to Ontario, and to respond to the potential impacts of changing technology and international economic trends in the electricity sector.*
2. *The Government of Ontario is committed to upholding the objectives of sustaining affordable electricity rates, enhancing provincial competitiveness, preserving financial soundness and safeguarding Ontario's quality of life.*

The framework for the Terms of Reference also outlined a number of issues to be considered by the Advisory Committee. Our assessment of options was to address, but not be limited to, the following issues:

- *affordable electricity rates for all classes of customers;*
- *achievement of greater economic efficiency;*
- *power system reliability and obligation to serve;*

- *economic competitiveness and regional economic impacts;*
- *implications for public finance, including public sector indebtedness and provincial/municipal government revenues;*
- *First Nations and Aboriginal issues;*
- *electricity trade and energy security;*
- *arrangements for nuclear power;*
- *local accountability; and*
- *sustainable development.*

Much of the public debate concerning our review focused on the privatization of Ontario Hydro. The Terms of Reference asked us to consider options for introducing private equity to the extent that ownership reforms would help foster a competitive electricity system, and it is within that context that we conducted the review.

B

OBJECTIVES

Through the public consultation process, the Advisory Committee received numerous views from across the province, and beyond, on the priorities for Ontario's electricity system. As noted in Part III, the price of electricity is a key concern for many. However, a common theme running through many oral and written submissions was that reforms

for competitiveness and low rates must not jeopardize a number of other important qualities that Ontarians value highly.

For example, we were cautioned that financial concerns must not override the important objectives of ensuring the safety, reliability and accessibility of electricity. Similarly, equity across customers and regions of the province was seen to be important. There are many public policy objectives, such as economic development and environmental responsibilities, that many believe to be important, and which they believe should not be compromised in restructuring discussions.

The message to the Advisory Committee was clear. Any effective plan to promote competitive forces in Ontario's electricity system involves a delicate balancing of diverse and often competing objectives. Therefore, the Advisory Committee pursued the economic benefits of competition while giving full consideration to the policy priorities of all people in the province.

The Advisory Committee identified a number of objectives to guide the development of our framework for fostering competition in Ontario's electricity system:

- Reforms should enable all customer classes to share in the benefits of a competitive electricity market so that all customers are assured of competitive electricity rates. Customers should benefit

from greater choice through access to new products and services as they become available in the years ahead. Accessible and reliable electricity supply to all consumers must be preserved, with continued high technical standards for safety.

- Changes should be introduced to minimize negative environmental impacts. The timely introduction of innovation and sustainable, cost-effective energy technologies and processes should be promoted.
- The electricity system should be structured to support economic development and job growth in the province, and promote the competitiveness of Ontario businesses and industry.
- The Advisory Committee's recommendations must be structured to acknowledge the diverse composition and characteristics of all major players in the energy supply, distribution and retail sectors. Similarly, reforms must be sensitive to the special circumstances and issues associated with providing electricity to customers located in rural, remote and northern regions of the province, and in First Nation and Aboriginal communities.
- Reforms should promote a level playing field in which all players in the competitive sectors of the electricity system can compete fairly for business against a clear, common set of rules in the market.

- The commercial operation of the electricity system should be promoted, and the financial integrity of the electricity system should be upheld through decision-making that is driven by appropriate economic signals and market forces.
- The financial soundness of the Province must be preserved. Costs associated with restructuring should be minimized, and shared equitably and fairly by all who benefit from Ontario's electricity system. In particular, those who have invested in the current system — workers, municipalities and the Government of Ontario — must be treated equitably and fairly as reforms are implemented.
 - A transition path should be identified to support an orderly shift toward a competitive market for electricity to ensure stability in service and rates. Appropriate roles for regulation in a competitive electricity market should be identified to ensure that the public interest continues to be protected. The new structure should allow sufficient flexibility for the electricity system to develop and respond over time to competitive forces in a rapidly changing North American environment.

A

COMPETITION IN THE MARKET FOR ELECTRICITY

The Advisory Committee recommends the establishment of wholesale competition, followed by the phased introduction of full retail competition, for the supply of Ontario's electricity.

To establish a market-based mechanism for determining Ontario's electricity supply prices, the Advisory Committee recommends a gradual transition to an open, competitive market in which all customers have access to the electricity supplier of their choice. The reforms recommended by the Advisory Committee to realize this vision for the electricity system are outlined in detail in the subsequent chapters of this part of our report.

We recommend that the first step in the transition be the establishment of a competitive market for electricity generation at the wholesale level.

Once a fully operational wholesale market is established, we recommend that direct access for other customers be phased in, with the ultimate goal of establishing a system of full retail competition in which electricity suppliers compete to sell power to all customers, including residential users.

We believe that the introduction of wholesale competition as an initial step toward the longer-term vision of full retail access will make it possible to capture at an early date many important benefits of enhanced competition in Ontario's electricity supply system.

For the Advisory Committee, retail competition is the appropriate, ultimate model for the Ontario electricity system. The development of full retail access for all consumers will take time, since it will first require the development of new institutions and technologies. We have structured our recommendations for wholesale competition to facilitate further change toward the ultimate goal of a fully competitive retail electricity market.

D) WHOLESALE COMPETITION

The Advisory Committee recommends the introduction of a system of wholesale competition for the supply of Ontario's electricity — in which electricity generators compete to sell electricity to distribution utilities and other large customers that demand 5 MW of power, or more, at one site.

Under wholesale competition, Ontario-based electricity generators will compete with suppliers both from within and outside the province to sell electricity to the large purchasers of bulk power that comprise the wholesale market — the distribution utilities (the wholesalers) and those large customers that demand 5 MW or more at one site. These purchasers will be responsible, either directly or through an agent, broker or marketer (ABM), for making their own arrangements for buying electricity.

The participants in the wholesale market — large users, distribution utilities and generators — will need to be registered as members of the Ontario Electricity Exchange, as discussed in Chapter 6 — The Marketplace for Electricity. They will be involved in bidding for and offering electricity in the spot market, in negotiating financial contracts, and in managing their market risks by using financial instruments. Unlike the current system, the new market will require the distribution utilities to participate, as purchasers, in the price-setting process.

Wholesale access will not, however, place such demands upon residential customers. These customers will continue to rely on their distribution utilities to buy electricity in the marketplace and, in effect, to negotiate prices on their behalf.

The Advisory Committee recognizes the pressing needs of large electricity users, for whom the ability to secure adequate supplies of power at competitive prices has a direct impact on their financial position and, for many, on their ability to compete with businesses in other jurisdictions. We therefore recommend that Ontario's large retail consumers of electricity — those that demand 5 MW of power, or more, at one site — should be offered direct access to electricity suppliers as soon as practicable.

Some large power users are already accustomed to direct dealings with Ontario Hydro and have the ability to bargain effectively with suppliers. This process may be facilitated by sophisticated metering and load-management equipment. We believe that large electricity users will be interested in, and capable of, buying their own power during the wholesale competition phase, and that they should be given the opportunity to make the arrangements most suited to their needs as soon as possible.

Large users can receive assistance in purchasing power by retaining the services of electricity ABMs. The Advisory Committee expects that such service providers will emerge in the wholesale market, offering alternative ways for electricity customers to tailor power purchases to best meet their energy requirements.

We believe that wholesale competition will produce substantial efficiency gains that will lead to competitive electricity prices for all customers.

11) RETAIL COMPETITION

The Advisory Committee recommends that full retail competition be phased in to Ontario's electricity market as soon as practicably possible.

The Advisory Committee recommends moving quickly to establish a robust wholesale competition market, with a view to phasing in retail access as rapidly as possible after the wholesale market is established and reliability ensured. To some extent, we believe that market forces will encourage the system to evolve naturally toward full retail competition, as customers become more demanding and sophisticated, both in terms of their energy needs and their ability to take advantage of diverse approaches for purchasing electricity.

We believe that all customers, large and small, should have a choice of suppliers. Retail customer choice can provide benefits beyond those provided by a competitive wholesale market. Because electricity users differ in the types of service they require and in the risks they are willing to take in terms of electricity costs, enabling users to make their own arrangements for power will allow them to best meet their

individual needs. New, sophisticated ways of tracking electricity usage will give customers the option of shifting their energy use away from costly peak periods of energy demand, which would allow them to realize savings. Retail access also has the potential to combine new services and rates, including the ability to substitute one source of energy for another.

Competition in the retail market will enable further efficiency gains as commercial incentives take hold. We believe that all customers will benefit from this process. Retail competition has the potential to benefit all customers by providing greater choice among their electricity providers, with attendant pricing and reliability options. Choice in itself brings about important benefits. Consumer choice among suppliers will introduce discipline into Ontario's electricity market, and provide a powerful incentive for competing suppliers to pursue economic efficiencies, product diversity and innovation.

Retail access, while it makes possible a number of potential benefits for all consumers, can also bring significant risks if the market is not properly prepared. Consumers require information on the new system, and the necessary infrastructure and market structures must be in place before retail access can work in the best interests of all consumers.

There are a number of technical requirements associated with introducing retail competition. Customers will need meters capable of measuring energy in detailed ways, such as by time of day or by type of use. At present, such meters can be very expensive, and until their costs come down considerably, the potential benefits of retail competition could be very small. Also, the distribution utilities, accustomed at present to serving all the customers in their franchise area, will necessarily need time to establish the new systems and procedures that could physically accommodate the role of new electricity supply companies between the wires and the customers. Such realities are at the heart of our recommendation that retail access be phased in only when it is practicable.

As is the case with the deregulation of any industry, it can be expected that customers will have concerns about the shift to retail competition. Will it really bring wider choice, lower-priced energy, greater convenience, better service? New regulatory and supervisory procedures will have to be established and developed. Customers will have to be assured of redress against fraudulent or technically incompetent suppliers. The energy service companies that will emerge to serve these customers will have to show that they are indeed capable of providing these benefits. All this will take time.

Prior to the introduction of full retail access, it will be important for a developed market of electricity ABMs to be in place to provide this important role in the retail market. The full benefits of retail competition will require an energy services industry that can meet consumer demand, while avoiding domination of the market by a few companies. Energy service companies will have expanded roles to play, and will need to offer a broad range of services.

An orderly move to full retail competition will ensure that all customers continue to enjoy the same reliability and service they have today. The introduction of competition through a staged approach is recommended, to enable a careful assessment of benefits achieved by reforms at each stage in the restructuring process. A staged approach will make it possible to determine the timing of next steps.

A deliberate but cautious step-wise approach to restructuring the marketplace will allow for adequate planning and reduce the risk of disruption. It will ensure that the essential elements of competitive market-based pricing are functioning well in the initial stages of wholesale competition before proceeding to the next step. Adjustments to redress market failures will also be easier if they are undertaken before progressing to the next level.

E**OBLIGATIONS TO SERVE
AND TO SUPPLY**

The obligation *to serve* is imposed on the entity that owns and operates the distribution facilities. That is, the obligation is on the distribution wires company to provide a connection and deliver electricity to premises located in its franchise area, according to the terms and conditions of the franchise arrangement. The obligation to serve exists because the distribution company has a monopoly in its franchise area. The customer who wants delivery of power has no option but to use the franchised distribution entity. It follows that the distributor should therefore have no option but to deliver to every customer within the franchise area.

In contrast, the obligation *to supply* relates to the provision of electricity, a commodity, to the user. The obligation to supply relies on a string of contractual arrangements and transactions that stretch back from the consumer through the distribution and transmission systems to the producer of power, the generation company.

In a competitive wholesale market, the distributors would have the obligations both to serve and to supply. In return for these obligations, the local distributor will retain exclusive access to the customers in its franchise area, except

for large users. With the introduction of retail access, customers will have a choice of suppliers. The obligation to supply will be found in the contractual arrangement between the customer and the supplier.

In a competitive marketplace, it will be the obligation of the System Operator — a role discussed in Chapter 6 — to ensure that sufficient power is available to meet the province's needs. Distributors, large customers and ABMs will bid for their requirements. Generators, directly or through ABMs, will offer energy to meet these requirements. The System Operator will manage the market-clearing process and will contract for the supporting services as may be needed to provide the required degree of reliability. However, the System Operator will have no obligation to the consumer. A failure to supply is a contractual failure between the contracting parties, and will have to be dealt with as such.

C**DEREGULATION OF
NATURAL GAS:
EXPERIENCE WITH
COMPETITION**

Ontario has seen the deregulation of natural gas and the introduction of retail competition in that industry. This experience was often cited in discussing the feasibility of reforms in the electricity industry.

There are three components to the price of natural gas in Ontario — the commodity price, the transportation charge, and the distribution charge. Before deregulation, the natural gas commodity price was an administered price, determined by agreements between the federal government and the producing provinces — Alberta, British Columbia and Saskatchewan. The transportation rates were regulated by the National Energy Board (NEB), and local distribution rates in Ontario were regulated by the Ontario Energy Board (OEB). The transportation and distribution companies did not mark up the commodity price.

All Ontario natural gas users purchased their supplies from local distribution companies (LDCs). The LDCs contracted for gas supplies from TransCanada PipeLines Ltd. (TCPL). TCPL, in turn, purchased gas from the gas producers and transported it to Ontario.

On October 31, 1985, the federal government and the producing provinces entered into an *Agreement on Natural Gas Markets and Prices*, the aim of which was to create the conditions for “an orderly transition which is fair to consumers and producers and will enhance the possibilities for price and other terms to be freely negotiated between buyers and sellers.”

This *Agreement* deregulated the commodity price of natural gas, and it is now determined in the competitive market. The transportation rates and local distribution rates in Ontario continue to be regulated by the NEB and OEB, respectively. The transportation and distribution companies still do not mark up the commodity price.

Deregulation of the commodity price means that the price of natural gas is determined by market forces.

Customer choice boils down to a decision on the terms and conditions for purchase of the commodity. Deregulation of the commodity price, along with open access to transportation and distribution systems and published tariffs, has also resulted in many gas buyers purchasing directly from suppliers other than the LDCs.

The OEB supported the development of a market for natural gas in Ontario. To facilitate the transition, the OEB conducted hearings to separate (unbundle) the gas company’s commodity and distribution (delivery) charges, establish a transportation-service rate, and develop a buy/sell mechanism. Consumers were given access to the distribution pipelines of the LDC, and just and reasonable tariffs were established.

In November 1985, virtually all of the natural gas sold annually in Ontario was marketed to the LDCs under longer-term contracts.

Although direct purchase was the method of choice for large-volume industrial gas users almost from the start, today, many smaller-volume commercial, institutional and even residential customers are utilizing the direct purchase option. By 1995, 67 per cent of gas was purchased directly by customers, either on their own account or on their behalf by ABMs.

We were told that deregulation of the natural gas commodity market also increased opportunities for exports, and stimulated expansion of industry supply capacity in expectation of market growth. The natural gas industry in North America has experienced the development of

market hubs and forward markets that facilitate transactions and spread risks. There has been a shift in emphasis away from high-cost energy mega-projects to increasing the efficiency of energy markets and the delivery systems in North America.

The Advisory Committee noted the developments in and the experiences of the natural gas industry in its review of the electricity system. As pointed out by many of the submitters, although lessons may be learned from these experiences, the two industries are not totally similar and their differences should be recognized in designing changes to the electricity industry.

6

THE MARKETPLACE FOR ELECTRICITY

A marketplace is a forum where willing sellers and buyers meet to establish a price for the exchange of goods or services. Currently, because Ontario's bulk electricity prices are set by the Board of Directors of Ontario Hydro, Ontario does not have a marketplace for electricity.

In the previous chapter, the Advisory Committee recommended the establishment of a competitive wholesale market for electricity, where suppliers compete to provide power to wholesalers and large users of electricity. Eventually, the Advisory Committee is recommending that there be direct access for all customers to the electricity supplier of their choice.

Central to the operation of a competitive market for electricity will be a system for collecting the offers of competing suppliers and the bids of purchasers, dispatching supplies to meet the province's electricity requirements, and settling financial transactions between the sellers and buyers.

A

SYSTEM OPERATOR

1) ROLE

The Advisory Committee recommends that an independent agency, the System Operator, be established. The System Operator would dispatch electricity over the transmission system, oversee the delivery and coordination of electricity supplies in the province, and ensure security of supply.

Electrical generation and transmission facilities must be carefully managed to ensure that they can always meet the demands of users. Not only must the required amount of energy be supplied, but it is also necessary to take active steps to ensure, for example, that it is supplied at the correct voltage and that any constraints on transmission capacity are carefully observed.

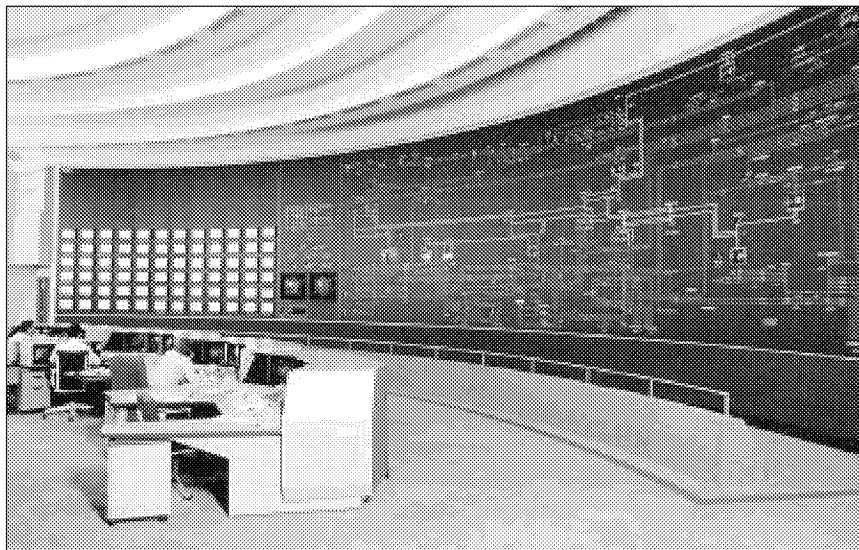


Photo courtesy Ontario Hydro

Ontario Hydro's Clarkson System Control Centre

Because Ontario's transmission system is complex, a single agent, the System Operator, must have complete authority from moment to moment over how the system is controlled, to identify which generation and transmission facilities are called upon. Although the System Operator would own no facilities itself, it would function in effect as the operator and dispatcher of the provincial transmission system.

It is desirable that the offers of energy from generators, and bids for energy from users, be provided to the System Operator at least one day in advance. This permits a ranking of the generators in merit order (the offers can be ranked in order from cheapest to most expensive for each half-hour of the next day), and the identification of the market-clearing, or spot market price, for each such period.

Each generator must indicate where on the transmission system its energy will be supplied, and each taker of electricity must indicate where on the system it wishes to take power. This permits the System Operator to compute a balance across the transmission system, and to identify points where there may be stress on the transmission facilities. If such constraints turn out to be critical, it may be necessary to call upon generators that would not have been chosen according to the merit order (for example, offering more expensive power, but located closer to the users). Generators whose dispatch

would involve constraints in the transmission system would, in effect, be treated as if their electricity were more expensive than the price at which it was offered. In other words, the merit order of suppliers would be rearranged to take account of critical transmission constraints.

Once the constraint-adjusted merit order is determined, the System Operator can notify the generators as to whether they have been accepted for each half-hour, and what the spot market price will be. Generators will be paid a spot market price that is calculated for each half-hour period. This price reflects in large part the offer of the last generator accepted by the System Operator to satisfy the demand for that half-hour period.

The System Operator also arranges for special supporting services to ensure that the transmission system operates at required voltage standards and that, in the event of unanticipated interruptions, backup power reserves are available. The System Operator also ensures that sufficient electricity is available to handle unexpected demand.

On the following day, the System Operator may not actually call upon generators in the expected order. Calls for power depend on many events. For example, weather-related interruptions and other difficulties may require quick actions that disturb the anticipated order of calls for power, to ensure that the system is safely controlled.

The System Operator is the appropriate body to judge the technical capabilities of all would-be generators and others connected to the transmission system. In a competitive system, all would-be competitors are subject to similar terms and conditions, based on accepted and well-known industry technical standards. Any power generator or purchaser that meets these requirements is free to offer or bid power to the System Operator, subject only to appropriate financial requirements (as discussed later in this chapter under the Electricity Exchange).

Because the System Operator has intimate knowledge of any constraints in the system, it has a role in identifying the need for new transmission facilities. Also, because the System Operator has knowledge of the conduct of the participants — failing to generate when an offer has been accepted or to take power when a bid has been accepted — it has a role in monitoring the behaviour of the participants in the market.

II) STRUCTURE

The Advisory Committee recommends that the System Operator be an independent non-profit agency, with the ability to recover justifiable costs incurred in the course of its business.

It will be evident from this discussion that the System Operator is an extremely important body — indeed, the single most important body in

the system — since it carries the full responsibility for ensuring a proper, safe, reliable and economical operation. Currently, the system operator functions are provided by Ontario Hydro's Clarkson System Control Centre.

It is evident, however, that the System Operator must operate, and must be seen to operate, entirely independently of all the owners of facilities, whether they be generators, transmission owners or distributors. Having been vested with the power to run or not to run any facility, the System Operator would be open to charges of bias and favouritism in the event that its independence were in question. The formula for recovering the costs of the System Operator should be set out in the rules that govern its operations.

B

ELECTRICITY EXCHANGE

1) PARTICIPATION IN THE ELECTRICITY EXCHANGE

The Advisory Committee recommends that an Electricity Exchange be established. Members should include all those entities — generators, energy service companies, specified purchasers, agents, brokers and marketers — that wish to supply or purchase electricity through the Ontario transmission system.

Just as it is essential to establish an independent System Operator to ensure the physical integrity of Ontario's competitive electricity system, it is essential to establish an

Electricity Exchange to ensure the system's financial integrity.

The System Operator serves as the objective gate-keeper for physical access to Ontario's transmission system by would-be competitors. An equally objective agency must be in place to ensure that all would-be suppliers and takers of electricity are capable of meeting their financial obligations.

In the current electricity system, there are obligations to serve and to supply, which are credible in part because Ontario Hydro and the municipal electric utilities have statutory responsibilities and are answerable to the people. In a competitive system with privately-owned providers, customers must have an equally strong assurance of access to safe and reliable electricity.

Purchasers of electricity through the transmission system must be registered purchaser-members of the Electricity Exchange, just as generators must be registered as supplier-members. Purchasers would include the distribution utilities, non-franchise customers (in a wholesale market), and agents, brokers and marketers (ABMs). The Electricity Exchange must ensure that all such participants are financially viable and able to meet their commitments.

In a competitive wholesale market, electricity suppliers from outside Ontario will be eligible to offer to supply power. Non-Ontario-based

suppliers should, however, offer power to the System Operator through the Electricity Exchange, using the services of a registered ABM. Similarly, potential purchasers of electricity located outside Ontario should arrange to buy power through the Electricity Exchange with the services of a registered ABM.

II) SETTLEMENT ROLE OF THE ELECTRICITY EXCHANGE

On the day of delivery, the dispatch of power is based on the merit order of suppliers, to the extent possible. In practice, there may be modifications to the merit order to ensure that electricity needs are met in a safe and reliable manner.

After the day is over, the System Operator provides the Electricity Exchange with information needed for the settlement procedure — in effect, a list of actual transactions and prices. The Electricity Exchange takes responsibility for settling the financial accounts between the sellers and the purchasers, matching the actual volumes of power supplied and purchased, by entering credits or debits to its members' accounts.

The Electricity Exchange also has a market information function. At a minimum it should publish, in a timely fashion, the market-clearing prices at each location and the quantities taken and supplied on the system as a whole for each half-hour.

III) STRUCTURE OF THE ELECTRICITY EXCHANGE

The Advisory Committee recommends that the Electricity Exchange be a non-profit entity, with the ability to recover justifiable costs incurred in the course of its business.

We propose that the Electricity Exchange be set up as a non-profit organization. There will need to be rules governing its operation, practices and procedures, establishing criteria to cover issues such as applying for admission to participate; requirements for participation; making bids and offers; determining payments to generators and customer charges; and dispute resolution mechanisms.

The formula for recovering the costs of the services rendered by the Electricity Exchange should also be set out in the rules. The rules would also govern the behaviour of the participants in the Electricity Exchange, including conduct and issues such as conflicts of interest. Compliance with the rules would be required to maintain membership in good standing.

We believe that the Electricity Exchange will become an important guarantor of the soundness and responsiveness of Ontario's electricity system. Ontario residents have been accustomed over the years to place complete confidence in the security and reliability provided by Ontario Hydro, and will demand no less from successor institutions.



PRICE MECHANISMS

Spot market prices must be expected to fluctuate considerably from hour to hour and over the year. This is potentially inconvenient for both sellers and purchasers. Generators want predictability, partly because this makes it easier to raise funds from financial markets to construct new facilities. Direct customers may want to balance their supply and control the variability of prices. Distributors want stability, especially if their smaller customers prefer to have fixed-price terms for their supply.

The Advisory Committee anticipates that most participants will wish to make use of techniques that transform the volatility of spot market prices into more stable and predictable terms.

There are two broad, and acceptable, techniques to complement spot markets — the use of bilateral financial contracts, and buying and selling futures contracts. Each method will enhance the usefulness of the market. In addition, price transparency (based on the timely publication of prices by the Electricity Exchange) and market depth and liquidity (based on requiring ABMs, physical suppliers and takers to be members of the Exchange) will strengthen the ability of the marketplace to respond sensitively to consumers' needs.

I) BILATERAL FINANCIAL CONTRACTS

The Advisory Committee supports the use of bilateral financial contracts, but recommends that bilateral physical contracts be prohibited.

A generator and a purchaser may agree on a fixed-price contract for a certain amount of electricity over a period of time. By doing so, they share the risks of spot market price volatility between them in a mutually acceptable way.

We recommend, however, that bilateral physical contracts be prohibited. No one should be allowed to arrange for the physical delivery of energy through the Ontario transmission system without going through the System Operator and using the spot market. Physical contracts could sharply reduce the usefulness of the spot market price as a signal of the competitive equilibrium in the system. Even more important, physical contracts could exacerbate constraints in the transmission system and force other parties to accept less advantageous prices.

In our view, the System Operator must have complete discretion as to how electricity is to be physically dispatched, in accordance with a set of transparent and well understood rules.

II) FUTURES MARKET

The Advisory Committee recommends that a futures market for electricity be established within the Electricity Exchange.

Bilateral financial contracts can be useful, but are also potentially difficult and time-consuming to arrange. Neither party may have good information on likely future movements in the spot market price, and thus may be hesitant to sign a long-term commitment.

It would be useful for the Electricity Exchange to offer its members a set of standardized futures contracts. A futures contract specifies a fixed amount of power delivered at a specified place during a specified period of time.

Buying or selling a number of futures contracts from the Electricity Exchange could achieve the same result as using bilateral financial contracts for the generator or taker of electricity, with the advantage of knowing that the price paid has been determined by a market-clearing process. Typically, futures contracts are available for periods of a year or more ahead, and their prices, published by the Electricity Exchange, would provide a convenient reference point for other contracts in the electricity market.

The Advisory Committee believes that the development of a futures market would provide important opportunities for electricity buyers and sellers to manage their risks.

The first North American futures market for electricity was established by the New York Mercantile Exchange (NYMEX) in March 1996. Based on its experience with natural gas contract trading, the NYMEX expects electricity contract trading to build volume quickly, and develop into one of the most active commodities offered on that exchange.

The rate of growth of an Ontario-based futures market will depend in part on the perceived advantages to buyers and sellers of electricity from participating in such a market.

Interest and participation in an Ontario-based futures market also will be affected by the extent to which the matching of offers and bids through the Electricity Exchange is seen to result in a fair and accurate spot market for electricity, since the spot market price will be a crucial determinant of the commodity's value.

A

ACCESS TO THE TRANSMISSION SYSTEM

As the owner and operator of the transmission grid and most of the electricity generation in the province, Ontario Hydro was able to develop and operate a transmission system that was uniquely matched to its needs. However, introducing wholesale competition to the electricity system requires many buyers and sellers in the marketplace, and will impose new demands on the transmission system.

For this reason, the first step in restructuring Ontario Hydro and its monopoly is to introduce changes to the structure of the provincial transmission grid.

The Advisory Committee recommends open, non-discriminatory access to Ontario's electricity transmission system.

In the future, Ontario's transmission system will have to support the movement of electricity from a large number of competing generators located both within and outside the province. Open, non-discriminatory access for all generation companies that wish to supply Ontario's electricity market is a prerequisite for competition. In a competitive market, generators compete to sell electricity on the basis of the lowest price. Those suppliers from which

offers are accepted will need access to the transmission system to deliver the power that they have committed to produce.

The Ontario electricity grid is connected with electric utilities in Manitoba, Michigan, Minnesota and New York, and has the potential to be similarly connected to Quebec if additional investment is undertaken. These interconnections will play an important role in the development of a competitive market, particularly in the early years, when there will be considerable excess capacity on both sides of the border.

Ontario's transmission system will become a common carrier for all electricity accepted by the System Operator, regardless of its origin. Open access would extend to both suppliers and potential customers outside Ontario. In the previous chapter, we recommended that out-of-province buyers and sellers be represented by agents, brokers, and marketers (ABMs), who are registered with the provincial Electricity Exchange.

If an out-of-province supplier wishes to sell power in Ontario, it will first have to go through the system operator in its own jurisdiction, so that its electricity can be dispatched to the border. The supplier's ABM, that will be registered with the

Ontario Electricity Exchange, will offer power to the Ontario System Operator at the border inter-connection in the same way as an Ontario-based generator. Ontario-based generators that wish to export power would similarly present themselves — both to the Ontario System Operator and to the system operator in the customer's territory. Regardless of whether the generator and customer have signed a bilateral financial contract, both the offer and the bid will be dealt with on terms equal to those offered to in-province suppliers and purchasers.

“Wheeling” — the transmission of power from one jurisdiction to another through Ontario — could only take place if both the generators and the customers meet the conditions for dispatch in the Ontario merit order. Such transactions would therefore have to comply with the same requirements as transactions involving in-province generators and customers.

Ontario's System Operator will be responsible for applying the rules relating to access impartially. Although the System Operator will not own any part of the transmission system, the agency will be solely responsible for operating the total system.

B

STRUCTURE

The Advisory Committee recommends that the current transmission assets of Ontario Hydro be set up as a Transmission Grid Company under the Ontario Business Corporations Act.

Transmission systems are generally perceived to be natural monopolies. Unlike generation, the transmission of electricity is not conducive to competition.

The natural monopoly represented by the transmission lines does not have to be owned by a single entity. It is feasible to have multiple owners of the transmission system, since the overall management of the system will be in the hands of the System Operator, and this body will be independent from any owners of transmission facilities.

The provincial transmission system is owned almost entirely by Ontario Hydro. Transmission assets that form the grid include the infrastructure required to carry high-voltage electricity, 115 kV and higher — the lines, transformer stations, land and rights-of-way. There appear to be three types of transmission facilities — those associated with specific generation plants, those that supply local loads and distribution systems, and the balance of the facilities. The proper placement of these assets will require further refinement in the restructuring.

The costly technical infrastructure of the existing Ontario Hydro transmission grid argues for keeping the current system as a single operation — despite the fact that there could be multiple owners of the transmission system in the future. In the Advisory Committee's view, maintaining a single set of transmission wires and supporting infrastructure, as in the current system, will better serve ratepayers.

To ensure the open and non-discriminatory character of the transmission system, the transmission system should be owned by corporate bodies that are separate from any of the generation companies and the distribution utilities.

Ontario Hydro's transmission grid could remain publicly-owned, separate from any other provincially-owned entities, or it could be operated under private ownership, as in a number of other jurisdictions — and in Canada, with the natural gas industry. Whether publicly- or privately-owned, the monopoly operations of transmission would have to be regulated, both as to tariffs and service quality, including rules for access.

The Advisory Committee recommends that the Transmission Grid Company be responsible for maintaining and managing Ontario Hydro's high-voltage transmission grid.

Upgrading, expanding and strengthening the transmission grid are important elements to ensure reliable delivery of electricity from generators to customers. Transmission constraints can impose substantial costs on the electricity system if they result in “locked-in power” (i.e., prevent a lower-cost bidder from delivering). A well-maintained and properly capitalized transmission system will ensure that Ontario benefits fully from all available supplies of electricity at the lowest cost. Pressures to expand the grid, or to expand interconnections with other jurisdictions, may increase in a competitive environment.



TARIFFS

The pricing of transmission is complicated. There are different pricing methods available, and the transmission pricing structure that is chosen is important. In addition to ensuring adequate revenues for the owners, transmission tariffs need to provide:

- incentives for the efficient use of the system;
- efficient locational signals to generators;
- incentives for capacity expansions, and contraction; and,
- incentives to operate at efficient cost levels.

The operation of a transmission system is also highly complex. The amount of power that can be accepted from a given generator depends on a number of factors: the relative locations of the generators on the system; location-specific demands for power; and special conditions such as storms and extreme heat. The System Operator will be responsible for determining which generators will run, and how to dispatch the power into the transmission system to meet the total demand.

The Advisory Committee supports a constraint-related charge being levied on generators to reflect the costs of transmitting electricity from a specific generation location to demand locations.

A transmission constraint charge will be calculated for each location, and will be added to, or subtracted from, the price offered by the generator at that location. The combined price and constraint charge will constitute the generator's offer for the purpose of setting the merit order. In this way, each generator will be ranked to reflect costs of transmission constraints related to bringing its power into the market.

Constraint charges would act as locational signals to generators. They would be set at relatively high levels in areas of the province with surplus generation capacity relative to load. Conversely, low charges (or payments) would provide an incentive for generators to invest in

new facilities that are close to load centres, helping to minimize line losses and congestion, and reducing the need for capital investment in new transmission facilities.

The Advisory Committee recommends that consumers continue to see "postage-stamp" rates for transmission across the province.

Constraint-related charges, while providing locational incentives for generators, need not penalize consumers in respect of their own locations. The locational signals should affect generators, not consumers.

The Advisory Committee supports the use of a constraint-related charge to reflect congestion in the transmission system, to facilitate the planning of new transmission facilities.

Decisions on future investment in the transmission system are also important. It is critical that transmission owners, like the owners of generating plants, receive the appropriate investment signals. We have recommended locational differences in the constraint-related charge to influence decisions on future investment in generation. Similarly, the transmission tariff should provide an appropriate incentive to ensure that new transmission facilities are built.

The Advisory Committee recognizes the need for a central planner for the provincial transmission system. The System Operator, as both the receiver of all offers and bids and the dispatcher, is in the best position to identify physical constraints in the system. In the Advisory Committee's view, the System Operator should have a central role in planning appropriate transmission facilities, to ensure that adequate capacity is available to serve the needs of Ontario customers.

The Advisory Committee supports using the transmission system as a convenient point for collecting levies that support important public policy objectives.

We recommend in Chapter 14 — Financial and Electricity Rate Impacts — for example, that a stranded asset charge be levied upon all users of the transmission system until the overhanging Ontario Hydro debt has been defeased. Subsidies to low-density or remote areas of the province could also be funded from a unit charge on transmission. Environment-related levies could be imposed here as well.

In this chapter, the Advisory Committee presents its recommendations for introducing competition in Ontario's electricity generation sector. We begin by discussing approaches to restructuring Ontario Hydro's generation assets, considering operating efficiencies and examining issues related to competition and market power. This is followed by our recommendation for the creation of a level playing field for the electricity generation industry. Finally, we discuss private ownership as a means of enhancing competition in the generation sector.

A

RESTRUCTURING ELECTRICITY GENERATION

The Advisory Committee recommends that Ontario Hydro's current monopoly in electricity generation be eliminated.

The Advisory Committee recommends that Ontario adopt an open and competitive market for electricity generation. Competition will promote the efficient supply of electricity services to meet the demands of Ontario's electricity consumers at the least cost to the economy. Competition also will ensure that future capital spending on generation is based on market forces, rather than central planning, political intervention or other considerations.

As outlined in Chapter 3 — Pressures for Change — there are a number of existing pressures to change Ontario's electricity system. In particular, these pressures raise questions about the structure of electricity generation, which accounts for 70 per cent of the delivered cost of electricity in Ontario. The current structure of the electricity supply industry, in which Ontario Hydro controls the transmission system and some 90 per cent of all generation capacity, precludes the development of competitive forces.

As requested in the Terms of Reference, we have considered possible structural and regulatory reforms, and potential ownership changes, that may assist in phasing in competition in generation.

The Advisory Committee recommends that Ontario Hydro's generation assets be separated and established as distinct, competing operating entities.

Separating Ontario Hydro's generation assets to create distinct competing entities is an essential step in opening up the electricity supply market. Indeed, without taking this step, the full benefits of competition will not be realized.

In assessing the options for creating a competitive market in generation, we have sought changes that would support the following objectives:

- ensuring that Ontario's electricity consumers benefit from greater choice and efficiencies in electricity supply, and from competitive prices, as generators compete to supply power to the market;
- ensuring that reliability and safety in electricity supply are not compromised by any structural change to the generation sector;
- retaining operating efficiencies in electricity generation, and recognizing physical characteristics and limitations associated with the composition of the province's generation mix, and the physical structure of the transmission system;
- developing both immediate and sustained competition in electricity generation;
- fostering a level playing field for electricity generators;
- creating a contestable market by minimizing barriers to entry of new electricity generators, including suppliers of environmentally-sustainable energy; and,
- limiting the risk of market power being abused by any one generator through anti-competitive pricing or market conduct.

We do not believe that the choice before the Government is to decide between restructuring for efficiencies to compete with utilities in the broader North American market, or pursuing competition within the

province. Rather, we believe that shifting away from Ontario's current monopoly structure will achieve both.

The number of generators competing for business in the province can be increased, while retaining sufficiently-sized, efficient domestic producers to ensure that Ontario remains a significant presence and an important player in the North American electricity market. The separation of Ontario Hydro's generation assets into a number of distinct, competing generating entities is necessary, both to give customers choice among suppliers and to promote competition in electricity supply.

On this issue, the Director of Investigation and Research of the federal Bureau of Competition Policy reported to us that the Bureau's experience suggests that limiting competition unnecessarily in domestic markets is unlikely to be an effective strategy for achieving success in other markets. On the contrary, the Director suggests that competitive success in external markets is more likely to be advanced by promoting vigorous competition in domestic markets.

In developing our recommendations we have sought configurations for Ontario Hydro's generation assets that will both retain operating efficiencies and avoid anti-competitive market behaviour by electricity suppliers.

1) EFFICIENCIES IN OPERATIONS

Decisions concerning the separation of Ontario Hydro's generation assets must take into account the characteristics of different production technologies, to determine whether there may be groupings of generating units that would enable economic efficiencies to be realized in operations.

Some level of aggregation can help minimize costs associated with financing, operations, fuel acquisition, reserves, regulation and reliability requirements. The extent to which efficiencies are made possible by the size or scope of a company's operations is determined by the production technology in place.

The establishment of multiple generation entities, as we recommend in this chapter, will enhance the potential for competition and promote efficiencies. Market forces will remove incentives to close plants prematurely or stimulate overbuilding, which are potential risks under central planning.

As Ontario's existing generating facilities are retired, the competitive sector can grow as needed by introducing new capacity with more economic technologies. The market, rather than centralized decision-making, should determine whether or not it is economical to keep plants running, convert or introduce new sources of electricity from untapped

hydroelectric (i.e., Adam Beck 3) or new gas-fired facilities. Market forces will dictate the most economic choices in electricity generation, and also facilitate the introduction of new generating technologies.

In the sections that follow, we discuss guidelines for separating Ontario Hydro's generation to ensure operational efficiencies. We discuss the utility's nuclear, hydroelectric and fossil fuel generation assets.

a) Nuclear Generation

The Advisory Committee recommends that Ontario Hydro's nuclear generation stations have a single owner, and that they operate as four distinct, competing entities.

We recommend treating nuclear generation separately from other types of generation in the restructuring process, in part because the operating characteristics of nuclear generation are vastly different from hydroelectric and fossil fuel generation.

The Advisory Committee believes that separating Ontario Hydro's nuclear generation is essential to ensure maximum output and competitive market prices for the supplies generated. With nuclear generation accounting for some 60 per cent of Ontario Hydro's electricity supply, dividing nuclear generation, to the extent possible, is important to promote competition in generation.

Ontario Hydro's nuclear generation assets could be divided into three entities by site (Pickering, Bruce and Darlington); or be divided by station (Pickering A and B, Bruce A and B, and Darlington) to form five entities. We were told that the nuclear technology at Pickering A and B is similar and that there is symmetry in joint operations between these two stations. Therefore, we recommend that four competing operations for nuclear generation be set up, one at each nuclear station located at the Bruce and Darlington sites, and one at the Pickering site.

Separating nuclear operations into four would enable competition to come to bear on this important segment of Ontario's electricity production sector. Disaggregation into distinct operating entities would advance the competitive spirit as each operation seeks to maximize its efficiency. This would alleviate concerns over market power in nuclear generation, as competing operations would not be in a position to adversely affect market prices.

While the Advisory Committee supports some separation of nuclear operations, we recognize that nuclear generation is distinct from other generating technologies because of its highly complex infrastructure and maintenance requirements. These characteristics favour some degree of joint planning and coordinated maintenance and operating support.

The Advisory Committee acknowledges the important operating synergies in nuclear generation and recommends a structure that enables continued coordination on important operational aspects. We therefore recommend that Ontario's existing nuclear generation, while operating as distinct entities, be retained under a single owner.

Common ownership of nuclear generation facilities would enable coordination of important strategic and financial planning, and make it easier to coordinate operational and maintenance resources as required. Maintaining operational liaison would allow for focused support from both human resources and physical assets, thereby avoiding costly duplication. Administrative and technical efficiencies can be maximized by coordinating planning and the management of used nuclear fuel. Costs can be contained as stations take full advantage of shared resources and expertise.

b) Hydroelectric Generation

The Advisory Committee finds that Ontario Hydro's hydroelectric facilities should be grouped by river system.

Maintaining a single operator for hydroelectric facilities on individual river systems will provide better coordination of water flows and output than would be possible if there were multiple operators on a river. Operations of one hydroelectric

resource on a river can affect the water flows and the operations of other hydroelectric stations downstream. A single operator for all hydroelectric installations on a river would also preclude a situation in which one operator might disadvantage another by changing flow rates or diverting water.

In addition to benefitting from natural synergies in terms of water flows, grouping by river system has economic benefits. Some of the smaller hydroelectric facilities might be more efficiently operated by a grouping of small stations on a river under the control of a common operator. Coordinated regulation and management through a common operator for all stations on a river would also benefit the general community, which looks to Ontario's river systems to support other activities such as agriculture, fishing and tourism, and a range of recreational activities.

Ontario Hydro currently operates 69 hydroelectric stations. The hydroelectric stations on the Niagara and St. Lawrence Rivers are the largest installations, with a combined capacity of 2,600 MW. Major facilities with a capacity of more than 400 MW are located on the Ottawa, Madawaska, Mississagi, Abitibi and Mattagami Rivers. Intermediate-sized facilities of 200 MW or more are located on the Nipigon and Montreal Rivers and in the Kenora district.

Grouping stations by river system would make it possible to create a number of distinct operating entities that could either be run independently or as part of a larger operation with other hydroelectric and/or fossil fuel facilities.

c) Fossil Fuel Generation

The Advisory Committee finds that Ontario Hydro's fossil fuel generation assets could be operated as distinct entities.

Fossil fuel generation assets can largely be separated without fragmenting the facilities or risking the loss of operational efficiencies. Fossil fuel plants are well suited to be operated as individual entities.

Ontario Hydro has eight fossil fuel plants. The three major plants are Lambton, Lakeview and Nanticoke, located in southern Ontario, close to load centres and the U.S. market. Two smaller units, Thunder Bay and Atikokan, also produce significant amounts of power for the northwestern part of the province. The Lennox generating station operates at very low capacity factors as a supplier at extreme peak periods. The R.L. Hearn and J.C. Keith plants are not currently in use, but could be put back into service. (We understand, however, that there is an Ontario Hydro proposal to demolish the J.C. Keith facility.)

The potential exists to create up to eight distinct fossil fuel entities in the province that could be operated on their own, or grouped to operate as part of a larger operation with other fossil fuel and/or hydroelectric facilities.

11) COMPETITION AND MARKET POWER

The Advisory Committee recommends that Ontario's electricity generation facilities be sufficiently separated to prevent any one company, or any group of companies acting together, from being able to exercise undue market power.

Separating Ontario Hydro's electricity generation facilities into individual units or groups of units is a necessary, but not in itself sufficient, condition for establishing a competitive marketplace. The number and sizes of suppliers in the market will be important to enable competitive forces to take hold, and to avoid excessive market power from being exercised by any one company, or any group of suppliers acting together.

It is important that electricity suppliers not be able to engage in anti-competitive behaviour that enables them to profit by maintaining prices above competitive levels for a significant period of time. This use of market power creates inefficiencies by reducing pressures for suppliers to keep production costs down. It also creates less incentive for generators to compete for customers through product innovation or enhanced customer service. A firm's

ability to exercise market power is determined by the number of competitors in the market and the portion of the market that it serves.

When assessing whether a market is concentrated, and whether a company is likely to have market power, regulatory agencies use a variety of broad indicators. The "Merger Enforcement Guidelines" established by Canada's federal Director of Investigation and Research, operating under the *Competition Act*, suggest, for example, that the Director will not challenge a merger where the post-merger market share of the merged entity would be less than 35 per cent, or where the post-merger share of the market accounted for by the four largest firms in the market would be less than 65 per cent. There is literature suggesting that five or six relatively equal-sized firms would be sufficient to support price competition.

These indicators are not conclusive, since a number of factors will ultimately determine whether a company has the potential to exercise market power in that particular industry. But general indicators are helpful in providing notional guidelines for how companies will behave in a market.

Beyond these general indicators, the unique characteristics of Ontario's generation mix must be taken into account, most notably, the large contribution presently made by nuclear generation.

We believe that our recommendations for dividing up nuclear operations and for separating Ontario Hydro's other generation assets to create a number of competing operations, together with open entry to the market and diverse ownership structures, as discussed below, will foster healthy competition in electricity generation. Further, our recommendations in other sections of our report concerning the structure of the marketplace and the regulatory monitoring of generators' offers to supply the system will also reduce the potential for abuse of market positions.

III) OTHER SOURCES OF COMPETITION

The Advisory Committee recommends that all electricity generators, including out-of-province suppliers, be able to compete on equal terms to supply electricity to the Ontario market.

Electricity that is supplied by generators other than Ontario Hydro generation will provide important additional competition in supplying electricity to the Ontario market.

Privately-owned utilities produce electricity from sources such as hydroelectric, steam, natural gas and combustion turbine facilities, as do a number of Ontario's industrial electricity users. Together these sources represent 4.5 per cent of Ontario's generating capacity.

Non-utility generators, or independent power producers, currently represent 2.7 per cent of Ontario's generating capacity. Non-utility generation comprises a range of sources, such as hydroelectric, natural gas, wood waste and landfill gas. Renewable energy sources and high efficiency natural gas technologies offer energy options that have environmental advantages, and many of these projects can be designed and built within short periods of time. We expect that independent power generation and cogeneration projects will grow in a competitive market.

Generators outside of Ontario also will provide a source of competition for Ontario's electricity market.

Ontario currently has access to supplies from Manitoba, Quebec, Michigan, Minnesota and New York.

We believe that the other recommendations outlined in later sections of this chapter for levelling the playing field for generators and diversifying ownership structures will be integral in building upon our recommendations for generation restructuring.



LEVELLING THE PLAYING FIELD

The Advisory Committee recommends that the necessary reforms be undertaken to create a level playing field for electricity generators in Ontario.

The Advisory Committee believes that to lay the foundation for competition, restructuring generation into a number of competing entities must be complemented by creating a level playing field for all suppliers.

A number of factors will influence both the degree to which competition takes place among existing generators, and the ability of new generators to enter the market to compete in supplying electricity. Firms must be able to compete equitably for business according to a consistent set of rules. Equal treatment of all participants provides the best assurance for achieving competition among companies which continue to hold considerable influence in the market.

The threat of market entry by potential new companies can be an effective deterrent to the exercise of undue market power by existing generators, inducing market participants to price their services competitively and promoting innovation. The development of a contestable market depends partly on the ease with which new companies can choose to enter the market. Barriers to entry must be kept to a minimum. The promotion of competition “at the margin” is a critical element in moving toward a competitive market.

Providing fair and equal terms for competitors is particularly important in a market where both publicly-owned and privately-owned

generators are competing for customers. We envisage Ontario continuing to have a generation system based on a mix of ownership structures. Structural impediments to competition, such as the special status of publicly-owned assets that confer cost advantages on the basis of ownership, must be eliminated.

We have identified a series of possible initiatives, outlined below, that we believe would help achieve a more equitable and contestable market in generation. Some of these directions are discussed in detail in other chapters of our report.

- The transmission grid should be operated as an independent company. The independence of the transmission system is essential in a competitive market to preclude self-dealing and preferential access to affiliated generators.
- An independent System Operator should be established to coordinate the dispatch and delivery of electricity across the transmission system.
- Generators must offer all the power that they wish to sell through the transmission system to the System Operator, through a process that will determine a market-clearing price for different periods of the day. This spot market must be open to all technically-qualified generators on known and equal terms.

- The monitoring of market activities is essential to the cultivation of a competitive electricity generation market. An appropriate regulatory structure must be provided to ensure that anti-competitive behaviour does not impede the transition to competition.
- Publicly-owned generating entities should operate in a commercial manner. Where feasible, they could be set up as corporate bodies under the Ontario *Business Corporations Act*. Management must have tangible incentives to perform to commercial standards, and should be required to use commercial criteria in operations and when making decisions on capital investment. Remuneration for employees should be based on known performance indicators.
- To ensure that all electricity suppliers compete on an equal basis, publicly-owned operations participating in the market should be required to make payments that reflect the same fiscal conditions under which private companies are obliged to operate. For example:
 - grants equivalent to provincial and federal income taxes, payable to the Government of Ontario, to mirror the provincial and federal income tax obligations faced by privately-owned companies;
 - capital and large corporation taxes, payable to the Province;
 - grants equivalent to property taxes, based on the same assessment criteria as privately-owned facilities;
 - grants in lieu of dividends, payable to the shareholder, the Government of Ontario;
 - if borrowing from the Province is permitted, publicly-owned companies should be required to borrow at commercial rates, with interest paid as though they were private companies; and,
 - revaluation and financial restructuring of the publicly-owned entities should reflect a commercial market orientation.

By reducing barriers to entry and introducing a more equitable market environment, Ontario can move to establish a market for electricity generation that is open to new electricity suppliers. By making it easier for new companies to enter, even large generators will have an incentive to innovate and behave competitively to protect their bottom line. They will have incentives to meet customer demand efficiently, or risk losing business to potential new companies entering the market.



OWNERSHIP

A move away from a monopoly supplier of electricity to a new structure in which Ontario Hydro's generation and transmission activities are separated, generation assets are divided up, and the playing field is levelled for all generators, are important pillars of our recommendations for the generation sector. An additional pillar involves enhancing competition by introducing diverse ownership structures in generation.

The Advisory Committee believes that the introduction of private equity into the ownership of Ontario Hydro's generation assets should be undertaken to enhance the introduction of competitive forces in Ontario's electricity system.

We believe that ownership changes can complement structural initiatives and serve to hasten the development of a competitive electricity market. Separating Ontario Hydro's generation into a number of individual, competing entities is an integral first step toward competition.

Publicly-owned entities, however, are by nature unlikely to provide the full benefits that competition can bring. Under public ownership there remains a risk that political, rather than commercial factors, will determine pricing and investment decisions. There is an even greater risk that managers, despite being

directed to behave competitively, will approach decisions quite differently than if they were answerable to private shareholders. It is difficult for example, to eradicate the belief that the government will always provide a financial safety net. In the marketplace, risk accompanies the chance of reward, and this risk/reward paradigm fosters the innovative behaviour that ultimately serves consumers well.

We emphasize that the introduction of private ownership is not a replacement for restructuring generation. Private ownership alone will not bring about competition in the electricity marketplace. The Advisory Committee does not, therefore, support the creation of a privately-owned generation monopoly.

We believe, however, that private equity, introduced into a restructured market in which both publicly-owned and privately-owned companies have equitable access to the market and participate under the same rules, can strengthen incentives for efficiency and the successful adaption to change in the system.

1) FOSSIL FUEL AND HYDROELECTRIC GENERATION

The Advisory Committee recommends that private equity be introduced into the fossil fuel and hydroelectric generation assets that are currently held by Ontario Hydro.

We believe that competition would be enhanced by the introduction of private equity into the hydroelectric and fossil fuel-based generation facilities currently operated by Ontario Hydro.

The Advisory Committee believes that options should be explored for introducing different ownership structures into the operations of these generating facilities. Private equity could be phased in to create public/private partnerships. Operations could also be offered in their entirety for sale to private investors.



Niagara Falls

Photo courtesy Gail Benson

II) NIAGARA RIVER HYDROELECTRIC GENERATION

The Advisory Committee recommends maintaining under public ownership the hydroelectric generation assets on the Niagara River that are currently held by Ontario Hydro. These assets should be set up as a corporate body under the Ontario Business Corporations Act.

The Advisory Committee believes that there are strong economic arguments that support the enhancement of competition in generation through new ownership structures wherever possible. At the same time, we recognize the importance of structuring a system that is responsive to the unique characteristics of Ontario.

One predominant characteristic of the Ontario system is the strong public sentiment that has been expressed about Niagara Falls. Niagara Falls represents a resource that is viewed by many as having a special heritage significance. We anticipate that there may be considerable public opposition to transferring to private ownership the generating facilities connected to this natural resource, which Ontario Hydro has traditionally managed on behalf of the Province.

III) NUCLEAR GENERATION

The Advisory Committee recommends maintaining under public ownership the nuclear generation assets that are currently held by Ontario Hydro. These assets should be set up as a corporate body under the Ontario Business Corporations Act.

We are not recommending that Ontario's nuclear generation assets be offered for sale at this time. There are a number of important factors that we feel make a strong case for retaining public ownership of nuclear assets.

There are commercial concerns surrounding the sale of nuclear assets. The privatization process for nuclear generation would not be as straightforward as the process involved in divesting hydroelectric or fossil fuel plants, because of the special commercial risks associated with owning nuclear facilities.

The appropriate arrangements for decommissioning of nuclear plants and the disposal of radioactive waste that has accumulated over the years are issues that would need to be resolved before offering nuclear plants for sale. As well, the lifespan of nuclear stations and the timing of their costly maintenance requirements are less predictable for potential investors than more conventional technologies, such as fossil fuel and hydroelectric generation systems.

Apart from these commercial concerns, the Advisory Committee anticipates that there would be a high degree of public concern over moving nuclear power out of Government control into private hands. Nuclear technology is viewed as more complex than hydroelectric or fossil fuel plants. There is a strong public perception that, because of safety concerns, it would be preferable to leave the nuclear system in the hands of a public corporation as a responsibility of the Government, rather than the private sector. The Advisory Committee recognizes that these are important issues to some Ontario residents.

We have recommended that there be four nuclear entities operating under single ownership. Separating nuclear operations may assist in positioning the stations for eventual private ownership, as may be permitted by suitable regulatory and safety arrangements, and in accordance with public opinion.

We acknowledge that there may be other options entailing different operating or ownership arrangements for Ontario's nuclear generation sector. Our recommendation does not preclude such directions in the future. One proposal that came to our attention suggested a merger of Ontario Hydro's nuclear activities with those of Atomic Energy of Canada Limited. Such a proposal would need to be the subject of further discussion between the federal

and provincial governments. We are confident that the Government would keep the needs of Ontario's nuclear industry under consideration in such discussions.

IV) A GRADUAL PROCESS OF OWNERSHIP REFORM

As a first step to the restructuring process, we believe that Ontario Hydro's generation assets should be separated and set up as competing operating entities, as recommended in this chapter. The establishment of multiple, publicly-owned generating entities, together with the initiatives we recommend to level the playing field for all generators, should effectively initiate competition.

There are other jurisdictions, such as Sweden, where a publicly-owned generation company operates independently as a competing entity. We believe that public ownership of some generation will not preclude the development of competitive market forces. Competition from new players, and the prospect of new suppliers entering the market, will play important roles in fostering a competitive electricity system over time.

Preparing the generation assets for new ownership structures will take time. The competitive structure within which the generators would be expected to operate should be well established before initiating privatization, to ensure that the value of individual operating units is fully

recognized in the market valuation process. We believe, however, that Ontario's electricity system may benefit from an early introduction of private equity into the generation sector.

We note further that the directions proposed in the report represent our recommendations for configuring Ontario's existing generation assets to begin the restructuring process. It must be emphasized, however, that market signals will point to the most efficient and effective mix of generating operations in Ontario. The composition of the generation sector will evolve partly in response to technical advances, and by the changing face of competition in Ontario and in the North American electricity market.

While we have recommended separating Ontario Hydro's generation assets into a number of competing entities, the ultimate configuration of the assets will emerge. As the process of offering generating assets for sale evolves, the market valuation placed on different assets may well result in alternative groupings. For example, while assets may be offered for sale by river system or fossil plant, potential investors will decide which groupings of assets are most appropriate for their business interests. The ultimate configuration should not be prescribed, but rather should be allowed to evolve through the market valuation process as generating assets are offered for sale.

The restructuring of a mature electricity system is a challenging exercise. In the case of Ontario's electricity system, the task is particularly difficult, owing to some important characteristics of our system, such as the high proportion of Ontario's electricity generated by nuclear power.

The Advisory Committee believes that our recommendations for generation will provide the basis of an evolution for competitive forces in Ontario's electricity generation sector, while respecting the unique features of the province's system.

A

ASSETS OF THE CURRENT
DISTRIBUTION SYSTEM

Electricity is delivered in Ontario through a distribution network that consists of local distribution entities and Ontario Hydro Retail. The local distributors and Ontario Hydro Retail differ in customer density, size of customer base, geographical spread, and financial base. Electricity distribution involves two distinct businesses: the physical wires and related infrastructure, and the electricity sales and energy services businesses.

Ontario's municipal electric utilities (MEUs) have combined assets of about \$5-billion, little debt and a relatively large net income. Ontario Hydro Retail, while it has assets of \$2.8-billion, also shares a portion of the debt load of Ontario Hydro, which is approximately \$33-billion.

Two ownership questions arose throughout the Advisory Committee's discussion with participants in this review:

- Who owns the distribution assets of the municipal utility?
- Who owns Ontario Hydro?

1) WHO OWNS THE
DISTRIBUTION ASSETS OF THE
MUNICIPAL UTILITY?

Municipal corporations are creatures of provincial legislation. A utility commission is an agent of the municipality, and is owned by, and answerable to, the municipal council. Although a MEU manages and controls municipal property, the municipality owns the assets of the utility commission. A utility commission uses its revenues to retire debt. Any profit will go to the municipality, unless Ontario Hydro supplies power, in which case the profit stays with the utility commission.

The Municipal Electric Association (MEA) is of the opinion that Ontario Hydro does not have any ownership claims to the distribution assets of the local utilities. The connection between Ontario Hydro and the distributing utilities consists of a contractual supply relationship and a regulatory role played by Ontario Hydro over the MEUs.

The Advisory Committee did not hear any express contrary view regarding the ownership of municipal assets. There was no suggestion under any proposed restructuring that the assets of the MEUs would be seized without compensation. The real issue

underlying this question seems to be whether the restitution would provide sufficient compensation for the municipality.

11) WHO OWNS ONTARIO HYDRO?

The Advisory Committee recommends that the Government of Ontario affirm its ownership of Ontario Hydro at the outset of the restructuring process to conclude debate on this issue.

Ontario Hydro is a body corporate, created by provincial statute. It has no share capital. It is composed of the persons appointed to its board of directors, who are appointed by the Lieutenant Governor in Council. The board is governed by the legislative framework that establishes Ontario Hydro, which includes provisions for a memorandum of understanding between the Minister of Environment and Energy and Ontario Hydro, and for issuing Minister's policy directives. The *Power Corporation Act (PCA)* establishes the operational mandate of Ontario Hydro and sets limitations on its activities.

Despite the structure of the legislation and the fact that many of its activities require an order in council, the Advisory Committee considers Ontario Hydro, for the most part, to be an unregulated monopoly. Ontario Hydro also has broad supervisory and regulatory powers over matters relating to the provision of electrical power in the province that affect its competitors.

We acknowledge, however, that despite its unregulated nature, the Government is answerable for Ontario Hydro.

The price payable for power, set out in Section 92 of the *PCA*, includes an amount sufficient to repay all outstanding debt or other funds required to finance Ontario Hydro's capital works over a 40-year period. MEUs pay a portion of this debt retirement in the cost of power that they purchase. MEUs display this amount as an asset with an offsetting amount, "equity in Ontario Hydro", on their financial statements. This reserve for equity is part of the basis of claims made by some that municipalities (through their utility commissions) own Ontario Hydro.

Mr. Justice Craig, in *Hydro Electric Commission of the Township of Nepean v. Ontario Hydro* (1979) 92 D.L.R. (3d) 481,491, stated: "In my opinion the debt retirement contributions themselves made by these municipalities over the years (being the amount of the alleged equity) can never be recovered." This matter went to the Supreme Court of Canada (1981 1 S.C.R. 347); Mr. Justice Dickson stated: "The whole concept of certain utilities building up 'equity' in the assets of Ontario Hydro is a concept created by Ontario Hydro in its attempt to be 'fair' to certain users."

The MEA is of the opinion that the municipal utilities are the beneficial owners of Ontario Hydro assets and equity. Some MEA members are of the opinion that the consent of the MEUs is required if Ontario Hydro wishes to dispose of its assets and deal with its equity. It was also suggested that if Ontario Hydro was totally dissolved, the MEUs would make a claim that they should be entitled to the proceeds or the value of the assets.

The Advisory Committee does not agree with the MEA view. We believe that Ontario Hydro manages its assets in trust, not for the MEUs or the municipalities, but for the Province. Among the powers given to Ontario Hydro by the Province was the ability to create debt, and that debt is guaranteed by the Province. It is our opinion that the debt was created on behalf of all customers — all users of Ontario Hydro's electricity system — to purchase assets for these same customers. The customers served by both the MEUs and Ontario Hydro Retail are all beneficiaries of the Ontario Hydro electricity system. We believe that all share in the assets and liabilities through the Government of Ontario.

Although this debate on ownership did not deter us in our deliberations, the question surfaces repeatedly in any discussion of Ontario Hydro.

The Government had an opportunity in 1973 with the passing of the *Power Corporation Act* to resolve the

issue; it did not. This omission could be interpreted as a decision not to incorporate the concept of ownership argued for by the MEUs at that time, and not as an acknowledgement of the claim of municipal ownership based on historical interpretation as the MEA contends. It seems appropriate that the Government should settle this issue once and for all, and not let this state of uncertainty continue.



RESTRUCTURING THE DISTRIBUTION SYSTEM

The Terms of Reference for the work of the Advisory Committee request that we investigate and assess structural change options for phasing in competition in the distribution system. Specifically, the Advisory Committee was to look at options that would enhance the efficiency of the distribution sector.

Distribution costs represent approximately 15 per cent of the price of electricity in the municipal bill, 32 per cent of the Ontario Hydro Retail bill before rural rate assistance, and 24 per cent after rural rate assistance. This represents more than one billion dollars a year that is available for efficiency improvements. While the amount of annual savings in percentage terms on this amount may seem nominal, the cumulative effect cannot be ignored.

We heard a general consensus that there are too many organizations charged with the task of delivering

power, even though the basis of that consensus is not well-defined.

Retaining an electricity delivery model that supports more than 300 structures, however, cannot be a prudent organizational scheme.

We believe the consolidation of MEUs offers the potential for economies of scale and of scope, as well as related operational efficiencies and cost savings. The most obvious efficiency gains are in billing, collection and administration.

The Advisory Committee acknowledges that delivering electricity through a municipal utility commission structure may have been the best approach when the objective was provincial electrification. We believe, however, that the current local utility commission structure may no longer be appropriate, once the vertically integrated monopoly of Ontario Hydro disappears, electricity is sold through an Electricity Exchange, and retail access is a reality.

The Advisory Committee is convinced that changes in the other sectors of the electricity system will lead to a restructuring in distribution. The vertical separation of Ontario Hydro and the creation of a competitive market in generation will result in a new role for distributors. This new role will mean undertaking new responsibilities and will demand new skills — for example, forecasting, sophisticated purchasing and contract negotiating, dealing with the spot market and futures

market, delivering energy services and products which respond to new needs, innovation and developments in technology. We believe that these new responsibilities, risks and challenges will provide the ultimate incentive to MEUs to restructure. It is important that, as restructuring occurs in the broader electricity system, all parts of the system keep in step with the reforms taking place elsewhere.

The move toward retail competition will also prompt changes in the distribution business. Retail access will result in a fundamental shift in the way a distribution utility does business. No longer can it be assured of its customer base for supplying electricity. There are no captive customers, and individual end-users will be able to shop around for their own electricity supply. The distribution utility will be forced to compete for customers and larger distributors should be able to obtain better supply arrangements for their customers.

We see an electrical utility as a business. Commercial acumen will be a necessary element in dealing with competitive generation companies, searching out new customers, and investigating new services and technologies. The distribution utility will be responsible for determining its own needs and negotiating to ensure that they are met. No longer will the MEU be able to look comfortably to “Mother Hydro” for

supply. In the end, we believe that market forces will propel consolidation in the distribution business.

Bill 185, an amendment to the *PCA*, permits MEUs to expand to their municipal boundaries and, as they expand, to take over Ontario Hydro Retail's business. The scheme deals with the transfer of the assets and liabilities of Ontario Hydro Retail to the MEU, the calculation of the payment owing to Ontario Hydro, employee transfers and their pensions, and certain financial arrangements, using rural rate assistance phased out over five years. The Advisory Committee found Bill 185 instructive for a number of reasons — not the least of which was the length of time it took for the affected parties to negotiate the terms to apply to expansions. A government working group was established in 1988; a report to government was made in 1990; draft legislation was prepared in 1992; consultation followed; Royal Assent was received on December 9, 1994.

The Advisory Committee considers that the benefits of a restructured distribution system include:

- facilitating effective customer choice;
- eliminating the distinction between MEU and Ontario Hydro Retail customers, and ensuring that the same consideration is shown to each in designing service standards and rates;
- giving Ontario Hydro Retail customers the same right of access to their distributor as enjoyed by MEU customers;
- making the larger distributor more commercially attractive in the new electricity marketplace;
- adding operating synergies — no matter the type of rationalization, synergies would occur, only the level would differ;
- eliminating duplication and overlap of physical resources — vehicles, equipment, personnel — given that Ontario Hydro Retail is being absorbed;
- creating economies of scale in management, billing, collecting, purchasing, maintenance costs, building requirements, staffing, planning, engineering, information systems, etc.;
- reducing both operating costs and prices, both of which are necessary to enhance the competitive profile of the resulting entities;
- increasing the customer base, resulting in increased security, market share and market certainty;
- enhancing the ability to engage in long-term planning;
- increasing the resources available to invest in new technologies, products and specialty services;
- simplifying retail access, if fewer distribution systems are involved in transporting the electricity;

- establishing the basis for the separation of the wires business from the electricity sales and energy services businesses, to enhance competition in the latter; and,
- providing a driver for future innovation and flexibility to pursue opportunities to combine electrical energy services with other services such as telephones, cable, natural gas, etc.

We also acknowledge that there could be disadvantages to changing the system, including:

- a loss of responsiveness and accountability to the local community;
- a decline in customer influence if small utilities merge into larger entities;
- an increase in size without corresponding compensating benefits;
- the costs of implementation (such costs, however, should be balanced against the opportunity costs lost if there is no rationalization);
- the possible disruptiveness of change, and particularly if rationalization is voluntary and not prescribed, since the lack of a standardized approach could be more unsettling and cause greater disruption; and,
- possibly greater initial disruption for municipalities, where the current commission is a public utility commission, and the

integrated functions of the commission need to be separated.

The Advisory Committee is convinced that changes in the structure of the electricity system are inevitable. On balance, the benefits of restructuring the distribution system, in light of the larger changes occurring elsewhere in the system, outweigh any inconvenience that may result from reorganization. We believe that the restructuring of the distribution sector must be undertaken in tandem with the changes being made in the electricity system as a whole.

Currently, the MEUs are in a position to direct the restructuring and rationalization process as it relates to them. There is a possibility that if they do not actively support the rationalization of their system, they will end up as unwilling passengers who are along for the ride, but have no influence on the direction of the journey.



RECOMMENDATIONS FOR STRUCTURAL CHANGE

The Advisory Committee finds that the dismantling of Ontario Hydro will require a complementary restructuring of the distribution system to ensure the efficient distribution of electricity in Ontario.

The Advisory Committee's recommendations for Ontario's electricity system include competition among generators and open access to the transmission system. The evolution of a competitive wholesale market toward full retail access will necessitate purchasers of a size, number, and sophistication to manage a portfolio of electrical supply. Our recommendations for structural change are designed to ensure that reliability and quality of service remain intact, while positioning the distributors for direct retail access.

In our examination of the distribution system, we focused on ways to ensure distribution utilities are prepared to meet the challenges of the new electricity system — to manage a portfolio of supply contracts, and various financial mechanisms (futures, options and other market hedging tools). Distributors must have the ability to introduce and operate appropriate technologies for systems and load control, metering and billing, construction and operational practices.

The Advisory Committee recommends that the distribution sector be restructured based upon the following three principles:

- *that Ontario Hydro Retail be absorbed into the local distribution system;*
- *that there be fewer distribution utilities; and,*

- *that each distribution utility keep separate its monopolistic wires business from its competitive electricity sales and energy services activities.*

In 1994 an *ad hoc* task force of the MEA adopted the following as a principle to guide its review of the distribution system:

Local distribution utilities should be of sufficient size to own and competently manage and operate a distribution system in order to effectively satisfy the needs of its electricity customers, including assuming all costs and additional responsibilities flowing from the restructuring of the electricity system.

The issue that remains unanswered is what is the optimum size for a distribution utility?

The Advisory Committee was made aware, through both written submissions and oral presentations, particularly in Sudbury and Thunder Bay, of the difference between northern and southern Ontario, in terms of distance and the impact of remoteness.

In light of the diverse nature of the electricity delivery system in Ontario and of the communities that are served, we are of the view that **there is no one size that fits all reform recommendations that is appropriate for each community**. It is obvious from the submissions we heard and read that the imposition of a specific model would not find favour with either the municipalities or the

municipal utilities and their ratepayers.

The MEUs support local control over restructuring, and generally prefer a rationalization along local municipal boundaries — the shoulder-to-shoulder concept — and the ability to form co-operatives. The Advisory Committee agrees that local participation would probably result in greater acceptance of the outcome.

The Advisory Committee recommends the shoulder-to-shoulder structure, following county/regional lines and not just local municipal boundaries. The overriding principle in any restructuring of boundaries should be that no serviced area will be left without service.

We support the move to a shoulder-to-shoulder structure, wherever it works, and believe it should follow for the most part county/regional lines, rather than municipal boundaries. At the same time, we recognize a need for flexibility, because such boundaries may not suit planning and efficiency criteria, given the current infrastructure.

In the north and in less populous areas, utility boundaries will have to be set to cover areas currently serviced and existing distributors should expand to cover these areas.

Providing electricity to northern and remote areas of Ontario will be a challenge — and requires further study to determine the most energy-efficient method of delivery. Clearly,

the affected communities must be involved in any decision and local residents are likely to have concerns regarding their quality of life, affordability, and the environment.

The Advisory Committee recommends that Ontario Hydro Retail be absorbed into the local distribution system.

Although we believe that rationalization and reduction in the number of MEUs is highly desirable and should be encouraged, we acknowledge that the actual reorganization is best left as a local decision. The response to this opportunity for change will differ, depending on the MEU. We acknowledge that some will rise to the challenge, survive and thrive, while others may falter.

The Government, however, has the right, the responsibility and the ability to play a major role with respect to Ontario Hydro Retail. It is in this spirit that we put forth a plan, described at the end of this section, that advances the merger of Ontario Hydro Retail with the local distribution system. The plan could also be used to foster the consolidation of MEUs, while ensuring the MEUs some stability in obtaining their supply of electricity under wholesale competition.

The Advisory Committee recommends that the remote communities not attached to the transmission grid be served by community-based entities.

Currently, Ontario Hydro serves a number of communities out of its northwestern office that are not connected to the transmission grid. These communities should be served by community entities, supported by a non-profit organization that provides operating services. This organization would include representatives of the communities and appropriate government representatives — including federal representation in the case of First Nation communities. Other aspects of servicing, including the standard, quality, and type of power service appropriate for the community, would be determined by each community.

The Advisory Committee recommends that distribution utilities be given all the powers of a corporate body under the Ontario Business Corporations Act.

It seems to us that distribution utilities, in as much as they are businesses, should operate as such, and also should have the responsibilities and the authority of corporate bodies. Performance indicators should be established and made public, to motivate management and employees to operate in the most efficient and effective way for their shareholders, the ratepayers.

The Advisory Committee recommends that each distribution utility be directed to keep separate its monopolistic wires business from its competitive electricity sales and energy services activities as soon as possible.

A fundamental part of the Advisory Committee's vision of Ontario's electricity system is the eventual transition to full retail access. We believe that the distribution utilities should prepare for this by immediately keeping separate their monopolistic (and therefore regulated) business from their potentially competitive (and unregulated) businesses. This separation is necessary to avoid the cross-subsidization of monopoly and competitive services.

We are recommending functional separation, with regulatory oversight, as needed. A functional separation is an accounting separation, so that a separate set of books is created and maintained for each type of business. The regulator would regulate the monopoly business to ensure that the monopoly does not subsidize the competitive businesses. Structural separation, by contrast, would require full separation.

The activities of the monopoly are those that relate to the ownership of the physical distribution assets, and involve the provision of a common carrier service within fixed geographical boundaries — the wires and related equipment.

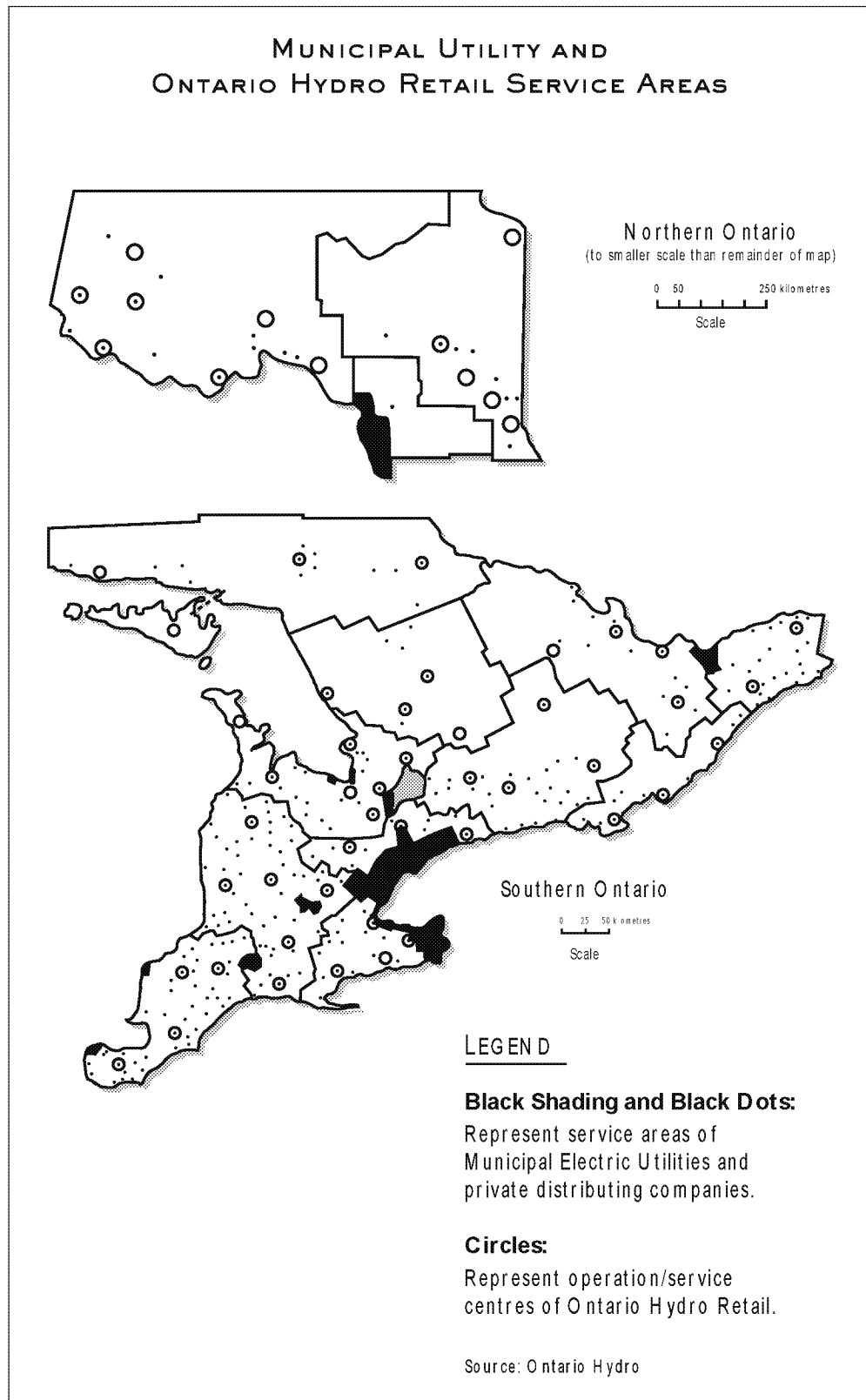
The competitive activities relate to the sale of electricity and the provision of energy services, and do not depend in any way on geographical boundaries.

Until there is retail competition, the energy services side of the distribution utility — the municipal energy service company (MESCO) — will have an exclusive right to sell electricity within its franchised area. With retail access, however, there will be competition both in selling electricity and in providing energy services — from generators, agents, brokers, and marketers, energy service companies, and even other MESCOs.

It is important to remember, however, that there are new activities for the MESCO, even under wholesale access. For example, the MESCO will have to negotiate for electricity supply on behalf of its franchise customers. It will have to be able to work within the marketplace and with the Electricity Exchange, buying on the spot market and using the futures market to enable it to obtain a stable price for its customers. When the MESCO offers electricity supply outside its franchise to wholesale customers or energy services, it will be operating in a competitive market.

The Advisory Committee recommends that a level playing field be created for all energy services entities.

There are many benefits flowing to the owner/operator of the physical distribution facilities in the marketing of commodity and energy services that would give it a competitive advantage over the energy services companies (ESCOs). We think it is essential that the playing field be level from the beginning. As well as functionally separating the activities, we believe that a publicly-owned MESCO should be treated like a privately-owned ESCO. All subsidies in the system must therefore be transparent and accounted for. If taxes are payable by an ESCO, then a MESCO, playing in the same market, must pay taxes or an amount equivalent to taxes.



A PLAN FOR BLENDING ONTARIO HYDRO RETAIL INTO THE DISTRIBUTION SYSTEM

1. The activities, assets and an appropriate allocation of debt of Ontario Hydro Retail (OHR) are transferred to separate companies, created under the *Business Corporations Act*. These companies would conform to regional municipality, county or district boundaries. The Government, through the Minister of Environment and Energy, would be the sole shareholder and hold 100 per cent of the common shares in each company — as the company is being formed on the basis of a take-over of the assets of OHR.
2. Each company would be responsible for:
 - a) managing the business of the former OHR area located within the company's boundaries;
 - b) purchasing power to serve the former OHR area and to supply the MEUs that are located within the company's boundaries;
 - c) encouraging cooperation among the MEUs within its boundaries, and, if appropriate, the "folding-in" of any of these MEUs, by its municipal owner, into the company; and,
 - d) seeking wider cooperation, and perhaps amalgamation, with neighbouring companies.
3. As an incorporated company, each would have the power: to borrow; to purchase or sell assets; to issue additional shares; to invest in generation projects, subject to any restrictions on ownership. Some of these powers would be subject to shareholder's approval.
4. A municipality could decide to join the company. It would be permitted to dissolve its MEU and transfer its assets and debt (if any) to the company in return for shares proportional to the net assets contributed by the municipality.
5. As part of the consideration for transferring its assets to the company, the municipality also would receive a proportion of the Minister's shares — proportional to the total combined municipal equity and the Minister's equity. If all the municipalities transferred into the company, the municipalities would collectively hold 100 per cent of the shares and the Minister would hold none. In this way, OHR would in effect be transferred to the municipalities collectively, in affected regional municipalities, counties or districts, without payment. If one or more municipalities did not transfer in, the Minister could sell their right to the shares, either to the company or to a third party. The Minister would be obliged to divest her shares within a given period of time.
6. After an MEU joined the company, the company would acquire responsibility for managing the business of that former MEU. The municipality would then be a shareholder of the company, entitled to vote at annual meetings and to elect the board of directors.
7. The shareholders of the company (the municipalities) would be free to sell any or all of their shares to third parties, or to amalgamate with another company.
8. Waterloo Region and each of the six municipalities in Metro Toronto Region would be permitted to form companies to procure their electricity supply. In Metro Toronto, each MEU could then very easily fold itself into the municipally-owned company. The three MEUs in Waterloo Region would own 100 per cent of that company according to their proportional equity. In these instances, there would be no Government involvement as there are no OHR assets or debt to allocate.

A

ONTARIO HYDRO TECHNOLOGIES

The Advisory Committee was asked to investigate introducing private equity as a means of enhancing competition in Ontario Hydro's business operations. In previous chapters of our report, we have recommended separating Ontario Hydro's generation, transmission and distribution activities.

Ontario Hydro Technologies (OHT) is a business unit within Ontario Hydro; its activities are set out in Chapter 2 — Ontario's Electricity System Today. OHT currently relies on Ontario Hydro resources that will no longer be available under our recommended structure.

The Advisory Committee recommends that private equity be introduced into the ownership of Ontario Hydro Technologies.

In a competitive environment, Ontario must continue to support research to keep pace or lead new development in electricity-related technologies. The world-class skills and expertise currently located in OHT have an important role to play in the province in promoting high value-added economic investments.

We believe that it would be appropriate to introduce private equity into OHT. Private equity could provide the business with the freedom and flexibility to pursue commercial interests. There may be opportunities to explore partnerships with research institutions and industry as a means of encouraging this important work.

We recognize that because OHT currently lends broad technical support to Ontario Hydro, it may be preferable to introduce changes into OHT once the new structure for the utility is confirmed. In the meantime, OHT should enter into commercial arrangements with the other, separated entities of Ontario Hydro, as well as with other partners.

B

ONTARIO HYDRO INTERNATIONAL INC.

The Advisory Committee was asked to consider the sale of Ontario Hydro International Inc. (OHII).

OHII is a self-sustaining, wholly-owned subsidiary of Ontario Hydro; its activities are set out in Chapter 2 — Ontario's Electricity System Today. OHII relies on Ontario Hydro resources that will no longer be available under our recommended structure.

The Advisory Committee recommends that Ontario Hydro International Inc. be offered for sale to the private sector.

The activities of OHII are not suited to the recommended new structure of Ontario's electricity system, which is directed to meeting the province's electricity needs. At the same time, we recognize the potential of OHII's activities to contribute to Ontario's economic growth by opening up new markets for investment. We also recognize that promoting Ontario's expertise in sustainable energy development projects abroad is an important role for the province to play in meeting growing environmental pressures.

We believe that OHII is well-suited to be operated as a privately-owned entity. The Advisory Committee cannot justify retaining such a business as a publicly-owned corporation. It is our opinion that electricity ratepayers in Ontario should not support OHII's international investment activities. These investment activities are best managed by private industry, rather than as decisions made on behalf of ratepayers by an entity controlled by a publicly-owned monopoly utility.



REGULATION OF ELECTRICAL INSPECTION

The Advisory Committee was asked to investigate Ontario Hydro's authority to regulate the safe use of electricity and electrical equipment in Ontario. Current activities associated with electrical inspection are set out in Chapter 2 — Ontario's Electricity System Today. The Advisory Committee believes that the responsibility for the development and approval of the *Ontario Electrical Safety Code*, which is distinguishable from the inspection activity, should remain the responsibility of a stakeholder group. The group should include appropriate industry, government and consumer representatives, and should be responsible for ensuring the continuation of electrical safety and consumer protection goals.

The Advisory Committee assumed that the purpose of electrical inspection would continue to be to ensure compliance with the *Ontario Electrical Safety Code*. We believe that Ontario Hydro's current electrical inspection activities can be neatly severed from the utility.

After examining several options for regulating electrical inspection, the Advisory Committee concluded that the system that is ultimately chosen

should meet a number of objectives to ensure both public safety and the effective provision of service. These objectives include:

- high-quality, cost efficient inspection services;
- consistent enforcement of the *Ontario Electrical Safety Code*;
- a straightforward, responsive process that maximizes inspection opportunities and includes an effective dispute resolution mechanism; and,
- provisions to ensure that the costs of the inspection service are borne by its users, with no government subsidization.

We heard of many options for providing electrical inspection in a restructured electricity system. The options embrace both centralized and decentralized models, and include:

- a monopoly component of the restructured system — for example, inspection would become the responsibility of the Transmission Grid Company;
- a provincial government responsibility — inspection would become the responsibility of a government ministry;
- an agency of the provincial government — inspection would become a separate, provincial agency and, although part of the government, not necessarily part of the civil service;

- a not-for-profit corporation — inspection would be restructured into a new corporation that would exist outside government and be responsive to users only;
- a municipal government responsibility — inspection would become a responsibility of local municipalities;
- a private, competitive service — each of the existing Ontario Hydro territory offices could be privatized (into five or more entities) with a coordinating body to develop accreditation procedures, as well as rules governing potential conflicts of interest; and,
- a hybrid of private competition and municipal monopolies — which is the model used in Alberta.

The Advisory Committee recommends further study of the regulation of electrical inspection — to ensure that this necessary activity continues to focus on public safety while being carried out in the most effective and efficient manner possible. In the meantime, we recommend that this activity be undertaken by the Transmission Grid Company.

We consider the matter of electrical inspection to be an important issue that has both safety and competitive aspects.

In the limited time we have had to review the many issues covered in the Terms of Reference, the Advisory Committee was not able to give this issue the full consideration it deserves. Moreover, we are generally

aware that the Government may be studying the potential deregulation of areas that are currently regulated, the self-regulation of some areas, and the privatization of regulation activity.

For these reasons, and to ensure that the options available to the Government are properly assessed, we suggest that this issue be studied further and that the affected stakeholders be consulted.

Electricity production and transmission have a number of adverse impacts on the environment. Fossil fuel-based operations, for example, produce sulphur dioxide, nitrous oxides and volatile organic compounds that impair air quality downwind. Emissions of greenhouse gases from fossil fuel plants have worrisome long-term implications for climate change. Hydroelectric installations can place significant pressure on land and water resources, and may have adverse effects on fish and wildlife habitats. As well, nuclear stations raise complex, unresolved issues such as the management of used fuel and other radioactive wastes. Transmission towers intrude significantly on the landscape, and some electricity transformers still in use contain PCBs.

The amount of electricity consumed is also directly related to the amount of electricity produced, and therefore to its related environmental impacts.

Ontarians are increasingly becoming aware that their current lifestyles are not compatible with the long-term survival of the planet. The emission of noxious or toxic by-products is already causing significant problems. Climatologists urgently warn that we must reduce greenhouse gas emissions to avoid the potentially catastrophic implications of climate change. Such messages are frequently unwelcome,

and it is fair to say that most people are still living in a state of denial. But environmental issues must be addressed — if not in this decade, then later, at a higher cost.

The restructuring of Ontario's electricity system presents an opportunity to consider these concerns and to examine appropriate approaches to environmental protection. Does a shift to competition imply new challenges for ensuring environmental stewardship? Does it provide new potential avenues for addressing environmental concerns? The answer to both questions is yes.



ENVIRONMENTALLY- SUSTAINABLE ENERGY OPTIONS

A competitive electricity market can affect the quality of Ontario's environment by influencing the mix of fuels or technologies used to generate electricity. The move to a restructured competitive electricity system, with open competition and a level playing field for electricity suppliers, could accelerate the introduction of newer, more environmentally-friendly means of generating power.

One such initiative is currently under examination by the Regional Municipality of Ottawa-Carleton, and involves turning waste landfill

gases into energy. This type of sustainable energy project would provide environmental benefits both by reducing the greenhouse gases that originate from landfill sites and by lowering the demand for fossil fuel-based energy. The Ottawa-Carleton Municipality is also considering a cogeneration project to capture waste heat from the digester gas process for conversion into electricity, which could be used for the wastewater treatment operations.

As well, the Toronto District Heating Corporation brought to our attention its plans for expanding steam-generating facilities and entering into the district cooling market. The Corporation has identified a cogeneration project to provide heat and electricity, while increasing energy efficiency, lowering operating costs and significantly reducing environmental impacts.

The Advisory Committee heard of many other innovative, sustainable energy projects under way or planned in the province that involve non-traditional responses to meeting Ontario's electricity needs. We believe that these are directions that should be encouraged. In particular, regulatory structures should not create barriers to small-scale and local generation projects that can accelerate the introduction of environmentally-sustainable energy sources.

Renewable energy technologies such as wind and photovoltaic power are alternative energy sources that avoid the harmful environmental impacts of conventional electricity production. In the long run, renewable energy sources will have to play a larger role in Ontario's energy mix.

While the costs of new renewable energy technologies are coming down, they are still generally higher today than those of traditional energy sources. A competitive market that favours least-cost generation risks placing renewable energy at a disadvantage in the near term. Moreover, many such renewable technologies are still in the development stage. It is important that these technologies be developed through to commercialization so that they will eventually provide substantial cost-effective electricity supplies — reducing the need for more environmentally harmful sources of power generation.

Ontario Hydro has in recent years initiated a program to assist the development and market acceptance of renewable energy technologies, and to enhance prospects that these sources will provide affordable alternatives to existing power sources in the longer term. In a competitive electricity market, investments to further the development of renewable energy technologies will depend to a greater degree on decentralized decision-making. There is a case for

targeted public support for such initiatives while they remain at the early stages of their evolution.

During our review, several different approaches were brought to our attention that could be used to encourage the development of, and broaden the market for, sustainable energy sources that will minimize environmental impacts. Some approaches suggested involve resource mix requirements.

For example, one option is a set-aside for renewable energy that would require a certain percentage of all new electricity production in the province to be procured from renewable energy technologies. The set-aside could be structured to promote a diversity of renewable energy technologies, and to allow competition between renewable energy suppliers. The set-aside could be phased out with the maturity of the renewable energy market.

Also noted, were “green pricing” schemes that could offer consumers a choice of supporting cleaner power sources. Another approach involved the application of fees on more polluting sources, matched by rebates on cleaner power, to favour renewable supplies. Alternatively, social-cost-based dispatch methods would add a premium to non-renewable energy to reflect its environmental costs — in effect altering the order in which supplies are dispatched to favour the use of renewable energy sources. Instruments to limit air emissions,

such as tradeable emission permits or quotas, would create incentives to shift toward less-polluting energy projects.

These are just some of the many ideas that were brought forward to the Advisory Committee with a view to creating a commercial structure in which cleaner energy sources can flourish.



ENERGY EFFICIENCY

Considerable debate has taken place on the prospects for energy efficiency initiatives in a competitive electricity system. We believe that a number of energy efficiency activities will continue in a competitive market. The drive to reduce operating costs will lead companies to seek efficiencies within their own operations by reducing their energy use. Energy management initiatives undertaken in operations across the economy will help limit environmental impacts.

A competitive electricity market will also create incentives to exploit new market opportunities and innovative ways of retaining and attracting customers. Investments in energy efficiency may be stimulated as companies compete for customers by broadening the array of services offered, including information and assistance in introducing more energy-efficient equipment and practices. Customized demand-side management packages might be used

to compete for large industrial customers. New electrotechnologies may be marketed that provide businesses with less-polluting production technology options. Energy efficiency can be marketed broadly with other non-energy services through building or industrial process designs. The longer-term development of energy services may prosper as the competitive market reveals a diversity of consumer preferences and stimulates new, energy-efficient products and services.

At the same time, we expect that some types of energy efficiency activities will be put at risk in a competitive electricity system. Participants in the electricity production, transmission and distribution sectors may be encouraged to reduce their discretionary costs generally, including investments in energy efficiency, in response to a greater emphasis on cost containment and price competition. Broad-based demand-side management may prove to be less compatible with a commercially-driven electricity system if the emphasis is on maximizing volumes of electricity sold. Where undertaken, energy efficiency initiatives may focus on less expensive, softer programs, such as information services.

The short-term focus that drives some decisions in a competitive market may also inhibit the

implementation of energy efficiency programs. Without an early payback, customers and utilities alike may be less willing to bear the costs associated with demand-side management.

We heard a range of options for encouraging energy efficiency in a competitive electricity system. For example, energy efficiency can be influenced by the structure of regulation to which utilities are subject, and legislated requirements for demand-side management could be introduced. The Advisory Committee heard suggestions for a regulatory role to address resource planning, to ensure that new supply needs are met in the most economical and environmentally efficient ways. It was recommended that environmental costs be taken into account when weighing options for future supply.

Another suggestion involved raising funds through a mandatory levy on electricity sales that could be used to help finance and implement energy efficiency programs, educational initiatives or research on renewable energy. A non-profit agency could be established to be responsible for allocating financing fairly to a range of different projects and technologies.

In general, cost pressures in a competitive electricity system may be less likely to encourage environmental stewardship. Voluntary activities in support of the environment may be undertaken less

frequently in a cost-based competitive market. While some larger companies may voluntarily undertake environmental initiatives that extend beyond meeting environmental regulations, it may be more difficult for smaller competitors to pursue initiatives that benefit society, such as providing energy conservation information or education packages for schools.



POLICY APPROACHES

The Advisory Committee believes that there is an important role for the Government in advancing society's environmental objectives.

Our report points to many arguments that favour competition over monopoly. However, we do not argue that market forces will, unaided, produce socially-desirable outcomes. Where environmental objectives are concerned, similar to other public policy issues, the Advisory Committee believes that the Government will have to stay very much involved. Indeed, all levels of government — federal, provincial and local — have a responsibility to define environmental goals and to adopt appropriate measures to achieve them.

The Advisory Committee believes that the process of restructuring Ontario's electricity system must be accompanied by consideration of the most appropriate regulations or other instruments to secure the protection of the environment and, specifically, to support energy efficiency and the introduction of renewable energy technologies.

The Advisory Committee believes that there are public policy goals associated with the protection of the environment that will require the participation of Government, either through a regulator or other instruments. The Government should assess the changes that may be necessary in the transition to a competitive electricity system, to address those environmental objectives it deems to be in the long-term interests of Ontario society.

As noted in Chapters 7 and 9, the Advisory Committee supports the use of the transmission and distribution systems as a source for collecting levies to support important public policy objectives, including those related to the environment.

The Advisory Committee believes that a range of regulatory and market-based approaches are available that can be tailored to recognize and complement a commercially-driven system and assist in meeting Ontario's environmental objectives. Economic policy instruments could be explored that enable market participants to choose their own ways of meeting environmental standards. A wide

array of innovative solutions may surface in a competitive market, as decentralized decision-making encourages initiative and corporate focus. Public policy can build on market-driven efforts to achieve provincial environmental goals.

In furthering environmental objectives, opportunities should be explored to coordinate or harmonize measures between jurisdictions. This would both effect more substantive environmental results, and alleviate concerns over competitive advantages that can arise in the event that one jurisdiction adopts more stringent environmental standards than its competitor jurisdictions.

We believe that the move to a competitive market for electricity in Ontario should not require the

sacrifice of environmental goals. If anything, we believe that it will create a situation in which our environmental objectives can and should be more, not less, demanding.

In generating, transmitting and using electricity, our society imposes significant burdens on our environment — many of which threaten to grow and become more onerous to our successors and descendants as time passes. We urge the Government and our fellow citizens to take heed of these concerns and to respond to the opportunities provided by reform of the province's electricity system, by adopting new, more market-sensitive policies to achieve Ontario's environmental goals.

The Advisory Committee recognizes that there are a number of public policy issues that require examination and resolution in the context of reforming Ontario's electricity system.



ABORIGINAL ISSUES

The Advisory Committee heard from First Nation chiefs and advisors on issues ranging from electricity rates and service, to land claims and environmental concerns.

Many Ontario Hydro generation facilities and transmission rights-of-way occupy or affect lands over which First Nations assert rights. A common theme in First Nation submissions was that no authority was given for these developments. Further, it was suggested that First Nations have either received no compensation, or that compensation received was inadequate. Since some developments have been in place for more than 60 years, there are a number of longstanding grievances. We understand that any sale of Ontario Hydro assets must acknowledge the fact that there are unresolved grievances now, and that more could arise in the future.

Ontario Hydro has been working with First Nations to resolve grievances and negotiate compensation. But we were told that First Nations have concerns about the future status of negotiations both

with Ontario Hydro and its successors.

First Nations asked that their Aboriginal and treaty rights not be abandoned or ignored in any changes proposed to the electricity system. They reminded us that they have constitutional rights for resource sharing and traditional uses of land. Steps must be taken to ensure that a fair resolution of any outstanding grievances is not jeopardized in introducing changes to the electricity system.

We heard how the flooding for hydroelectric generation and clearing for transmission lines have had adverse impacts on First Nation communities. We were asked to ensure that remote communities continue to receive an adequate supply of reliable and affordable electricity.

In a more positive light, we were also told that there are potential economic development opportunities for Aboriginal communities as a result of any changes in the electricity system, such as the potential to own and operate existing, redeveloped or new generating facilities. The Advisory Committee was told that the energy sector can create careers to help develop a healthy economy and provide greater self-reliance in communities where opportunities are currently extremely limited.

Through written submissions and presentations, the Advisory Committee learned of the special circumstances facing remote First Nation communities. We recognize the challenge of providing energy to remote communities, where average incomes are generally low and the cost of electricity service is high. Something as basic as opening a laundromat can be impossible in a location where electricity is the only source of energy, and the available capacity is limited.

The Advisory Committee heard a number of proposals to create more effective energy options in remote communities — such as district heating in larger communities or increased use of renewable technologies. As we identified in Chapter 9 — Distribution of Electricity — there is a need for further study to determine how best to serve Ontario's northern and remote areas.

The Advisory Committee enjoins the Government of Ontario to develop with the federal government and First Nations an effective program to provide energy to Aboriginal communities. In this regard, a study could be undertaken to examine the delivery of power to remote communities, including issues such as how best to offer energy services to remote areas, the possibilities of grid extensions, the availability of other energy sources, the opportunities for renewable energy applications, a

planning framework to assist remote areas in selecting the most appropriate energy sources, the cost of servicing the remote territory, subsidization needs, etc. In servicing First Nation communities, the involvement of the federal Department of Indian and Northern Affairs is absolutely necessary.

First Nation concerns are unique to each First Nation, and involve much more than the electricity system — which means that they generally fall outside the mandate of the Advisory Committee. This being said, we believe that the impact of Ontario's electricity system on First Nation communities warrants further study, and that any changes proposed must be sensitive to Aboriginal and treaty rights.



LABOUR ISSUES

Ontario's reliable electricity system is to a large degree the result of the contributions and skills of its employees. We agree with the observation that this will be no less important in a competitive environment than it was in a monopoly structure.

Any move to restructuring is disruptive and difficult for employees, and the Advisory Committee heard the concerns of employees of Ontario Hydro and the MEUs directly and through their labour unions.

The electricity system includes many highly-skilled, well-educated and motivated employees who will want to be actively involved in any change process. Moreover, a condition for the success of any restructuring is the involvement of employees. Employees must be informed about proposed changes, and be invited to participate in the change process.

The Advisory Committee anticipates that the Government will involve management and employees, and their bargaining agents, from the outset of the restructuring process. We are confident that the outcome will reflect the labour laws and health and safety standards of Ontario.



ASSESSMENT ACT

The *Assessment Act* provides a framework for assessing property in Ontario. The assessed value for real property excludes machinery used to produce electric power, but includes the buildings, structures, structural facilities or fixtures used in connection with producing the power.

This means that a hydroelectric station, which is primarily a building, is assessed at a higher rate than a fossil fuel plant, which has relatively more machinery and less building infrastructure. It seems inconsistent to create a tax disadvantage for a renewable electricity source such as hydroelectric power.

The Advisory Committee suggests it may be prudent to establish a special assessment category for electrical generating facilities — for example, one based on their electrical rating rather than the amount of civil works. This measure would also assist in creating a level playing field for all generation technologies.



WINDFALL MUNICIPAL TAXES

All market participants should face the same rules in a competitive electricity system. Publicly-owned utilities should pay the same municipal tax rate as privately-owned companies. We acknowledge, however, that this could lead to substantial windfall taxes for some municipalities.

As a result, the Government will want to examine the impacts of these new municipal revenues, and may deem it more appropriate for public policy reasons to use some of the revenue to benefit all electricity users. For example, a base rate could be established for municipalities, and any revenue above this rate could be used to support public policy programs, such as serving northern and remote communities, or undertaking environmental initiatives.

E**WATER POWER RENTALS**

Ontario Hydro operates 49 of its 69 hydroelectric stations on provincial public lands, under numerous leases, licences of occupation and water power rental agreements. There are a number of other hydroelectric facilities in Ontario, likely located on both public and private lands. We expect that those stations on public lands would have an arrangement with the Province.

A number of issues flowing from the arrangement Ontario Hydro has with the Province have been highlighted in our review.

- If existing hydroelectric facilities on public lands are sold, should Ontario Hydro's contractual obligations be assigned to the new owners, or should the Government sell the land and facilities together?
- The Advisory Committee was told that the current rates do not reflect true market value. If the land lease arrangements are to continue, the rental rates should be examined. The term, value and conditions of any future leases would have to be established clearly in order to attract private-sector interest in hydroelectric generation facilities.
- It is unclear whether the current arrangements provide an assessment for "water use" as a public resource. There does not

appear to be any payment to the Province for water use at hydroelectric facilities on private lands or at other generation facilities (nuclear or fossil fuel stations). If water use is assessable, it would seem appropriate that there should be an evaluation of the resource, wherever it is used.

F**OTHER PUBLIC POLICY ISSUES**

There are a number of other public policy issues that will require resolution in the context of electricity market reform. These include, **but are not limited to:** foreign and domestic ownership restrictions if assets are sold; reciprocity with neighbouring jurisdictions; strategies for the sale of assets; defining boundaries between transmission lines and distribution wires; and rules on vertical integration and mergers within the electricity industry.



GENERAL FRAMEWORK

The restructuring of the electricity system requires the introduction of an appropriate legislative and regulatory framework. This is needed both to enable reform, and to ensure the ongoing operation of a competitive market that will work in the best interests of Ontario's electricity users.

The Advisory Committee finds that a regulatory scheme for electricity must be established where none has existed before.

Over the past 90 years, regulation of Ontario Hydro has generally been sporadic or non-existent. Public ownership does not necessarily result in public control. Since utility planning and management are very complex, public ownership in many cases actually seems to have resulted in less control and accountability, not more. Indeed, major generation and transmission investment decisions, and even rate decisions, have been politicized — such processes have been wasteful of time and resources in many respects.

It is now widely accepted that governments do not need to own an enterprise in order to achieve public objectives. That is why, in most democracies in recent years,

privatization of state assets has been much more common than nationalization of private industries.

The Advisory Committee recommends new legislation to replace the Power Corporation Act and necessary amendments to other statutes, particularly the Public Utilities Act and the Ontario Energy Board Act.

Moving from 90 years of monopoly in electricity to a largely competitive market structure for electricity requires substantial changes to all the major statutes that deal with the electricity industry, including those governing Ontario Hydro, the municipal electric utilities (MEUs) and the Ontario Energy Board. A number of related statutes will also require revision.

There was little disagreement among those who participated in the Advisory Committee's public consultation process that the existing legislative framework, and especially the *Power Corporation Act (PCA)* and the *Public Utilities Act*, is outdated and inappropriate for the current electricity system — let alone for a new system.

There is a general consensus that Ontario Hydro must give up its monopoly positions and its regulatory role as part of the restructuring of Ontario's electricity system. A new legislative scheme would formalize the legal uncoupling of Ontario Hydro, create a new regulatory system, and set in motion a competitive process for the electricity system in Ontario.

B

LEGISLATION

The Advisory Committee recommends that new legislation setting out the framework for Ontario's electricity system be of a policy nature only. The existing Ontario Hydro monopoly control over the generation and transmission of electricity in the province, and its regulatory control over the distribution of electricity, would be removed.

The Government must make a number of policy decisions. These decisions must be made and announced to settle the general framework and set the parameters of Ontario's restructured electricity industry. The Government may issue policy directives under Section 10 of the *PCA* to initiate the restructuring.

Competitive markets are by their very nature unpredictable, and the transition from a monopoly structure to a competitive environment could be counterproductive if the Legislature attempts to legislate at a level of detail that presumes its ability to know future market outcomes. We

encourage the Government to express its policy in broad terms, which will set the overall direction toward a competitive electricity market, without hindering the dynamic play of market forces.

Restructuring the entire market for an essential service such as electricity involves some risks. This is not a reason to avoid restructuring, but it argues in favour of flexibility, responsive supervision of the emerging competitive electricity market, and the ability to make rapid corrections.

In contrast to policy-making, operating decisions will have to be made to implement the Government's policy once the policy framework has been announced. During the transition, rules of operation for the various segments of the industry will develop in a cohesive fashion. The transition process is outlined in Chapter 16 — Managing the Transition to Competition.

C

REGULATION

The Advisory Committee recommends that the regulatory system set out in the legislation be of a generic type, and that the regulator be given the authority to forbear.

Changes to the *status quo* will require safeguards that reassure the public and alleviate the anxiety and fears surrounding the reorganization. The introduction of competition into Ontario's electricity system will result both in regulation of some parts, and

the deregulation of others. Regulation must be developed to support, not thwart, the development of competition.

We are not recommending that any one regulatory technique be set out in the legislation. Rather, the Advisory Committee believes that the Legislature should state the goals of regulation and leave the selection of techniques to the regulator.

Legislation that required the use of any particular regulatory technique would be unduly limiting, since the nature and degree of regulation will not be static, but will change over time. The regulator will require the authority to implement government policy in a climate of market uncertainty, and should be provided with a range of regulatory powers — from the most active (prior approval), to the most passive (monitoring).

With an effective statutory power of forbearance, the regulator will have the discretion to determine the appropriate degree of regulatory intervention.

During the transition to competition, the recommended restructuring will require some degree of regulatory oversight to monitor the evolving market. Such activity would be both limited in duration and in scope, and would become inactive after the establishment of effective competition. The regulator should have the legal authority, at least during the transition to competition, to examine the rates that may be

charged by any of the participants in the chain — from generation to transmission to distribution. In areas where there is a natural monopoly, however, some regulation will continue to be necessary.

A sunset provision could be enacted to repeal the regulator's authority to supervise the competitive activities. We do not recommend such a provision since anti-competitive strategies can be employed at any time, and they could result in diminishing consumer benefits. The regulator should have in reserve the same powers as during the transition. The mere fact that these powers exist could deter much of the anti-competitive conduct. Ideally, if the transition to effective competition occurs smoothly, the regulator will be able to forbear from exercising its full regulatory powers, and regulate passively by responding only to complaints. Indeed, the market itself will operate to restrain anti-competitive behaviour.

The regulation of monopolies can take many forms — from the traditional cost of service regulation to the more recent concept of incentive regulation. The Advisory Committee heard that any regulatory system should avoid lengthy and costly public hearings and provide an incentive to the management of the regulated company to operate efficiently, pursue innovative activities, and offer customers choice in service and products.

In summary, the regulator in the new electricity system will require legislative authority to regulate in a number of new areas, including: the monopoly elements of electricity transmission; the monopoly elements of electricity distribution; and the retail rates of MEUs to their franchise customers. Moreover, the regulator will require a residual power to receive and resolve complaints that any provider of electricity or electricity services is doing, or failing to do, anything that is prohibited or required by law, regulatory policy or practice.



THE REGULATOR

1) THE ONTARIO ENERGY BOARD

The Advisory Committee recommends that the Ontario Energy Board be given the responsibility for regulating the electricity industry in Ontario.

Currently in Ontario, the Ontario Energy Board (OEB) is set up by legislation to regulate the natural gas industry, and to provide advice to the Minister of Environment and Energy and the Government on a number of energy issues, including the rate proposals of Ontario Hydro.

We believe that it would be appropriate for the OEB to be the regulator responsible for addressing electricity matters. We do not think that it would be fiscally responsible to create a new agency with an exclusive mandate for electricity, or to have

two energy regulators in the province.

In its presentation, the Ontario Natural Gas Association advocated a level playing field among all energy industries, as well as within the electricity sector. We believe it is sensible for both the regulator and the type of regulation to be the same for the natural gas and electricity industries, to ensure that both types of energy are treated consistently.

The Advisory Committee was also made aware in various presentations of the future possibilities of “converging” technologies, and the resulting need for consistency in treatment of the different industries.

Because we are examining a regulatory scheme for electricity where none has existed before, it will not be easy to get all of this right the first time. The more detailed and rigid the regulator’s mandate, the less flexibility the regulator will have to adapt to rapidly evolving events, and the greater the likelihood that the regulation will not work well. We urge the Government to give the OEB a broad, comprehensive mandate, based on the assumptions that the need for regulation will change, and that the regulator should have flexibility to respond to changes.

Currently, rates charged by the MEUs are regulated by Ontario Hydro. The OEB would assume the regulatory role over the MEUs, or their successor bodies, including the retail rates the MEUs charge to their

franchise customers. Once retail access is introduced, the regulation would focus on access to the distribution wires and the rates for their use.

We heard that municipal councils could manage their electricity utilities, as they do other services, without outside regulatory controls. However, there is an important distinction between managing electricity services and other municipal services, such as water, sewers, bus lines and a zoo within the utility structure.

Electricity is part of a much larger network, connected to provincial, interprovincial and even international grids. Moreover, with the rationalization of MEUs, the appropriate local political control may be more difficult to define. In the event that some municipalities choose to sell their distributors, political control of privately-owned companies would not be appropriate.

11) PROCESS

The Advisory Committee recommends that the Ontario Energy Board Act be amended to reflect a regulatory process that is suitable for the 21st century.

The OEB is currently operating with a legislative framework that was established more than 30 years ago. We were told by many of the participants about the statutory restrictions that constrained the OEB when dealing with the deregulation of the natural gas industry.

Changes will be required to the *Ontario Energy Board Act* when the OEB receives its new electricity mandate. This also would be the time to ensure that the OEB has appropriate procedural powers.

We support efficient hearing mechanisms, including the settlement of issues outside the hearing room. In recommending changes to the *Ontario Energy Board Act*, we urge the Government to ensure that the regulator has sufficient flexibility and the appropriate regulatory tools to ensure a process that will serve the energy industry well into the 21st century.



TYPES OF REGULATION

The Advisory Committee recommends that the type of regulation used in Ontario's electricity sector be set out in broad terms to permit the regulator to regulate as is suitable for the activity and the times. The regulator must, however, be guided by two main objectives — that it is to promote and safeguard competition, and that it should regulate with a light-hand. The regulator must also have the legal authority to forbear regulation when it deems this to be appropriate.

I) COST OF SERVICE REGULATION

Cost of service regulation controls rates and earnings. The regulator sets prices on a regular basis, based on estimates of output and a determination of the costs of providing the output, to include a fair return to shareholders. Since the prices are set to provide revenues to cover costs incurred and deliver a return for shareholders, improvements in cost-efficiency will flow through to the customers, and not to shareholders. There is no incentive to be efficient. Since the return is based on assets, there may even be an incentive to overinvest.

Variations of this method are used to improve incentives for cost control and increased efficiency, including variable rates of return on equity or generic rates, and various profit-sharing mechanisms. Cost of service regulation is currently the method used to regulate Ontario's natural gas industry.

II) INCENTIVE REGULATION

The Advisory Committee recommends that incentive regulation be implemented as a generic control mechanism. Regulatory judgement is required to ensure that any productivity gains and cost savings are shared by both the regulated entities and their customers, as would occur in a competitive market, rather than by the shareholders alone.

Incentive regulation is designed to improve the performance of a regulated industry through the use of rewards and penalties. It gives the company a greater incentive to reduce costs and improve efficiency. The Advisory Committee is of the opinion that incentive regulation would be useful in pricing electricity transmission and distribution.

Most participants in our consultation process referred to price cap regulation when discussing incentive regulation. This type of regulation directly controls rates, without the cost allocation and rate design process of cost of service regulation, and allows earnings to fluctuate according to the efficiency of the company. Under price caps, the regulated entity is permitted to increase its rates each year, without seeking prior regulatory approval, by an amount that is a specified number of percentage points less than the increase in some price index, usually the Consumer Price Index (CPI), minus a productivity offset (x). After initial hearings to select the appropriate index and the appropriate value of "x", future hearings would be largely unnecessary or greatly simplified.

Performance-based regulation works to improve efficiencies by assessing performance against a defined benchmark. The operational effectiveness of the regulated company is measured against predetermined goals or standards that have been set with the regulator. A

formula-based profit-sharing mechanism can be used to enable some sharing of benefits between shareholders and customers.

Revenue caps are another form of incentive regulation. Under revenue caps, increases in operating and maintenance are limited to general inflation levels.

The regulator must be able to review and fine-tune the effect of the incentive regulatory scheme. The regulator will need to impose some reporting requirements on the industry, and will require information on revenues and profits.

III) COMPLAINT

For a regulator to act only on complaint presumes the validity of industry conduct. It is most efficiently used for the less contentious and more competitive elements of the industry, such as service quality. If a complaint were found to be justified, the regulator would be empowered to make a corrective order. In effect, decisions by the industry would be presumed to be legally valid and in force unless a complaint was received.

The ability to respond to complaints uses the regulator more like a safety device in case things go wrong, rather than as a surrogate for a competitive market. This regulatory approach is most appropriately used in functioning industries.

IV) MONITORING

Monitoring is the most restrained type of regulation — an approach which gives the regulator the authority to require the industry to file information. It is essential that the regulator has the necessary power to act on unsatisfactory filings.

F

ELECTRICITY GENERATION

The Advisory Committee recommends that the Province ensure that responsive regulatory tools are in place in the early years to oversee and ensure fair competition in electricity generation.

The level of regulatory supervision required in the generation industry depends, to a great extent, on the degree of market power exercised by the successors of Ontario Hydro's generation, and the degree and rate at which new players enter the market. Where there is a mix of publicly- and privately-owned generation, privately-owned generators — and their lenders — will require assurance of their legal right to compete in Ontario with any publicly-owned generators. This right must include access to the transmission system on fair and equal terms, and the assurance that their product will be dispatched into the system by a neutral and independent System Operator.

In the beginning, some regulatory oversight will be required in the generation sector to facilitate competition, and ensure that it

occurs and continues to develop. The explicit role of a regulator at this early stage will be to prevent practices that would eliminate or hamper competition, to assure that any changes will not harm the consumer, to secure the reliability of electricity, and to efficiently use public resources. Since it will be difficult to predict how market forces will work, regardless of the ultimate configuration of assets, broad parameters should be established to provide the regulator with a mandate for this oversight — a role that is universally acknowledged to be necessary.

When Ontario has a vigorous, effective and fully functional competitive market in electricity generation, there will be no need for a regulator to oversee power rates. Generators will offer their power at marginal cost in advance and will receive the system marginal price. During the transition to competition, however, to ensure that the participants do not exercise market power, the regulator could examine the generators' offers of price and supply to ensure that they are acting competitively. Further, the regulator could also respond to complaints, including complaints from the System Operator. For example, the System Operator could ask the regulator to investigate any outages to ensure that they are legitimate and that the generators are not manipulating (i.e., gaming) the system. Similarly, there may be

complaints about the System Operator that could also go to the regulator for resolution.

Ultimately, of course, the federal *Competition Act* is available to address predatory pricing, collusive and exclusionary practices, anti-competitive mergers and abuse of dominant market positions. However, we believe the Province should not rely exclusively on competition law and federal enforcement in introducing competition into Ontario's electricity system. In our opinion, the federal competition law should be complementary to, and not an alternative to, appropriate provincial regulation.

In general, we are of the view that, through legislation and the appropriate regulatory framework, the Province must take an active role in ensuring that the emerging competitive market in electricity generation does materialize, and that it does so as quickly and efficiently as possible. The Province cannot abdicate its responsibility in this regard to the federal government.



ELECTRICITY TRANSMISSION

The Advisory Committee recommends that incentive regulation be implemented for transmission pricing.

There was virtual unanimity that competition in generation requires non-discriminatory access to the transmission system, and that the

separation of the “conduit” from the “content” of electrical energy is essential to create a common carrier. Transmission of electricity, after being separated from generation, will become a service, and the means to supply that service, the transmission lines, will be a monopoly.

Early in the restructuring process, the generation and transmission rates will need to be unbundled under regulatory supervision, so that separate rates for the transmission of electricity can be developed.

Transmission rates would have to be set out in published tariffs, which would be reviewed and approved or modified by the regulator. The prices rolled into the transmission tariffs would relate to connection charges and the use of the transmission lines. Such tariffs must be reasonable and not discriminatory. Transmission companies should not be able to overcharge suppliers or purchasers to cover their inefficiencies, and, if privately-owned, to extract monopoly profits that enrich their shareholders.

We recommend that incentive regulation be used in pricing transmission. If price cap regulation, the initial price levels would have to be set. If these initial price levels are set too high, incentive regulation is likely to perpetuate excessive prices. Careful consideration of the appropriate price index and the appropriate choice of “x” are crucial. Creating a productivity offset that is too low would leave a great share of

efficiency gains with shareholders, and this would not accurately reflect the results of competitive markets. By contrast, setting “x” too high would place an excessive constraint on the firms’ earnings.

The regulator will also set service standards. The transmission monopoly may be required to show how its performance measures against the standards.



ELECTRICITY DISTRIBUTION

The Advisory Committee recommends that incentive regulation be implemented for distribution pricing.

Since two or more sets of parallel wires are unlikely ever to be permitted along the same poles or in the same underground conduits, the Advisory Committee views the wires portion of the distribution system as a natural monopoly. For this reason, the distribution system also needs to be subject to some degree of regulatory scrutiny for rates and service quality, much like the transmission grid.

Under wholesale competition, the retail price of electricity to the franchise customers also requires regulation, as this service is still a monopoly.

Even under wholesale access, the MEUs will be obliged to transport power within their service areas, and perhaps to adjacent MEUs when

moving power of a generator located within their franchise areas. Such situations would almost certainly be intensified under retail access. The various components rolled into the MEUs' rates must be unbundled to arrive at a distribution-only tariff. Ongoing regulatory supervision will be necessary to ensure that MEUs do not discriminate in granting access to their distribution wires.

Distribution rates would have to be set out in published tariffs, which would be reviewed and approved or modified by the regulator. The prices rolled into the distribution tariffs would relate to connection charges, the use of the distribution wires, and other charges related to the distribution business. Such tariffs must be reasonable and not discriminatory. Distributors should not be able to overcharge to cover their inefficiencies, and, if they are privately-owned, to extract monopoly profits that enrich their shareholders.

Given the large number of distribution utilities (even after rationalization), it would be inefficient to attempt regulation on a case-by-case basis. The Advisory Committee believes that the regulation of distribution should be light-handed. We also recognize that there are costs of regulation, and believe that those regulatory costs must not exceed the potential benefits of regulation itself. The regulator should have the authority to receive and resolve specific

complaints about the distribution system.

We recommend that incentive regulation be used in the pricing of distribution. A combination of price caps and performance-based benchmarking appears feasible. For example, the "x" in a price caps formula could be based on the performance of the ten or so best distribution utilities. We do not envision hearings for every distribution utility, and that is not our recommendation. Instead, we recommend that some overall price cap, perhaps with boundaries, be established simultaneously for all distribution companies.

The regulator will have to set service quality standards, and to conduct regular audits to determine whether these standards are being met. The planning and the operation of a reliable, distribution system is extremely important to ensure that the captive customers of distributors can obtain service. Both present, and future demand must be met, and the cost of new investment will also require regulatory sanction.

To the extent that the MEUs are involved in competitive activities — such as generation, selling electricity to non-franchise customers either inside or outside their franchise area, or providing energy services — it will be necessary to ensure that they do not use their monopoly distribution service revenues to subsidize their competitive activities. To ensure that

there is a level playing field in the competitive part of the distribution sector, competitors of the MEUs must be protected from having to compete with subsidized services. At the same time, the captive MEU customers must be protected from being compelled to subsidize the distributors' competitive services. This requires, as discussed in Chapter 9 — Distribution of Electricity — either the implementation of accounting rules (for joint and/or common costs) that would keep separate the wires business from the energy services business.



THE SYSTEM OPERATOR

The System Operator will accept offers and bids for power, and dispatch electricity equitably in accordance with an accepted and transparent set of rules. The rules governing offers, bids and dispatch should be developed in conjunction with, and with the assistance of, various stakeholders. The rules should include provisions to address situations in which the rules are violated. The System Operator will assess the technical capabilities of those attached to the transmission system — generators, large users and distributors.

The Advisory Committee recommends that the Ontario Energy Board have a residual discretion to audit, and hear and determine complaints from users about the interpretation and application of the rules by the System Operator.

Once the rules are in place, there may be questions about the fairness of their application. There must be some remedy available if a dispute over the application of a rule cannot be resolved by consensus. Disputes should not go to the courts. The OEB's expertise in energy matters suggests that it would be a preferable forum.



THE ELECTRICITY EXCHANGE

The Electricity Exchange requires rules, which like the rules governing the operation of the System Operator, should be developed in conjunction with, and with the assistance of, various stakeholders. The Electricity Exchange is responsible for assessing the financial capabilities of those who wish to use the marketplace — generators, distributors, non-franchise users, agents, brokers and marketers — and for requiring these users to register as members.

The Advisory Committee believes that there will be a need for a body to provide regulatory surveillance over the Electricity Exchange.

Although we did not examine this issue thoroughly, it seemed to us that this might be a role for a body such as the Ontario Securities Commission.

K**AGENTS, BROKERS AND
MARKETERS**

The Advisory Committee recommends that agents, brokers, and marketers be licensed.

Electricity agents, brokers and marketers (ABMs) will be important players in a restructured electricity industry, particularly as Ontario moves toward wholesale, and ultimately retail, competition.

Electricity brokerage is a relatively complex, sophisticated and risky business — we would suggest more so than natural gas brokerage — and requires oversight. There will be a number of consumer protection issues regarding the activities of these ABMs in the electricity market. In addition, there is the issue of the

financial viability of the ABMs, and concerns about default by reason of financial failure. The financial soundness of ABMs should be assured by requiring them to register with the Electricity Exchange.

With respect to consumer protection and public interest issues, we recommend that there also be a licensing requirement for ABMs. The OEB has had some experience with ABMs in the natural gas industry. The Advisory Committee believes that the OEB would be an appropriate licensing agency of ABMs for electricity. Alternatively, it might be appropriate to entrust the Electricity Exchange with this role as well (to allow for one-stop shopping for ABMs). In that case, the OEB could hear appeals from licensing decisions of the Electricity Exchange.

A

INTRODUCTION

The Terms of Reference for the Advisory Committee asked that our recommendations for Ontario's electricity system uphold the broad objectives of affordability and financial soundness. In this chapter we discuss how the directions proposed in our report will affect consumers (through impacts on wholesale electricity rates) and taxpayers (by arrangements suggested to pay down Ontario Hydro's debt).

The Advisory Committee's recommendations focus on moving away from the existing monopoly structure to a new system in which Ontario's electricity system is dominated by competitive forces. We propose to advance competition by creating competing companies out of Ontario Hydro's generation assets, and by opening up the market to enable others to participate on a fair basis. Equitable treatment for all players means that a generator, whether it is publicly- or privately-owned, should have no tax advantage nor access to special subsidies. It also means that all generators must have non-discriminatory access to the provincial transmission system. We also expect that the benefits of competition in generation will be significantly increased by the introduction of private equity.

We propose a new marketplace that will enable electricity prices to be determined by the market forces of supply and demand, and we envision a system in which wholesale competition will evolve in stages to the retail level, so that all electricity consumers can ultimately choose their own supplier. Moreover, restructuring in the distribution sector will enhance the electricity price reductions achieved in the competitive market for generation.

The Advisory Committee prepared a set of analyses to estimate the impact of our recommendations on wholesale electricity rates. These impact scenarios were prepared for comparison with a *status quo* outlook that perpetuates the existing vertically integrated, monopoly structure of Ontario's generation and transmission sectors.

B

CONTEXT OF THE ANALYSIS

The restructuring assumptions used in the analysis do not replicate all the recommendations of the Advisory Committee. The restructuring assumptions focussed on our main recommendations to separate Ontario Hydro's current functions and to establish a competitive market for the generation of electricity.

A financial model was used to assess the impacts of breaking up Ontario Hydro's operations and introducing competition in generation. Four new generation companies, a transmission company and a retail distribution company were postulated as being created from Ontario Hydro's existing assets and activities. These new entities were required to operate in a commercial manner (i.e., to face the same tax obligations and borrowing costs as privately-owned corporations). They were also assigned initial capital structures, including debt levels that were consistent with maintaining acceptable credit rating compared with similar types of businesses.

Our analysis assumed that the new businesses and the competitive generation market would begin operating on January 1, 1999. This date was chosen as a starting point for the analysis because it would provide time to establish a fully operational and competitive wholesale market, and to set up the independent Electricity Exchange and System Operator. From that starting point, our analysis was extended through to the year 2005.

Under conservative assumptions, the Advisory Committee's analysis shows that its recommendations for a competitive generation market are likely to result in future wholesale electricity rates that are lower than those which can be expected by maintaining the current system. Moreover, these electricity price benefits can be achieved without imposing a burden on Ontario's taxpayers.

Advice provided to the Advisory Committee suggested that competition is likely to depress significantly the average price available to generators, especially in the early years. This will provide a basis for the wholesale price of electricity, which will reflect the changes at the transmission level as well as in generation, to come down as well.

The Advisory Committee considers it a matter of high priority to deal with the balance of Ontario Hydro's debt, over and above that which could be sustained by prudently financed, commercially-run companies operating in a competitive marketplace. At the same time, we consider it appropriate that, if possible, the repayment of the utility's debt should be the responsibility of electricity users, not taxpayers. Our scenarios show that it should be possible to defease (a process whereby payments are matched, over time, by revenue inflows from purchased securities) the excess debt by 2005. At the same time, the Advisory Committee's projections indicate that it should also be possible to enable wholesale customers to realize a gradual decline in prices throughout this period.

This projected result does not rely on the proceeds from asset sales to pay down Ontario Hydro's debt. While such sales would be desirable in terms of introducing private equity into the ownership of some of Ontario

Hydro's assets, we recognize that the prices that investors would pay are very difficult to predict. In any case, our analysis shows that the stream of revenues from operations can defease the debt by 2005; asset sales might accelerate the process.

That said, we believe that the introduction of private equity into the system will bring greater competitive benefits. The enhanced pursuit of efficiencies and innovations by privately-owned companies in a competitive market are likely to result in lower rates for consumers and greater choice of services and products.

Our scenarios did not incorporate results from restructuring the distribution sector. We do anticipate that changes in that sector will lead to new efficiencies and benefits for consumers, but we felt that it was premature to model a specific new structure. Our analysis of rate impacts was therefore confined to the wholesale price of power — the price paid by distributors and large users — rather than extending to the retail price paid by consumers. We expect that declines in wholesale rates will be augmented at the retail level, as restructuring proceeds in the distribution sector.

The financial impacts of restructuring at the generation and transmission levels were examined through a number of scenarios, based on alternative assumptions about the prices available to generators and the

operating efficiencies that the companies might achieve. The scenarios reflect advice to the Advisory Committee about potential price reductions at the generation level in a competitive environment. Competition in the generation market will be responsible for most of the price reductions that consumers can expect to see.

For details on these five scenarios ("A" to "E") and the assumptions underlying our analysis, readers are referred to Appendix E. The key findings of our analysis are presented in the following sections.



IMPACTS ON ONTARIO HYDRO'S DEBT

Taxpayers are concerned about the implications of Ontario Hydro's debt for the fiscal health of the Province. This debt is guaranteed by the Province, and the taxpayers of Ontario are ultimately responsible for its disposition. The long-term debt is currently about \$33-billion, and is expected to decline to about \$28-billion by the end of 1998, which is the starting point of our financial impact analysis.

Our scenarios postulated a new financial holding company — the Ontario Hydro Acceptance Corporation (OHAC) — that would take over Ontario Hydro's assets and liabilities on January 1, 1999. OHAC would assume the responsibility for servicing and retiring Ontario

Hydro's debt. It would immediately transfer Ontario Hydro's assets to the new operating entities and take back debt in these corporations, based on commercially-oriented financial structures. OHAC would then begin to receive payments from these corporations (interest, grants equivalent to full taxes, dividends, and water rental fees), and would also receive funds from a special charge, the stranded asset charge, imposed at the transmission level.

In our analysis, the sum of the generation price, the transmission tariff, generation and line losses, the payments to non-utility generators, and the stranded asset charge constitute the wholesale price.

OHAC would use the payments it receives to service, retire and defease the remaining Ontario Hydro debt. OHAC could also make payments to the non-utility generators in accordance with their long-term supply contracts. See the Endnote for a further discussion on the contractual agreements with non-utility generators.

The Advisory Committee's analysis shows that in the five scenarios tested, it would be possible to defease fully the Ontario Hydro debt by 2005, while reducing the stranded asset charge and the wholesale price from year-to-year. By 2006, the stranded asset charge would no longer be needed, and its elimination would further reduce wholesale electricity prices at that time.

D

IMPACTS ON WHOLESALE ELECTRICITY RATES

Our analysis of the rate impacts of competition focused on the wholesale prices charged to distributors and large users. Wholesale prices account for some 85 per cent of the total costs incurred by distribution utilities, and constitute by far the largest portion of costs for most electricity consumers.

The Advisory Committee believes that a competitive market for electricity generation will result in significant pressure to reduce the prices paid to generators, which in turn will reduce the prices paid by electricity consumers.

Ontario Hydro has committed itself to a freeze on average wholesale electricity prices from 1996 to 2001.

The Advisory Committee's scenarios for a competitive market show that it is possible to do better than this — and indeed that wholesale prices can be reduced between 1999 and 2005, even while dealing with Ontario Hydro's overhanging debt. In 2006, wholesale prices would decline sharply, because the stranded asset charge would no longer be needed for debt reduction. In one set of scenarios ("B" and "D"), wholesale prices fall to 5.45 cents per kWh by 2006, almost 11 per cent less than the *status quo* projection. The other set of scenarios ("A", "C" and "E") shows wholesale prices falling to 4.45 cents per kWh in 2006, some 27 per cent less than the *status quo*.

It is important to recognize that any scenario reflects the assumptions it contains. The Advisory Committee is confident that the assumptions within this scenario analysis are both reasonable and conservatively drawn, although we did not model extraordinary events, such as system failures. These analyses should not be interpreted as forecasts, but rather as projections of the range of results that can reasonably be expected with the introduction of competition in Ontario's electricity system.



ENDNOTE – CONTRACTUAL AGREEMENTS WITH NON-UTILITY GENERATORS

The Advisory Committee recommends that non-utility generators be offered a partial buy-out of their remaining contractual obligations, so that they can actively participate in the competitive market for electricity generation.

As noted in Chapter 2, Ontario Hydro entered into contracts with non-utility generators in the late 1980s in anticipation of growing demands for electricity. These non-utility generation (NUG) contract costs place a significant and growing financial burden on Ontario's electricity system. By the year 2000, Ontario Hydro's existing contract purchases will represent eight per cent of total forecasted supply.

For NUG suppliers to contribute to the competitive generation system, they must have the opportunity to move away from these contractual obligations. We believe that NUGs can play an important role in furthering price competition and in introducing environmentally-sustainable power. Therefore, it is critical that these suppliers be encouraged to participate in the competitive market.

We recommend that non-utility generators be offered the opportunity to opt out of their existing contracts, with partial compensation. This would amount to a lump-sum payment in an amount less than the net present value of a full buy-out.

Our analysis treated the financial obligations of NUG contracts in a different manner than the recommendation because of the difficulty in determining the appropriate payment for such a partial buy-out. As in the case of asset sales, the financial obligations of a partial buy-out would depend on negotiations, in which many factors would have to be considered. In the scenario analysis, Ontario Hydro's existing NUG contracts were treated as an obligation of OHAC on an ongoing basis. The NUG contracts would represent a continuing obligation beyond 2005 if this method of compensation were adopted.

III

CONSULTATION PROCESS

The Terms of Reference directed the Advisory Committee to:

Consult broadly, through public forums, written submissions and other means, undertake research and foster dialogue to ensure that the views and concerns of all interested stakeholders and citizens are incorporated into the Committee's recommendations.

The Advisory Committee received hundreds of written submissions and letters, and also met with many individuals and groups. We were impressed by both the interest and the creativity demonstrated by these individuals and organizations.



THEMES

The Advisory Committee identified a number of recurring themes during the consultation process. The major issues and themes are summarized in this section.

Ontario needs reliable electricity.

The security of knowing that electricity will flow at the flip of a switch remains of vital importance, regardless of how much power you use or where you live. We were reminded that reliable electricity is an economic development tool, which attracts investment by industries that

cannot afford to lose production time or that have highly sensitive equipment. Dependable power is equally important to the agricultural industry, small businesses and individuals. Any changes to the existing electricity system must be managed carefully to avoid disrupting the reliable service Ontario enjoys today.

Some told us that reliable power is more important to electricity consumers than allowing competition. There was a concern that privately-owned generation companies, for example, might look at the bottom line and neglect maintenance or reduce service levels, which could translate into longer power outages. At the same time, we heard that a private company knows its product must be reliable if it is to attract and keep customers, and that the market will ensure adequate supplies are available when needed.

Remote or rural residential customers worried that competitive companies could view them as a group liability — customers that are too expensive to serve properly, or to serve at all.

In the area of service delivery, some participants expressed the opinion that smaller is better, and that municipal utilities are able to work

with other municipal crews to provide faster and more flexible local emergency response than Ontario Hydro. Others maintained that only a large organization, like Ontario Hydro, can muster the staff, equipment and expertise that are needed to respond to emergencies effectively.

Customers want reasonable, fair rates.

The cost of electricity was mentioned in almost every submission, presentation and letter to the Advisory Committee.

Some industry submissions indicated a freeze on electricity rates is not enough, and advocated a price decrease of as much as 30 per cent. We were told that Ontario risks plant closures if it cannot bring down its electricity costs, or match the flexibility offered in the United States. Higher costs for electricity create higher consumer costs for products and make it harder for Ontario business to compete in international markets.

We were also told that competition will reduce rates by bringing downward pressure on all electricity system costs, and by allowing businesses to pursue lower rates.

Not all residential consumers are convinced that industrial rates need relief. There are concerns that small users may be the most vulnerable because they lack market power. Some submissions expressed a fear

that costs to residential consumers will rise while industrial rates fall.

The electricity privatization experience in England was used both to support and oppose change. Although we were told that all customers are enjoying lower rates, we were also told that prices dipped briefly because of long-overdue business efficiencies, and are now starting to climb.

Some questioned whether consumers benefit from competition in other large industries, such as banking and insurance. They were concerned that a competitive electricity generation market could lead to windfall profits for a few, or result in foreign ownership.

Electricity must be produced in a manner that supports sustainable development.

The generation of electricity has a massive impact on Ontario's environment — from burning fossil fuels and building hydroelectric dams or transmission lines to managing nuclear facilities and promoting wise energy use. Ontario Hydro's environmental stewardship was applauded, and some warned that private companies may not be as diligent. We also heard, however, that private investors will promote higher efficiency, which will reduce both environmental risks and costs.

We were urged to find ways to promote renewable energy technologies and other sustainable forms of energy.

We were asked to consider ways to allow customers to select their preferred source for electricity, and to encourage time-of-day metering, which can help customers adjust consumption and avoid the need for new generation plants.

There was general agreement that the Government of Ontario must continue to regulate environmental standards, and that all players in the electricity market should be required to meet them.

Ontario's heritage hydroelectric generation facilities are precious resources.

We were told that hydroelectric generation is clean and cost effective, and that hydroelectric plants would continue to provide public benefits if they remain in public ownership.

In many cases, Niagara Falls was singled out as an especially precious heritage resource — a symbol of Ontario that is known worldwide. Some felt that there would be little public benefit or public support for private ownership of generating facilities associated with Niagara Falls, a Canadian “wonder of the world”.

Nuclear generating stations must be managed in a way that offers a high level of safety to the public and employees.

Plant employees and some nearby residents see Ontario Hydro's nuclear stations as the backbone of the local economy. We heard that Ontario is a leader in nuclear technology, and that

this gives Ontario's economy a strategic advantage.

There is widespread appreciation for Ontario Hydro's high standards that keep the nuclear stations safe for both workers and the community. While it was noted that the federal Atomic Energy Control Board will retain regulatory control over the nuclear facilities, there remained a great deal of discomfort about possible private ownership of nuclear power stations. It was also suggested that the nuclear stations should remain in one company because of the high level of specialized expertise needed.

Some argued that nuclear assets could not be moved to private ownership because investors may not want to assume the associated risks, for example, nuclear waste disposal and plant decommissioning. Others believed that there simply would not be sufficient interest in taking on ownership of a nuclear generating station.

There must be fair treatment of all customers — including those in rural or remote regions of Ontario.

Ontario's electricity system presents unique challenges. It serves remote and rural regions — including communities in the far north — as well as highly industrialized and densely populated areas.

Ontario covers a large area, much of which is sparsely populated, particularly in the north. Northern and remote customers said they are concerned they may be placed in

jeopardy because they are few in number and supplying their need for electricity is both expensive and difficult to meet.

The status of rural rate assistance.

The agricultural community pointed out the disadvantages of a farmer served by Ontario Hydro Retail, even with rural rate assistance, relative to one served by a municipal electric utility.

We were advised by some to end the current rate subsidy for rural residential users, while others advocated enhancing it.

Restructuring the industry will create opportunities.

Entrepreneurs throughout the province advocated options to support local electricity businesses in generation, distribution and other energy services. First Nation leaders see generation restructuring as an opportunity to encourage economic development in their communities.

Appropriate rules need to be in place to offer adequate protection without wrapping the industry in red tape.

We were told that Ontario Hydro should be freed from some of the rules under the *Power Corporation Act* so the utility can make business decisions without requiring government approval. At the same time, we were told that if the utility is given more freedom, it must be more accountable for the decisions it makes. Some suggested that Ontario Hydro be set up as a corporate body under the *Ontario Business Corporations Act*.

Many thought Ontario Hydro's role as a regulator of power rates placed the utility in a conflict because its retail business unit competes with municipal utilities for customers. There were suggestions that the involvement of Ontario Hydro and municipal electric utilities in other business activities, such as electrical contracting or selling technology, risked cross-subsidization of the competitive activities by the monopoly business.

We heard that regulations need to be in place to protect the environment; to promote the efficient use of energy; to ensure remote customers are served; to provide safe electrical inspections; to allow open access to the transmission grid; to manage water levels; and to avoid unfair competition between utilities, and electrical contractors and other businesses.

We were reminded that an open market and existing competition laws will provide a great deal of protection. We were asked to recommend ways to reduce the regulatory burden. The Ontario Energy Board was frequently cited as an agency that could monitor a competitive electricity market.

Ontario residents should have a say in any proposed changes to their electricity system.

Some Ontario residents want to be sure that their views were heard before any decisions are made about the future of Ontario Hydro and the municipal utilities. It was suggested that the Province hold a referendum.

Ontario taxpayers are concerned about Ontario Hydro's stranded assets and debts.

We learned of fears that private interests will be allowed to buy Ontario Hydro's most profitable assets — such as its hydroelectric plants — leaving the utility's debt and other, less attractive assets in public hands. This fear was heightened by the concern that the profits could leave the province if foreign ownership is allowed.

There were also concerns that open competition may allow large industries to strike attractive deals with private generators, which could raise the cost for remaining customers who have fewer options and less clout in the marketplace.

If change is needed, it should be introduced at a pace that ensures the greatest advantage for Ontario.

We were advised that if we recommend changes that are too cautious and try to design the perfect system, events will overtake us. Some believe the value of assets will decline as North America's competitive electricity market advances. Some noted an urgent need to address electricity rates to enable industry to compete.

Others told us that any changes introduced will be with us for a long time — so the implications must be carefully considered. Some submissions also recommended that we allow enough time to let Ontario Hydro reduce its debt to avoid stranded assets.

B

RESTRUCTURING THE ELECTRICITY SYSTEM

The Advisory Committee heard suggestions on a variety of ways to restructure all the elements of Ontario's electricity system. For example, most agreed the transmission grid is a natural monopoly, and that it should be separated from generation to ensure open, non-discriminatory access and fair tariffs for buyers and sellers.

The number of submissions and the complexity of the electricity system make it impossible to describe the many variations in detail. Creating a competitive environment involves changes to the generation (the sellers) and distribution (the buyers) sectors.

The following is an outline of some of the options offered to the Advisory Committee for restructuring generation and retail distribution.

1) GENERATION SCENARIOS

Maintain the *Status Quo*

The *status quo* would leave Ontario Hydro as a vertically-integrated, publicly-owned utility, providing wholesale electricity to distribution utilities, which in turn provide retail electricity to customers. Since Ontario Hydro has shown improvements in the last few years, some submissions argued that there is no need for major change.

Create One Public Generation Company

This scenario would separate Ontario Hydro's functional business units — perhaps as distinct companies under the Ontario *Business Corporations Act* — and keep the generation unit together. It was suggested that the resulting publicly-owned generation company would be an effective competitor in the North American market.

Create One Public-Private Generation Company

Some submissions favoured a public-private partnership by creating one generation company and selling shares in it to Ontario residents, including encouraging employee investment. A method of enabling electricity customers to take an equity interest was proposed. This model would raise equity to help pay down the debt, while keeping generation under public control.

Create Several Generation Companies

There were a number of suggestions for dividing Ontario Hydro's generation assets into several competing companies — which could be publicly- or privately-owned. Some submissions suggested separate nuclear, hydroelectric and fossil fuel companies; others preferred a blend of fuel technologies in each of the competing companies. There was interest both in keeping hydroelectric power under public ownership because it offers the most value at the least risk, and in publicly-owned

nuclear stations because of potential safety concerns.

Create a Number of Integrated Regional Utilities

Several submissions and presentations invited the Advisory Committee to consider vertically-integrated utilities in specific regions or counties.

11) DISTRIBUTION SCENARIOS

The Advisory Committee notes that there has been extensive review and discussion already about ways to rationalize Ontario's retail electricity distribution system. Most recently, the Municipal Electric Association (MEA) and Ontario Hydro released an interim report from a joint study that assessed a number of options for structuring the distribution system. The study found that all options would deliver customer satisfaction and reliability. Other criteria used included cost, rate equity, ability to deliver a range of services, customer influence, local accountability and ease of implementation. Appendix F sets out the results of the review.

The following proposals for the retail distribution system do not necessarily have to be considered on their own — elements of each can be combined.

The Status Quo

The current retail distribution system of 307 municipal electric utilities (MEUs) provides local accountability and good service. Ontario Hydro Retail provides services to areas not served by municipalities. Some submissions recommended leaving the existing retail system intact.

Build on the Bill 185 Method

Bill 185 amended the *Power Corporation Act* to allow 52 MEUs that were not serving their entire municipality to expand service to their municipal boundaries, thereby assuming responsibility for Ontario Hydro Retail customers. The legislation was passed in 1994 after years of work by all affected parties, including Ontario Hydro, the MEUs and their labour representatives.

The legislation sets out the matters to be considered before considering an extension: the long-term potential growth and development of the municipal corporation; the effects on the adjoining rural power district; and the effects on the supply of power to adjacent municipal corporations.

The MEA identified the following as issues that have arisen at the mandatory public meetings on extension by-laws: rate level and classes; service policies; emergency response; reliability standards; disaster recovery cost; the *Labour Relations Act* and union jurisdiction; and financial and operational risk.

Shoulder-to-Shoulder MEUs

Under this scenario, existing MEUs would expand their boundaries to meet their neighbouring MEU, thereby absorbing Ontario Hydro Retail's customers, assets and liabilities.

Regional/County/District Entities

In this scenario, MEUs would consolidate to create a regional/county/district entity. The assets and liabilities would move with the customers in merging MEUs and absorbing Ontario Hydro Retail. Each municipality would have an equity interest in "Regional/County/District Power" proportional to the assets it contributed to the entity.

Rationalization Linked with Municipal Restructuring

We were told that since municipal restructuring is currently being studied, the number of municipalities could be reduced and a broader-based municipal/county structure might be created. The service area of a distributor would change to be the same as the new municipal boundary.

Local Option for Services

The municipal responsibility of providing utilities (electricity, water, sewage) would be with the upper tier of municipal government. Revenues from the provision of utilities would be used to operate, maintain and develop utility services, and not for other municipal services.

Bill 26 (*Savings and Restructuring Act, 1995*) sets out a broader alternative in that it gives flexibility to municipalities to determine which municipal level, the upper or lower tier, will provide services or facilities (as prescribed in the regulations).

Electricity Co-operatives

Many MEUs currently participate in co-operatives and pay a pro-rated share (based on usage) for services such as billing, collection, general administration, information systems, operations, environmental issues, emergency communication and workforce response planning, rate-setting, metering, public awareness and safety, work procedures, energy management, training, human resource management, purchasing, and major equipment and tool resources. This concept would be expanded to include bulk power purchases.

Five to 20 Regional Utilities

In this scenario, the MEUs and Ontario Hydro Retail would be merged and regrouped into a number of stand-alone regional utilities responsible for distribution in defined geographical areas. A region would be based on a combination of factors, including critical size for operating efficiency, natural geographical boundaries, and compatibility with the current system.

Separation of Ontario Hydro Retail

All distribution now carried out by Ontario Hydro would be given to a separate, stand-alone entity. One version of this scenario would see this entity with a mandate to assist the local assumption of responsibility for areas covered by Ontario Hydro Retail; eventually, this entity would disappear.

An alternative version would be to maintain the entity as a separate distributor, as either one organization — Ontario Rural Retail Utility — or more, for example, Northern Ontario Distribution Company and Southern Ontario Distribution Company.

One Distribution Company

The MEUs and Ontario Hydro Retail would merge to form one large distribution company serving the entire province. The company's shareholders would be Ontario's municipalities and there would need to be regional offices.

One Wires Company

One wires company would be formed to consist of the distribution systems of the local utilities with Ontario Hydro's transmission and retail wires assets. The municipalities would be the shareholders in this one large wires company. As with the single distribution company model, there would be a need for the company to maintain regional offices.

Ontario *Business Corporations Act* Company

This option would eliminate the elected/appointed municipal utility and replace the municipal utility (a statutory body) with a corporate body established under the Ontario *Business Corporations Act*. In each company, the sole shareholder would be the municipality. As the

representative of the sole shareholder, the municipal council would control the company by appointing a board of directors. If the company was formed from more than one MEU, the shares would be held proportionately by the owner-municipality, according to the value of the assets each owner invested in the corporation.

IV

THE TRANSITION TO COMPETITION

A**THE IMPLEMENTATION OF
REFORMS**

The Advisory Committee believes that an orderly transition to a competitive electricity system will require a phased process in which the necessary reforms can be planned, developed and implemented.

Electricity consumers will need to be comfortable with the pace of change, and should be offered appropriate opportunities to be involved in the process where possible.

There are three types of decisions needed in reforming Ontario's electricity system: policy decisions, implementation decisions, and decisions about maintaining the new system. In this chapter, the Advisory Committee outlines the major activities associated with a phased transition.

**1) PHASE 1: Laying the
Foundation for Competition: Prior
to Passage of New Legislation**

Phase 1 lays the foundation for reform with the announcement of the decision to move to a new system and the initiation of legislative, regulatory and policy reform. Structural reforms are focused on the creation of an independent transmission system, internal restructuring of Ontario Hydro's generation assets, and the

rationalization of the distribution sector.

Policy Activities

a) It is essential that the electricity system operate in a stable and predictable policy environment. In the near term, as the Government is developing its overall structure for the electricity system, it would not be appropriate for Ontario Hydro to pursue new strategic policy directions or undertake large new capital expenditures. Also, Ontario Hydro Retail should not pursue opportunities to expand its electricity distribution business into new territory.

We anticipate that Ontario Hydro would not pursue activities in this interim period that might conflict with the public interest. However, should it be necessary to restrict Ontario Hydro's activities in this phase, the Minister of Environment and Energy could issue a policy directive to Ontario Hydro under Section 10 of the *Power Corporation Act* to direct Ontario Hydro in the exercise of its powers and duties.

b) The Advisory Committee emphasizes the importance of an early public announcement of the structure of the new electricity

system. A clear enunciation of the direction of the reforms is needed to enable participants to adjust operations and make business decisions that support the proposed reforms. Uncertainty can be very destabilizing, and also create barriers to change.

- c) There are a number of reforms that can be initiated within the current legislative framework. However, the more substantive reforms associated with moving to competition cannot be introduced without legislative change. New legislation to replace the *Power Corporation Act* and supporting statutes and a new regulatory framework must be developed. The Government will carry the responsibility for developing and introducing the new legislation and regulations.
- d) As the details of the reforms embodied in the legislative and regulatory frameworks are developed, the Advisory Committee supports the provision of adequate opportunities for public consultation. In the course of our review, we heard from many sectors that the public is very interested in the future of Ontario's electricity system, and that many groups and individuals are looking forward to further opportunities to provide their input and comments.

Implementation Activities

- e) There will be many activities associated with the planning, development and introduction of reforms, consistent with the policy direction set by the Government. The diversity of issues to be addressed in reforming the electricity system will require a process for providing input and direction from a wide range of stakeholders, as well as a number of Ontario Government ministries.

The Ontario Hydro Board of Directors and staff will play an important role in restructuring the utility's operations. The Advisory Committee, however, does not believe that Ontario Hydro should control the implementation process.

- f) The Advisory Committee believes that an appropriate initial step in moving to competition is the establishment of a separate transmission grid entity to provide equitable access for all generators supplying electricity in Ontario. The transmission grid of Ontario Hydro should be set up as a corporate body under the Ontario *Business Corporations Act*, pursuant to Section 75 of the *Power Corporation Act*, to form the Transmission Grid Company.
- g) The system operator function, which is currently provided by Ontario Hydro's Clarkson System

Control Centre, should initially be set up under the umbrella of the Transmission Grid Company. This will facilitate the implementation process, and is appropriate given the close operating linkages between the transmission and central system control functions of Clarkson. Rules, policies and procedures governing the activities of the System Operator must be established.

- h) The introduction of an independent operating Electricity Exchange to support wholesale competition cannot occur prior to the introduction of new legislation. However, in anticipation of the passage of legislation, the long lead time needed to develop the Exchange's technical infrastructure argues for the early initiation of some of the preliminary planning and design. There may be some liaison required with financial markets. Rules, policies and procedures governing the activities of the Electricity Exchange must also be established.
- i) The Ontario Hydro Acceptance Corporation should be established as the financial holding company, as outlined in Chapter 14 — Financial and Electricity Rate Impacts.
- j) Ontario Hydro has already introduced changes in its business unit operations that enable nuclear, hydroelectric and fossil fuel generation to be treated as distinct, competing entities within the

utility's monopoly operation. These changes provide important groundwork for reforms, which will need to be introduced to prepare for a truly competitive generation market.

The Advisory Committee recommends that, in this pre-legislation stage, Ontario Hydro further restructure its business units, in particular:

- The hydroelectric generation assets on the Niagara River should be set up as a corporate body under the Ontario *Business Corporations Act*, pursuant to Section 75 of the *Power Corporation Act*.
- The nuclear generation business unit should be set up similarly as a separate corporate body. Four distinct, competing entities should be established within that single nuclear company.
- The remaining hydroelectric and fossil fuel generation facilities should be reconfigured into business units appropriate to support the move to the Government's vision of a competitive market for power generation.

While still technically part of Ontario Hydro, these companies and business units would operate as independent businesses to the greatest extent possible. Appropriate financial, reporting and record-keeping procedures would be designed and implemented.

- k) The Advisory Committee believes that Ontario Hydro should be directed to deal with Ontario Hydro International Inc. in accordance with the Government's announced policy.
- l) Reforms to the distribution system require legislative change, but can be initiated at an early stage. We believe that the Government must announce its view of the system, and then quickly move to work with all players and affected groups towards implementation. In particular, the rationalization of the municipal electric utilities and the preparation for the transfer of Ontario Hydro Retail operations into the local distribution structure will require the Government to work closely with all key players in the distribution system, including the municipalities, the Municipal Electric Association, Ontario Hydro and the labour unions.

Regulatory Activities

- m) The Ontario Energy Board should be developing the practices, procedures and regulatory treatment governing the activities that it will be monitoring and regulating.

11) PHASE 2: New Legislative Framework In Place

Phase 2 activities take place once the new legislation has been adopted, and government policy can be implemented.

Reforms in this phase focus on establishing multiple generation companies and developing fiscal reforms

to level the playing field for electricity generators. An independent System Operator is established. The distribution system undergoes further change as Ontario Hydro Retail's assets are transferred and distribution entities are required to keep separate their distribution wires business from their electricity sales and energy services businesses. The regulator assumes its new responsibilities with respect to the electricity system.

Policy Activities

- a) The fiscal initiatives recommended in Chapter 8 — Electricity Generation — to level the playing field between privately-owned and publicly-owned generating companies should be developed and implemented.

Implementation Activities

- b) With the passage of new legislation, further companies should be set up to take over Ontario Hydro's generation assets. This action, together with the Niagara River hydroelectric and the nuclear generation companies, will result in a number of publicly-owned generation companies.

We recognize that it may not be practical to have several companies report directly to the Minister of Environment and Energy.

Therefore, the Government could consider creating a generation holding company, to which all the publicly-owned generating companies would report. This holding company should be

specifically charged with ensuring that the companies reporting to it operate on an arm's length basis to each other, and as distinct, competing entities.

- c) Appropriate decisions should be made to deal with Ontario Hydro Technologies in conjunction with the restructuring of Ontario Hydro's generation assets.
- d) With the new legislation in place, the System Operator should be established as a stand-alone operating entity, independent of the Transmission Grid Company.
- e) With the new legislation in place, the rationalization of municipal electric utilities can be completed. The transfer of Ontario Hydro Retail assets should be carried out. At this point, the distribution entities should be keeping separate their business activities relating to the distribution wires services, and those relating to electricity sales and energy services.

Regulatory Activities

- f) With the new legislation in place, the Ontario Energy Board assumes regulation over the monopoly activities — the transmission system and the distributors. The OEB would also assume regulatory oversight of the generation market to ensure that anti-competitive practices do not evolve during the transition to a competitive market in electricity generation.

III) PHASE 3: Introduction of Wholesale Competition

Phase 3 is marked by the introduction of wholesale competition. The Electricity Exchange also becomes fully operational.

- a) With the necessary legislation passed, and the technical infrastructure in place to support the operations of the Electricity Exchange, competition in the wholesale electricity market can be introduced, and generators can compete to supply power at the wholesale level, as defined by Government policy.

IV) PHASE 4: Furthering Competition in Generation

Phase 4 provides opportunities for private equity to be phased into the restructured generation sector, and also begins the process of moving toward full retail competition.

Policy Activities

- a) The Government would oversee the process of introducing private equity into generation. This process could be initiated during any stage of the transition.
- b) Planning and preparation should be undertaken to ensure an orderly introduction of full retail competition.

V) PHASE 5: Introduction of Retail Competition

Phase 5 sees the phased introduction of retail competition. Full retail competition marks the final stage of reform to the electricity system, with all customers having access to the supplier of their choice for electricity.



MOVING FORWARD

The Advisory Committee believes that the *status quo* should not be maintained. It is our view that the pressures for change already exist, and that they will gain momentum in the future. We support the introduction of change to the province's electricity system and the phasing in of competition, to provide Ontario's consumers with access to the benefits of a competitive market in electricity.

The Advisory Committee's work took place in the shadow of drastic decline in Ontario Hydro's fortunes during the 1980s. During that time there were dramatic increases in both the utility's debt and the cost of electricity to customers, and Ontario's status as a jurisdiction that offers attractive energy prices was eroded. Even the best of organizations suffer setbacks; and vesting such a heavy responsibility in a monopoly meant that when there were mistakes the impact of the errors would be greatly magnified.

We are, therefore, recommending that Ontario move to a system that is not only competitive in costs, but also in ideas and approaches.

In proposing a framework to provide a competitive electricity market for today's customers, we are promoting a competitive market for new ideas, new technologies and new economic circumstances. Many management teams will be competing for the right answers — and if they are wrong, their mistakes will be made at their own cost, rather than at the cost of all electricity users. We believe our recommended framework creates a better opportunity to bring lower costs to consumers, and also represents a more flexible and dynamic environment for accommodating change.

We live in a world of global economic competition. Over the past five months, the Advisory Committee has been witnessing the extent to which the existing boundaries in electricity are in the process of breaking down — in North America and on other continents. Ontario has the technical skills and the geographical position to be an effective competitor in a larger marketplace. Yet Ontario does not have a natural advantage based on hydroelectricity — unlike our neighbours in Manitoba and Quebec. Rather, our advantage will have to be developed from our technical skills, good management, and our adaptability to change — all of which

are most likely to be maintained and enhanced in an open, competitive market.

Ontario Hydro has been a great institution. But the utility's failures in the 1980s also confirm that it was an institution appropriate for different times and that conditions in 1996 are vastly different than those in 1906. The monopoly with which Ontario Hydro was endowed, and to which the people of Ontario have grown accustomed, is no longer suitable in today's competitive, changing world.

Ontario's existing electricity system has grown and evolved over the course of this century, and the shift to a new era in electricity will take time. During the transition to a new system, the Government must work within the structure it inherited, continue to monitor the market where competition does not exist, and prepare consumers for change.

We believe that the people of Ontario will accept change, provided that the reforms and the process are clearly communicated, and the benefits of competition are clearly understood. Our approach, therefore, supports an orderly transition to a competitive electricity system.

The Advisory Committee believes that the changes recommended in this report are appropriate, and that they will set in motion the competitive forces that will shape Ontario's electricity system in the 21st century.

APPENDICES



TERMS OF REFERENCE

November 2, 1995

ADVISORY COMMITTEE ON COMPETITION IN ONTARIO'S ELECTRICITY SYSTEM

PRINCIPLES

1. In support of its commitment to remove barriers to growth, the Government of Ontario has identified the need to examine potential changes at Ontario Hydro to bring it back to its proper role of providing reliable and affordable electrical power to Ontario, and to respond to the potential impacts of changing technology and international economic trends in the electricity sector.
2. The Government of Ontario is committed to upholding the objectives of sustaining affordable electricity rates, enhancing provincial competitiveness, preserving financial soundness and safeguarding Ontario's quality of life.

FRAMEWORK

1. Examine the economic, technological and public policy trends facing Ontario Hydro and the provincial electricity system and assess existing barriers to change.
2. Make recommendations on the structural, legislative, regulatory and, potentially, ownership reforms required to ensure Ontario Hydro and the provincial electricity system are poised to meet the competitive challenges of the 21st century.
3. Investigate and assess options for phasing in competition in Ontario's electricity system in the following areas:

a) Structural change options for phasing in competition, including:

- i) "Unbundling" of Ontario Hydro's generating, transmission and distribution functions into distinct companies;
- ii) Competition among Ontario Hydro and private generators to sell power to a single power pool, directly to municipal electric utilities, and/or directly to end customers;
- iii) Enhancing the efficiency of the electricity distribution sector.

b) Enhanced competition through establishment of an appropriate regulatory framework, including:

- i) Identification of the role of the regulator in ensuring that a fair competitive market in electricity is developed;
 - ii) Identification of areas where regulation will be required to ensure customer protection;
 - iii) Identification of impacts of a more competitive market on other regulations or standards governing or carried out by Ontario Hydro, for example, regulation of the municipal electric utilities.
- c) **The relative benefits and consequences of options for introducing private equity as a means of enhancing competition in Ontario's electricity system, including:**
 - i) Sale of non-essential business operations, such as Ontario Hydro International, Incorporated;
 - ii) The sale of Ontario Hydro's generating assets, as one or more private generating companies.
4. Review existing submissions and models for reform of Ontario's electric utility industry, including Ontario Hydro, municipal electric utilities, and other electric utilities in the province.

The assessment of these proposals shall include, but not be limited to, an appraisal of potential impacts and considerations with respect to:

 - Affordable electricity rates for all classes of customers;
 - Achievement of greater economic efficiency;
 - Power system reliability and obligation to serve;
 - Economic competitiveness and regional economic impacts;
 - Implications for public finance, including public sector indebtedness and provincial/municipal government revenues;
 - First Nations and aboriginal issues;
 - Electricity trade and energy security;
 - Arrangements for nuclear power;
 - Local accountability;
 - Sustainable development.
5. Consult broadly, through public forums, written submissions and other means, undertake research and foster dialogue to ensure that the views and concerns of all interested stakeholders and citizens are incorporated into the Committee's recommendations.
6. Complete its work and deliver its final report to the Minister of Environment and Energy by April 30, 1996.

B

BIOGRAPHIES

The Honourable Donald S. Macdonald is counsel at the Toronto office of McCarthy Tetrault. Mr. Macdonald was a member of Parliament from 1962 to 1978, and served as President of the Privy Council, Minister of National Defence, Minister of Energy, Mines & Resources, and Minister of Finance. From 1978 to 1988, he was a partner in McCarthy & McCarthy, Toronto, and during that period served as Chairman of the Royal Commission on the Economic Union and Development Prospects for Canada (the “Macdonald Commission”). He was Canada’s High Commissioner in Britain from 1988 to 1991. Mr. Macdonald is a director of a number of Canadian and American corporations. He is a member of the Queen’s Privy Council for Canada and a Companion of the Order of Canada.

Jan Carr is the Vice-President, Transmission and Distribution Division, for Acres International Ltd., a Canadian engineering consulting firm. Dr. Carr has more than 22 years of professional experience in the power utility field, and has worked in both the public and private sectors. He served as an elected utility commissioner and chairman in Niagara-on-the-Lake, and was active in the Municipal Electric Association — as a member of several working committees, chairman of the Niagara District, and a member of the MEA’s board of directors.

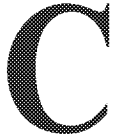
Robert Gillespie is Chairman and CEO, General Electric Canada, a manufacturer of electrical products. Mr. Gillespie joined GE in 1952 as a communications equipment design engineer, and held various senior positions until being named chairman in 1993. He serves as a director for several other companies as well as a number of GE subsidiaries, and for the Canadian Chamber of Commerce. As well, he chairs the Canadian Council for International Business, and is vice-chairman and director of the Canadian Standards Association. Mr. Gillespie has chaired the Electrical and Electronic Manufacturers’ Association of Canada, and was president of the Canadian Appliance Manufacturers’ Association and the Association of Professional Engineers of Ontario.

John Grant received a Ph.D. in 1964 from the London School of Economics. After returning to Canada, Dr. Grant joined the investment firm of Wood Gundy, where he was director and chief economist from 1973 to 1991. For almost two decades, he led a team of four economists at Wood Gundy that was engaged in forecasting the Canadian and U.S. economies, with special emphasis on financial markets. He retired from Wood Gundy in 1993, and currently teaches courses in macroeconomics and environmental economics at the University of Toronto.

Darcy McKeough was a member of the Ontario Legislature from 1963 to 1978, and served as Minister of Municipal Affairs, Minister of Treasury, Economics and Intergovernmental Affairs and Minister of Energy. He was president and CEO of Union Gas from 1979 to 1986, and of Redpath Industries in 1988 and 1989. Mr. McKeough holds honorary doctorates from the University of Western Ontario and Wilfrid Laurier University, and was appointed an Officer of the Order of Canada in 1994. He is a director of a number of Canadian and U.S. companies, and Chairman of the John P. Robarts Research Institute.

Sylvia Sutherland served two terms as mayor of Peterborough, from 1985 to 1991. During this period, Mrs. Sutherland founded the Peterborough Committee on Sustainable Development, the first municipal roundtable on the subject on Canada. She was a member of the city's Police Commission, the Utilities Co-ordinating Committee, the Utility Services Advisory Committee and also served with the Canadian Manufacturers' Association. Mrs. Sutherland has been chair of the Municipal Electric Association's environmental advisory committee, and a member of Ontario Hydro's environmental advisory committee.

Leonard Waverman is Professor of Economics and Director, Centre for International Studies, at the University of Toronto. Since 1990, he has been on the executive council of the International Association of Energy Economists, and editor of *The Energy Journal*. Dr. Waverman has written about the economics of energy and resources, public utilities, and industrial organization and public policy, and recently contributed to an international survey of changes in electricity systems around the world. He has also served as a part-time member of the Ontario Energy Board.



PARTICIPANTS

The following individuals and organizations participated in the consultation process of the Advisory Committee on Competition in Ontario's Electricity System.

Ajax Hydro-Electric Commission
Alcan Rolled Products Company
Algonquins of Golden Lake First Nation
Almonte Hydro
Amherstburg Public Utilities Commission
AMTIM Management Consulting
Anderson, Donald
Andrews, Stephen
ARA Consulting Group Inc.
Association of Major Power Consumers of Ontario
Atikokan Hydro
Atomic Energy of Canada Limited

Bayliss, Frank
Belleville Utilities Commission
Blenheim Public Utilities Commission
Blohm, Robert
Blue, Ian
Bobcaygeon Public Utilities Commission
Bracknell Corporation
Bradford/West Gwillimbury Public Utilities Commission
Brampton Hydro
Brantford Public Utilities Commission
Brantford Township Hydro Electric Commission

Brockville Public Utilities Commission
Brown, Paul
Bureau of Competition Policy, Industry Canada

Caledon Hydro
Cambridge Energy Research Associates
Campbell, Robert
Cambridge & North Dumfries Hydro Electric Commission
Canadian Association of Energy Service Companies
Canadian Chemical Producers Association
Canadian Energy Efficiency Alliance
Canadian Institute for Environmental Law & Policy
Canadian Niagara Power Company Limited
Canadian Nuclear Association
Canadian Nuclear Workers' Council
Canadian Petroleum Products Institute
Canadian Solar Industries Association
Canadian Union of Public Employees, Ontario Division
Carter, Cyril
Carvalho, Viviano
Cassidy, Michael (The Ginger Group)
Chalk River Hydro Electric Commission
Chatham Hydro
Chiefs of Ontario
Churley, Marilyn, NDP MPP
CIBC Wood Gundy
Citizens for Renewable Energy

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Clifford, Bill	Ferguson, Paul D.
Collie, Dave	Frey, Charles
Collingwood Public Utilities Commission	Gananoque Light and Power Limited
Committee for Competitive Electricity in Ontario	Gananoque Steel and Forging/Manchester Plastics Limited
Communist Party of Canada (Ontario)	Garner, Mark
Consumers Association of Canada	Gibson, Alan
Cook, Stephen	Gloucester Hydro Electric Commission
Cornwall Electric	Goldman, Sachs Canada
Cummings, Kealey	Gordon, Myron
Cunningham Gregory + Company	Goulbourn Hydro
Cuthbert, Doug	Grand Bend Public Utilities Commission
Daniels, Ron	Gravenhurst Hydro Electric Commission
Deseronto Public Utilities Commission	Great Lakes Power Limited
Deutsche Morgan Grenfell Canada	Greater Peterborough Chamber of Commerce
Dresden Utilities Commission	Green Energy Coalition
Drinkwalter, David	Grey Bruce Labour Council
Dunnville Hydro Electric Commission	Grimsby Hydro Electric Commission
East York Hydro	Guelph Hydro
Electrical Contractors' Association of Ontario	Haavisto, Fred
Energy Action Council of Toronto	Haldimand Hydro
Energy Advantage Inc.	Halpern, Paul
Energy Cost Management Inc.	Halton Hills Hydro Electric Commission
Energy Probe	Henney, Alex
Environment Canada	Hopcroft, Grant
Essex Public Utilities Commission	Howse, Robert
Etobicoke Hydro	Hunter, Ron
Exeter Public Utilities Commission	Hunter, Vivian
Falconbridge Limited	Hydro Mississauga
Federation of Ontario Cottagers' Associations Limited	INCO Limited
Fenelon Falls Board of Water, Light and Power Commissioners	Independent Power Producers' Society of Ontario
	Indian and Northern Affairs Canada

Industrial Gas Users Association	Millbrook Public Utilities
Ingersoll Public Utilities Commission	Commission
Innisfil Hydro	Milton Hydro Electric Commission
Integrated Energy Development Corporation	Moore, Bill
International Brotherhood of Electrical Workers	Moose Cree First Nation
Jean, Jerry	Morgan Stanley & Co. Inc.
Joore, T.H.	MPR Associates
Joskow, Paul	Municipal Electric Association
J.P. Morgan Securities Ltd.	Municipal Electric Association, District 1
Kanata Hydro	Municipal Electric Association District 3
Kehoe, Frank	Municipal Electric Association District 8
KEMA-ECC Inc.	Municipal Electric Association District 9
Kingston Public Utilities Commission	Murdock, Claire
Kingsville Public Utilities Commission	Nanticoke Hydro Electric Commission
Kitching, Jim	Napanee Hydro Electric Commission
Klohn-Crippen Consultants Ltd.	Natural Resources Canada
Kroeger, Arthur	Nepean Hydro Electric Commission
Lawler, Wes	Nesbitt Burns
Leamington Public Utilities Commission	Newbury, Roger
Limebeer, John	Niagara Falls Hydro
Lincoln Hydro Electric Commission	Nishnawbe-Aski Nation
Lindsay Hydro-Electric System	North York Hydro Commission
London & District Labour Council	Northumberland County
London Hydro Electric Commission	Novacor Chemicals - Canada
Makivirta, Taisto	O'Dell, Peter
Marcello, Carmine	Omeme Hydro
Markham Hydro Electric Commission	Ontario Cable Association
Marsh & McLennan Limited	Ontario Chamber of Commerce
Mathewson, Frank	Ontario Coalition of Integrated Waste Management
McVey, Elmer	Ontario Electrical League Contractors' Committee
Merrill Lynch Canada Inc.	Ontario Energy Board
Middlesex Federation of Agriculture	Ontario Energy/Environment Caucus
Midland Walwyn Capital Inc.	Ontario Federation of Agriculture

Ontario Federation of Labour	Reed Consulting Group
Ontario Forest Industries Association	Remiz, Frank
Ontario Hydro	Regional Municipality of Ottawa-Carleton
Ontario Mining Association	Richardson Greenshields of Canada Limited
Ontario Ministry of Economic Development, Trade & Tourism	Ridgetown Public Utilities Commission
Ontario Ministry of Finance	Robb, Gordon
Ontario Ministry of Municipal Affairs and Housing	Roman, Andrew
Ontario Ministry of Natural Resources	Round, Leonard
Ontario Ministry of the Solicitor General and Correctional Services	Rudd, Dave
Ontario Natural Gas Association	RUN Community Task Force
Orillia Water, Light & Power Corporation	Sam Horton Consulting
Ottawa-Carleton Economic Development Corporation	Sarnia Hydro
Ottawa Hydro	Sarnia Lambton Chamber of Commerce
Palmer, William K.G.	Scarborough Public Utilities Commission
Paris Public Utilities Commission	Scharfenberg, Roland
Pelham Hydro Electric Commission	Schrama, Peter
Pembroke Hydro Electric Commission	Scott, P.J.
Perth Public Utilities Commission	Scugog Hydro
Peterborough & District Labour Council	Seethapathy, Ravi
Peterborough Utilities Commission	Simcoe Hydro Electric Commission
Petro-Canada Products	Simms, David
Petrolia Public Utilities Commission	Simonsen, Peter
Pickering Hydro-Electric Commission	Société de Transmission Électrique de Cedars Rapids Limitée
Point Edward Public Utilities Commission	Society of Ontario Hydro Professional and Administrative Employees
Port Hope Hydro	Sole, Fred (Huron Consultants)
Power Workers' Union	Somerville, Bill
Power Workers' Union, Division 9	South Bruce Impact Advisory Committee
Prescott Public Utilities Commission	Southern Electric International
Pugh, Randy	Springwater Hydro Electric Commission
RBC Dominion Securities Inc.	St. Catharines Hydro-Electric Commission

St. Mary's Paper Ltd.	Union of Ontario Indians
St. Thomas Public Utilities Commission	Wabaseemoong Independent Nations
Stein, Amy	Wallaceburg Hydro-Electric Commission
Stirling Public Utilities Commission	Wasaga Beach Hydro Electric Commission
Stratford Public Utilities Commission	Waterloo, Wellesley and Woolwich Hydro Electric Commission
Sudbury and District Labour Council	Welland Hydro Electric Commission
Sudbury Hydro	Wells, Thomas
Technology Applications Inc.	West Lincoln Hydro Electric Commission
Tellus Institute for Resource and Environmental Strategies	West Lorne Public Utilities Commission
Tembec Inc.	Windsor Utilities Commission
Thamesville Public Utilities Commission	Winchester Hydro Commission
Thessalon Hydro Electric Commission	Woodstock Public Utilities Commission
Thorold Hydro Electric Commission	Woodville Hydro Electric Commission
Thunder Bay Chamber of Commerce	Whitaker, Lynne
Thunder Bay Hydro-Electric Commission	Whiteside, Robert
Tilbury Public Utilities Commission	Whittaker, Donald
Tippelt, Robert	Wilson, Hamish
Toronto District Heating Corporation	Winter, Ralph
Toronto Dominion Securities Inc.	York Hydro
Toronto Hydro	Young, Rev. Gordon
Township of Tay Hydro Electric Commission	Zurich Hydro Electric
TransAlta Corporation	
Trebilcock, Michael	
Trent University	
Tweed Hydro Electric Commission	

RELEVANT LEGISLATION

D

ONTARIO

Consolidated Hearings Act
Employment Equity Act
Environmental Assessment Act
Environmental Protection Act
Expropriations Act
Freedom of Information and
Protection of Privacy Act
Human Rights Code
Intervenor Funding Project Act*
Labour Relations Act
Municipal Act
Municipal Franchises Act
Occupational Health and Safety Act
Ontario Energy Board Act
Ontario Water Resources Act
Pay Equity Act
Pension Benefits Act
Power Corporation Act
Public Utilities Act
Regional Municipalities Act
Social Contract Act*
Toronto District Heating
Corporation Act
Workers' Compensation Act

*sunset legislation

CANADA

Atomic Energy Control Act
Canada Labour Code
Canadian Environmental
Assessment Act
Canadian Environmental
Protection Act
Canadian Human Rights Act
National Energy Board Act
North American Free Trade
Agreement Implementaion Act
Nuclear Liability Act
Transportation of Dangerous
Goods Act



FINANCIAL AND ELECTRICITY RATE IMPACTS

Consistent with the Terms of Reference that asked the Advisory Committee to uphold the broad objectives of affordability and financial soundness, we have analysed the direction of our proposals to assess the impacts of these recommendations on electricity consumers and taxpayers in the Province.

To analyse these impacts, the Committee prepared a set of scenarios that modelled some of the major recommendations of the Committee and imposed them on a financial model of Ontario Hydro. The scenario results were compared to a *status quo* Base Case that perpetuates the current monopoly structure. This scenario analysis is not exhaustive (it was confined to changes at the generation, transmission and Ontario Hydro retail distribution levels; competitive impacts at the MEU distribution level were not modelled), but key alternatives were investigated, including different levels of generation prices and changes to costs from efficiency improvements.

Under conservative assumptions, the results of this analysis show that the key recommendations of the Advisory Committee are likely to result in wholesale electricity rates lower than the status quo projection without imposing a burden on taxpayers.

A

CONTEXT OF THE ANALYSIS

Ontario Hydro provided its Base Case scenario, a *status quo* outlook through 2005. The information in this scenario included projections of revenues, costs, prices and balance sheet data in sufficient detail to disaggregate the corporation into its component parts. We used the macro-economic assumptions of the Base Case for GDP growth and inflation, and its projections of Ontario's electricity requirements, but imposed a different corporate structure on the financial model from 1999 onward.

We were provided the use of a financial model of Ontario Hydro by one of the financial institutions, who also gave advice on appropriate valuation methods and capital structures for the new, disaggregated companies. **However, the analysis and conclusions are our own.**

The intent of the analysis was to quantify the impacts of a proposed corporate restructuring and the imposition of open competition in generation on three key issues, namely:

- how wholesale electricity rates would be affected;

- how Ontario Hydro's debt could be appropriately dealt with; and,
- how the new business entities might be organized to compete successfully in a mixed ownership environment.

The restructuring recommendations were assumed to come into effect on January 1, 1999. This assured time to establish the key institutions of the new, competitive wholesale electricity market (the offices of the System Operator and the Electricity Exchange), to reorganize the municipal electric utilities for their new and more demanding roles, and to establish a new regulatory regime. In the period prior to January 1, 1999, Base Case conditions were assumed to prevail.

It is important to say at this point that any such exercise, however complex it may be, can only be as good as its underlying assumptions. The Advisory Committee's intent was not to prepare an accurate forecast of electricity market conditions, but rather simply to illustrate some of the implications of adopting different corporate structures.



RESTRUCTURING ASSUMPTIONS

The restructuring assumptions in this analysis do not replicate all the Advisory Committee's recommendations. In many cases, this simply reflects the fact that the recommendations do not have definite financial implications. However, there are some specifics that deserve comment.

As one example, we did not model the effects of asset sales to the private sector. In the scenarios that we created, the operating entities that succeed Ontario Hydro remain in public ownership, but they are structured as if they were privately-owned, and make payments equivalent to full taxes at the same rates that private companies would pay. This made it possible to estimate values for the companies, and their ability to issue debt. However, we recognize that once the companies are actually operating, a number of factors will come into play that could change dramatically the price that investors would be willing to offer for them. Furthermore, because we were able to assure ourselves that the overhanging Ontario Hydro debt could be dealt with successfully without resorting to asset sales as such, we did not pursue the issue further in our modelling.

Another example of limiting the financial scenario analysis is our treatment of the distribution sector. While the Committee is recommending restructuring in that area, we stop short of making specific proposals about which utilities should extend to which boundary. We expect that the shake out of distribution and the ultimate adoption of retail competition will lead to new efficiencies and further opportunities for consumers to benefit, but again, we felt that it was premature to model a specific outcome. So the analysis extends to the

wholesale price of power, i.e., the price that the distributor would pay, but not to the retail level.

The restructuring assumptions used in the analysis focussed on the recommendations for the separation of Ontario Hydro's current functions and the establishment of a competitive market for the generation of electricity.



MODELLING A NEW CORPORATE STRUCTURE

For the purposes of this exercise, Ontario Hydro is succeeded on January 1, 1999, by a new company, the "Ontario Hydro Acceptance Corporation" (OHAC). OHAC immediately transfers the assets of Ontario Hydro to six new companies: one nuclear generation company, two hydroelectric generation companies, one fossil generator, a transmission company and a retail distribution company. (An aggregated MEU was postulated to represent the operations of the municipally-owned distribution companies, but Ontario Hydro's retail operations were not merged into this aggregated MEU in these scenarios.)

All the operating companies are set up as business corporations, i.e., shareholder-owned companies (where the shareholders could be the Crown, private investors, or other companies). These companies are assumed to be under the control of independent boards of directors, to have separate balance sheets and income statements, and to operate in a commercial manner. OHAC itself then becomes a financial holding company, the functions of which are essentially to service, defease and retire the debt of Ontario Hydro. OHAC receives payments from the operating companies to enable it to carry out its functions.

As business corporations, these new companies were made subject to full taxation schedules. (If publicly-owned, the analysis assumes that the company pays grants to the province equivalent to the taxation schedule faced by a privately-owned company, with the province retaining the federal portions of income and capital taxes.) All the new companies pay full municipal property taxes. The hydroelectric generators are required to pay water rentals at double the current level in the first year, growing or declining subsequently with the market-determined price of power. We removed all hidden or explicit subsidies from the cost structure of these companies. The debt obligations of the companies are on commercial terms, with no government guarantee (nor any guarantee fee paid to the province). Rural rate assistance is currently funded by a charge against certain electricity customers, which is used to reduce the charges paid by other customers. We assumed that a subsidy to low-density markets would continue to be funded by a charge against other customers and would not have a material net impact on the profit and loss statements of any of the companies.

The six new companies were given appropriate valuations. Their assets were written up or down to reflect a market-based evaluation as of January 1, 1999. Discounted cash flow (DCF) analysis, using their projected revenues and costs, was the principal tool for evaluation. Other indices such as price/earnings ratios and dividend yields were used to check the reasonableness of the DCF estimates. Once valued, the new companies were assigned a level of debt considered appropriate to maintain a strong BBB credit rating according to Standard and Poors' financial benchmarks for utilities and energy distribution companies (natural gas and electricity). Table 1 shows the asset revaluations and capital structures that resulted.

The companies' fixed assets were also given new, revised "useful lives" for the purposes of calculating the capital cost allowances that would be available to them for tax purposes. Except in the case of the fossil stations, the revision was upward, and substantial. The effect of this was to generate a significant potential for the deferral of income tax (an increase in the assumed life permits a larger amount of depreciation to be charged against taxable income than would be taken against income reported to shareholders). This would generate a tax shelter for the hydroelectric, nuclear, transmission and distribution companies if they were to be sold to private owners.

Table 1: Restructuring Assumptions - \$ Billion, January 1, 1999¹

	Scenarios "A", "C" & "E"		Scenarios "B" & "D"	
	Assets	Debt	Assets	Debt
Hydroelectric Company	4.6	2.5	5.4	3.0
Nuclear Company	10.5	4.7	11.5	5.2
Fossil Company	0.145	0.036	0.145	0.036
Transmission Company	6.2	3.7	6.2	3.7
Retail Distribution Company	2.5	1.5	2.5	1.5
Energy Services Company ²	0.435	0.131	0.435	0.131
Corporate Group ²	0.211	0.063	0.211	0.063
Total	24.7	12.6	26.4	13.6
Ontario Hydro December 1998 (Base Case)	37.6	28.0	37.6	28.0
Writedown or Reduction	12.9	15.4	11.2	14.4

1. Differences in the asset valuations and debt assignments are the result of the assumption of increasing prices for energy at the generation level in Scenarios "B" and "D".
2. The Energy Services Company and the Corporate Group are part of the existing Ontario Hydro structure. For completeness, both of these entities were included in the asset revaluation.

In our scenarios, OHAC issues debt instruments to the six new companies on commercial terms. The new companies make payments to OHAC from 1999 onwards. These payments include:

- interest;
- taxes (or payments equivalent to) - federal and provincial corporation income taxes, capital taxes, municipal property taxes, and the Large Corporations tax;
- water rental payments;
- dividends;
- nuclear decommissioning charges;
- the “stranded asset charge” (described below); and,
- the proceeds of sales of securities or assets, if any (in our scenarios, none were made).

In turn, OHAC makes the following payments:

- interest and scheduled principal repayments on outstanding Ontario Hydro debt;
- the debt guarantee fee on outstanding Ontario Hydro debt;
- municipal property taxes received (a pass through, but this is really at the discretion of the Province);
- water rental payments received (we assumed these were retained in whole by OHAC, but payouts to other parties are likely); and,
- payments to non-utility generators (NUGs) to compensate them for the difference between electricity prices received in the spot market and prices specified in their contracts with Ontario Hydro. (This method of compensation was adopted instead of our recommended partial buy-out because of the uncertain size of the payment that a negotiated settlement may impose; see the Endnote in Chapter 14.)

We assume that any balance remaining each year is used to defease the remaining Ontario Hydro debt. (Defeasing debt is accomplished by purchasing securities whose interest and principal payments can be used to meet the obligations on that debt.)

D**PRICING ASSUMPTIONS**

The key to the analysis is the price for energy that generating companies will receive in the new competitive marketplace. Moving from the current cost-based prices to competitive pricing (accepting whatever the market-clearing price may be) means that the companies' assets, too, will ultimately be worth only what they can expect to earn in this new environment.

The Advisory Committee considered several references for establishing a working estimate of the annual average market-clearing price to Ontario-based generators between 1999 and 2005.

A supply curve was constructed that reflected the short-run marginal costs of generation using the current plant. Ontario Hydro supplied demand data that indicated what types of generation were "on the margin" throughout the year. Comparison of these two sets of data suggested that fossil generation from either the Nanticoke or Lambton stations was most likely to determine the system marginal price much of the time. Averaging Ontario Hydro's unit cost projections for operations, maintenance and administration (OM&A) and fuel for these two stations in 1998 gave a price of 3 cents Canadian per kWh.

A number of submissions to the Advisory Committee indicated that technological change and the prevailing prices for natural gas have made generation using that fuel a likely choice for new supply. Estimates of marginal prices for combined-cycle combustion turbine generation range from 1.7 cents to 2.5 cents U.S. per kWh (about 2.3 to 3.4 Canadian cents at current exchange rates). Allowing for gas price increases and exchange rate changes between now and 1999, the estimate of 3 cents Canadian per kWh appeared reasonable.

Current spot prices in the U.S. market were estimated to average about 2.5 cents U.S. Although the spot market is not currently well developed, it is expected to become more important in the future. A 2.5 cent U.S. price is likely to be consistent with a Canadian price of about 3.1 cents per kWh in 1999, after accounting for inflation differentials and exchange rate changes.

An analysis of those U.S. generation facilities that are likely to be competitive suppliers to Ontario projected supply costs of about 3 cents U.S. per kWh or lower in the period between 2000 and 2010.

Ontario Hydro prepared upper and lower estimates of the prices that might be realized in a competitive retail access market for the period 1997 to 2005. After adjusting for exchange rate appreciation (with the Canadian dollar rising to purchasing power parity at 88 cents U.S. by 2001), the lower estimates ranged

from 2.6 cents per kWh in 1999 to 3.8 cents in 2005; the upper estimates ranged from 3.0 cents to 4.8 cents.

Recognizing the sensitivity of the scenario results to the estimated market prices for electricity, we decided to run two sets of scenarios. One held nominal generation prices at 3 cents per kWh throughout the period from 1999 to 2005. The other began at 3 cents in 1999 and increased the price steadily to 4 cents over the period.

Assuming a type of incentive-based regulation for the transmission and distribution wires monopolies, a rate cap was imposed on the new transmission company. A target rate of return on equity of 11.5 to 12 per cent was established, and net income above the level needed to achieve this return was used to reduce the assumed transmission tariff. (As noted earlier, we did not model the retail price structure beyond the wholesale level.)

E

COST ASSUMPTIONS

One important item of cost was changed from the Base Case assumptions. Ontario Hydro's Base Case used an average interest rate of more than 9 per cent on the outstanding Ontario Hydro long-term debt, and assumed that this rate would apply to any new long-term debt issued by Ontario Hydro as well. In our scenarios, the new long-term debt issued by the six operating companies in 1999 was assumed to bear a rate of 8 per cent, a level more consistent with current industrial bond yields. All the new companies were assumed to maintain cash balances of \$100 million throughout the scenarios, and these balances were credited with interest at a rate of 5 per cent.

To keep the analysis focussed on the restructuring impacts, we introduced only one further cost modification. One set of scenarios included a general efficiency improvement of 3 per cent a year, relative to the Base Case, applied to the OM&A and overhead costs of the new companies, cumulating to a 23 per cent reduction by 2005. The advice we received from experts with experience in restructuring for competitive markets suggested that this was a conservative estimate of the reductions that might be expected in this more challenging environment. The other set of scenarios was identical except that this cost reduction was not included.

F**THE SCENARIOS**

First, we defined four cases, differing in terms of the price and cost assumptions as noted above. Table 2 summarizes Scenarios “A” to “D”.

Table 2: Descriptions of Scenarios “A” to “D”

	“Exchange” Price (cents per kWh)	Efficiency Gains (% per year)
Scenario “A”	3.0, 1999 to 2005	Base Case
Scenario “B”	3.0 in 1999, rising to 4.0 in 2005	Base Case
Scenario “C”	3.0, 1999 to 2005	3% Relative to Base Case
Scenario “D”	3.0 in 1999, rising to 4.0 in 2005	3% Relative to Base Case

Then, we also included one other case for analysis. Our preliminary analysis indicated that the fossil generating company was a consistent cash drain on the system (suggesting that, as a whole, it would not likely be viable under any of the other scenarios). In Scenario “E”, the assumptions of Scenario “A” were maintained but the fossil plants were assumed to be out-of-service. This was modelled by reducing the fossil company’s OM&A costs by 90 per cent (leaving 10 per cent to represent the costs of necessary upkeep and security), by eliminating working capital, and by setting new investment in fixed assets to zero. Replacement power was assumed to be available from outside generators (e.g., imports) at the market-clearing price. (It is important to note that our analysis focussed on an aggregated fossil company, whose capacity is only lightly drawn upon. We did not investigate the viability of individual fossil units, nor did we explore the potential cost savings from re-engineering them or running them at higher load factors. Our results should not be interpreted as suggesting that the fossil plants have little value.)

G**DEALING WITH THE DEBT OVERHANG**

The breakup of Ontario Hydro into six operating companies does not, of course, eliminate its outstanding liabilities. According to the Base Case assumptions, the utility’s long-term debt at December 31, 1998 would be around \$28 billion (having been paid down by more than \$5 billion between the end of 1995 and the end of 1998).

For the purposes of this exercise, all of Ontario Hydro's obligations are assigned to OHAC. In each scenario, as Table 1 shows, the debt that could be issued by the new operating companies, at the beginning of 1999, is in aggregate substantially less than the remaining debt of Ontario Hydro that OHAC must assume. We believe that it would be appropriate to direct revenue streams from the new companies (interest payments, grants equivalent to full taxes, water rentals (at least in part), and dividends) to OHAC to enable it to defease this obligation.

There is a further source of funds available, without requiring taxpayers to assume any of the debt burden. In the Base Case, the wholesale price of electricity (that is, the price charged to the MEUs, including generation and transmission) stays at 6.0 to 6.1 cents per kWh between 1999 and 2005, consistent with today's price. (Ontario Hydro has publicly committed to maintain this price until 2001.) However, in our scenarios, the gap between this price and the market-clearing price to generators is considerably greater than the amount required to provide an appropriate rate of return to the regulated transmission company. In effect, there is room to levy a stranded asset charge (SAC) which can be used in its entirety to hasten the defeasance of the Hydro debt.

Accordingly, in each scenario, we took as a goal the reduction of the balance of undefeased Hydro debt to the level supported by the six successor operating companies, no later than 2005. In every case, it turned out to be possible to do better than this. In fact, we found that the SAC could be gradually reduced each year, while still eliminating the debt overhang by 2005. This meant that an equal reduction could be made each year in the wholesale price of electricity. Even in the worst case, in which the market-clearing price remained at 3.0 cents per kWh, with no efficiency improvements, the wholesale price of electricity could fall from 6.0 cents in 1999 to 5.72 cents by 2005. (It then drops dramatically further to 4.45 cents in 2006, since the SAC, no longer necessary, could be entirely eliminated.)

Assuming no extra efficiency improvements at the distribution level, these reductions in the wholesale price of electricity should flow through proportionately to consumers as well. However, our recommendations for restructuring at the distribution level are likely to result in considerably more cost savings for consumers, while maintaining and broadening the service options available to them.

Alternatively, the scenarios could have been run on the basis of maintaining the wholesale price at 6.0 to 6.1 cents per kWh from 1999 until the debt overhang was eliminated. Since the SAC would have been higher from 2000 onward, it

would have eliminated the overhang more rapidly. But we considered it more realistic to assume that a steady downward movement in wholesale electricity prices combined with rapid reduction in overhanging debt would be a preferable strategy.



SUMMARY OF THE RESULTS

The scenario analysis was aimed at testing whether the following three objectives could be achieved simultaneously:

- wholesale electricity prices, including transmission tariffs, lower than in the Base Case;
- eliminating the debt overhang from the restructuring of Ontario Hydro within a reasonable period of time; and,
- subjecting the successor entities to the equivalent of a fully-taxed environment.

The simulations showed that it was possible to achieve these objectives in all of the scenarios tested.

Wholesale Price Impacts

Cases “A”, “C” and “E” hold the market-clearing price to generators at 3.0 cents per kWh from 1999 to 2005; in cases “B” and “D”, it rises from 3.0 cents to 4.0 cents over the period. In terms of the wholesale price, however, the difference between these is not great, because the rising price to generators in “B” and “D” increases the taxes and dividends they can pay to OHAC (and the debt and interest they can carry), reducing the stranded asset charge accordingly.

Thus, in cases “B” and “D”, since the generating companies experience faster cash flow growth, they are valued more highly. Therefore, they can be assigned more debt and reduce the debt overhang that OHAC must manage and increase the revenues available to OHAC for debt defeasance. As a result, the SAC starts at a lower level and is able to fall more quickly, without compromising the goal of complete debt defeasance by 2005.

As Table 3 shows, it is paradoxically the case that the increasing price to generators in cases “B” and “D” permits a faster decline in the wholesale price, but only until 2005. Once the debt overhang and the SAC have been eliminated, the wholesale price drops much further in cases “A”, “C” and “E”, reflecting the fact that the underlying price to generators is a full cent per kWh lower from 2005 onward.

Table 3: Wholesale Electricity Prices

(Cents per kWh)

Scenario	1999	2000	2001	2002	2003	2004	2005	2006
Base	6.03	6.05	6.06	6.06	6.07	6.08	6.09	6.1(e)
"A"	5.99	5.96	5.91	5.87	5.83	5.77	5.72	4.45
"B"	6.01	5.97	5.91	5.86	5.80	5.73	5.67	5.45
"C"	5.99	5.94	5.89	5.83	5.78	5.71	5.65	4.45
"D"	6.00	5.94	5.87	5.81	5.74	5.66	5.59	5.45
"E"	5.95	5.88	5.80	5.72	5.64	5.55	5.46	4.45

Note: Base Case 2006 price is an estimate, based on previous year trends. Wholesale price includes generator's price, transmission tariff, generator and line losses, payments to NUGs, and stranded asset charge.

The effect of the efficiency improvements introduced in Cases "C" and "D" is to accelerate the debt and rate reductions, because the benefits of these improvements are passed on to OHAC in the form of higher dividends. (OHAC accepts 100 per cent of cash flow after capital expenditures as a dividend.) If the companies were to be sold to private investors, these gains would accrue to their shareholders, or, more likely, in the competitive environment, would be shared between shareholders and consumers, through further reductions in the market-clearing price of electricity.

Debt Reduction

The scenarios illustrate one of the key elements involved in such modelling exercises. When assets are valued on the basis of discounted cash flows, as indeed they are in modern financial markets, the question arises: "What factors will determine expected cash flows?" There is no fully accepted answer to this, but our scenarios assumed that investors would value the new companies at the beginning of 1999 on the basis of their projected cash flows (followed by 3 per cent growth in perpetuity). The net debt that can be allocated to the new operating companies will depend on the markets' view of their prospects. In turn, this will depend very much on how the market expects generation prices to behave over time.

In Scenarios “B” and “D”, where the price to generators rises from 3 cents to 4 cents by 2005, we assume that financial markets would anticipate this and factor the improvement in the companies’ earning power into their valuations. Thus, more debt can be assigned to the companies in these scenarios and the overhanging debt balance that must be defeased by other means (e.g., the SAC) is less. Table 4 shows how the overhanging debt is reduced between 1999 and 2005 in each of the scenarios; note that we did not attempt to achieve a precise zero balance at the end of 2005.

Table 4: OHAC Overhanging Debt Balance

(\$ Millions, End of Year)

Scenario	1999	2000	2001	2002	2003	2004	2005
“A”	13,656	11,836	9,813	7,590	5,252	2,787	258
“B”	12,780	10,965	8,966	6,789	4,520	2,150	(254)
“C”	13,609	11,708	9,566	7,182	4,636	1,908	(948)
“D”	12,753	10,879	8,786	6,475	4,028	1,428	(1,267)
“E”	13,568	11,624	9,513	7,254	4,947	2,565	189

Asset Sales

These scenarios do not include any sales of assets or companies to private investors. If the proceeds of such sales were paid to OHAC, it would be able to use them to defease the outstanding Ontario Hydro debt, which would tend to reduce the SAC more rapidly. On the other hand, OHAC’s ongoing revenues would be reduced for the following reasons:

- the federal portion of income tax would flow to the Federal Government, not to OHAC;
- some of the companies would be able to defer taxes by writing up the effective lives of their fixed assets; and,
- dividends would flow to shareholders, not to OHAC.

We did not examine whether an asset sale or accepting dividend and tax payments from a publicly-owned corporation was the better option for debt defeasance and rate reductions. We did not investigate this option because of the multiple factors that would determine the prices that investors would be prepared to pay for these assets. These prices would reflect potential investors’ perceptions of the rate of growth of the electricity market, the regulatory environment, the potential for further efficiency improvements, and many other factors.

One of the factors that is most difficult to estimate is the degree to which private owners could be expected to pursue efficiency gains more aggressively.

Although these scenarios do not depend on private equity contributions to obtain the benefits of competition and debt defeasance, we do believe that, in principle, private investors would bring even greater benefits to ratepayers (and ultimately taxpayers) through their enhanced pursuit of efficiencies.

I

OTHER ISSUES

In any subsequent analysis, the following issues will need to be considered.

First, the scenarios could be extended to include more extensive sensitivity analysis than the two cases (generation prices and efficiency improvements) we considered. Changes in interest rates, specific costs (fuel in particular), and electricity demand and growth are several areas where sensitivity analysis would be useful.

Second, the scenarios were predicated on a Base Case that assumes that technological risk is either minimal or manageable. This is an unavoidable assumption because of the unpredictable nature of technology or operational failures. However, in the event that any of the generation companies were to suffer an operational failure that would remove them from the competitive bidding market, the supply curve for Ontario would be altered. Furthermore, costs and revenues would be adversely affected. The ability of the restructured (or any) system to deliver lower cost power to consumers and maintain acceptable progress in reducing debt would be impaired.

Third, the costs generated by the NUG contracts continue beyond 2005. The disposition of Ontario Hydro's load-displacement contracts with the NUGs is a complex matter. In these scenarios it is assumed that the NUG contracts would devolve to OHAC, which could create a subsidiary to offer their output to the System Operator. They would always run when available, and OHAC would receive the market-clearing price. OHAC would fulfil the terms of the contracts by paying them the contracted amounts (based on contract provisions for price and volume escalation), which, in these scenarios, involved a substantial net overpayment relative to the market price.

We suggested in Chapter 14 that NUGs be offered a partial buy-out of their remaining contracted obligations. NUGs could be paid their contracted revenues up front, based on contract prices less an estimated market price. This up front payment could then be defeased through OHAC. The impact would be to delay debt retirement and/or reduce rate reductions, depending on how revenues were allocated.

Fourth, the analysis did not extend to the larger distribution sector, the more than three hundred municipal utilities. However, assuming that lower wholesale electricity prices are passed through to consumers, then additional benefits could accrue to ratepayers if the distribution utilities reduce their internal costs and introduce efficiencies. We assume rationalization and amalgamations in this sector should be able to deliver improved cost effectiveness. Recognizing that the cost of wholesale electricity represents about 85 per cent of total distribution utility costs, the remaining 15 per cent of costs could deliver some additional savings.

Fifth, this analysis allowed the municipal property tax component of OHAC revenues to flow through to local governments. The distribution issues associated with that flow through could alter that assumption in practice. A similar issue arises with water rentals. Currently, some of these revenues are passed to others. The scenario analysis assumed all these revenues (approximately double the Base Case revenues) are available to OHAC. The Government of Ontario may wish to pass some of these revenues to others, including Ministries, First Nations or local governments and agencies.

We do not make recommendations on these matters. However, this analysis does demonstrate that Government may have sufficient latitude in a restructured and competitive electricity system to accomplish multiple objectives.

Sixth, the current system allows some large industrial customers to negotiate with Ontario Hydro for special rates, usually lower than the wholesale price. In the competitive market that is central to the Committee's recommendations, large industrial customers will be able to assure their electricity costs by participating in the parallel financial markets. Futures contracts for electricity supply and financial contracts with generators will allow large customers to offset price risks. However, the SAC is levied at the transmission level and is envisioned as an unavoidable charge **to be paid by all electricity customers**. The Committee feels that the decline in wholesale prices that results from competitive activity in generation markets, and the temporary nature of the SAC, will forestall significant investment in self-generation by these industrial customers.

Seventh, in the years subsequent to 2005, OHAC could well have very large net inflows, which would be available to the Ontario treasury for the province's general purposes, e.g., to reduce taxes. OHAC could also be an appropriate conduit to make explicit subsidies by taxpayers to electricity consumers (e.g., to customers in low-density areas). OHAC could also be an appropriate mechanism for providing transparency for environmental economic instruments such as carbon taxes, acid gas levies, demand-management

incentives, or other charges or subsidies designed to shift behaviour by generators or consumers in environmentally desirable directions.

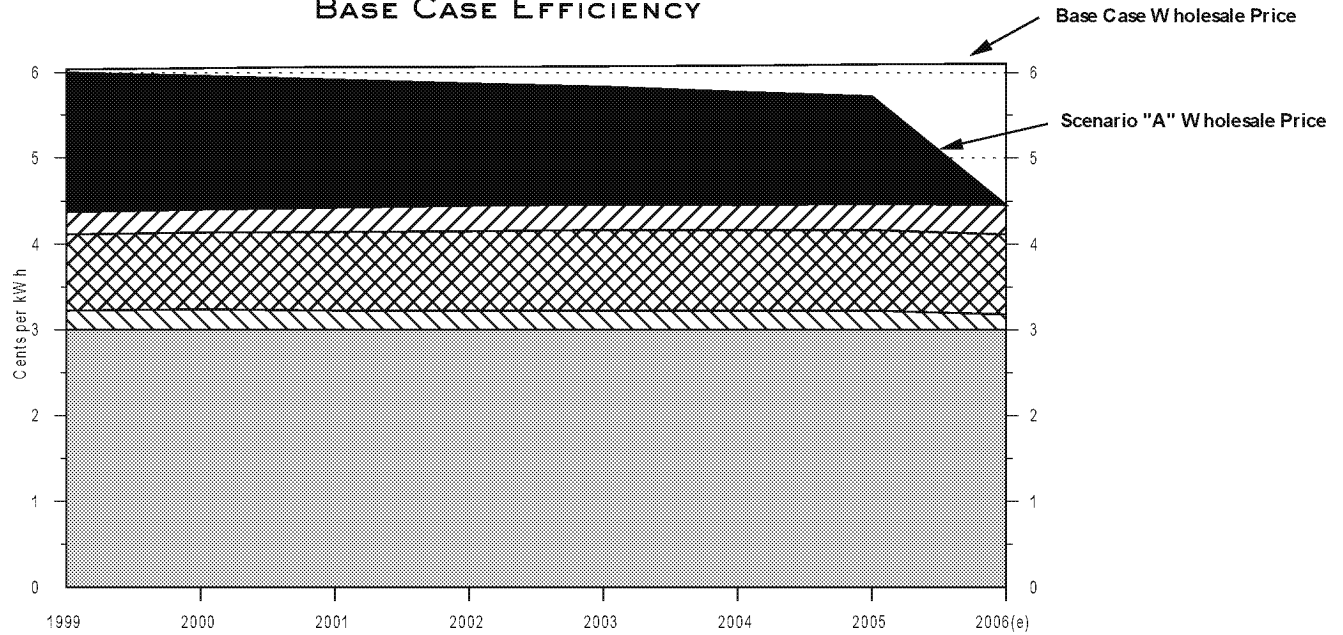


CHARTS

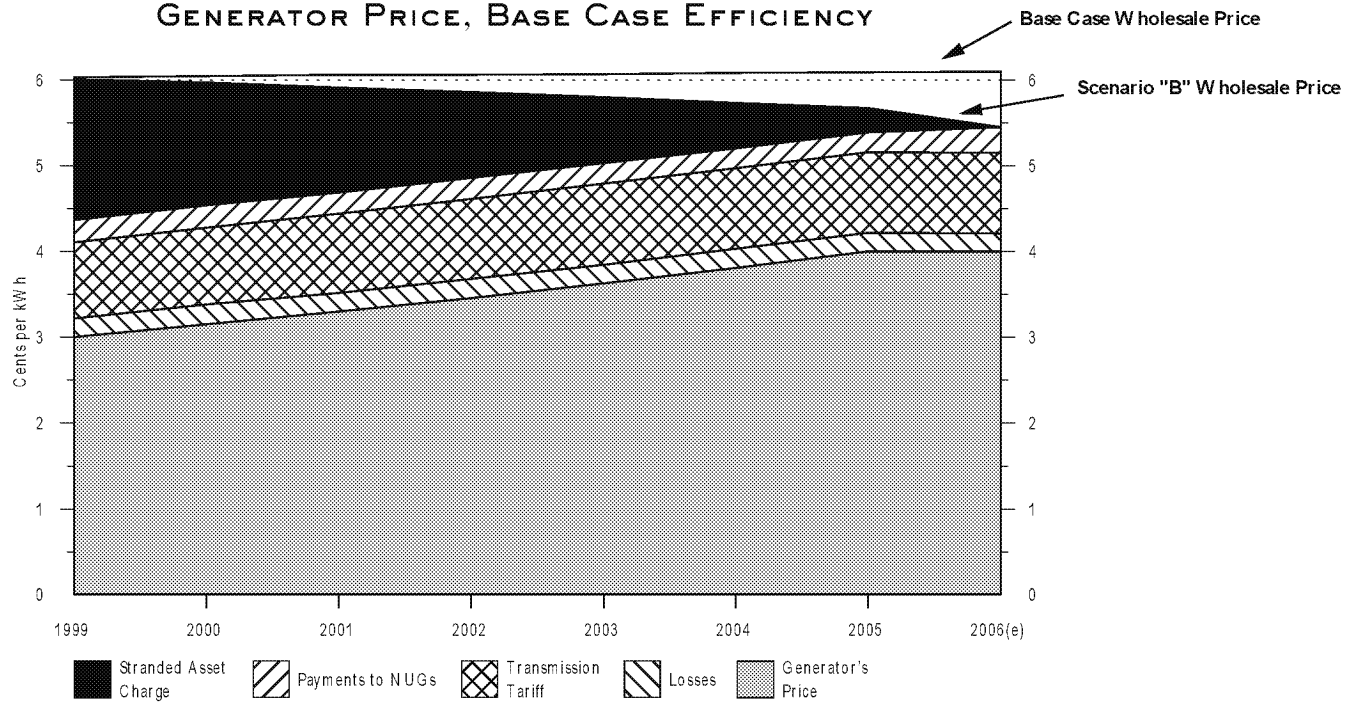
The following charts illustrate the components of the wholesale electricity price in each of the five scenarios.

In every scenario the SAC is gradually reduced and eventually eliminated by the end of 2005, resulting in a sharp drop in the wholesale price. Also, the payments to non-utility generators continue beyond 2005, reflecting the particular method used to model the existing contracts with Ontario Hydro. In the case of a partial buy-out of these contracts, payments would end once the obligation had been met. Then, similar to the SAC, the NUG payment portion of the wholesale price could be eliminated, resulting in another drop in wholesale prices.

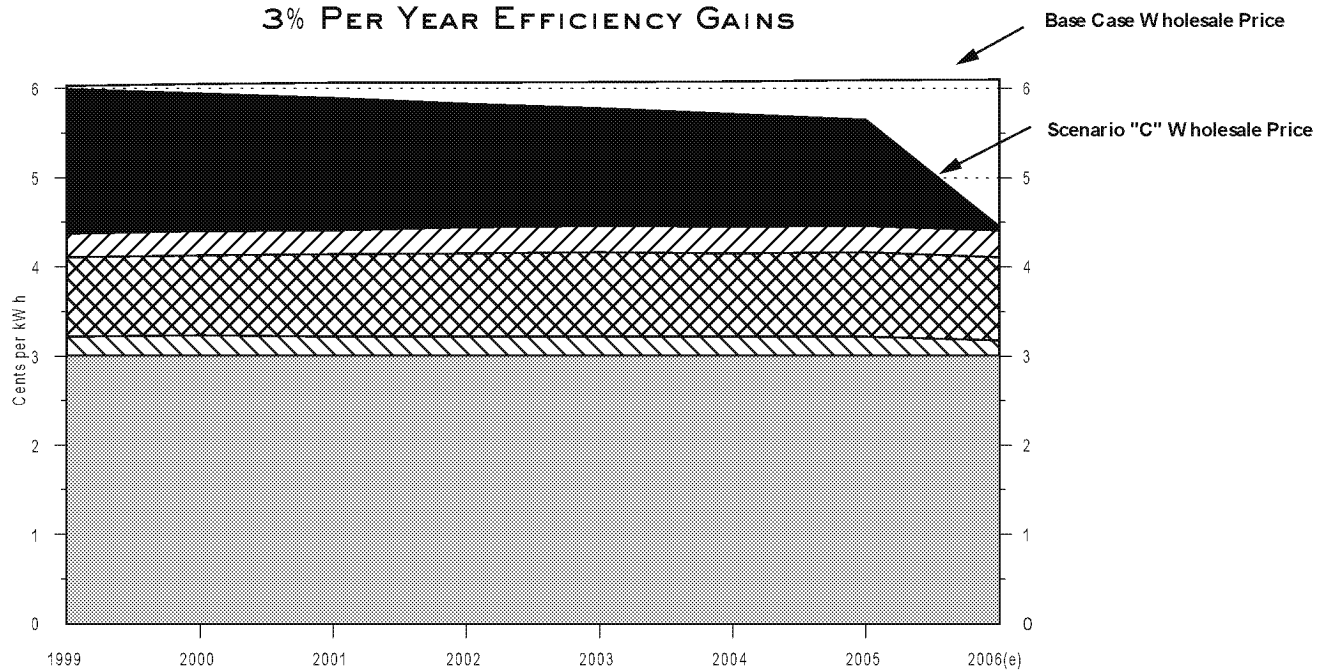
**CHART 1: SCENARIO "A" - 3 CENT GENERATOR PRICE
BASE CASE EFFICIENCY**



**CHART 2: SCENARIO "B" - 3 TO 4 CENT
GENERATOR PRICE, BASE CASE EFFICIENCY**



**CHART 3: SCENARIO "C" - 3 CENTS,
3% PER YEAR EFFICIENCY GAINS**



**CHART 4: SCENARIO "D" - 3 TO 4 CENTS,
3% PER YEAR EFFICIENCY GAINS**

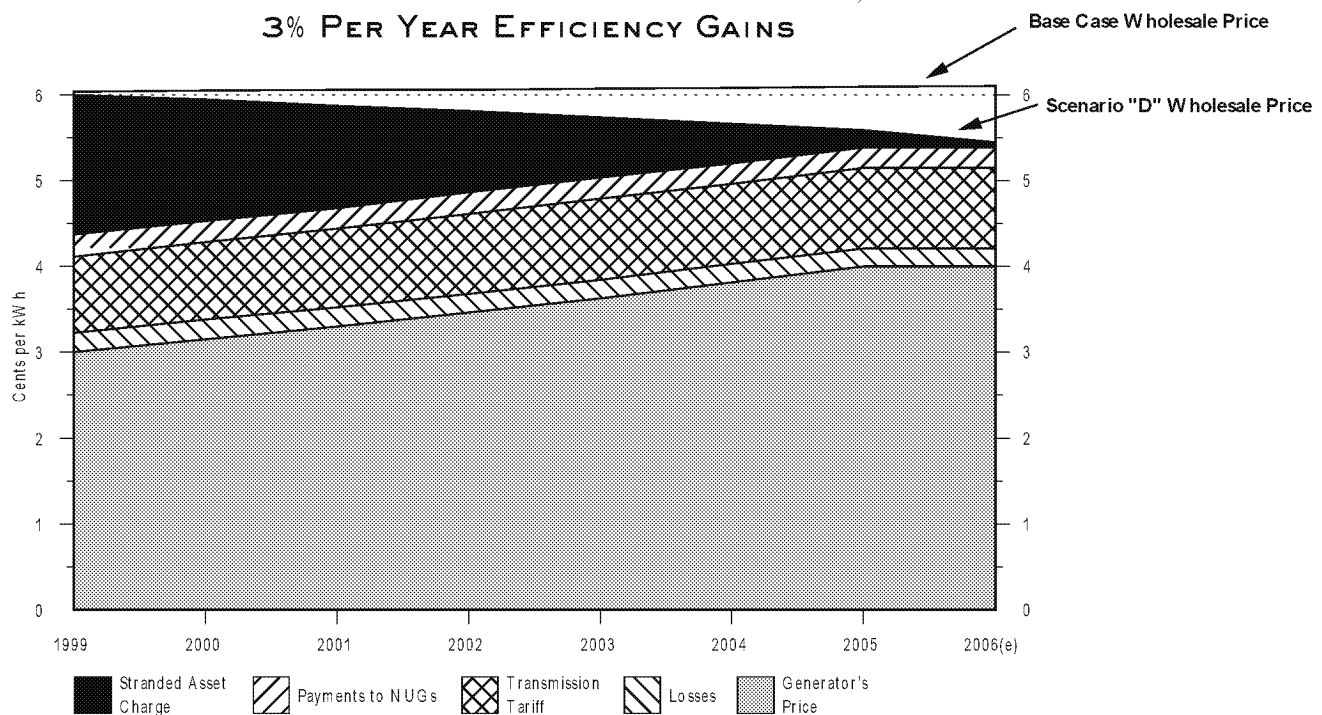
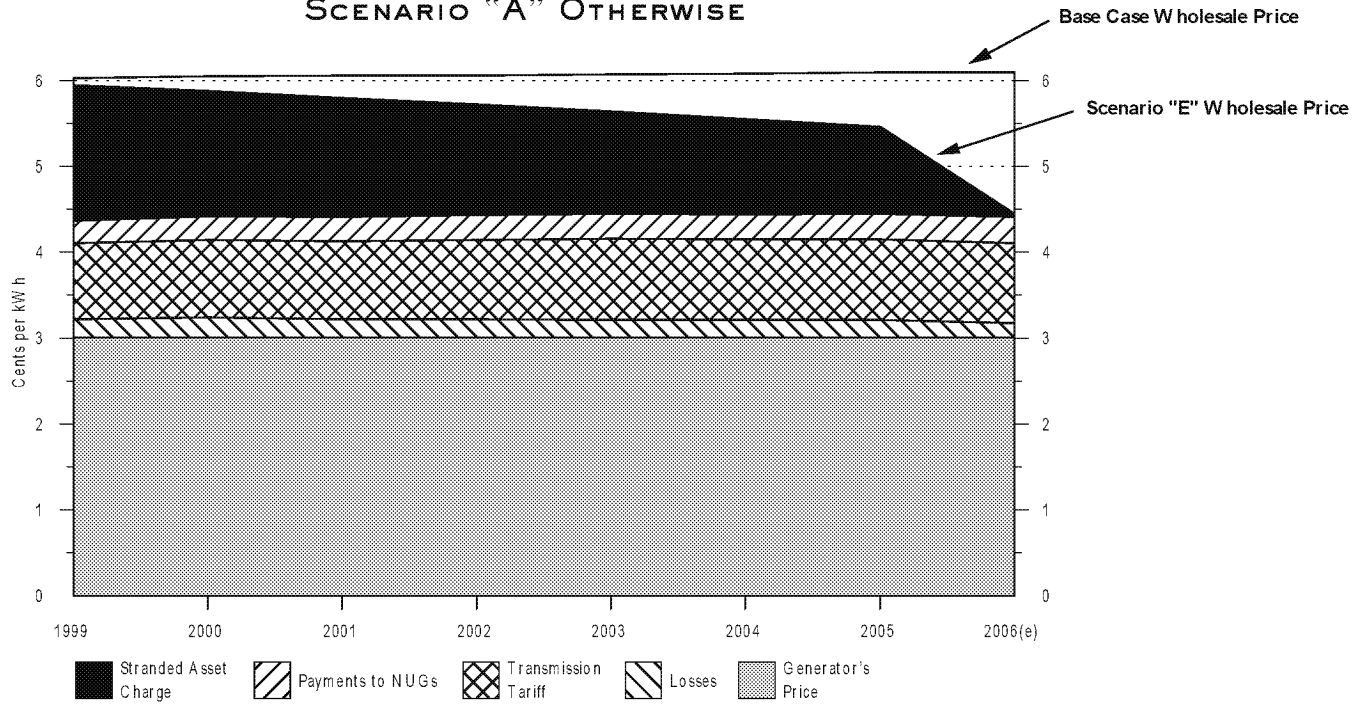


CHART 5: SCENARIO "E" - "MOTHBALL" FOSSIL
SCENARIO "A" OTHERWISE



F

JOINT STUDY INTO RETAIL ELECTRICITY SERVICE IN ONTARIO

Analysis of Options for the Structure of Electric Distribution in Relation to Study Criteria

CRITERIA								
Distribution Options	Reliability	Cost	Rate Equity	Customer Satisfaction	Capability to Deliver Range of Services	Customer Influence	Local Accountability	Ease of Implementation
1. Provincial Distribution Agency	0	?	-	0	+	-	-	-
2. Geographic Regional Franchises (all-in)	0	+	-	0	+	-	-	-
3. Geographic Regional Franchises Maintaining Existing Large Municipal Utilities	0	+	0	0	+	-	-	-
4. Rationalized Municipal Structure (less than 312)	0	+	+	0	+	-	+	-
5. Extended Municipal Structure (approx. 800)	0	-	+	0	-	+	+	-
6. Municipal Cooperatives	0	+	0	0	+	0	0	0
7. Status Quo	0	0	0	0	0	0	0	0

Legend

- 0 No change from status quo
- +
-

Notes:

- Changes are directionally denoted only; no attempt is made to display the relative magnitude of change for each option.
- See Appendix VI [of Joint Study] for further explanation.

SOURCE: Adapted from Municipal Electric Association/Ontario Hydro Joint Study - Interim Report, December 1994