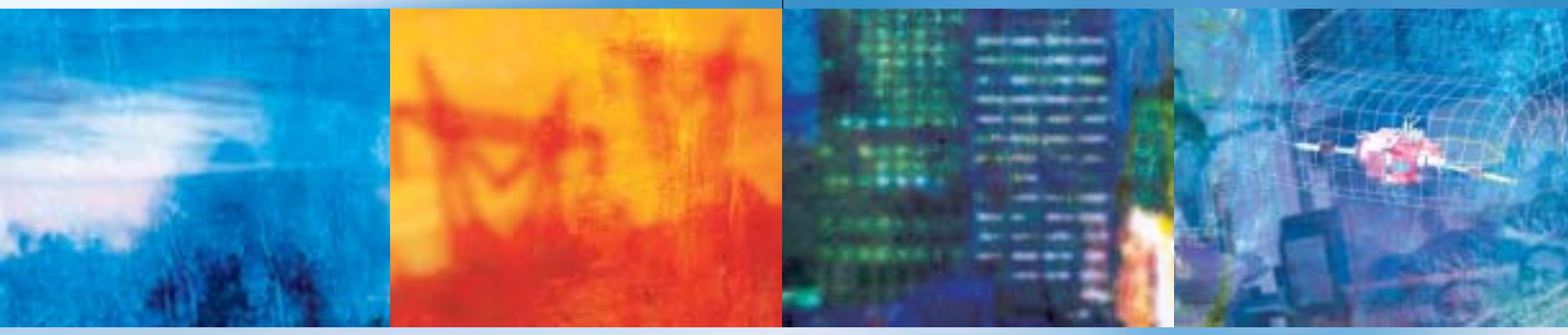
Hydro Québec

STRATEGIC PLAN 2004-2008



Hydro-Québec,
a business-driven publicly owned company

MISSION

"The objects of the Corporation are to supply power and to pursue endeavours in energy-related research and promotion, energy conversion and conservation, and any field connected with or related to power or energy."

Hydro-Québec Act, section 22

VISION

To become a world leader in energy

By developing its expertise for the benefit of its customers, employees and shareholder, and by working with partners in business ventures.

VALUES

- Customer satisfaction
- "Business first" approach
- Respect for employees
- Quality improvement
- Respect for the environment, in cooperation with local communities
- Safeguarding the future

October 2003

The *Strategic Plan 2004–2008* must be submitted to the Québec government on or before November 1, 2003. It will be subject to review by a parliamentary commission of the National Assembly within three months following the date on which it was tabled.

Note to the reader

Unless otherwise indicated, monetary amounts in the text are expressed in Canadian dollars ($) and cents (¢).

Table of Contents

Summary *5*

Introduction *17*

Background *17*

Business Environment *23*

Energy Working for Québec *31*

Quality of Service and Value Creation: Staying the Course *31*

Improving Hydro-Québec's Overall Performance *32*

A Strategic Plan to Develop the Electricity Market *39*

Business Objectives of the Strategic Plan 2004–2008 ..... *41*

Hydro-Québec Production *43*

Hydro-Québec TransÉnergie *57*

Hydro-Québec Distribution *71*

Hydro-Québec CapiTech and Hydro-Québec IndusTech *97*

Financial Outlook *111*

Financial Outlook for the Strategic Plan 2004–2008 ..... *111*

Sensitivity Analysis of Consolidated Net Income Forecast for 2006 ..... *116*

Economic Impact *117*

Appendices

1. *Follow-up to the* Strategic Plan 2002–2006 ..... *121*
2. *Human Resources Expertise and Efficiency* *153*
3. *Hydro-Québec: A Driving Force Behind Technological Innovation in Québec's Energy Sector* *159*
4. *Development Issues for Hydroelectric Projects* *175*
5. *Overall Energy Efficiency of the Power System* *185*

Glossary *219*

Summary

Hydro-Québec has benefited from the restructuring of North America's electricity market. In recent years, the company has achieved profitable sales on external markets and recorded substantial net income while providing quality service to its Québec customers.

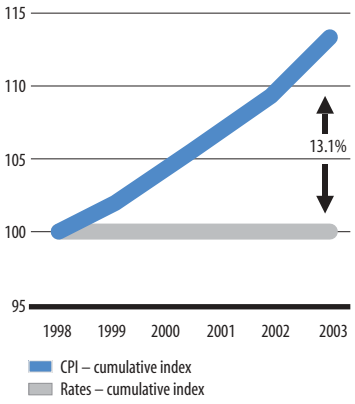
In Québec, the *Act respecting the Régie de l'énergie* has established a heritage pool giving Québec consumers access to a maximum volume of 165 TWh of electricity per year at an average commodity rate of 2.79 cents a kilowatthour. This is the lowest rate in North America for such large quantities of energy. Over and above the heritage pool, supply for the Québec market must be acquired through competitive bidding, leading to the signing of supply contracts based on market price.

Electricity demand in Québec should rise by about 1.3% a year until 2008. This is creating additional pressure to develop new sources of supply, whose costs will exceed those of the existing generating fleet, and to improve the overall energy efficiency of the power system.

Elsewhere in Canada, British Columbia, Alberta, Saskatchewan, Manitoba and Ontario have opened their wholesale markets to competition. New Brunswick, Nova Scotia and Newfoundland are also planning to restructure their markets in the near future.

In the United States, California's energy crisis in 2000, followed by the scandal surrounding the collapse of Enron in 2001, caused market turmoil. A crisis of confidence forced many companies to abandon or reorganize their energy trading operations. Electricity prices on U.S. markets are subject to significant fluctuations. Two major factors come into play: excess generating capacity, which puts downward pressure on prices, and uncertainty with regard to the supply of natural gas, which pushes prices up. On the whole, electricity prices are expected to edge down in the future.

Electricity Rates and the Consumer Price Index



The major blackout of August 14, 2003, which affected millions of customers in Ontario and the states of New York, Michigan and Ohio, highlighted modern society's heavy dependence on reliable electricity service. As a result, the authorities may pay more attention to the restructuring efforts undertaken by the Federal Energy Regulatory Commission (FERC), the investments needed in transmission systems and the interdependence of energy markets and the continent's transmission systems.

Around the world, there are numerous business opportunities, but the competition is also very intense. The successful companies are those that work to commercialize their expertise through investments in the international arena and focus on areas where they can use their world-class know-how to manage regulatory and political risks, along with foreign exchange risk, more effectively than their competitors. With this in mind, Hydro-Québec will focus its international operations on high-voltage transmission, an area in which the company excels.

Quality of Service and Value Creation: Staying the Course

The business objectives proposed in Hydro-Québec's *Strategic Plan 2004–2008* are designed to consolidate the progress made with respect to three major goals:

- Maintain the quality of customer service.
- Create value for the shareholder and Québec society.
- Increase electricity generating capability in Québec.

Building on its strengths, Hydro-Québec will concentrate on improving its overall performance in five key areas:

- quality of customer service
- employee motivation and expertise
- value creation for the shareholder and Québec society
- sustainable development
- organizational efficiency

Maintain the Quality of Customer Service

By consolidating the achievements of recent years, Hydro-Québec is committed to taking action with regard to service quality and reliability so as to maintain a satisfactory price-quality ratio for its customers.

With respect to rates, Hydro-Québec Distribution is aiming for a normal return in a regulated environment, in the current legal framework. Hydro-Québec remains convinced that the rates paid by Québec customers will continue to be among the lowest in North America.

Motivate Employees and Develop Expertise

Hydro-Québec will continue its efforts to motivate employees and to ensure they are committed to the strategic business objectives of each of its divisions. The company also plans to take measures to improve the performance and productivity of its human resources while providing a safe workplace.

Furthermore, in the context of an aging work force and a growing number of retirements, Hydro-Québec will deploy the necessary strategies to ensure the continuity and development of its expertise.

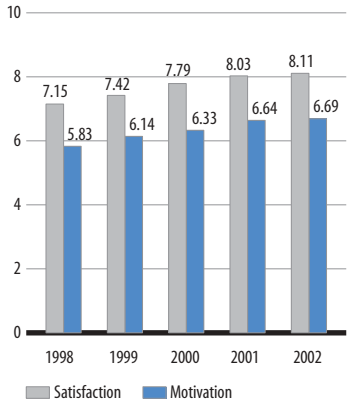
Create Value for the Shareholder and Québec Society

Hydro-Québec will continue to develop its generating fleet and promote electricity sales on wholesale markets and the Québec retail market.

The company will help sustain economic development and employment in all regions of Québec through its operating activities, investments and purchases from independent power producers, as well as its international projects and the operations of its technology subsidiaries.

Hydro-Québec will participate in the diversification of Québec's economy. Its industrial business development efforts will target value-added sectors, with a view to creating maximum wealth and jobs in Québec for each megawatt of new industrial demand.

Employee Satisfaction and Motivation



2004–2008

Cumulative dividends totaling $4.9 billion

220,000 person-years of employment in all regions of Québec

Sustainable Development

Environmental protection

Social equity

Economic efficiency

Contribute to Sustainable Development

Hydro-Québec adopted the concept of sustainable development in 1989. This long-term commitment combines preservation of the environment, social equity and economic efficiency.

That is why Hydro-Québec uses mainly hydroelectric facilities to generate safe, clean, renewable energy. However, since hydropower and wind power are expected to be insufficient to meet demand, despite the gains made through energy efficiency, Hydro-Québec will have to use thermally generated electricity, over and above the output of Gentilly-2 and Tracy generating stations.

In energy efficiency, Hydro-Québec continues to play a leadership role. Between 1990 and 2006, it will have helped to achieve energy savings of up to 23.5 TWh. Hydro-Québec also dedicates substantial sums to the development of technologies that limit greenhouse gas emissions.

Moreover, through its social involvement, programs for low-income customers, and donations and sponsorships, Hydro-Québec will continue to be actively involved in Québec's development as a society.

Become Even More Efficient

Like most North American electric utilities, Hydro-Québec is now structured according to three core areas of activity: generation, transmission and distribution. This division of functions reflects the new operating modes of a market that is open to competition between electricity producers. By clearly separating profit centres from services to the divisions and corporate support activities, the new organizational model enables the company to track the improved efficiency of each division more effectively.

To improve its performance, Hydro-Québec will freeze its operating expenses until 2006, keeping them at their budgeted 2003 level. To absorb cost increases, including the wage indexation provided for in collective agreements, the company plans to reinforce various measures, including efficiency gains, optimization of operations, reduction of personnel costs, downsizing through attrition, and postponement of certain expenses related to support activities.

Business Objectives of the *Strategic Plan 2004–2008*

An analysis of Hydro-Québec's main strategic issues has led it to develop the following business objectives:

Hydro-Québec Production

Objective 1
Increase electricity generating capability

With the growth in accessible, profitable electricity markets in Québec and throughout northeastern North America, Hydro-Québec Production will continue developing its generating capability, with particular emphasis on Québec's own hydroelectric potential. Increased generating capability is also made necessary by the recent narrowing of the gap between available output and contractual commitments, making it more difficult to manage risks related to variations in runoff.

Over the *Strategic Plan 2004–2008* period, Hydro-Québec Production plans to add 10 TWh to its annual generating capability. It will achieve this goal by increasing the productivity of its generating fleet (0.6 TWh), operating the generating stations commissioned in 2003 at full capacity (2.8 TWh) and moving up the commissioning dates of facilities under construction or awaiting authorization (6.5 TWh).

Hydro-Québec Production plans to continue developing hydroelectric potential in Québec to supply markets beyond the time frame of the *Strategic Plan 2004–2008*. All projects will have to meet the following three conditions:

- be profitable under market conditions
- be environmentally acceptable
- be well received by local communities

By the End of 2008

10-TWh increase in annual generating capability

Investments of $2.4 billion to ensure reliability and quality of operations

Without postponing or replacing any project involving hydropower, which remains its preferred generating option, Hydro-Québec Production will also pursue its efforts to complete the proposed Suroît combined-cycle generating station before 2008.

In addition, the division plans to purchase thermally generated electricity from power producers in the northeastern part of the continent. These purchases will help maintain a prudent margin of flexibility in terms of its contractual commitments and the risk of low runoff.

Objective 2
Increase the division's profitability

By 2008, assuming average runoff over the Strategic Plan period, Hydro-Québec Production aims to increase its earnings before interest, taxes, depreciation and amortization by $200 million compared with the 2002 results. This goal will be achieved through optimization of its activities on wholesale markets and a freeze on operating expenses.

Objective 3
Ensure the reliability and quality of operations

Substantial measures will be taken to ensure the reliability and long-term operability of the division's facilities. Hydro-Québec Production will therefore invest some $2.4 billion in refurbishing the generating fleet and improving its productivity. Technological innovation will also continue to be an important tool for enhancing the reliability and quality of operations over the medium and long term.

Hydro-Québec TransÉnergie

Objective 1
Offer transmission service that meets customer needs

Hydro-Québec TransÉnergie meets the highest industry standards, with a Service Average Interruption Duration Index (SAIDI) below the target of 0.65 hours per year. Consequently, it is able to offer its customers reliable, high-quality transmission service.

The quality of service will continue to improve, in line with customer expectations. In order to meet these expectations, the division will pursue four strategies:

- Review and update its understanding of the needs and expectations of transmission system customers.
- Ensure that capacity is available when customers need it, and provide services adapted to their needs.
- Continue improving its environmental performance.
- Uphold its commitments to public and worker safety.

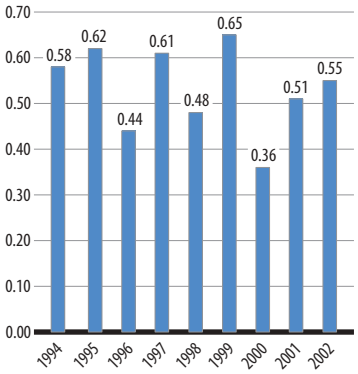
Objective 2
Maintain the reliability of the transmission system

Hydro-Québec TransÉnergie, which comes under the exclusive jurisdiction of the Régie de l'énergie, is responsible for the reliability and security of the transmission system in Québec. The division intends to maintain system reliability in compliance with the requirements of power industry regulatory authorities, and will also work to improve security of supply by diversifying its supply channels.

Objective 3
Ensure the division's profitability

To maintain its profitability, with a view to creating shareholder value, Hydro-Québec TransÉnergie will seek to achieve the rate of return authorized by the Régie de l'énergie, seize opportunities for revenue growth by increasing the availability of its facilities and carry out profitable international operations.

Service Average Interruption Duration Index[1]

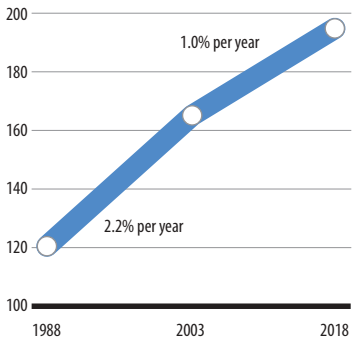


1. *Does not take into account interruptions due to exceptional weather conditions. Service interruptions are attributable to power failures or scheduled outages.*

Hydro-Québec Distribution

Objective 1
Ensure an adequate, diversified supply of electricity

Growth in Demand in Québec (TWh)



On Québec small- and medium-power markets (rates D, G and M), Hydro-Québec Distribution expects to record annual sales of 100.5 TWh in 2008—3.3 TWh more than in 2003, representing an increase of 3.4% for 2003–2008 or an average increase of 0.7% per year.

On Québec's large-power market, Hydro-Québec Distribution plans to generate sales of 77.0 TWh in 2008—7.8 TWh more than in 2003, for an increase of 11.3% or average growth of 2.2% per year.

Revenue of $10,492 million is forecast for 2008, assuming that electricity rates will begin to be increased as of January 2004.

Hydro-Québec Distribution will ensure that it has a supply portfolio at its disposal so that it is able, at all times, to meet the energy requirements of Québec markets. The division will also try to optimize the use of its various contracts so as to minimize costs to its customers.

Objective 2
Emphasize Hydro-Québec's energy efficiency leadership

With a view to sustainable development, Hydro-Québec has carried out major energy efficiency initiatives. The company estimates that recurring energy savings resulting from measures instituted between 1990 and 2006 will be approximately 23.5 TWh, including 3 TWh stemming directly from its programs.

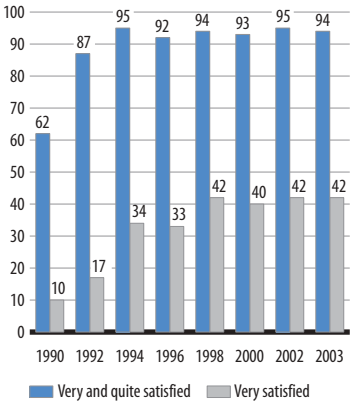
Backed by its past experience, Hydro-Québec Distribution is continuing its direct involvement in energy efficiency through its *Energy Efficiency Plan 2003–2006*. With an objective of 750 GWh in energy savings, the Plan will require investments of $257 million over a little more than three years. Of this amount, $125 million will be absorbed by Hydro-Québec Distribution, $10 million is expected from the Agence de l'efficacité énergétique and $122 million will come from participating customers.

Objective 3

Offer Québec customers service that meets their expectations

In keeping with its customers' expectations, Hydro-Québec Distribution plans to provide reliable electricity service as well as high-quality services and advice by relying on its employees and the use of modern tools and methods. It intends to act as a socially and environmentally responsible distributor.

Rate of Public Satisfaction (%)



Objective 4

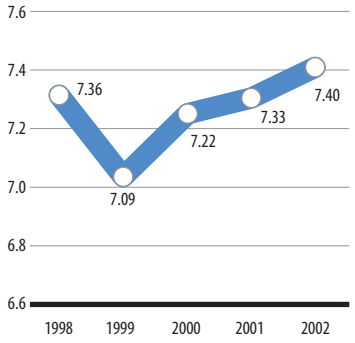
Achieve the authorized rate of return in 2004 and then maintain it

Hydro-Québec Distribution plans to maintain strict cost control and improve its efficiency and productivity. In addition, it will enhance its assets and expertise by continuing its activities to commercialize technologies related to its core businesses.

In the industrial sector, the division intends to focus on the establishment of industries that offer added value for Québec (maximum jobs and investments per megawatt of contract power), in order to maximize the economic spinoffs in Québec for a specific rate impact.

Over the time frame of the Strategic Plan, the division expects to apply to the Régie de l'énergie for rate increases that will allow it to achieve a normal rate of return in a regulated environment, in the current legal framework. Over the medium term, it should also propose an incentive regulatory framework to the Régie that will be advantageous both for customers and for the shareholder.

Overall Customer Satisfaction
(Rates D, G and M)



Hydro-Québec CapiTech

Objective 1

Continue to increase the value of the existing portfolio

Hydro-Québec CapiTech plans to continue its efforts to increase the value of its venture capital portfolio and will limit the total amount invested as risk capital to $240 million. Over the term of the Strategic Plan, the subsidiary will consider profitable sales opportunities in order to maximize the portfolio's financial return.

Hydro-Québec CapiTech will not invest in new venture capital funds.

Venture Capital

Maximize financial performance

Technological, market and strategic intelligence-gathering

Objective 2

Maximize the strategic and commercial spinoffs of investment activities for Hydro-Québec

Through its investments and network of partners, Hydro-Québec CapiTech will continue to monitor technological and market developments and gather strategic intelligence, in order to support Hydro-Québec's technological innovation strategy.

Hydro-Québec IndusTech

Objective 1

Ensure profitable sales growth and maximize the value of the investment in AVESTOR

Hydro-Québec IndusTech Portfolio

AVESTOR – lithium-metal-polymer batteries, in partnership with Kerr-McGee Chemical

TM4 – powertrain and generator systems

ESEV project – energy systems for mainly electric vehicles

AVESTOR is currently fine-tuning its manufacturing process. Initially, it will target telecommunications, a large market where operators of wireline, broadband cable and wireless networks use batteries as a backup power source in the event of utility power grid failures.

AVESTOR will then broaden its marketing program, proceeding with caution, to include other market segments such as industrial stationary applications and the energy sector. A lithium-metal-polymer (LMP) battery for the automotive industry is also being developed. The LMP battery could be suitable for mainly electric vehicles in terms of weight, safety and stable performance.

Objective 2

Ensure profitability of TM4 in the very near term and maximize its value

TM4 has successfully supplied various customers with powertrain systems ranging from 25 to 40 kW and generators from 10 to 170 kW. It is currently working with wind turbine integrators on the design of generator systems with a power rating of several megawatts.

The company expects to make commercial breakthroughs in the land transportation and energy markets. Over the medium term, it will look for a strategic industrial partner with the necessary infrastructure and access to a high-volume market.

Objective 3

Facilitate development of mainly electric vehicle prototypes for a market that would use AVESTOR and TM4 products

In 2002, Hydro-Québec IndusTech signed a cooperation agreement with Société de Véhicules Électriques, created by a consortium of two French companies, Dassault and Heuliez. Under the agreement, ESEV (Energy Systems for Electric Vehicles) project management has decided to speed up development of AVESTOR's lithium-metal-polymer battery with a view to coupling it with the powertrain system produced by TM4.

Hydro-Québec IndusTech plans to continue its support for the development and demonstration of integrated propulsion systems using traction batteries for mainly electric vehicles, in partnership with the private sector.

Financial Outlook

While consolidating the progress made in terms of service quality over the past several years, the business objectives formulated in the *Strategic Plan 2004–2008* will lead to an improvement in the company's financial position.

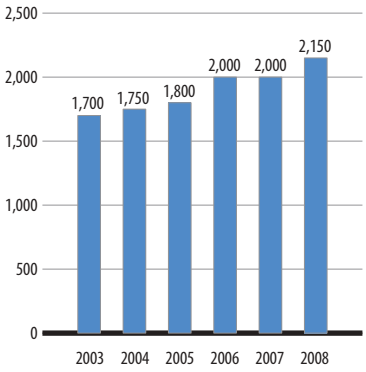
Return on equity will stabilize at about 11% during the entire 2004–2008 period, a rate that is higher than the average cost of debt.

In 2003, the company expects net income of $1,700 million, which should rise to $2,150 million by 2008. This growth is due to higher electricity sales, mainly in Québec, tight control of operating expenses and an improvement in the financial results of subsidiaries.

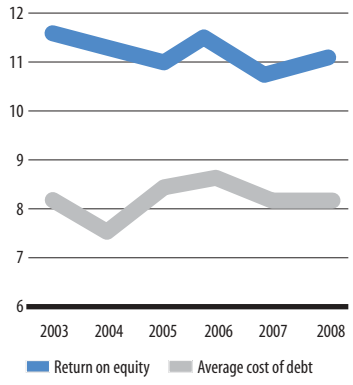
In accordance with its agreement with the shareholder, the company expects to declare dividends equal to 50% of net income in each year covered by the Strategic Plan. Dividends for the period are estimated at $4.9 billion. This is in addition to $3.4 billion in taxes to the provincial government and municipalities and $0.9 billion in loan guarantee fees.

Hydro-Québec also makes a significant contribution to the Québec economy through its growth, capital spending and purchases of goods and services. Over the 2004–2008 period, Hydro-Québec's activities will help sustain 220,000 person-years of employment in all regions of Québec.

Net Income ($ millions)



Return on Equity and Average Cost of Debt (%)



Introduction

Background

For more than 50 years, Hydro-Québec has provided Quebecers with a reliable supply of electricity while contributing to their collective prosperity.

In 1944, the *Act to establish the Quebec Hydro-Electric Commission* created Hydro-Québec. Its mandate was to supply Québec with electric power at the lowest rates consistent with sound financial management. To that end, the company was allowed to generate, acquire, sell, transmit and distribute energy throughout Québec.

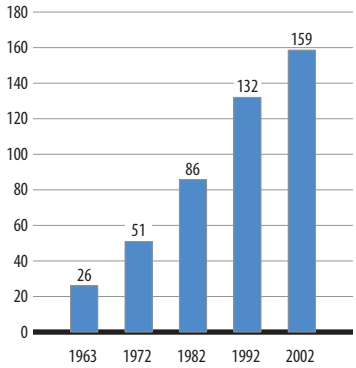
Hydro-Québec began its operations with four hydroelectric generating stations purchased by the Québec government from Montreal Light, Heat and Power Consolidated—Chambly, Rivière-des-Prairies, Les Cèdres and Beauharnois—and thus essentially served the Montréal area.

In the post-war years, demand for electricity grew rapidly. It accelerated even more in the late 1950s, when Hydro-Québec undertook development projects to increase its generating capability and to meet its customers' growing needs.

Construction of the Manic-Outardes complex began in 1959. To carry out the project, Hydro-Québec joined forces with Québec engineering firms, forming long-term partnerships that have enabled Québec's engineers to gain international recognition for their expertise in high-voltage power transmission and hydroelectric generation.

In the early 1960s, it became increasingly apparent that the conditions governing access to electricity were not the same for all Quebecers. Montrealers were served by Hydro-Québec and enjoyed low rates, while consumers in many outlying regions were paying exorbitant prices. To remedy this situation, the Québec government decided in 1962 to nationalize the electricity industry in favor of Hydro-Québec.

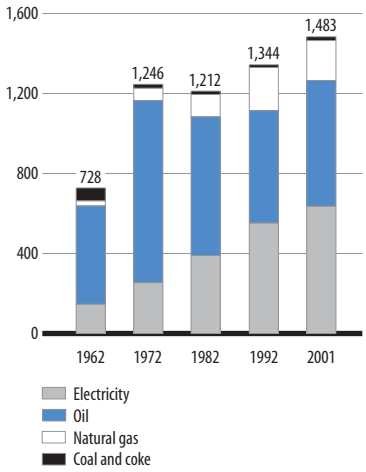
Electricity Demand in Québec
(TWh)



1944

Creation of Hydro-Québec

Québec's Energy Balance
End-Use Consumption
(petajoules – PJ)



In this way, Hydro-Québec could meet the needs of all Quebecers, guarantee better quality of service for all and develop Québec's tremendous hydroelectric potential.

The Manic-Outardes complex led to major technological innovations. Hydro-Québec became the world's first utility to use very-high-voltage (735 kV) lines to transmit electricity over long distances. Utilities in other countries would follow suit.

In the late 1960s, Hydro-Québec joined forces with Newfoundland and Labrador Hydro, forming the Churchill Falls (Labrador) Corporation to develop the hydroelectric potential of Labrador's Upper Churchill River. The project involved construction of the Churchill Falls power plant, which has a capacity of 5,428 megawatts (MW).

Early in the 1970s, the Québec government launched the largest construction project in Québec's history: the first phase of the La Grande hydroelectric complex in the James Bay region, with a total capacity of 10,282 MW. This major investment would soon be justified by the oil crises of 1973 and 1979. At the peak of construction, the James Bay sites employed more than half of Québec's construction workers.

In 1975, Hydro-Québec, along with the Cree and Inuit communities, signed the *James Bay and Northern Québec Agreement*, which would become a model for such agreements around the world. Subsequent complementary agreements broadened the scope of the document, which is based on respect, understanding and common objectives that have paved the way for new partnerships.

The abundant, inexpensive energy generated by the James Bay power plants has met Quebecers' growing needs, while promoting new industries. Electricity represents an ever-increasing share of Québec's energy mix, since it ensures greater independence and superior security of supply, not to mention the advantages of clean energy.

In 1978, the Québec government gave Hydro-Québec new powers so that it could market its expertise on global markets. The company created a subsidiary, Hydro-Québec International, whose mandate is to provide consulting services and technical assistance around the world.

In 1981, a law was passed to convert Hydro-Québec into a joint-stock business corporation, with the Québec government as its sole shareholder. With this new status came the obligation to pay annual dividends to the government. At the same time, the company's mandate was broadened to include the promotion of energy efficiency.

In 1983, an amendment to the *Hydro-Québec Act* extended the company's mandate to all areas related to energy, including research, and eliminated any geographic limitations on its operations, authorizing it to generate, acquire, sell, transmit and distribute power outside Québec.

After the second phase (4,954 MW) of the La Grande complex was launched in the late 1980s, Hydro-Québec carried out major undertakings in the decade that followed: a program to improve transmission system reliability, an ambitious energy efficiency project and efforts to improve customer service. It also began construction of the Sainte-Marguerite-3 hydro-electric development.

In 1996, the Québec government published the Québec Energy Policy, whose objective is to ensure that energy serves Quebecers, with due regard for the principles of sustainable development, and to take full advantage of the changes occurring in the North American energy industry.

1978

Start of international operations

1981

Hydro-Québec becomes a joint-stock company

Mandate extended to include energy efficiency

1983

Mandate extended to all areas related to energy

New powers authorizing electricity exports and other international operations

1996

Québec Energy Policy

The Québec Energy Policy gives Hydro-Québec a central role and determines the main policy directions and objectives for its operations:

- Hydro-Québec will remain the exclusive property of the Québec government.
- Hydro-Québec will improve its profit margin and generate increased profits for the shareholder.
- Hydro-Québec will be the key component of an industrial strategy focused on making Québec an energy hub.
- Hydro-Québec will maintain its innovative efforts, with R&D focused on core businesses. It will also enhance the commercial potential of its projects, form partnerships with the private sector and increase the industrial and economic spinoffs of its operations.
- Hydro-Québec will seek a new economic partnership with Aboriginal communities to develop the energy resources of Northern and Eastern Québec.

1996

Creation of the Régie de l'énergie du Québec

In 1996, the Québec government also created the Régie de l'énergie, the provincial energy board that is responsible for economic regulation of energy transmission and distribution. Any change in the electricity rates charged in Québec must be approved by the Régie.

1997

Opening of the wholesale electricity market

On May 1, 1997, Québec joined the trend to restructuring of the North American market by opening its transmission system and wholesale electricity market to competition. This process was overseen by the Québec government, which is taking a cautious approach to ensure the reliability of Québec's electricity supply. A few months later, the U.S. Federal Energy Regulatory Commission (FERC) issued a wholesale power marketer licence to H.Q. Energy Services (U.S.), a Hydro-Québec subsidiary. Hydro-Québec received the right to negotiate the sale and purchase of electricity directly, based on the U.S. market price, enabling it to further commercialize Québec's energy-sector assets and expertise.

Québec's wholesale electricity market now consists of 11 distributors: namely, Hydro-Québec Distribution, nine operators of municipal systems and one regional cooperative. With the opening of the wholesale market, all may purchase electricity in Québec or elsewhere. Similarly, independent power producers may sell electricity outside Québec, as does Hydro-Québec Production.

Hydro-Québec also acquired a 41% interest in Noverco, the holding company that controls Gaz Métropolitain. Through Noverco, Hydro-Québec also has a substantial indirect stake in Enbridge, the largest petroleum transporter in the world and the largest natural gas distributor in Canada.

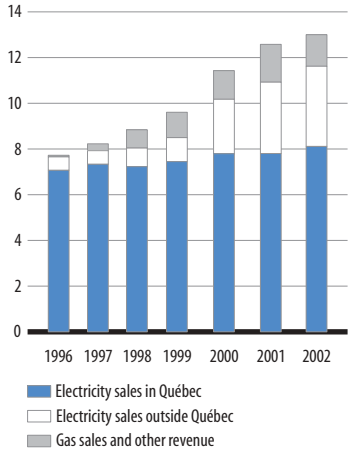
With careful management of its marketing activities, Hydro-Québec has taken advantage of the opening of the North American electricity market. From 1996 to 2002, sales were up by nearly 70%, net income almost tripled and sales outside Québec increased more than fivefold. The opening of the North American market has enabled the company to pay more than $2.3 billion of dividends to the Québec government in the past four fiscal years and make a substantial contribution to Québec's prosperity.

Pressure to open the retail market to competition is almost non-existent in Québec. Given the lack of tangible benefits for customers, Hydro-Québec does not intend to effect such a change. Nevertheless, under the *Act respecting the Régie de l'énergie*, if the Québec government deems it advisable, it may ask the Régie to consider opening the retail market.

In 2000, after the Québec government passed the *Act to amend the Act respecting the Régie de l'énergie*, Hydro-Québec confirmed the functional separation of its operations: namely, distribution, transmission and generation of electricity.

In the past four fiscal years, dividends totaling $2.3 billion have been paid to the Québec government

Revenue ($ billions)



2000

Generating activities deregulated

Obligation to supply heritage electricity

The new Act opens electricity generation to competition, while maintaining the gains resulting from the nationalization of the electricity industry. It makes Hydro-Québec Distribution responsible for the reliability of the distribution system and security of supply for the Québec market. It also provides that Hydro-Québec Production must supply up to 165 TWh of heritage electricity a year to Hydro-Québec Distribution at an average commodity rate of 2.79 cents per kilowatthour—the lowest rate in North America for such a large volume of energy.

Over and above the heritage pool, Hydro-Québec Distribution must conclude supply contracts based on market price to meet Québec demand each year. In 2002, Hydro-Québec Distribution launched its first long-term call for tenders to meet growing demand, which should exceed the heritage pool by 2005. All producers, including Hydro-Québec Production, may take part in tender calls issued by Hydro-Québec Distribution. For example, Hydro-Québec Distribution has signed a long-term contract with TransCanada Energy for the supply of 507 MW of electricity, beginning in 2006.

Now that it has an organizational structure adapted to an increasingly open market, Hydro-Québec will continue improving its performance while pursuing the profitable development of Québec's energy resources, thereby contributing to the prosperity of all Quebecers.

Business Environment

Situation in North America

In recent years, landmark events, such as the terrorist attacks of September 11, 2001, the energy crisis in California, the demise of energy trader Enron and the war in Iraq, have disrupted the political and economic context of the energy sector in North America and other parts of the world.

The U.S. and global economic downturns, as well as the strong volatility of natural gas and electricity prices in North America, have added to the uncertainty of the process of regulatory change. All these factors have slowed the electricity sector's restructuring in the United States and Canada.

Situation in the United States

Electric Power Supply

The wholesale market in the United States has been open to competition since 1997, when conditions for nondiscriminatory open access to transmission systems were put in place. A subsidiary of Hydro-Québec Production, H.Q. Energy Services (U.S.), holds a power marketer licence issued by FERC. The division can therefore deliver electricity not only at the border but also directly to the markets. Moreover, Hydro-Québec Production can store water in its reservoirs and rapidly produce energy at its hydroelectric generating stations, which gives it commercial flexibility and a definite competitive edge.

Since the U.S. wholesale market was opened, it has undergone significant changes. In the northeastern states, a number of utilities have sold their generating assets, opening the door to new players, many of them large firms specializing in the production and trading of electricity and other forms of energy—natural gas, coal and fuel oil.

We have also seen the emergence of energy traders and marketers, and the creation of power exchanges which enable producers and resellers to take part in short-term markets via direct bids.

California's energy crisis in 2000, followed by the scandal surrounding the collapse of Enron in 2001, caused turmoil on the U.S. markets. A crisis of confidence forced many utilities to abandon or reorganize their energy trading operations. These structural factors caused a crisis for the energy marketer model, and the revenues and stock market valuations of energy trading companies plummeted. Major financial institutions and large oil and gas producers have taken over a large portion of these operations.

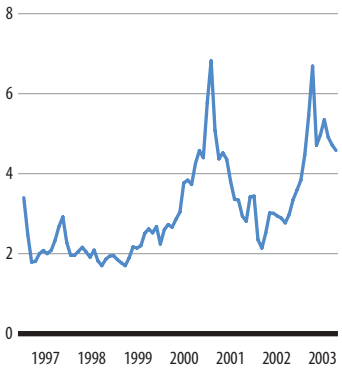
Within this context, Hydro-Québec has maintained a large volume of electricity transactions on the spot and short-term markets, as opportunities have arisen. The company makes sales and purchases in the northeastern U.S. and conducts energy trading operations. It uses financial instruments to reduce market risks and to carry out hedging and arbitrage operations based on energy-price fluctuations.

Generally speaking, market opening led to a decline in electricity prices until the summer of 1999. Production flexibility then decreased sharply, however, leading to price spikes during peak periods. Market development and increased transaction volume then caused prices to fluctuate considerably.

In 2000 and 2001, soaring natural gas prices pushed up electricity prices on all the wholesale markets. In 2001, declining fuel prices brought electricity prices down, but this situation was short-lived; in 2002 and 2003, the price of natural gas again rose and analysts see it as the first sign of a supply-demand imbalance. The high price of natural gas indicates a change in the gas market, which is characterized by limited supply and rising demand, largely due to the requirements of gas-turbine facilities.

Electricity demand in the United States has reached a stage of maturity. For the 2001–2020 period, electricity demand in the U.S. Northeast is expected to grow by 1% to 2% a year, depending on the particular market—an increase of 20 TWh a year. In recent years, there has been a substantial rise in the use of natural gas to generate electricity. This situation has created large surpluses in generating capacity, and the price of electricity has become increasingly linked to that of natural gas. These surpluses should lower the volatility of electricity prices on U.S. markets.

Natural Gas Wellhead Prices in the United States
(US$/thousand cubic feet)

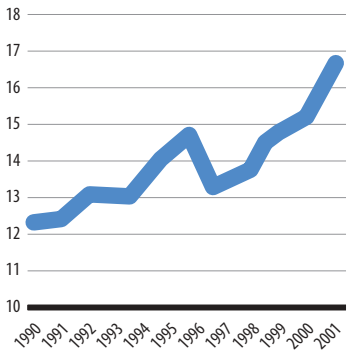


Source: Energy Information Administration (DOE).

For many years, Hydro-Québec has been selling a considerable volume of electricity outside Québec. In the 1990s, long-term contracts signed before the market was restructured yielded an average of $500 million a year. However, since the wholesale market in the United States was opened, electricity sales outside Québec have grown at an unprecedented rate. In 2002, they represented $3.5 billion of revenue, or almost 27% of the company's total sales.

The prices obtained by Hydro-Québec on its external markets are uncertain and subject to significant fluctuations. Two major factors come into play: excess generating capacity, which exerts downward pressure on prices, and uncertainty with regard to the supply of natural gas, which pushes prices up. On the whole, electricity prices are expected to edge down in the future.

The Share of Natural Gas in Electric Power Generation in the United States *(US$/thousand cubic feet)*



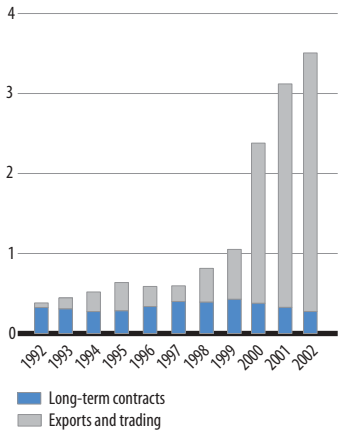
Source: Energy Information Administration (DOE).

Power Transmission

The opening of the wholesale market led to the creation of independent system operators (ISOs). However, these groups did not meet FERC's expectations regarding efficient, secure and nondiscriminatory management or development of the transmission systems, especially in congested areas. Consequently, in 2000, FERC proposed the creation of regional transmission organizations (RTOs).

On July 31, 2002, FERC published a notice of proposed rulemaking on the Standard Market Design (SMD). It described market rules and oversight mechanisms pertaining to the wholesale market and power transmission for the companies under its jurisdiction. Several states opposed the SMD, prompting FERC to issue, on April 28, 2003, the *Wholesale Power Market Platform White Paper*, which presents the changes to be made to the draft rules. FERC continues to advocate the formation of RTOs but has ceased to set a national deadline. It states that it will study the proposed RTOs and their schedules on a case-by-case basis. Contrary to the provisions of the original SMD statement, FERC now allows point-to-point transmission services between the regions to be maintained, as well as supply priority for local loads.

Revenue from Electricity Sales Outside Québec *($ billions)*



Hydro-Québec TransÉnergie, which operates Québec's transmission system, has the characteristics of an RTO:

- exclusive management of the reliability and security of Québec's asynchronous system as well as facilities operation, which provides protection from fluctuations on neighboring systems
- its large load (35,000 MW) and geographic reach
- a single rate for the entire system
- independent management ensured by rigorous separation of Hydro-Québec TransÉnergie's operations from Hydro-Québec Production's generation and wholesale operations, and from Hydro-Québec Distribution's energy supply operations

The commercial and regulatory uncertainty, which has persisted for several years, has had an adverse impact in several regions of North America on investment in and management of transmission systems. This, in turn, has compromised their capacity and reliability.

The major blackout of August 14, 2003, which affected millions of customers in Ontario and the states of New York, Michigan and Ohio, highlighted modern society's heavy dependence on reliable electricity service. As a result, the authorities may pay more attention to the restructuring efforts undertaken by FERC, the investments needed in transmission systems and the interdependence of energy markets and the continent's transmission systems.

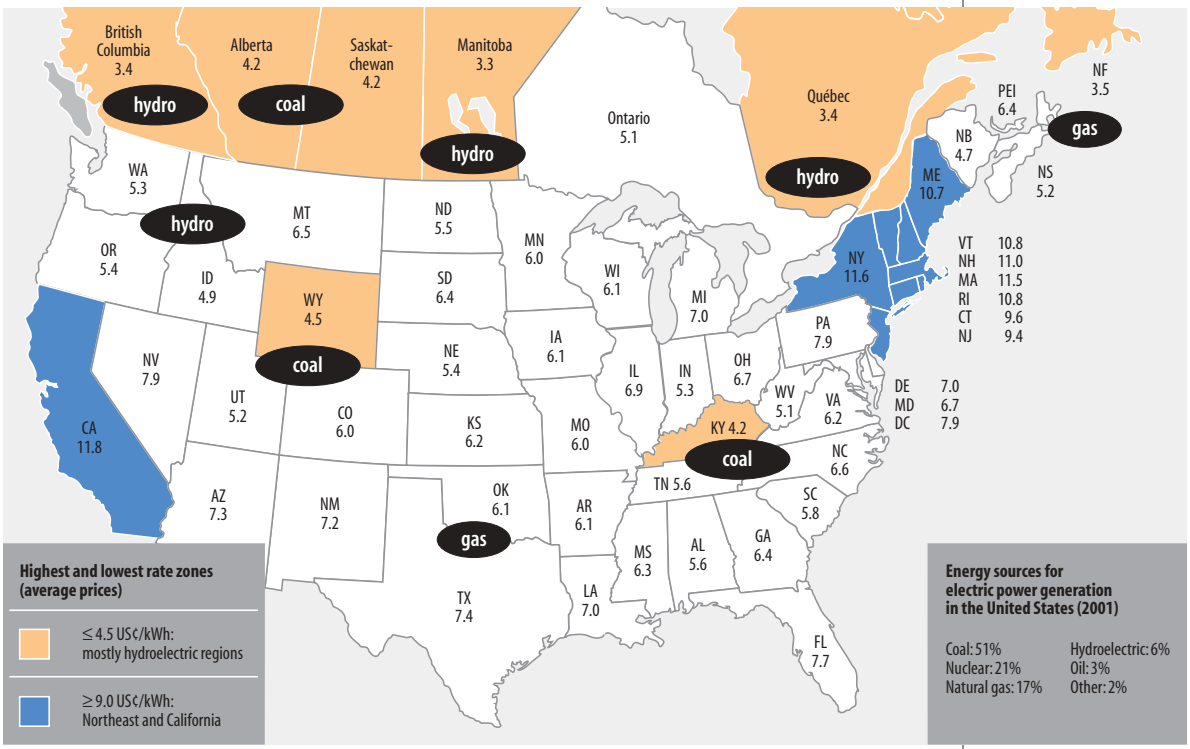
It is likely that the awareness created by the blackout of August 14, 2003, will be favorable to independent carriers, as indicated by the U.S. Energy Secretary's orders to put the underwater Cross Sound Cable line into service.

Retail Market

In the United States, the decision to open the retail market rests with each state. Twenty-three states, including Pennsylvania, Maryland and most of New England, have adopted the legislative and regulatory provisions required to restructure the electricity industry and to open their retail markets to competition. Still, certain states have delayed opening their retail markets or have repealed the legislative and regulatory provisions they had adopted. California suspended the opening of its retail market in 2001, becoming the first state to do a complete review of its restructuring process.

In addition, most of the states that have decided to open their retail markets have adopted transitional measures to protect consumers from the price volatility that may occur.

Average Price of Electricity by State (2001) and Province (2000) (US¢/kWh)
Overall Average



Sources: Energy Information Administration, Statistics Canada.

These measures take different forms: reduction of consumer rates in effect before restructuring, or freezing or maintaining rates for a certain period, etc. Opening the markets in these states is therefore taking longer than initially expected.

Situation in Canada

In Canada, the decision to restructure the electricity industry and open the wholesale and retail markets is up to each province. The trend to restructuring of the industry is gaining strength.

British Columbia, Alberta, Saskatchewan, Manitoba and Ontario, in addition to Québec, have opened their wholesale markets to competition.

In November 2002, the British Columbia government announced a new energy policy designed to increase investment in the energy sector while maintaining a low-cost supply for consumers. The policy maintains public ownership of BC Hydro, whose distribution, transmission and generation operations are now unbundled. As is the case in Québec, consumers will benefit from an advantageous heritage pool covering electricity that is produced by generating stations built before the policy took effect.

Alberta gave all consumers free access to its retail market in January 2001 and Ontario opened its market in May 2002. The Ontario market remains centralized, however. Consequently, Hydro-Québec Production does not have access to Ontario's municipal systems and cannot sell them electricity directly; it must go through the centralized market via the Independent Electricity Market Operator. In November 2002, uncertainty surrounding the supply of energy in the Ontario market and the volatility of consumer prices prompted Ontario to cap small users' rates until 2006.

New Brunswick plans to open its wholesale market to competition and to provide limited access to its retail market. This restructuring will take place when its *Electricity Act*, passed in 2003, comes into force. Nova Scotia has developed a strategy to restructure its electricity market by 2005. Newfoundland and Labrador, for its part, has begun studies and consultations on the restructuring of its market.

Hydro-Québec could participate in the development of profitable generating facility projects in neighboring provinces.

Situation in Québec

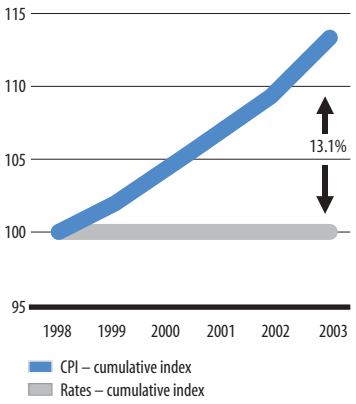
In Québec, Hydro-Québec's distribution operations are governed by the Régie de l'énergie on the basis of cost of service. Electricity rates have to be uniform throughout Québec, and the rate applicable to one consumer category cannot be changed to offset cross-subsidization between the various rate categories.

Customers in Québec will have enjoyed a rate freeze extending from May 1, 1998, to January 1, 2004. Taking inflation into account, the freeze is equivalent to a 13.1% decrease in rates. In this respect, Québec stands out from the various Canadian provinces and U.S. states that have experienced severe rate shocks.

Power transmission operations are also regulated on the basis of cost of service.

Driven by Québec's economic growth, electricity demand in Québec should rise by about 1.3% a year until 2008. This is creating additional pressure to develop new sources of supply, whose costs will exceed those of the existing generating fleet, and to improve the overall energy efficiency of the power system.

Electricity Rates and the Consumer Price Index



International Situation

It is estimated that more than a million new megawatts will be required by 2010 to meet growing electricity demand worldwide. Indeed, global electricity consumption is expected to rise by 2.4% a year, on average, from 2001 to 2025. The most rapid growth should occur in the developing countries of Asia and in South America.

In most of these countries, the absence or inadequacy of energy infrastructures is one of the biggest roadblocks to economic growth. New energy demand is expected to give rise to investments in generation and transmission facilities worth US$1,200 billion by 2010.

Access to capital and expertise is also a major obstacle for many countries whose economies and populations are growing rapidly. To accelerate their development, these countries are inviting companies active on the international scene to invest in their energy infrastructures.

Around the world, there are numerous business opportunities, but the competition is also very intense. A number of players have made ill-advised investments and sustained considerable losses in recent years. The successful companies are those that work to commercialize their expertise through investments in the international arena and focus on areas where they can use their world-class know-how to manage regulatory and political risks, along with foreign exchange risk, more effectively than their competitors.

With its global reputation and successful technical record, Hydro-Québec will focus its international operations on high-voltage transmission, an area in which it excels. In this area, Hydro-Québec TransÉnergie's status as an independent carrier and its ability to manage a transmission system in a nondiscriminatory manner give it significant advantages.

Energy Working for Québec

Objectives

Quality of customer service

Value creation for the shareholder and Québec society

Increased generating capability in Québec

Hydro-Québec's Mission

"The objects of the Corporation are to supply power and to pursue endeavours in energy-related research and promotion, energy conversion and conservation, and any field connected with or related to power or energy."

(Hydro-Québec Act, section 22)

Quality of Service and Value Creation: Staying the Course

The business objectives proposed in Hydro-Québec's *Strategic Plan 2004–2008* follow from those of the three previous Strategic Plans. A summary of the achievements and results of the *Strategic Plan 2002–2006* is given in Appendix 1. The business objectives maintained by the company are intended to consolidate the progress made toward achieving the company's major goals set forth in the *Hydro-Québec Act* and the Québec Energy Policy. They will ensure that high-quality service is provided to all Québec customers with a view to creating value for the shareholder (the Québec government) and Québec as a society, especially by increasing electricity generating capability in Québec.

Hydro-Québec has many advantages that will help it achieve these objectives:

- improved customer service
- hydroelectric potential that can be developed at competitive costs
- favorable locations for thermal generation projects
- marketing and price arbitraging potential on wholesale markets in the U.S. Northeast, based on hydroelectric generating stations, reservoirs and interconnections
- the expertise to gain prominence on international markets in the field of high-voltage transmission
- a presence in the development of energy transmission and natural gas distribution through its interest in Noverco

Building on its strengths, Hydro-Québec will concentrate on improving its overall performance in five key areas:

- quality of customer service
- employee motivation and expertise
- value creation for the shareholder and Québec society
- sustainable development
- organizational efficiency

Improving Hydro-Québec's Overall Performance

Given the value of its assets and the scope of its operations, Hydro-Québec is the largest energy company in Québec. Therefore, it is important to ensure that the company continues to grow and to create new wealth for Québec. While continuing to support the province's economy with a view to sustainable development and maximum efficiency, Hydro-Québec must ensure that its customers receive the best possible service for their money. It must also ensure that its employees are motivated, productive and satisfied with their jobs, and that its shareholder obtains a maximum rate of return.

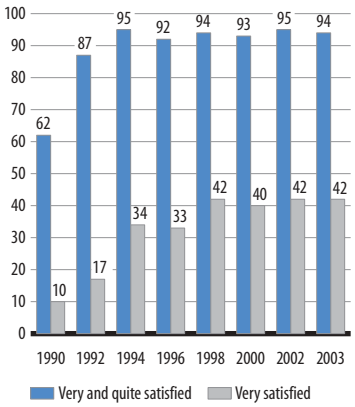
Maintain the Quality of Customer Service

The actions arising out of the *Strategic Plan 2002–2006* have allowed Hydro-Québec to achieve very positive results in terms of service to Québec customers. For example, the rate of public satisfaction with Hydro-Québec stood at 95% in 2002. This reflects the general image that the public has of the company's management and service performance. The public satisfaction level held steady in 2003, with an overall rate of 94%, including 42% who were "very satisfied."

By building on the achievements of recent years, Hydro-Québec is committed to taking action with regard to service quality and reliability so as to maintain a satisfactory price-quality ratio for its customers.

With respect to rates, Hydro-Québec Distribution is aiming for a normal return in a regulated environment. Hydro-Québec remains convinced that the rates paid by Québec customers will continue to be among the lowest in North America.

Rate of Public Satisfaction (%)



Motivate Employees and Develop Expertise

Hydro-Québec is mindful that its performance depends above all on the men and women who work for it. The company will therefore continue its efforts to motivate employees and to ensure they are committed to the strategic business objectives of each of its divisions.

The company also plans to take measures to improve the performance and productivity of its human resources while providing a safe workplace.

Furthermore, in the context of an aging work force and a growing number of retirements, Hydro-Québec will deploy the necessary strategies to ensure that its expertise is maintained and developed. The company's initiatives and strategies to achieve these objectives are described in Appendix 2.

Create Value for the Shareholder and Québec Society

The actions stemming from the previous Strategic Plans have helped improve the company's profitability, to the benefit of its shareholder, the Québec government, which is in a better position to pass on the benefits to Québec society. Net income for 2002 was a record $1.5 billion, almost double the net income posted in 1997. This performance is due mainly to additional revenues from short-term sales on external markets, higher sales in Québec and management of the debt, which took advantage of lower interest rates. Pursuing its profitability and value creation objectives for the shareholder and Québec society, Hydro-Québec will continue to develop its generating fleet and electricity sales on the retail market in Québec as well as on wholesale markets.

Hydro-Québec will help sustain economic development and employment in all regions of Québec through its operating activities, its investments in generating, transmission and distribution facilities and its purchases from independent power producers, as well as its international projects and the operations of its technology subsidiaries.

Hydro-Québec will participate in the diversification of Québec's economy. Its industrial business development efforts will target value-added sectors, with a view to creating maximum wealth and jobs in Québec for each megawatt of new industrial demand.

In this way, Hydro-Québec will be involved in the collective development effort in the regions, reconciling its development needs and priorities, as determined by its core mission and its commercial reality, with customers' expectations and the communities' legitimate concerns regarding its role as a development partner.

Contribute to Sustainable Development

As a forward-looking company, Hydro-Québec adopted the concept of sustainable development in 1989. It regards sustainable development as a long-term commitment that combines preservation of the environment, social equity and economic efficiency.

In line with its vision and values, Hydro-Québec uses mainly hydroelectric facilities to generate safe, clean, renewable energy. More than 95% of the energy it generates is derived from water resources; moreover, the company is the largest purchaser of wind energy in Canada. Hydro-Québec intends to pursue these efforts by placing priority on development of Québec's hydroelectric potential.

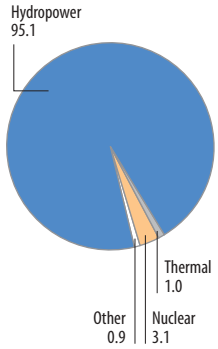
However, since hydropower and wind power are expected to be insufficient to meet demand, despite the gains made through energy efficiency, Hydro-Québec will have to use thermally generated electricity, over and above the output of Gentilly-2 and Tracy generating stations. The company will have to obtain energy from some proposed thermal projects, which can be commissioned much faster than hydroelectric facilities.

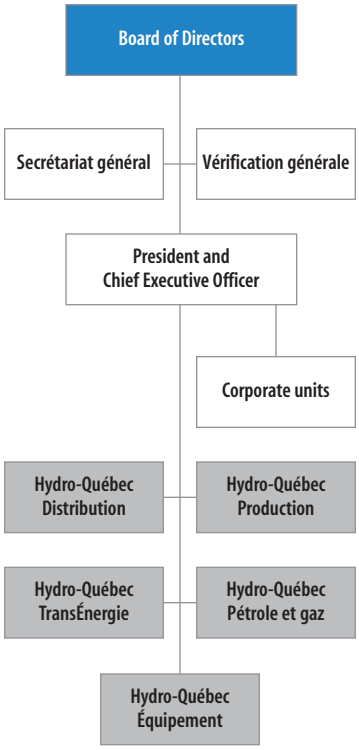
In energy efficiency, Hydro-Québec continues to play a leadership role. Thus, if the same technologies and behaviors that prevailed in 1990 continued until 2006, an additional 23.5 TWh would be needed to meet Québec's requirements. These recurring energy savings will be achieved through Hydro-Québec's direct initiatives with respect to its power system (8 TWh) and energy efficiency programs (3 TWh), and their indirect effects on customer behavior and the use of more efficient technologies (12.5 TWh).

Hydro-Québec also dedicates substantial sums to the development of technologies that promote sustainable development. Through its technology subsidiary Hydro-Québec IndusTech, the company is developing a lithium-metal-polymer battery—a key component for electric vehicles. Hydro-Québec is also investing, through Hydro-Québec CapiTech, in a company that is developing a technology designed to eliminate waste, produce a synthetic gas and generate electricity.

Finally, through its social involvement, programs for low-income customers, and donations and sponsorships, Hydro-Québec will continue to be actively involved in Québec's development as a society.

Sources of Supply in 2002 (%)





Make Hydro-Québec Even More Efficient

As a state-owned corporation with a commercial vocation, Hydro-Québec has developed a more flexible structure that helps it provide first-rate service at the lowest possible cost. By improving its efficiency, the company increases its contribution to society's prosperity by paying dividends to its shareholder, the Québec government.

Like most North American electric utilities, Hydro-Québec is now structured according to three core areas of activity: generation, transmission and distribution. This division of functions reflects the new operating modes of a market that is open to competition between electricity producers. By clearly separating profit centres from services to the divisions and corporate support activities, the new organizational model enables the company to track the improved efficiency of each division more effectively.

To improve its performance, Hydro-Québec will freeze its operating expenses until 2006, keeping them at their budgeted 2003 level. To absorb cost increases, including the wage indexation provided for in collective agreements, the company plans to bolster various measures, including efficiency gains, optimization of operations, reduction of personnel costs, downsizing through attrition, and postponement of certain expenses related to support activities.

Context:
End of the freeze on electricity rates

Objective:
Freeze operating expenses

Profit Centres

With mandates and responsibilities specific to their lines of business, Hydro-Québec's divisions and subsidiaries are well positioned to act on new growth opportunities in their market niches.

High management targets have been set for each division, and the degree to which they are achieved will be measured with precise indicators. The company's overall performance depends on rigorous management whereby each division is accountable for optimizing its own processes and achieving its own business objectives.

With the creation of the divisions, Hydro-Québec has better control over the development of each market niche. The divisions operate in their own areas of excellence according to the laws of the marketplace and, in this way, stimulate vitality and entrepreneurship within the company.

Hydro-Québec Distribution, whose operations are regulated on the basis of cost of service, is a virtual monopoly, serving 97% of Québec customers. It is responsible for supplying Québec customers with electricity and must ensure equal treatment of all producers that respond to the calls for tenders it issues to meet needs over and above the heritage pool. It must also provide quality service to its Québec customers. Hydro-Québec Distribution must obtain a normal return, as determined by the Régie de l'énergie, in a regulated environment. The method for determining the authorized rate of return has been approved by the Régie de l'énergie. According to this method, Hydro-Québec Distribution would be entitled to a return of 8.71% for 2004. It should be noted that the division has scaled back its international operations.

Hydro-Québec TransÉnergie, whose operations are also regulated on the basis of cost of service, is responsible for the reliability and safety of the transmission system in Québec. The division ensures that all wholesale customers have nondiscriminatory access to Québec's transmission system, in accordance with North American regulatory provisions. In April 2002, the Régie de l'énergie rendered its decision allowing Hydro-Québec TransÉnergie to adjust its rates retroactively, as of January 1, 2001. Furthermore, the Régie established its rate of return at 9.66% for 2001. However, based on recent decisions by the Régie de l'énergie, it is expected that this rate will be reduced. Thanks to its expertise in very-high-voltage transmission, the division has developed profitable operations on the international scene.

Hydro-Québec Production must supply Québec customers with a heritage pool of up to 165 TWh of electricity a year, at an average commodity rate of 2.79 cents a kilowatthour. Apart from this obligation, the division competes against other producers on wholesale markets, especially in Québec. Hydro-Québec Production has obtained from the Québec government a monopoly over the development of hydroelectric projects of 50 MW or more in Québec. It sees to the development and profitable marketing of Québec's energy resources—including the optimization of its reservoirs' storage capacity—on markets in the U.S. Northeast, without affecting the supply to Québec customers. This profit centre has obtained substantial, ever-increasing returns in recent years. These returns are justified, especially in view of the risk of low runoff, whose impact in a single year could reach $1.2 billion.

Profit Centres

Monopoly situation – Regulated on the basis of cost of service

Hydro-Québec Distribution
Hydro-Québec TransÉnergie

Competitive situation

Hydro-Québec Production
Hydro-Québec CapiTech
Hydro-Québec IndusTech

Rate of return authorized by the Régie de l'énergie for Hydro-Québec TransÉnergie and Hydro-Québec Distribution

Return determined on the basis of the return from a risk-free investment (long-term government of Canada bonds), plus a premium that reflects the market risk

Hydro-Québec CapiTech and **Hydro-Québec IndusTech** are wholly owned subsidiaries of Hydro-Québec operating in the energy technology field. Hydro-Québec CapiTech is a venture capital company whose mandate is to make profitable investments in technology companies related to Hydro-Québec's core business lines. It also provides strategic and commercial intelligence to support the company's technology innovation strategy. Hydro-Québec IndusTech's mandates are to industrialize and to market, in partnership with the private sector, technologies arising out of Hydro-Québec's research activities.

Services to the Divisions and Corporate Support

Hydro-Québec ensures that each profit centre's objectives reflect a high level of customer service, the shareholder's profitability requirements and the development of employees' expertise. Like any commercial company, it must also manage substantial risks, allocate capital, practise effective financial control and monitor the financial returns earned by its various units.

The services to the divisions and corporate support are intended to promote value creation by improving the profit centres' performance. These support functions allow the divisions to focus on their core activities.

The objective of human resources management is employee motivation and satisfaction, harmonious labor relations, development of competencies, development of managerial leadership and training of a new generation of employees who will contribute to the company's growth.

To improve its efficiency, optimize its costs and improve customer satisfaction, Hydro-Québec has set up a shared services centre, which follows the best practices in this field. The centre encompasses a range of operations, including information technologies, the procurement of goods and services, real estate and documentation management.

As regards technological innovation, the objectives of which are described in Appendix 3, Hydro-Québec aims to support the divisions' performance and ensure the company's long-term viability. Consequently, innovation focuses on the needs of core businesses. Innovative technology projects are defined in cooperation with the divisions and are directly related to improvement of their operations.

Hydro-Québec Équipement carries out construction projects for the divisions that operate in the electricity sector. Société d'énergie de la Baie James has a mandate to carry out construction projects north of the 49th parallel. Their main objective is to reduce project costs and lead times.

Hydro-Québec Pétrole et gaz manages Hydro-Québec's stake in Noverco, the holding company that controls Gaz Métropolitain. It also promotes oil and gas exploration on the Gaspé Peninsula and in the estuary and Gulf of St. Lawrence. Once it obtains the necessary permits, the division will contribute up to 25% of the investment required for the drilling of the geological structure known as Old Harry.

A Strategic Plan to Develop the Electricity Market

Hydro-Québec proposes objectives regarding the development of the electricity market for the benefit of its customers, its shareholder and Québec society. As the table on the next page shows, a number of important parameters of the *Strategic Plan 2004–2008* are uncertain, while others are more definite.

Main Parameters Related to the Development of Hydro-Québec's Electricity Market

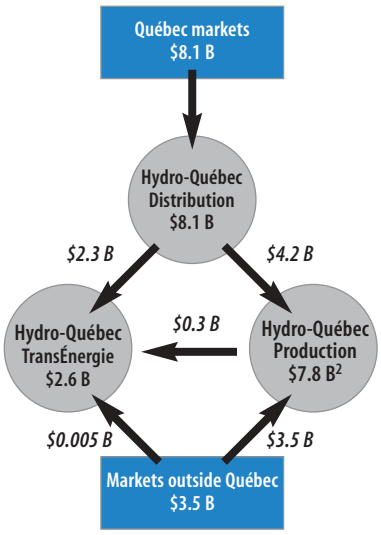
Parameters Subject to Uncertainty

- Weather (maximum variation for Hydro-Québec Distribution: ± 4.5 TWh/year; ± 4,300 MW)
- Runoff (annual standard deviation: ± 20 TWh, or ± $1,200 million a year for Hydro-Québec Production)
- Nature and impact of the harmonization of North American accounting rules
- Terms of the Kyoto Protocol applicable to electricity producers
- Hydroelectric generating station projects that will be approved and carried out
- Whether Gentilly-2 operates until 2028 or is replaced
- Volume of possible imports on the U.S. portion of the direct-current transmission line

Known Parameters

- Obligation to serve Québec customers; fairly predictable electricity demand
- Maximum financial results required by the shareholder
- No other interconnections to be commissioned before the end of the current Plan (2008)
- Hydroelectric generating station projects: 10 to 12 years from the initial studies until a project is commissioned
- Sustainable development requirements for all projects

Revenue Flow Among the Divisions in 2002[1]



1. *Excluding revenue from the natural gas segment, international investments, Hydro-Québec Équipement and service units (total consolidated Hydro-Québec revenue: $13.0 B).*
2. *All figures have been rounded.*

Revenue for each division – electricity segment ($11.6 B)

- *Hydro-Québec Distribution: $1.6 B*
- *Hydro-Québec TransÉnergie: $2.6 B*
- *Hydro-Québec Production: $7.5 B*

Hydro-Québec's three main divisions work in synergy to deliver the kilowatthours that customers need. The chart in the sidebar shows the breakdown of the $11.6 billion of revenue that the company earned from the electricity segment in 2002, as it would have been distributed among Hydro-Québec Distribution, Hydro-Québec TransÉnergie and Hydro-Québec Production. The *Strategic Plan 2004–2008* reflects this structure and presents business objectives and development strategies for each division. It also presents business objectives and strategies for the technological subsidiaries, Hydro-Québec CapiTech and Hydro-Québec IndusTech, whose results are incorporated into the results for corporate units.

Business Objectives of the *Strategic Plan 2004–2008*

An analysis of Hydro-Québec's main strategic issues has led it to develop the following business objectives:

Hydro-Québec Production

- **Increase electricity generating capability**
- **Increase the division's profitability**
- **Ensure the reliability and quality of operations**

Hydro-Québec TransÉnergie

- **Offer transmission service that meets customer needs**
- **Maintain the reliability of the transmission system**
- **Ensure the division's profitability**

Hydro-Québec Distribution

- **Ensure an adequate, diversified supply of electricity**
- **Emphasize Hydro-Québec's energy efficiency leadership**
- **Offer Québec customers service that meets their expectations**
- **Achieve the authorized rate of return in 2004 and then maintain it**

Hydro-Québec CapiTech

- **Continue to increase the value of the existing portfolio**
- **Maximize the strategic and commercial spinoffs of investment activities for Hydro-Québec**

Hydro-Québec IndusTech

- **Ensure profitable sales growth and maximize the value of the investment in AVESTOR**
- **Ensure profitability of TM4 in the very near term and maximize its value**
- **Facilitate development of mainly electric vehicle prototypes for a market that would use AVESTOR and TM4 products**

FIXED ASSETS
AS AT DECEMBER 31, 2002

$23.6 billion

REVENUE
IN 2002

$7.9 billion

MAIN CUSTOMERS
IN 2002 (% OF REVENUE)

Hydro-Québec Distribution: 54%

Other wholesale markets – North America: 45%

Other international markets: 1%

TOTAL WORK FORCE
AS AT DECEMBER 31, 2002

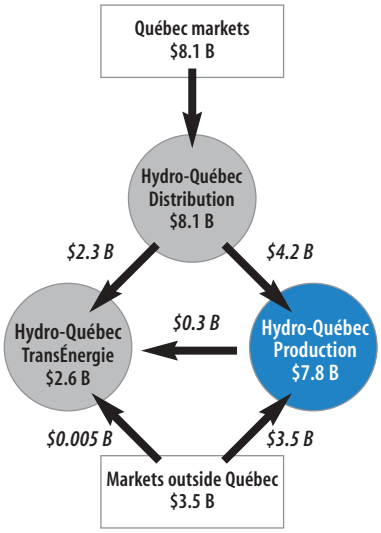
3,401 employees

REGULATORY REGIME

Heritage pool electricity (maximum volume of 165 TWh per year) at a fixed rate for Hydro-Québec Distribution

Above that volume and outside Québec: free competition

Revenue Flow Among the Divisions in 2002 – Electricity Segment



Hydro-Québec **Production**

Mandates

- **Sell electricity on wholesale markets inside and outside Québec**
- **Operate the division's generating facilities and reservoirs**
- **Develop Québec's hydroelectric potential**
- **Develop thermal generation on a selective basis**
- **Conduct trading of electric power and related energy products on North American markets**
- **Manage holdings, investments and professional services in the field of electricity generation on international markets**

Business Objectives 2004–2008

1. **Increase electricity generating capability**
2. **Increase the division's profitability**
3. **Ensure the reliability and quality of operations**

Objective 1
Increase electricity generating capability

Hydro-Québec has developed a highly competitive hydroelectric capability in Québec, making it one of North America's leading producers.

With the growth in accessible, profitable electricity markets in Québec and throughout the northeastern part of the continent, Hydro-Québec Production will continue developing its generating capability, with particular emphasis on Québec's own hydroelectric potential.

Although investments to increase this capability have been substantial in the past few years, they have not yet returned to the level of the early 1990s, as desired.

Increased generating capability is also made necessary by the recent narrowing of the gap between available output and contractual commitments, making it more difficult to manage risks related to variations in runoff.

To increase its generating capability, Hydro-Québec Production plans to implement the following three strategies:

- Add 10 TWh to its annual hydroelectric energy output by 2008.
- Continue to develop hydroelectric potential.
- Maintain an adequate margin of flexibility by developing thermal generation on a selective basis.

Strategy 1.1

Add 10 TWh to annual hydroelectric energy output by 2008

Over the *Strategic Plan 2004–2008* period, Hydro-Québec Production plans to add 10 TWh to its annual generating capability. It will achieve this goal by increasing the productivity of its generating fleet (0.6 TWh), operating the generating stations commissioned in 2003 at full capacity (2.8 TWh) and moving up the commissioning dates of facilities under construction or awaiting authorization (6.5 TWh).

Productivity gains

As part of its careful management of generating assets, Hydro-Québec Production invests in refurbishing its facilities and improving their performance. This enables it to maintain the fleet in optimum condition in order to ensure reliable service for its customers.

Since 1990, Hydro-Québec Production has posted substantial productivity gains by taking steps to enhance the performance of its generating units and by reducing energy-capable spillages. These energy efficiency measures yielded a cumulative productivity gain of 4.2 TWh between 1990 and 2003.

In the coming years, the refurbishing of hydroelectric generating stations, the ongoing program for turbine runner replacement and the rollout of MATH (the French acronym for hydraulic turbine analysis models) technology, which improves generating unit performance, should contribute an additional 0.6 TWh in productivity gains by 2008.

Moving up commissioning dates

To acquire additional hydroelectric generating capability of 6.5 TWh by 2008, Hydro-Québec Production will make every effort to move up the commissioning of facilities under construction and the development of projects awaiting authorization (Péribonka generating station).

Construction and commissioning timetables have been optimized so that Hydro-Québec Production will have the output from Toulnustouc generating station at its disposal by winter 2005–2006, and from

Eastmain-1 before summer 2007. Péribonka generating station is scheduled to come on stream in fall 2008, if the division obtains the necessary construction authorizations before summer 2004.

Altogether, the division will invest some $5.4 billion in hydroelectric development projects between 2004 and 2008.

Hydro-Québec Production – Energy Balance 1998–2008 *(TWh)*

	1998	2003	2008	Growth 2003–2008
Available energy				
Generating facilities (average runoff), current long-term purchases and deliveries received under agreement	188	189	189	–
Hydroelectric generating projects (new output)	–	1	11	10
New short and long-term purchases[1]	–	5	5	–
Total	**188**	**195**	**205**	**10**
Commitments				
Sales in Québec – Heritage pool electricity	143	164[2]	165	1
New commitments to Hydro-Québec Distribution	–	–	5	5
Other sales in Québec	–	2	2	–
Sales outside Québec (long-term contracts)	8	3	3	–
Other obligations and system losses	19	17	17	–
Total	**170**	**186**	**192**	**6**
Capacity for additional sales[3] inside and outside Québec, and banking in reservoirs	**18**	**9**	**13**	**4**
Planned short-term sales outside Québec			**7**	

1. *New purchases from independent power producers in Québec and external supplies.*
2. *At normal seasonal temperatures, sales would have been 1.8 TWh lower.*
3. *For 2004–2008, assuming average runoff, and not including purchase/resale transactions outside Québec.*

Strategy 1.2
Continue to develop hydroelectric potential

Hydro-Québec Production plans to continue developing hydroelectric potential in and around Québec in order to supply markets beyond the time frame of the *Strategic Plan 2004–2008*. This objective, in keeping with the past 40 years of development, reflects both the economic interest of competitive hydroelectric projects and the many environmental advantages of hydropower.

All projects will have to meet the following three conditions:

- be profitable under market conditions
- be environmentally acceptable
- be well received by local communities

Hydro-Québec Production is working actively to develop a number of profitable hydroelectric projects, which will not generate available output until after 2008, however. These projects include Eastmain-1-A generating station and the Rupert diversion, with the possible addition of Sarcelle generating station, and the Chute-Allard and Rapides-des-Cœurs developments. Currently in the draft design stage, these projects are covered by agreements with the local communities and should get under way in 2005 or 2006. The electricity generated by these facilities will add a total of 11 TWh to Hydro-Québec Production's annual available output.

In 2004, Hydro-Québec Production also hopes to commence the draft design of four generating stations, with a total capacity of 1,500 MW, to be developed on the Romaine River in the Mingan region. Extensive surveys and technical studies have already been carried out for this project, which will cost an estimated $5 billion for the generation component. The Romaine development could be followed by a second major 1,500-MW project on the Petit Mécatina River in the same region. Hydro-Québec Production will offer the Innu and the Minganie RCM partnering agreements similar to those reached for the Toulnustouc and Péribonka projects. The conditions for obtaining environmental approval for the Romaine development will determine the cost-effectiveness and feasibility not only of this project but also of the Petit Mécatina River project.

In addition, studies conducted in 2002 enabled Hydro-Québec Production to update its evaluations of the hydropower potential of four rivers in the Nunavik region: the Nastapoka, Caniapiscau, George and À la Baleine rivers. These studies yielded the following conclusions:

- The Nastapoka River development project (approximately 500 MW) is only marginally profitable. Building it could eventually be considered, however, in conjunction with the larger project for developing the Grande rivière de la Baleine, because of the rivers' relative proximity.
- The Caniapiscau River development (about 1,600 MW) could be of interest in the medium term. However, its current projected cost of approximately 11 cents per kilowatthour is too high. The project also poses some environmental challenges.
- The George River hydroelectric development (around 3,100 MW) does not seem environmentally feasible, given the laws and regulations now in effect. Its cost is also high.
- The À la Baleine River development project (about 1,100 MW) is too expensive, with a cost of more than 15 cents per kilowatthour.

Furthermore, Hydro-Québec Production is not making any investment or purchasing forecasts regarding any portion of the output that could be generated by the development of the Lower Churchill River in Labrador. This project would, in any case, only be completed after 2012.

Construction lead times and costs

The profitability of hydropower projects is closely linked to construction lead times and the ability to control costs while complying with quality standards and environmental requirements. Reducing lead times can directly increase project profitability since, for the same cost, the facilities can be commissioned earlier and begin generating revenue sooner.

To develop profitable hydropower projects, partnering agreements must also be reached with local communities and the necessary environmental approvals must be secured. Hydro-Québec Production will therefore continue to work closely with the appropriate authorities to find ways of speeding up the project approval and environmental review processes.

A notable recent example is the Toulnustouc project, for which the provincial assessment process was conducted both diligently and according to a reasonable timetable. Hydro-Québec Production notes the same diligence on the part of the Québec government, and the same constructive approach, for the current assessment of the Péribonka project.

In terms of the federal authorities' environmental assessments, Hydro-Québec Production considers that better control on both sides is needed throughout the process if hydroelectric projects are to be assessed diligently and within a reasonable time frame (see Appendix 4). The assessment of the Péribonka project currently under way, as well as the environmental assessment of the Eastmain-1-A development and the Rupert diversion, will point to any progress in this area. Recent indications regarding the assessment timetable for the Péribonka project are encouraging.

Project acceptance by local communities

Acceptance by local communities is an essential condition for completing the development of hydroelectric potential. Hydro-Québec Production will continue to propose partnerships with host communities for all new projects, similar to those reached for the Toulnustouc and Péribonka developments.

Construction of Eastmain-1-A generating station and the Rupert diversion will be covered by the *Boumhounan Agreement*, just as the Eastmain-1 development, now under construction, is covered by the *Nadoshtin Agreement*. Both agreements were signed with the Crees.

Hydro-Québec Production will continue to develop strategies and means that ensure competitive project development. At the same time, it will offer substantial business opportunities to local and regional companies by placing particular emphasis on subcontracting. For the Toulnustouc project, for example, nearly $100 million had been injected into the North

Shore region by the end of 2002; as well, since the start of construction, 65% of workers on the site have come from the region. The experience gained here will be applied to future projects.

Hydro-Québec Production will also pursue the process of consulting with host communities. Regional information and discussion forums must allow host communities to closely monitor generation projects, from the start-up phase to commissioning.

Strategy 1.3
Maintain an adequate margin of flexibility by developing thermal generation on a selective basis

Hydroelectric generation has many benefits and remains the option of choice for Hydro-Québec Production. However, it also presents significant challenges, notably in terms of acceptance by host communities and environmental assessment.

In view of current market conditions, including stronger growth in electricity demand in Québec, the division proposes to take advantage of market opportunities between now and 2008, beyond the existing and currently planned means of generation. Failing other solutions, thermal generation will help it fulfill energy requirements until significant output from the large-scale Eastmain-1-A development and the Rupert diversion becomes available. Without postponing or replacing any project involving hydropower, which remains its preferred generating option, Hydro-Québec Production will therefore pursue its efforts to complete the proposed Suroît combined-cycle thermal generating station before 2008. This 800-MW, natural gas-fired plant would generate some 6.5 TWh of energy annually.

The division will also have to make a decision on the major overhaul needed at Gentilly-2 nuclear power plant, in order to add at least 25 years to its useful life. A decision should be reached by about 2005.

In addition, Hydro-Québec Production plans to purchase thermally generated electricity from power producers in the northeastern part of the continent, as long as this option complements its own generating facilities cost-effectively. These purchases will help maintain a prudent margin of flexibility in terms of its contractual commitments and the risk of low runoff.

A secure power supply

Hydro-Québec Production's first responsibility is to supply Hydro-Québec Distribution with heritage pool electricity of up to 165 TWh per year for its Québec customers.

Hydro-Québec Production plans to deliver this volume reliably under the terms set forth by law, while also generating profitable sales at competitive prices on deregulated markets. To do this, it will keep up its current practices with regard to security and reliability of the supply. For example, it will

- maintain a sufficient energy reserve to cover a 64-TWh runoff deficit over two consecutive years
- maintain a 10% to 12% capacity reserve for the heritage pool, equivalent to a load-shedding risk of 2.4 hours per year (North American standard)

Security of supply for the heritage pool depends on effective multi-year management of runoff risk. When the gap between available output and contractual commitments narrows, as has been the case in recent years, management of runoff risk depends largely on the capacity to import electricity through interconnections. Hydro-Québec Production will therefore ensure that Hydro-Québec TransÉnergie, the transmission provider in Québec, guarantees reliable access to import capacity on existing interconnections.

Objective 2
Increase the division's profitability

Hydro-Québec Production is working to increase its profitability by 2008. By the end of 2008, assuming average runoff over the Strategic Plan period, it aims to increase its earnings before interest, taxes, depreciation and amortization by $200 million compared with the 2002 results. The division will achieve this goal by optimizing its activities on wholesale markets and freezing operating expenses.

The return on capital employed, measured on the basis of earnings before interest, taxes and budgetary contingency, will be kept at over 12% for this period.

Strategy 2.1
Continue to optimize short-term sales and purchases on wholesale markets

While fulfilling its commitments on the Québec market, Hydro-Québec Production is active on regional energy markets in northeastern North America. Its trading includes the sale of electricity produced in Québec, the purchase of electricity for resale, and price arbitraging within certain markets. The division is constantly optimizing its trading through new and efficient tools. By developing this activity, it continues to capitalize on its hydroelectric assets.

The 2004–2008 period will feature a limited level of net annual reservoir outflows for export purposes. Energy purchases, which will be more extensive than in the last period, and resales will both be optimized to ensure the greatest possible contribution to operating income. Firm and long-term transmission contracts will be limited to the capacities required to meet long-term commitments outside Québec, primarily the contract with Vermont customers.

Strategy 2.2
Continue careful management and freeze operating expenses

Hydro-Québec Production will continue to manage all its operations carefully. In this regard, the division plans to freeze its operating expenses until 2006, holding them at their budgeted 2003 level.

As well, the division will keep a tight rein on investments designed to ensure the long-term operability of its facilities, without compromising the medium- and long-term reliability of the generating fleet. These investments will total some $2.4 billion over 2004–2008.

Hydro-Québec Production also plans to sell its stake in Meiya Power in China, as this investment and Meiya Power itself have reached a stage of development that makes such a sale worthwhile. The division will continue to offer its technical assistance services internationally, but will confine its activities to highly profitable business opportunities. The outstanding competence and technical know-how of the division's employees and partners are major assets in this sector.

Objective 3
Ensure the reliability and quality of operations

Over the term of the Strategic Plan, great demands will be placed on the generating fleet. Reliability of operations is a key condition for achieving the division's objectives. Major efforts will therefore be made to ensure this reliability and the long-term operability of facilities.

Within the Strategic Plan period, Hydro-Québec Production will invest some $2.4 billion in refurbishing its generating assets and improving their productivity. The refurbishing plan is optimized according to cautious assumptions concerning generating station life cycles and known

constraints. For example, rehabilitation work will be scheduled so as to ensure the necessary generating capability to meet demand in a cost-effective manner.

The reliability and quality of operations also depend on the expertise and commitment of the personnel in charge of facility maintenance and operations. The division therefore plans to continue to maintain and develop competencies and carry out succession planning, while providing employees with a safe workplace. Job organization will become more flexible and better adapted to the service expected of the generating facilities. As always, maintenance will be optimized to reduce equipment repair time, through increased empowerment and better motivation of the crews.

Technological innovation will continue to be an important tool for enhancing the reliability and quality of operations over the medium and long term. Technological innovation efforts will focus on three major research challenges:

- profitability and acceptability of generating assets
- long-term operability of dams and other structures
- performance and long-term operability of facilities

FIXED ASSETS
AS AT DECEMBER 31, 2002

$17.3 billion

REVENUE
IN 2002

$3.0 billion

MAIN CUSTOMERS
IN 2002 (% OF REVENUE)

Hydro-Québec Distribution: 79%

Hydro-Québec Production: 10%

International market: 8%

Other: 3%

TOTAL WORK FORCE
AS AT DECEMBER 31, 2002

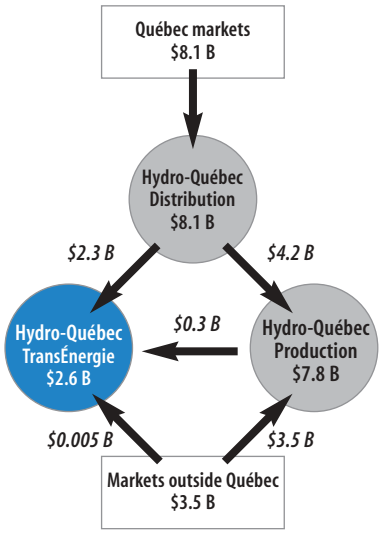
3,632 employees, including tele-communications employees

REGULATORY REGIME

Cost-based

Hydro-Québec **TransÉnergie**

Revenue Flow Among the Divisions in 2002 – Electricity Segment



Mandates

- **Transmit electricity and profitably market its transmission capacity to match the level of quality required by its customers**
- **Ensure system reliability and the development and long-term operability of its transmission assets**
- **Manage power movements in the Québec Control Area at the lowest possible cost and according to the quality expected, in compliance with the rules of the North American power industry**
- **Use its transmission expertise to develop, manage and operate profitable international activities**

Business Objectives 2004–2008

1. **Offer transmission service that meets customer needs**
2. **Maintain the reliability of the transmission system**
3. **Ensure the division's profitability**

Objective 1

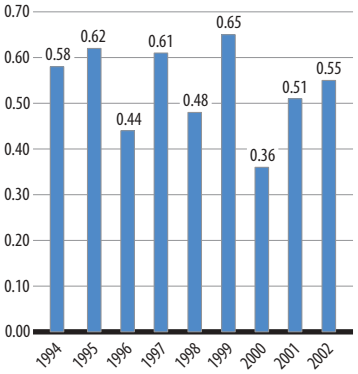
Offer transmission service that meets customer needs

Hydro-Québec TransÉnergie meets the highest industry standards, with a Service Average Interruption Duration Index (SAIDI) below the target of 0.65 hours per year. Consequently, it is able to offer its customers reliable, high-quality transmission service. This is crucial to satisfying Québec customers and creating value for Hydro-Québec's shareholder, the Québec government.

The division will continue to improve service quality in line with the expectations of its customers, namely Québec distributors, producers and wholesalers. In order to meet these expectations, it will pursue four strategies:

- Review and update its understanding of the needs and expectations of transmission system customers.
- Ensure that capacity is available when customers need it, and provide services adapted to their needs.
- Continue improving its environmental performance.
- Uphold its commitments to public and worker safety.

Service Average Interruption Duration Index[1]



1. *Does not take into account interruptions due to exceptional weather conditions. Service interruptions are attributable to power failures or scheduled outages.*

Strategy 1.1

Review and update its understanding of the needs and expectations of transmission system customers

To meet the specific expectations of its two major customers, Hydro-Québec Distribution and Hydro-Québec Production, Hydro-Québec TransÉnergie plans to sign service agreements with them covering the following main points:

- performance and mode of interaction for integrating new loads and the output from new facilities into the grid

- quality and reliability of service
- additional transmission-related services to be supplied

With its other customers and partners, the division will establish, renew or complete the necessary agreements.

Strategy 1.2
Ensure that capacity is available when customers need it, and provide services adapted to their needs

To efficiently transmit the electricity required by Quebecers, Hydro-Québec TransÉnergie will continue to optimize the planning, operation and management of its system.

The division will make new investments, according to forecast needs and the commitments made to its customers. In this way, it will provide the necessary transmission capacity and prevent any congestion that may arise from growth in load and output.

Hydro-Québec TransÉnergie will also develop its transmission system in order to integrate the new sources specified in Hydro-Québec Distribution's Electricity Supply Plan (wind farms in the Gaspé region, biomass, cogeneration and other generation methods selected following calls for tenders). As before, the connection costs related to transmission lines for new generating stations will be incorporated into Hydro-Québec TransÉnergie's postage-stamp rate.

Analyses of the system's integration capability will enable the division to inform its customers of the costs and restrictions associated with any projects that involve the introduction of new loads and new generating facilities.

In addition, the division will submit proposals to Hydro-Québec Distribution for developing regional systems that ensure a local balance between supply and demand over the medium and long term, at the lowest possible cost.

Hydro-Québec TransÉnergie will continue to improve the availability of its facilities by applying the most efficient maintenance and operation practices.

For its wheeling operations to the northeastern United States, Hydro-Québec TransÉnergie will use technical and commercial means to enhance the capacity of its interconnections with neighboring systems.

The division will pursue its search for technical solutions to increase wheeling capacity, and will also continue to participate in various North American technical committees (North American Electric Reliability Council [NERC], Northeast Power Coordinating Council [NPCC], etc.). It will work to reduce restrictions affecting neighboring systems, with the following specific objectives:

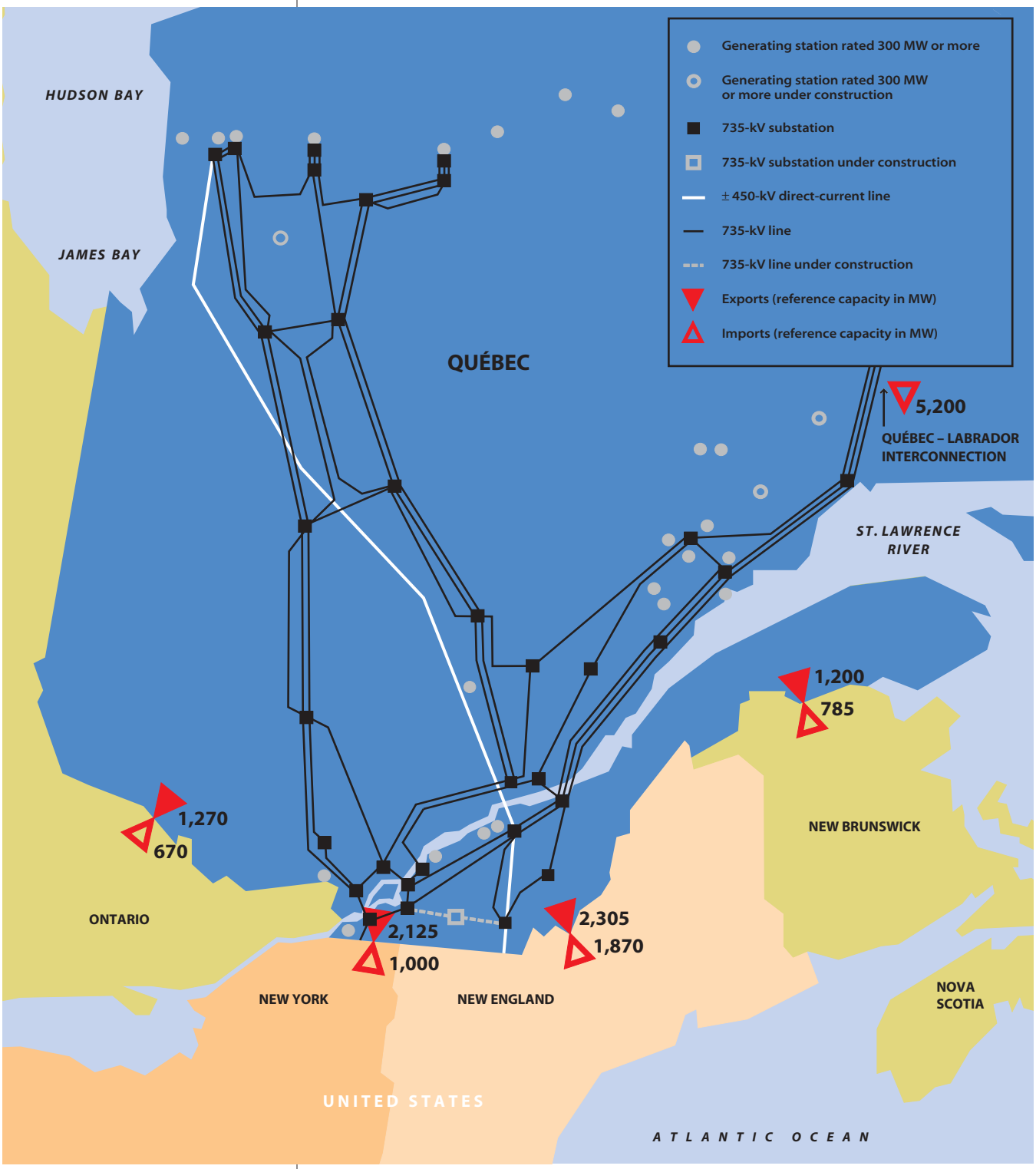
- For export, the division wants to increase wheeling capacity with New York State from 1,500 to 1,800 MW, and with the New England states, from 1,500 to 2,000 MW.
- For import, it plans to increase the wheeling capacity of existing interconnections with Ontario and New England, according to customer needs.

Strategy 1.3
Continue improving its environmental performance

Hydro-Québec TransÉnergie will take the necessary measures, such as internal and external audits, to maintain ISO 14001 certification of its environmental management system, and will also simplify processes.

The division demonstrates its environmental concern mainly by respecting property when carrying out work and by controlling the risk of oil spills.

Hydro-Québec's Major Facilities



Strategy 1.4
Uphold its commitments to public and worker safety

In the area of health and safety, Hydro-Québec TransÉnergie will maintain its preventive approach based on the safety partnership principle. This approach includes training, communication and awareness activities for its own employees and for contractors' personnel.

The division will take various steps to promote and ensure public safety near facilities:

- increase public awareness of the potential dangers of facilities
- control access and ensure the integrity of facility perimeters

Objective 2
Maintain the reliability of the transmission system

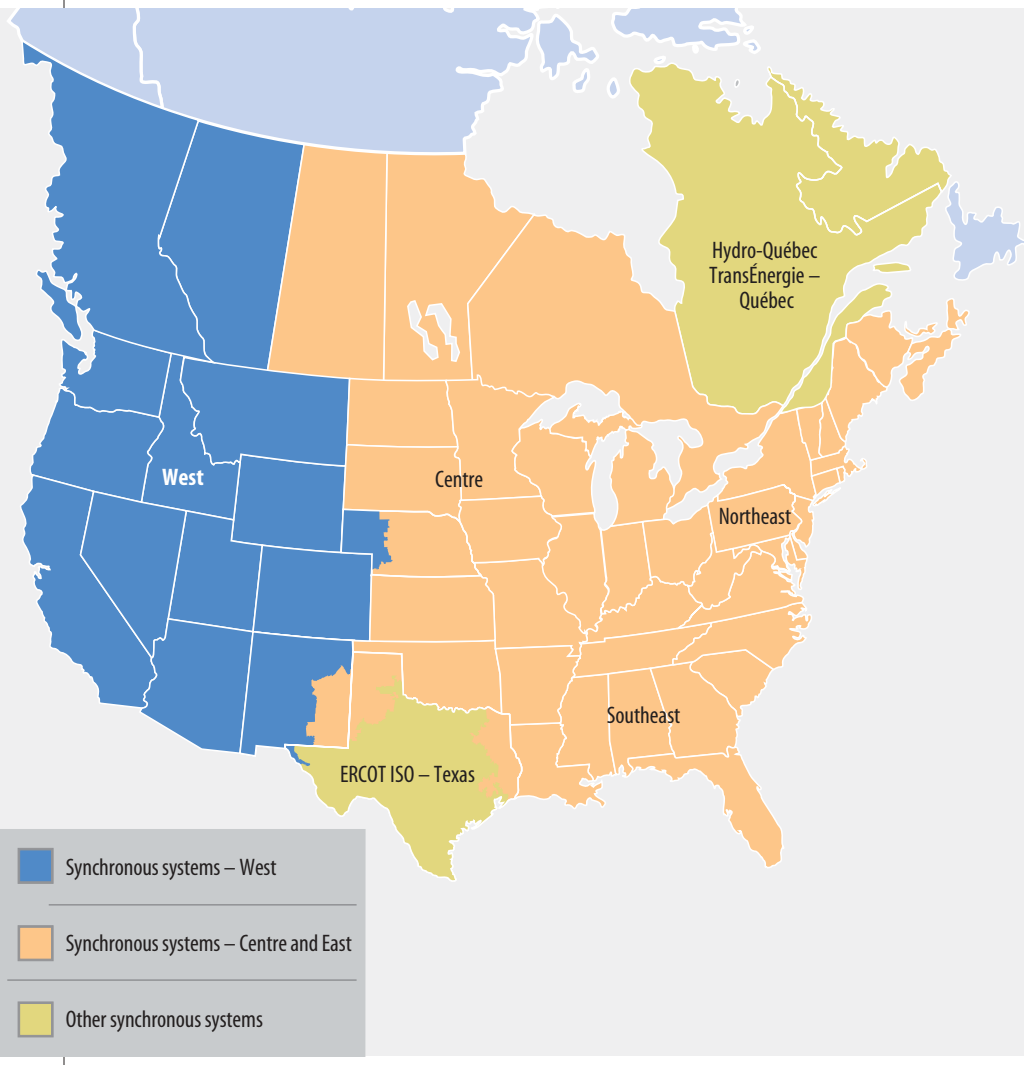
Hydro-Québec TransÉnergie, which comes under the exclusive jurisdiction of the Régie de l'énergie, is responsible for the reliability and security of the transmission system in Québec. The division intends to maintain system reliability in compliance with the requirements of power industry regulatory authorities: the Northeast Power Coordinating Council regionally, and the North American Electric Reliability Council continent-wide. It will also work to improve security of supply by diversifying its supply channels.

Strategy 2.1

Manage and develop the transmission system in accordance with industry standards

To maintain the reliability of the transmission system, Hydro-Québec TransÉnergie will plan and manage the system better by developing measures that will help it handle fluctuations in load and supply. With this proactive approach, it will have the means to better evaluate capacities on the system.

Non-synchronous systems in North America



To ensure the security of power movements according to industry standards, Hydro-Québec TransÉnergie will monitor its system closely, take part in the activities of regulatory bodies and have security audits conducted on its operations.

In order to maintain the integrity of its transmission system, Hydro-Québec TransÉnergie will complete the project authorized in the aftermath of the ice storm of 1998, namely the system loop in Montérégie, and will propose a program to the Régie de l'énergie for reinforcing the transmission system.

The division also plans to use technological innovation to ensure the long-term operability of the system and improve its performance. It will therefore continue its research and development program, which focuses on the following five themes:

- Increase the useful life of certain types of equipment by 10% and lower maintenance costs for designated equipment by 10%.
- Reduce the cost of building new lines and substations by 10%.
- Raise the capacity of designated corridors by 33%.
- Optimize transmission system management.
- Reduce the impact of extreme weather events by 50%.

Intelligence gathering will enable Hydro-Québec TransÉnergie to take advantage of new technologies likely to improve the system's performance and ensure its long-term operability.

To diversify supply channels for Québec customers, Hydro-Québec TransÉnergie is reaffirming its interest in increasing system security in the Outaouais region by means of the Grand-Brûlé–Vignan line.

However, the division is postponing its plan to build a 1,250-MW interconnection with Ontario. It will carry on with the project only once it is assured that the rules and requirements governing transmission in Québec will make this investment profitable, and once the rules of the Ontario market have stabilized.

Hydro-Québec TransÉnergie must also ensure the performance of its telecommunications network, which plays a leading role in transmission system management and security.

The division will evaluate the investments and maintenance required to guarantee the long-term operability of the transmission system and the telecommunications network.

Strategy 2.2
Maintain the security of the division's assets

To safeguard its assets, Hydro-Québec TransÉnergie will adjust the security level of its facilities on the basis of the risks faced and the conclusions of security audits.

The division also intends to improve the security of the system control and management information systems. To achieve this goal, it will adopt measures for ensuring the security of computer applications and infrastructure that are appropriate for the risks and that comply with NERC security standards.

Hydro-Québec TransÉnergie will handle emergencies in a way that ensures the reliability and security of the transmission system and the telecommunications network. Accordingly, it will update its contingency plan annually and bring it into line with Hydro-Québec's contingency plans, and will conduct simulation exercises.

Objective 3
Ensure the division's profitability

To maintain its profitability, with a view to creating shareholder value, Hydro-Québec TransÉnergie will seek to achieve the rate of return authorized by the Régie de l'énergie, seize opportunities for revenue growth by increasing the availability of its facilities and carry out profitable international operations.

Strategy 3.1

Achieve the rate of return authorized by the Régie de l'énergie

To achieve the authorized rate of return, Hydro-Québec TransÉnergie is seeking the Régie's approval for a rate structure that ensures its profitability.

As a result of the investments planned to ensure transmission system reliability, Hydro-Québec TransÉnergie's revenue requirement would increase from $2.5 billion in 2003 to $2.8 billion in 2008. These are the revenues needed to achieve the rate of return authorized by the Régie de l'énergie. In addition, the decline in transmission reservations by Hydro-Québec Production for sales outside Québec increases the proportion of the transmission revenue requirement absorbed by Hydro-Québec Distribution.

The division will apply to the Régie for an increase in short-term rates, which should make long-term reservations more attractive and reduce upward pressure on Hydro-Québec Distribution rates. It would like to include telecommunications assets in its rate base, as well.

Hydro-Québec TransÉnergie will also submit to the Régie de l'énergie its proposed rules and conditions for implementing performance-based incentive regulations in Québec by 2008. Such regulations would foster continuous improvement of its performance and service quality through various mechanisms designed to make the savings generated by reductions in the cost of service profitable for both the division and its customers.

Hydro-Québec TransÉnergie will continue to control its expenses while maintaining the long-term operability of its transmission and telecommunications assets. It will freeze operating expenses until 2006, keeping them at their budgeted 2003 level. It will also focus its spending on work designed to ensure the long-term operability of its facilities, so as to optimize their useful life.

Investments budgeted for 2004–2008

Transmission assets in Québec	$3.8 billion
including asset maintenance	$1.4 billion
Telecommunications assets	$343 million
including asset maintenance	$270 million

To properly control expenses related to providing transmission service, Hydro-Québec TransÉnergie will evaluate how efficiently it operates, maintains and develops its transmission and telecommunications systems.

Strategy 3.2

Take advantage of opportunities for revenue growth by increasing equipment availability

Hydro-Québec TransÉnergie will act to increase the use of wheeling capacities, while complying with rate policies.

To this end, the division plans to improve the scheduling of equipment downtime by harmonizing any removals from service with those on neighboring systems and by precisely determining the best times to carry out its repairs. It will therefore adopt maintenance practices (cancellable outages) that limit system unavailability.

Hydro-Québec TransÉnergie will make sure that power market participants are given sufficient advance notice of any new available capacities to encourage new transactions.

Strategy 3.3

Ensure that international operations enhance the division's net income

In an international market where there are relatively few companies with transmission expertise, Hydro-Québec TransÉnergie enjoys many advantages. As a world-class transmission provider, the division can market its know-how and technological edge in the area of high-voltage transmission.

The division is already active as a partner, investor and supplier of products and services in Peru, Australia, the United States and Chile.

Over the term of the *Strategic Plan 2004–2008*, Hydro-Québec TransÉnergie will capitalize on its assets, in Australia and the United States in particular, and will continue to expand its portfolio of assets, mainly in the Southern Cone (South America). It will invest primarily in companies in which it can play a leading role and thus benefit from the value created by its activities.

To support its investment strategy, the division will make the most of its expertise and the marketing of its transmission products and services—live-line work, system studies, technological products—by responding to international calls for tenders related to its business objectives.

FIXED ASSETS
AS AT DECEMBER 31, 2002

$7.9 billion

REVENUE
IN 2002

$8.2 billion

MAIN CUSTOMERS
IN 2002 (% OF REVENUE)

Markets subject to the Rates Bylaw: 93%

Individual contracts: 6%

Unregulated: 1%

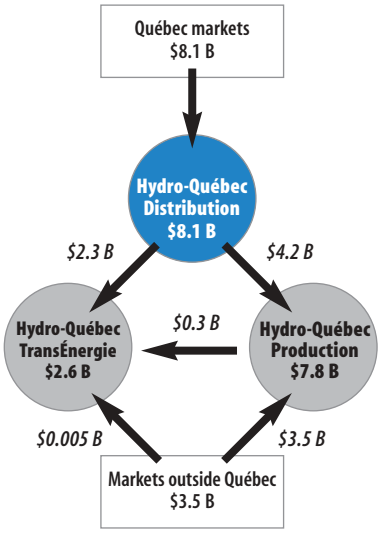
TOTAL WORK FORCE
AS AT DECEMBER 31, 2002

7,349 employees

REGULATORY REGIME

Cost-based

Revenue Flow Among the Divisions in 2002 – Electricity Segment



Hydro-Québec **Distribution**

Mandates

- **Ensure a secure supply of electricity**
- **Provide reliable and continuous electricity service to Québec customers**
- **Offer services adapted to customers' priority expectations**

Business Objectives 2004–2008

1. **Ensure an adequate, diversified supply of electricity**
2. **Emphasize Hydro-Québec's energy efficiency leadership**
3. **Offer Québec customers service that meets their expectations**
4. **Achieve the authorized rate of return in 2004 and then maintain it**

In the last four years, a major turnaround has been achieved in the area of distribution, improving the quality of both electricity service and customer service.

These efforts have resulted in a continuous rise in customer satisfaction since the low point recorded in 1999, a year that was marked by a labor dispute and summer power failures.

Service quality has improved even though electricity rates have been held at the same level since May 1, 1998.

To continue offering high-quality service, Hydro-Québec has measured the changing expectations of its various categories of customers at regular intervals since the 1990s. The main expectations are the same for all categories, apart from a few slight variations and different requirements related to their individual situations.

The business objectives and strategies presented in the following pages that follow attest to Hydro-Québec Distribution's desire to provide an adequate and reliable supply of electricity and high-quality services, while maintaining a satisfactory price-quality ratio for its customers.

Customers' Main Expectations

Business relations

- Fair and equitable treatment
- Respect for customers and understanding of their needs
- Low, competitive rates
- Simple, optimal rate structure
- Easy access and rapid, clear and courteous response
- Speedy processing and follow-up of requests
- Reliable means of measuring consumption
- Accurate, simple billing based on actual consumption
- Consideration of customers' specific needs
- Information, advice and programs contributing to energy conservation

Power supply

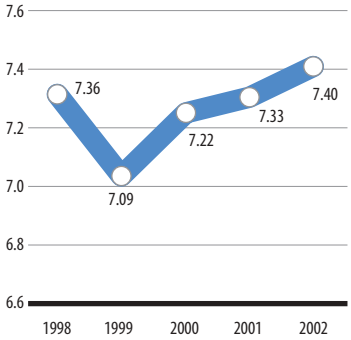
- Safe facilities
- Rapid repair of power failures
- Advance notification and consultation on scheduled interruptions for system maintenance
- Reduction of power failures
- Fast and accurate information in the event of a power outage
- Adequate supply for the future
- Respect for property during work
- Consideration of environmental concerns in projects and operations

Targets for 2008

A satisfaction level of 7.5 to 8.0 out of 10, depending on the customer category

A sustained satisfaction level of over 8.0 out of 10 among large-power customers (quality partnerships)

Overall Customer Satisfaction
(Rates D, G and M)

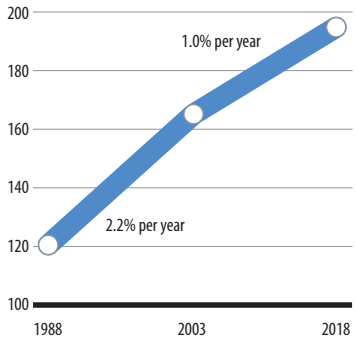


Objective 1

Ensure an adequate, diversified supply of electricity

From 1988 to 2003, Québec's electricity demand rose by an average of 2.2% a year, as a result of a substantial increase in industrial consumption which was, however, moderated by the development of energy conservation programs.

Growth in Demand in Québec (TWh)



Growth in demand in Québec

Over the next 15 years, growth in demand is expected to average 1.0% per year. This moderate rate of increase reflects slow population growth as well as the development of a more diversified, energy-efficient post-industrial society in which "new economy" businesses play a growing part.

Revenue of $10,492 million is forecast for 2008, assuming that electricity rates will begin to be increased as of January 2004.

Compared with 2003, these sales would represent an increase of 11.1 TWh or 6.7%, for an average of 1.3% per year. Revenue should increase by $1,926 million or 22.5%.

The forecast for electricity demand in Québec is based on a slowdown in the manufacturing sector in 2003 and a worldwide economic recovery in 2004. It also factors in the predicted impacts of past and future energy conservation initiatives.

Forecast Electricity Demand and Revenue in Québec by Sector[1] *(TWh)*

	2003[2]	2004	2005	2006	2007	2008	Growth 2003–2008
Domestic and farm	56.8	56.6	56.3	56.9	57.3	57.9	1.1
General and institutional	32.3	32.7	32.7	33.0	33.3	33.7	1.4
Industrial	72.3	72.9	75.7	78.8	79.6	80.7	8.4
Other	5.0	4.9	5.0	5.1	5.1	5.2	0.2
Total sales in Québec	**166.4**	**167.1**	**169.7**	**173.8**	**175.4**	**177.5**	**11.1**
Revenue in Québec ($M)	**8,566**	**9,029**	**9,684**	**10,100**	**10,172**	**10,492**	**1,926**
Small and medium power	97.3	97.9	97.6	98.6	99.4	100.5	3.3
Large-power customers	69.1	69.3	72.1	75.2	75.9	77.0	7.8

1. Updated in August 2003.

2. Includes results published from January to August 2003. At normal temperatures, sales for 2003 would have been 1.8 TWh lower.

On Québec's small- and medium-power markets (rates D, G and M), Hydro-Québec Distribution expects to record annual sales of 100.5 TWh in 2008—3.3 TWh more than in 2003, representing an increase of 3.4% for 2003-2008 or an average increase of 0.7% per year.

On Québec's large-power market, Hydro-Québec Distribution plans to generate sales of 77.0 TWh in 2008—7.8 TWh more than in 2003, for an increase of 11.3% or average growth of 2.2% per year.

The growth in sales in the domestic and farm sector (1.1 TWh) stems mainly from the creation of new households, the increase in personal disposable income and the stable market share for electricity in space and water heating.

In the general and institutional sector, the 1.4-TWh increase can be explained in the short term by significant construction of commercial space in 2003, among other factors. Over the medium term, it is based on the growth and aging of the population and the resulting service needs, the growth in service industry GDP, which is stimulated by the knowledge economy, and the increase in personal disposable income.

In the industrial sector, the growth in sales amounts to 8.4 TWh. In the short term, these sales will suffer the effects of a slowing economy. However, over the medium term, they will increase, mainly due to the expansion of existing companies and the arrival of new businesses. In addition, in the small- and medium-business sector, growth is also based on the rollout of electrotechnologies.

Note that two major industrial sectors account for nearly 75% of this growth:

- smelting and refining, with the expansion of the Alouette aluminum smelter in Sept-Îles, scheduled to come on stream in early 2005 (4.3 TWh annually)
- pulp and paper, with several capital projects planned, including the reopening of the Papiers Gaspésia mill in Chandler and the Kruger Wayagamack mill in Trois-Rivières

Moreover, on all of Hydro-Québec Distribution's markets, growth in sales is sustained by the favorable competitive position of electricity relative to the high prices of other forms of energy. This favorable position could spark growth in energy-intensive industrial projects and place upward pressure on rates for all customers. Additional Rate L sales of 2 TWh over 2004–2008 would mean rate increases of 1% for customers as a whole, since heritage pool electricity will be fully used by 2004, and a resulting transfer of wealth to industries with relatively limited economic spinoffs. The marginal cost of the additional power supplies required may thus affect market trends.

The division therefore intends to focus on the establishment of industries that offer added value for Québec (maximum jobs and investments per megawatt of contract power), in order to maximize the economic spinoffs in Québec for a specific rate impact.

Strategy 1.1
Ensure a balance between supply and demand

Hydro-Québec Distribution's goal is to have sufficient power at its disposal at all times to avoid the kinds of shortages for its Québec customers that consumers in other regions have experienced. In October 2001, it filed its first Electricity Supply Plan with the Régie de l'énergie du Québec (energy board), which accepted the main points of the Plan in August 2002. Hydro-Québec Distribution then issued its first call for tenders and awarded three contracts which were approved by the Régie in August 2003.

These three contracts cover baseload electricity and hourly dispatchable electricity (electricity delivered in amounts that follow fluctuations in demand throughout the day):

- 507 MW of baseload electricity generated from natural gas (September 2006) – TransCanada Energy
- 350 MW of baseload electricity generated from hydropower (March 2007) – Hydro-Québec Production
- 250 MW of hourly dispatchable electricity generated from hydropower (March 2007) – Hydro-Québec Production

Under regulations adopted or announced by the Québec government, Hydro-Québec Distribution plans to acquire blocks of energy produced by wind power, biomass and cogeneration. The availability of these various sources of supply should provide it with more than 500 MW of additional capacity by 2008.

For its supplies of wind power, Hydro-Québec Distribution will obtain a load-balancing service in order to manage the variability inherent in this type of generation.

Customer Expectation

Ensure that we do not run out of electricity in the future

Within the time frame of the *Strategic Plan 2004–2008*, Hydro-Québec Distribution plans to fill the remaining needs through short-term supplies. The division also intends to ensure a long-term margin of flexibility in order to reliably meet the needs of its Québec customers.

For example, it wishes to set up an interruptible electricity program, which its large-power customers may choose to join on a voluntary basis. The energy made available will enable it to handle extreme weather and other supply-related issues during peak periods.

Managing the supply portfolio

Between now and 2008, supply and demand will be kept in balance by a supply portfolio that is diversified along various dimensions, including contract duration and means of generation:

- Contract duration
  - long-term (including heritage pool electricity)
  - short-term
- Means of generation
  - hydropower
  - wind power
  - thermal
    - natural gas
    - biomass
    - cogeneration

Hydro-Québec Distribution remains convinced of the value of ensuring competition between and within the hydropower and natural gas generation segments, in order to secure better prices for its Québec customers.

The division will also define the criteria for managing these supplies so as to optimize the application of the different contracts and minimize costs to its customers.

Strategy 1.2

Ensure that the transmission provider takes the distributor's electricity needs into account in its planning

During the winter of 2002–2003, peak demand in Québec was higher than expected, and this revealed certain bottlenecks on the transmission system. The same situation could arise in coming winters if more severe weather conditions occur.

To meet its customers' needs, Hydro-Québec Distribution will continue to provide Hydro-Québec TransÉnergie with all the information it requires, as stipulated in the transmission service contract.

Hydro-Québec Distribution will ensure that the transmission system manager takes the appropriate measures so that all quantities of electricity used for its power supplies are delivered reliably at all times, especially during peak periods.

Objective 2

Emphasize Hydro-Québec's energy efficiency leadership

Since the early 1960s, Hydro-Québec has encouraged its customers to use electricity more efficiently. It has based its efforts in this regard on its customers' needs and the requirement to balance energy supply and demand. Appendix 5 lists all the measures taken by the company to increase the energy efficiency of the entire power system, from the generation of electricity to its use by Québec consumers.

With a view to sustainable development, Hydro-Québec has carried out major energy efficiency initiatives. The company estimates that recurring energy savings resulting from measures instituted between 1990 and 2006 and stemming directly or indirectly from the company's activities will total approximately 23.5 TWh, distributed as follows:

- 8 TWh arising from initiatives affecting the power system as a whole (generation, transmission and distribution)
- 3 TWh related directly to Hydro-Québec programs
- 12.5 TWh resulting from technological changes and customers' investments

These energy savings do not take into account the inherent energy efficiency of hydropower (99% efficient) versus fuel-fired facilities (33% to 55% efficient). Furthermore, electrical heating systems, which are widely used in Québec, offer nearly 100% efficiency, compared with 50% to 85% for fuel-fired systems.

The company has taken various actions affecting its customers, including:

- information and awareness activities
- business programs (financial support, equipment installation, training)
- product research, development, demonstration and testing
- support for standardization and regulation
- technical support (sales force, toll-free phone line)

Hydro-Québec's energy conservation initiatives have had two types of impacts:

- *direct impacts* stemming from customer participation in business programs
- *indirect impacts*, also called natural energy savings, which result from the efforts of both Hydro-Québec and other energy efficiency stakeholders

Backed by its past experience, Hydro-Québec Distribution is renewing its energy efficiency commitment with its *Energy Efficiency Plan 2003–2006*.

Customer Expectations

Offer programs and discounts that encourage energy conservation

Provide advice and help customers to better manage their energy consumption and achieve energy savings

Strategy 2.1
Renew the division's commitment to energy efficiency

Hydro-Québec Distribution plans to seize every new opportunity for initiatives that can improve energy efficiency and expand its portfolio of programs. It will nevertheless make sure that the revenue impact of these initiatives is recovered from rate increases, a principle that is recognized and accepted by the Régie de l'énergie.

To expand its portfolio, the division intends to make the most of the expertise it has developed and increase its partnerships, in particular with governments. This type of approach will reinforce synergy between stakeholders and ensure that their initiatives are complementary, thus maximizing the impact of all actions taken.

In order to sustain natural energy savings, Hydro-Québec Distribution will also pursue its commitment to standardization and support tougher regulations governing the efficiency of electrical equipment and buildings.

In addition, it will support the development of emerging efficient technologies through demonstration projects and experiments.

Energy Efficiency Plan

Objective of 750 GWh

16 programs intended for all customers

Investment of $257 million, including $125 million from Hydro-Québec Distribution

Strategy 2.2

Achieve 750 GWh in new energy savings by 2006 under the *Energy Efficiency Plan*

Hydro-Québec Distribution is counting on the *Energy Efficiency Plan 2003–2006* (EEP) to achieve savings of at least 750 GWh by the end of 2006.

Filed with the Régie de l'énergie in 2002, the *Energy Efficiency Plan 2003–2006* is based on a reassessment of energy conservation potential carried out in cooperation with the Agence de l'efficacité énergétique du Québec and on the results of consultations with various energy experts and customer groups.

In a decision handed down on June 5, 2003, the Régie de l'énergie approved the EEP as a whole, including the objective of 750 GWh in energy savings based on technical and economic potential of 8.5 TWh. The Régie also encouraged Hydro-Québec Distribution to set more ambitious long-term objectives.

According to the latest estimates, implementation of the EEP will require investments of $257 million over a little more than three years. Of this amount, $125 million will be absorbed by Hydro-Québec Distribution, $10 million is expected from the Agence de l'efficacité énergétique and $122 million will come from participating customers.

Hydro-Québec Distribution's approach promotes synergy and complementarity of initiatives undertaken with the Agence de l'efficacité énergétique, the Office of Energy Efficiency and business partners. The division does not intend to supplant market drivers. Rather, it sees its role as that of an agent for change who leads, stimulates and influences the energy efficiency market and helps transform it over the long term. For all customer categories, a simple approach is designed to facilitate access to programs and maximize energy conservation potential.

The EEP includes 16 programs intended for all customers. Three will be implemented in conjunction with the Agence de l'efficacité énergétique.

Residential customers and small commercial customers will thus be able to obtain a diagnosis and personalized advice that help them better understand and optimize their energy consumption.

For business and large-power customers, financial contributions are planned to encourage improved energy performance by their buildings, equipment and processes. In addition, the *Energy Efficiency Plan 2003–2006* provides for a new-technology demonstration program.

The success of the EEP depends on speedy implementation, customer participation and partner buy-in. Program results will have to be carefully monitored so that any necessary adjustments can be made quickly. These results will therefore be submitted to the Régie de l'énergie at the same time as the authorization request for annual EEP budgets.

Hydro-Québec Distribution will work to improve its EEP and increase its impact. In addition to energy conservation measures, it will examine various energy management options, always with a view to better managing the power supply and, consequently, reducing costs to its customers.

Objective 3

Offer Québec customers service that meets their expectations

In keeping with its customers' expectations, Hydro-Québec Distribution plans to provide reliable electricity service as well as high-quality services and advice with the support of its employees and the use of modern tools and methods. It intends to be a socially and environmentally responsible distributor.

Customer Expectations

Repair power failures quickly

Ensure that there will be no power failures

Strategy 3.1

Provide reliable, high-quality electricity service

In recent years, Hydro-Québec Distribution has put forward many initiatives to ensure the long-term operability of the distribution system and improve the quality of electricity service. These initiatives included refurbishing outdated sections of the system, strengthening distribution lines, performing preventive maintenance and vegetation control, etc.

A total of $2.2 billion has been invested since 1991 to ensure the long-term operability of the distribution system. As a result, the service average interruption duration index (SAIDI) has been improved by 50%, with 2.05 hours of service interruption per customer[1] in 2002, compared with 4.09 in 1991.

Over the last few years, a continuous improvement has been noted in customer satisfaction with the reliability of electricity service and service restoration times in the event of power failures.

In spite of these highly positive results, the rate of improvement has been stabilizing in the last few years, with an index that has leveled out at about 2 hours.

For certain customers or areas, however, the number of hours of service interruption per year regularly far exceeds the provincial average.

1. *Data does not include interruptions related to exceptional weather events.*

To improve system performance, Hydro-Québec Distribution will work to reduce the number of service interruptions, the average duration of interruptions and the number of customers affected by the interruptions. This approach will allow

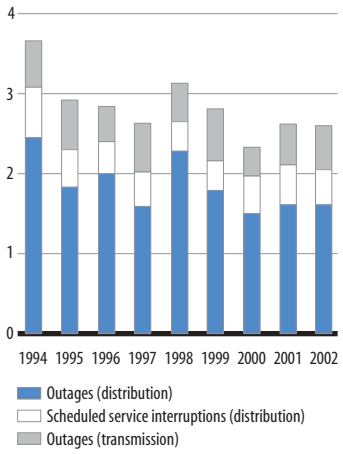
- better-targeted action to improve the distribution system
- greater control over differences in service continuity (length of interruptions experienced by some customers, which far exceed the Québec average)
- better benchmarking of system performance
- greater motivation of operations units to achieve the targets

Take preventive action to reduce the number of service interruptions

Hydro-Québec Distribution plans to reduce the number of service interruptions in the following ways:

- Make greater use of live-line methods to avoid service interruptions when work is performed on the system.
- Take steps to provide customers with temporary service when de-energized work must be done.
- Bring the system into compliance in order to reduce the number of restrictions that impede live-line work.
- Carry on vegetation management programs.
- Carry on preventive maintenance programs.

Average Hours of Service Interruption per Customer[1]



1. *Not including interruptions related to exceptional weather events.*

Act more promptly in order to reduce the length of interruptions

To take more rapid action and thereby reduce the length of service interruptions, Hydro-Québec Distribution will apply various measures, several of which are based on information technologies:

- new practices for recalling workers, so that they can act more promptly in case of power failures
- computer-assisted repair crew dispatching system (REAO)
- geographic information system (Dcartes)
- system automation

Improve the system to reduce the number of customers affected by power failures or scheduled service interruptions

It is also possible to reduce the number of customers affected by service interruptions. To this end, Hydro-Québec Distribution plans to:

- further automate the distribution system and optimize its architecture so as to reduce the extent of interruptions
- bring underground and overhead distribution systems into compliance with standards by cutting the number of restrictions, a step that will reduce the area of intervention in case of service interruption

Be prepared for extreme weather events

To be prepared for extreme weather events, Hydro-Québec Distribution will consolidate its experience acquired in managing Service Restoration Emergency Plans (SREPs). For example, a Web portal will provide municipalities with real-time information in emergency situations.

The division is also continuing its system reinforcement program in all areas with a high risk of icing. Some parts of the system serving priority loads will be equipped with sturdier architecture when lines are extended, rebuilt, moved or improved.

Targets for 2008

1.7 hours of service interruption per customer per year (adjusted)[1] for Québec as a whole by 2006 and thereafter

1 hour of service interruption per customer per year (adjusted) in downtown areas with very high load densities by 2006 and thereafter

1. Data does not include interruptions related to exceptional weather events.

Strategy 3.2

Provide customers with high-quality services and advice adapted to their needs

The initiatives taken in recent years have produced results: customer service has improved considerably, and customers are more satisfied.

For example, a substantial improvement can be observed in the speed of response to customers who contact the call centre.

Particular efforts have been made to improve service to business customers, with decentralized handling of telephone calls, more personalized service through the appointment of specially assigned representatives who visit the customers, and personalized consulting services.

Business relations with large-power customers have also been enhanced through continued quality partnership sessions focusing on customers' specific expectations. The goal here is to establish joint plans of action.

Based on these results, and with a view to maintaining or improving customer satisfaction, Hydro-Québec Distribution is determined to continue developing its business approach and its services, while adjusting them to fit customers' reality.

Adapt the business approach

Since the *Strategic Plan 2000–2004* was filed, Hydro-Québec Distribution has been implementing a business approach designed to make its customers' lives and activities easier. For example, it will continue to establish different interfaces (such as telephone, interactive voice response system, Internet, extranets, e-mail and fax), allowing customers to obtain information on services and advice on electrical products and ways to use electricity efficiently. Customer requests will be handled quickly and may lead to follow-up, as required, such as appointments for work to be performed.

Customer Expectations

Treat all customers fairly and equitably

Treat all customers with respect and understanding of their needs

Respond to telephone calls rapidly, clearly and courteously

Process customer requests rapidly and provide follow-up

Provide fast and accurate information in the event of a power failure

Provide advance notification and consultation on scheduled service interruptions

Ensure accurate billing based on actual consumption

Offer a simple bill adapted to customer needs

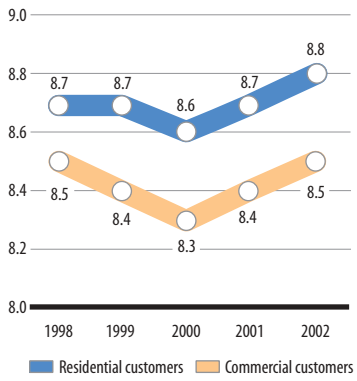
Use reliable means of measuring consumption at customers' premises

Be proactive and concerned with customers' specific needs

For business customers, the division will expand the deployment of a customized approach providing guidance in the search for business solutions adapted to customers' needs. Hydro-Québec Distribution's representatives are still the preferred point of contact with business customers. The representatives will continue to meet periodically with customers and provide them with consulting services.

Large-power customers will still enjoy attentive, personalized service, revolving around quality partnerships that aim for service quality and satisfaction. Representatives will offer customers a range of specifically designed, tailor-made services.

Quality of Customer Relations
(Out of 10)



Offer more consistent quality when responding to customers and handling their requests

Hydro-Québec Distribution will keep up its efforts to ensure a prompt response to customer requests at all times. It will also endeavor to deal with requests on the first call, with efficiency and customer satisfaction in mind.

In addition, the division will continue to expand its Internet customer relations centre (accessible at all hours of the day or night), and its extranets for large-power customers. Customers can thus obtain

- online information and advice
- transactional services: billing and payment, plus the option for residential customers of opening or closing an account
- for large-power customers, access to their personal records in interactive mode within a secure portal allowing e-mail exchange, access to personalized information and metering data, contract power adjustments and contract amendments, operating agreements, follow-up on service interruptions, etc.

As well, Hydro-Québec Distribution plans to introduce a new approach for work carried out on customers' premises. The necessary information will be made available to master electricians, via extranets, for requests involving simple jobs such as system hookups for new residential customers.

For requests involving more complex types of work, such as jobs that entail extending the grid, a representative will contact the customer to negotiate a time frame, make an appointment and provide follow-up, including notification of any change.

Provide customers with the information required in case of outages or scheduled service interruptions

Information on outages and scheduled service interruptions directly affects basic service. It is therefore one of customers' priority expectations, and one of Hydro-Québec Distribution's main concerns.

The division has made substantial efforts to establish the right conditions for improved service and performance follow-up. In addition to developing tools and follow-up systems, it has worked to make employees assigned to these tasks more aware of the importance of informing customers properly about the nature and length of service interruptions.

Hydro-Québec Distribution will carry on its initiatives to improve the speed and accuracy of the information transmitted in the event of outages and scheduled interruptions.

Support customers in managing their accounts and using electricity

Residential and commercial customers already have access to an Internet tool that helps them better understand their consumption. They can choose between different payment methods (preauthorized payment, Equalized Payments Plan, online payment) or negotiate a payment arrangement when necessary.

Many business and large-power customers already enjoy a variety of services, such as the option of choosing their own billing date and grouping multiple accounts on a single bill. As well, these customers are given Account Review reports during visits by their representatives, which provide an overview of billing for all their accounts.

In addition to personalized, integrated account management advice, business and large-power customers can obtain power quality support. This includes information on solutions for protecting equipment, technical studies and assistance in implementing solutions for reducing the impact of power fluctuations.

Through its subsidiary HydroSolution, Hydro-Québec Distribution also offers products to ensure customers' comfort and peace of mind: leasing and sale of water heaters, and sale and installation of all-electric or dual-energy heating systems as well as air conditioning and ventilation systems.

Within the time frame of the *Strategic Plan 2004–2008*, Hydro-Québec Distribution will continue its efforts to expand the services it offers.

Taking advantage of its extensive expertise in energy use, Hydro-Québec Distribution intends to extend the range of consulting services it provides for its business customers, in conjunction with the initiatives set forth in the *Energy Efficiency Plan*. Advisors will make use of technological innovations developed by the company's researchers to guide business customers through the various stages of their projects, so as to determine the best energy and technological solutions.

In its promotional efforts aimed at encouraging large national and international companies to establish, expand or maintain their operations in Québec, Hydro-Québec Distribution will favor an approach that seeks to optimize the quantity of electrical energy required relative to the number of jobs created or sustained.

Help economically disadvantaged customers

Hydro-Québec Distribution recognizes that electricity is essential for all households, including the most economically disadvantaged, which sometimes have trouble making payments. That is why no residential customer has their power cut off during the winter for failure to pay.

In cooperation with community organizations and the Québec government, the division will continue to apply new business practices and other measures to help the most economically disadvantaged customers. In addition to offering terms of payment based on their particular financial situation, the division will provide support so as to make it easier for them to pay their electricity bills.

Hydro-Québec Distribution will propose amendments to the Régie de l'énergie that would adjust the various components of the residential rate (fixed charges, energy blocks, power) in order to better reflect the costs. These amendments, which are in line with the strategic objectives announced by the Minister of Natural Resources, Wildlife and Parks, will benefit customers with low levels of consumption, including many low-income customers.

Strategy 3.3
Be a socially and environmentally responsible distributor

Increase public awareness of the safe use of electricity

Customer Expectations

Ensure that facilities are safe

Demonstrate environmental concern in projects and operations

Show respect for customers' property during work

For all customers, the safety of installations and safe use of electricity are priority expectations.

The number of deaths caused by electricity-related accidents has decreased significantly since 1990, with only one event occurring in 2000 and one in 2001. However, four accidents were recorded in 2002.

The Hydro-Québec Distribution Web site presents safety tips on the dangers of electricity and quick reference summaries for contractors on working near distribution lines when installing a swimming pool.

The division will continue its safety awareness programs created for four segments of Québec society:

- general public: awareness campaign, participation in events for the general public, activities focusing on prevention in the home

- young people: dissemination of the awareness program for preschoolers and schoolchildren
- specialized workers: construction industry program to heighten awareness of the risks related to working near distribution lines, and promotion of the site safety program
- emergency responders: 24-hour information service for medical personnel

Through its participation in various CSA committees, Hydro-Québec Distribution plans to help shape distribution system design standards on the basis of changing safety criteria.

Ensure responsible environmental management

Hydro-Québec Distribution will maintain ISO 14001 certification of its distribution system operations and take the necessary steps to obtain certification for its other operations by 2005.

It will carry on its sound environmental practices, including respect for customers' property during repair work and control of pollution risks.

To ensure that the system is better integrated into the environment, the division conducts an environmental assessment of all its construction projects. In cooperation with various partners (telecommunications companies), it will produce a catalog of options designed to harmonize distribution system installation in residential neighborhoods and commercial areas.

In partnership with the Fédération québécoise des municipalités and the Union des municipalités du Québec, Hydro-Québec Distribution will continue implementation of a standard memorandum of understanding on vegetation control. This memorandum will facilitate the establishment of specific agreements between the parties concerned, according to the context, local environment and particular issues such as development, joint pruning operations and communications with the public.

Work toward system undergrounding in support of related government programs and municipal projects

Quebecers are increasingly sensitive to the visual impact and footprint of the overhead distribution system. For this reason, Hydro-Québec Distribution is taking steps to foster greater customer interest in choosing an underground distribution system, notwithstanding the cost involved.

In spite of ongoing promotional efforts, there has not been a major increase in the number of new underground hookups. Nevertheless, some large municipalities plan to regulate the introduction of underground grids in new residential developments.

The division will continue to encourage municipalities to extend the underground system in new housing projects. It will also seek new partnerships with municipalities and telecommunications companies.

Hydro-Québec Distribution will also maintain its support for underground existing grids by taking part in the Québec government program and municipal projects for enhancing city streets.

The investments planned to support undergrounding initiatives for existing grids total $215 million over 2004–2008. On average, up to 2003, costs were shared by the partners as follows: 33%, provincial government and municipalities; 17%, telecommunications companies; and 50%, Hydro-Québec.

Undergrounding of existing grids *($ millions)*

Hydro-Québec Distribution Investments	**2004**	**2005**	**2006**	**2007**	**2008**	**2004–2008**
Government program	20	20	20	20	20	100
Partnership with municipalities	5	15	25	35	35	115
Total	**25**	**35**	**45**	**55**	**55**	**215**

Objective 4

Achieve the authorized rate of return in 2004 and then maintain it

In recent years, Hydro-Québec Distribution has improved service quality and customer satisfaction without introducing any rate increase, while also improving its financial performance by reducing its deficit. It has thus improved the price-quality ratio of its products and services.

Strategy 4.1

Maintain cost control

To achieve the level of profitability set forth in the *Strategic Plan 2004–2008*, Hydro-Québec Distribution must maintain strict control over its costs (expenditures and investments) and improve its efficiency and productivity.

Among other measures, the division will freeze its operating expenses until 2006, keeping them at their budgeted 2003 level. In addition, it will track its performance by means of overall indicators, as submitted to the Régie de l'énergie:

- distribution cost and customer services per standardized kilowatthour
- net operating expenses per customer account
- net operating expenses per standardized kilowatthour
- net fixed assets in service per customer account

To control its costs, Hydro-Québec Distribution will limit investments that do not generate additional revenue to an amount lower than the annual depreciation expenditure. It will thus ensure that these investments do not lead to additional rate increases.

Strategy 4.2
Emphasize expertise and technological innovation

Hydro-Québec Distribution will enhance its assets and its employees' expertise by continuing its efforts to commercialize technologies related to its core business.

On international markets, the division will confine its activities to risk-free technical assistance projects.

As regards technological innovation, it will concentrate on improving performance and reducing costs. This will include reductions ranging from 10% for undergrounding the existing system to 50% for extending the underground grid.

Customer Expectations

Offer low, competitive rates

Provide a simple, optimal rate structure

Strategy 4.3
Apply for rate increases that allow the division to achieve and maintain the authorized rate of return

Hydro-Québec's last rate adjustment dates back to 1998. Over the past five years, Québec customers have saved 13.1% compared with the rate of inflation, and they will be able to keep some of this advantage.

By 2008, Hydro-Québec Distribution must make sure it can adequately meet sustained growth in demand on Québec markets totaling 11.1 TWh, including 7.3 TWh at Rate L. It should be noted that sales of an additional 2 TWh at Rate L would lead to a 1% rate increase for all customers.

The cost of service will necessarily rise as a result of the new supplies required to meet growing demand. For 2004–2008, Hydro-Québec Production will allocate a larger share of its resources to Hydro-Québec Distribution, and will export less to neighboring markets. As well, Hydro-Québec Distribution will cover an increasing share of Hydro-Québec TransÉnergie's cost of transmission, once the income that division receives from its other customers has been deducted. Growing energy requirements in Québec and reduced exports will contribute to the increase in the share of transmission costs absorbed by Hydro-Québec Distribution.

The division filed an application in September 2003 requesting that the Régie de l'énergie decide on the following:

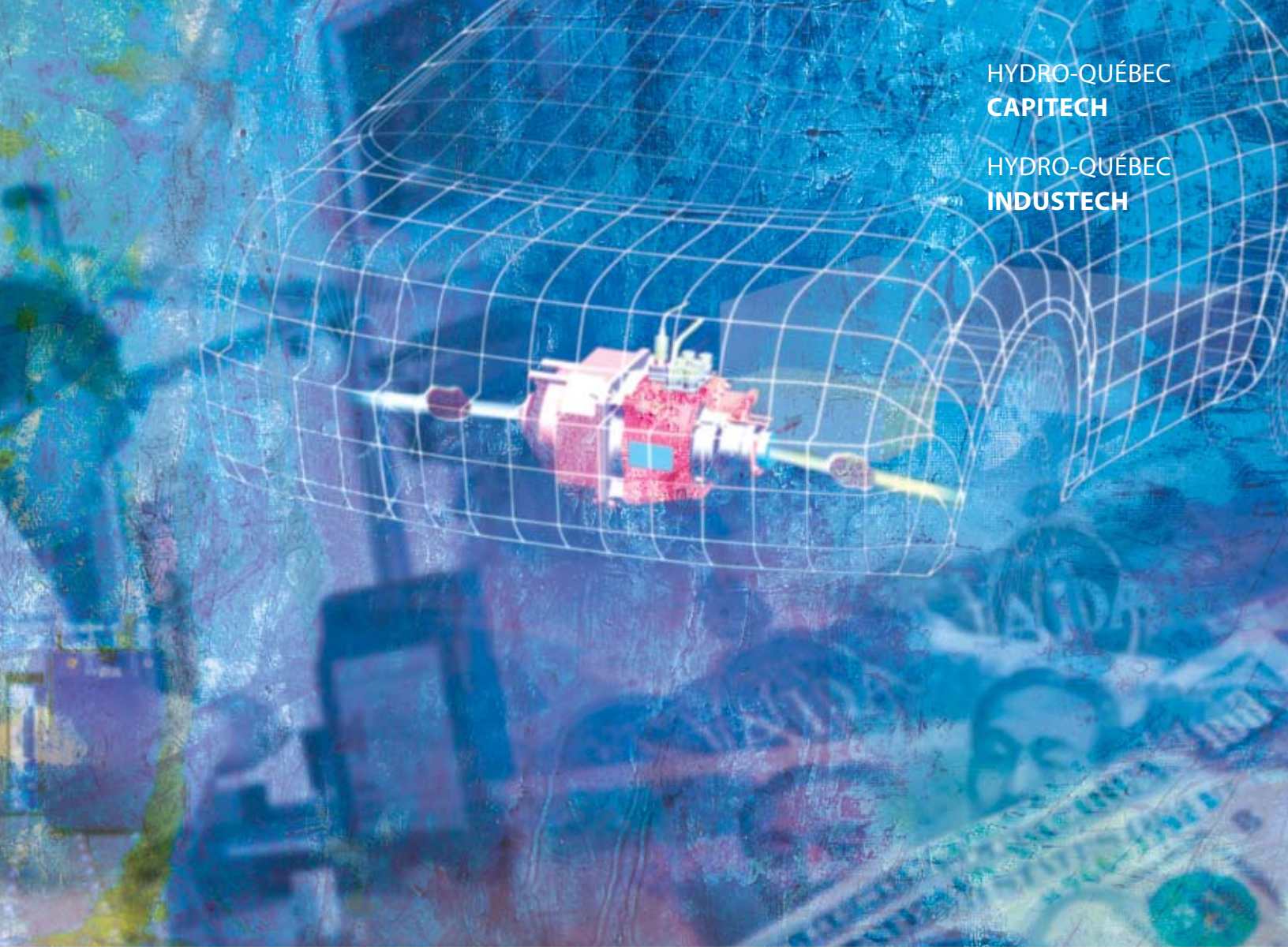
- a 3% rate increase for the 2003–2004 rate year that would take effect within 15 days following the Régie's decision, should it be favorable
- a 2.98% increase for the 2004–2005 rate year, applicable as of April 1, 2004

During the next stage of the rate case currently under way, Hydro-Québec Distribution will propose rate adjustments to the Régie de l'énergie in order to minimize the impact of the increase on customers with lower consumption levels.

The division will complete its application at the beginning of 2004 by proposing a gradual modification of the rate structure that will better reflect costs. As well, rate options related to the changing energy context will be offered to customers, particularly those in the large-power category.

Hydro-Québec Distribution expects to submit further applications for rate increases to the Régie in view of the growing energy needs of its Québec customers and rising transmission costs. These increases will allow the division to achieve a normal rate of return in a regulated environment, in the current legal framework, while maintaining inter-financing favoring residential customers and uniform rates throughout Québec.

Over the medium term, Hydro-Québec Distribution plans to propose a performance-based incentive regulatory framework to the Régie that will be advantageous both for customers and for the shareholder.



HYDRO-QUÉBEC
CAPITECH

HYDRO-QUÉBEC
INDUSTECH

COMPANY	**COMMITMENTS AND INVESTMENTS** (in millions of dollars)	**GEOGRAPHIC DISTRIBUTION OF DIRECT INVESTMENTS**	**INVESTMENT BREAKDOWN** (%)	**NUMBER OF COMPANIES**
Hydro-Québec CapiTech	196	Québec	72	18
		Canada (outside Québec)	5	5
Hydro-Québec IndusTech	232	Outside Canada	23	12

As at December 31, 2002

Hydro-Québec CapiTech and Hydro-Québec IndusTech are two wholly owned subsidiaries of Hydro-Québec operating in the energy technology field. They invest directly or indirectly in areas where the technological and commercial expertise acquired by Hydro-Québec through its core activities is an added value.

Hydro-Québec CapiTech, a venture capital company, was established in 1997 in response to the new market dynamics arising from the deregulation of North American energy markets and the rapid evolution of digital technology. This boom favored the emergence of new technologies related to Hydro-Québec's core businesses. As a result, Hydro-Québec developed a capacity to seize investment opportunities, combined with the ability to gather strategic technology intelligence for its divisions.

In 2001, the mission assigned to Hydro-Québec IndusTech enabled the company to work with the private sector to increase the value of intellectual property derived from Hydro-Québec research activities.

Hydro-Québec **CapiTech**

Mandates

- **Make profitable investments in technology companies related to Hydro-Québec's core activities**
- **Gather strategic and commercial intelligence through its investment activities**

Business Objectives 2004–2008

1. **Continue to increase the value of the existing portfolio**
2. **Maximize the strategic and commercial spinoffs of investment activities for Hydro-Québec**

Hydro-Québec CapiTech invests in energy companies that market or are on the point of marketing promising technologies.

Hydro-Québec CapiTech's top criterion in selecting its investments is the prospect of attractive financial returns. Its presence in Québec, Canada and abroad includes direct stakes in companies and indirect investments in the form of holdings in international funds.

Types of investments as at December 31, 2002

	Breakdown of amounts invested (%)	Number of companies/funds
Direct investments	70	33
Venture funds	30	4

Hydro-Québec CapiTech's selection criteria are in line with its investment and performance objectives:

- a solid management team with a track record of relevant accomplishments
- marketable products or services that are of strategic importance to Hydro-Québec and that belong to targeted market segments
- companies looking for seed capital or in the startup or expansion stages
- a large and expanding market
- other partners willing to invest in the venture
- a viable business plan with well-defined and realistic exit strategies

Hydro-Québec CapiTech is an active shareholder that grows the companies in its portfolio. It assists them in their search for strategic and financial partners, and has representatives on their board of directors.

Hydro-Québec CapiTech has reserved part of its portfolio for positions in energy venture funds. This approach enables the company to broaden its knowledge of the market and diversify its portfolio considerably. It selects partners on the basis of their ability to share information on business opportunities and new technologies.

By forming partnerships within the international venture capital community, Hydro-Québec CapiTech contributes to Hydro-Québec's market and technological intelligence.

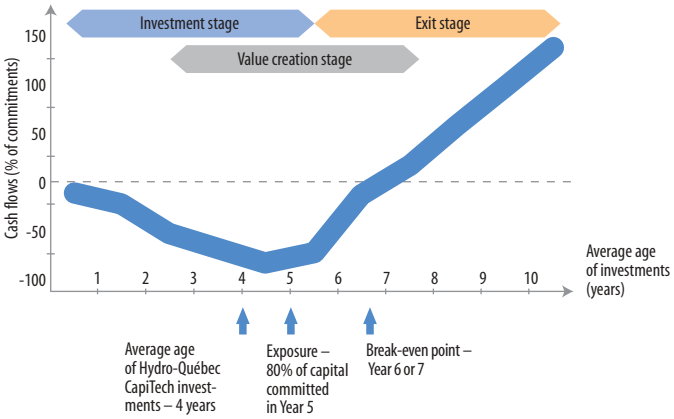
Objective 1

Continue to increase the value of the existing portfolio

Electricity shortages in California and the scandals surrounding the collapse of Enron caused market turmoil and a write-down of U.S. electric utilities. These companies have refocused on their traditional activities, thereby putting the brakes on the initial boom in North American energy markets.

Stock markets began to fall in 2001 and have continued along the same downward trend ever since. Hydro-Québec CapiTech experienced a drop in value and, like most venture capital funds, lower portfolio returns. The company anticipates a gradual turnaround in the medium term. Its current investments follow the patient capital rule, whereby a venture capital fund should generate a return within one investment–value creation–exit cycle, which generally lasts from five to eight years. Given current market conditions, Hydro-Québec CapiTech plans to continue its efforts to increase the value of its investments and will limit the total amount invested as risk capital to $240 million. In keeping with the investment–value creation–exit cycle, it will consider profitable sales opportunities toward the end of the Strategic Plan period in order to maximize the return on its portfolio.

Venture Capital Fund Investment–Value Creation–Exit Cycle



Strategy 1.1

Continue to provide financial support to the most promising companies in the portfolio

As at December 31, 2002, 70% of the investments by Hydro-Québec CapiTech were in the form of direct stakes in 33 companies. Since Hydro-Québec CapiTech anticipates market growth and rising securities values in the medium term, management wants to increase the value of high-potential holdings in its portfolio. As part of the process, it will be scrupulous in selecting companies as well as interested strategic buyers.

Hydro-Québec CapiTech will identify and rank its holdings according to their potential for financial return. It will participate in financing rounds of companies likely to generate a return on investment greater than 15%. The subsidiary may reinvest in the other companies in the portfolio, but only with a view to maintaining the value of its investment. Only in exceptional cases will it invest in new companies.

Strategy 1.2

Limit investments in international funds

As at December 31, 2002, 30% of Hydro-Québec CapiTech's holdings were indirect investments, distributed among the following international funds:

EnerTech Capital Partners II	U.S. venture capital fund that invests in companies likely to benefit from deregulation and the convergence of the energy and communications sectors.
Nth Power Technologies Fund I **Nth Power Technologies Fund II**	U.S. venture capital fund directed toward investment opportunities with a high-return potential resulting from the restructuring of the energy market.
SAM Private Equity Energy Fund	European venture capital fund dedicated to investments in companies that develop and market emerging energy technologies.

Through these funds, Hydro-Québec CapiTech has developed an extensive network of strategic and financial partners in the energy market and has access to numerous investment opportunities. Having attained this objective, Hydro-Québec CapiTech will not invest in new venture capital funds.

In cooperation with other fund sponsors, Hydro-Québec CapiTech plans to implement various strategies to increase the value of its funds, such as the reduction of management fees. As part of its efforts to increase the value of its direct investment portfolio, the company will ensure that it identifies all opportunities for synergy with investments in the various funds it sponsors.

Objective 2

Maximize the strategic and commercial spinoffs of investment activities for Hydro-Québec

Through its investments and network of partners, Hydro-Québec CapiTech will continue to monitor technological and market developments and gather strategic intelligence, in order to support Hydro-Québec's technological innovation strategy. Hydro-Québec CapiTech will contribute in four ways:

- Provide a window onto the investment market, enabling the company to identify emerging technologies with high growth potential.
- Keep the divisions informed of new technologies entering the market.
- Provide strategic intelligence on the technological initiatives undertaken by other electric utilities.
- Commercialize technologies developed by Hydro-Québec.

Monitoring is focused on market segments jointly selected with decision-makers in the divisions and technological innovation managers. The technological fields targeted by Hydro-Québec CapiTech must respect the profitability criterion, but also be related to the divisions' core operations. The table below illustrates this relationship.

Promising Technologies by Field of Endeavor

	Generation	Transmission	Distribution	Customer Services	Strategic Innovation
Real-time data acquisition, modeling and simulation systems	●	●	●		
Command and control systems	●	●	●		
Products to increase power flow		●			●
Network system equipment		●	●	●	
Broadband over power line			●	●	
Low- and high-power energy storage	●	●	●	●	●
Electric and hybrid vehicles				●	●
Software packages and products for integrated management of generating facilities and power systems	●	●	●	●	
Fuel cells, microturbines	●		●	●	
Waste-to-energy conversion	●				
New materials	●	●	●		●
Power electronics		●	●		
Software packages for demand-side management, customer relations and e-commerce	●			●	

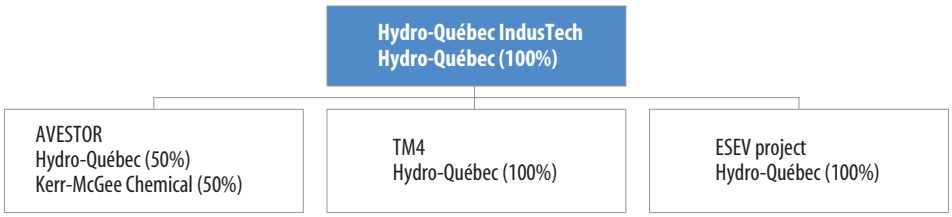
Hydro-Québec **IndusTech**

Mandates

- **In partnership with the private sector, pursue the industrialization and marketing of technologies resulting from Hydro-Québec research activities**

Business Objectives 2004–2008

1. **Ensure profitable sales growth and maximize the value of the investment in AVESTOR**
2. **Ensure profitability of TM4 in the very near term and maximize its value**
3. **Facilitate development of mainly electric vehicle prototypes for a market that would use AVESTOR and TM4 products**



Hydro-Québec IndusTech's portfolio is currently composed of:

- AVESTOR, a company held in partnership with Kerr-McGee Chemical that develops and markets a range of lithium-metal-polymer batteries for the telecommunications industry and potentially for energy markets, as well as for electric and hybrid vehicles.
- TM4, a company that designs and markets high-density, energy-efficient electrodynamic solutions, which are customized for the transportation industry and distributed generation.

- The ESEV (Energy Systems for Electric Vehicles) project, which helps foster strategic partnerships with manufacturers of mainly electric vehicles incorporating AVESTOR and TM4 technologies.

Objective 1

Ensure profitable sales growth and maximize the value of the investment in AVESTOR

AVESTOR was established in 1994 under the name Argo-Tech Production. Its mission is to pursue the development and marketing of the solid electrolyte lithium-metal-polymer battery. This technology has been developed since 1979 by Hydro-Québec's research institute (IREQ) and various international partners, including France's Centre national de la recherche scientifique, YUASA Corporation of Japan, USABC (United States Advanced Battery Consortium) and 3M Corporation.

After intellectual property and patent rights were clarified, Hydro-Québec conducted an international search and selected Kerr-McGee Chemical as its strategic industrial partner in 2001. Hydro-Québec IndusTech and Kerr-McGee Chemical each have a 50% stake in AVESTOR. Kerr-McGee Chemical, a U.S. firm, has an extensive business network and already produces salts for the world's conventional battery industry. The firm brings extensive manufacturing experience and considerable financial strength to AVESTOR.

AVESTOR's first commercial plant, which is located near its research centre on the outskirts of Montreal, manufactures lithium-metal-polymer (LMP) batteries for the telecommunications industry.

AVESTOR is currently fine-tuning its manufacturing process. Initially, it will target telecommunications, a large market where operators of wireline, broadband cable and wireless networks use batteries as a backup power source in the event of utility power grid failures. The AVESTOR battery requires no maintenance, can withstand extreme temperatures and is equipped with an integrated local and remote monitoring system. It enables the user to ensure continuity of service at a lower cost.

AVESTOR will then broaden its marketing program, proceeding with caution, to include other market segments, such as industrial stationary applications and the energy sector, where the battery could provide reliable and efficient backup for an alternating current power system. An LMP battery for the automotive industry is also being developed. The LMP battery could be suitable for mainly electric vehicles in terms of weight, safety and stable performance.

Objective 2

Ensure profitability of TM4 in the very near term and maximize its value

Established in 1998, TM4 is responsible for industrializing and marketing products derived from technologies that were developed by Hydro-Québec's research institute, in the course of its motor-wheel project.

TM4 now designs and markets systems that incorporate electro-mechanical and power conversion and control components. These systems meet specific customer requirements in electric motorization and distributed generation markets around the world. Moreover, TM4 systems have a competitive advantage in terms of performance, compactness and reliability.

Development of TM4 Technologies

1982 – Technologies derived from a magnetic confinement nuclear fusion (tokamak) project at IREQ

1991 – Start-up after 10 years of scientific research

1996 – Proof of motor-wheel concept

2002 – Commercial sales of motor-wheel by-products

TM4 has successfully supplied various customers with powertrain systems ranging from 25 to 40 kW and generators from 10 to 170 kW. It is currently working with wind turbine integrators on the design of generator systems with a power rating of several megawatts.

The company expects to make commercial breakthroughs in the land transportation and energy markets. Over the medium term, it will look for a strategic industrial partner with the necessary infrastructure and access to a high-volume market.

Objective 3

Facilitate development of mainly electric vehicle prototypes for a market that would use AVESTOR and TM4 products

The purpose of the ESEV project is to take advantage of AVESTOR and TM4 technological breakthroughs, as well as the synergy between these technologies, to foster the development of mainly electric vehicle prototypes that would use these technologies.

The ESEV project promotes sustainable transportation technologies and meets the objectives of the Kyoto Protocol. Greenhouse gas reduction is a global issue. In Québec, automobiles account for 40% of greenhouse gas emissions. In fact, the average car produces about 3.5 tonnes of greenhouse gases per year, and there are more than 3 million light-duty vehicles on Québec roads.

Although major car manufacturers and some battery developers (lithium-ion and nickel-metal-hydride) are currently focusing their marketing efforts on mainly thermal-engine hybrid electric vehicles, in their quest for a fuel-efficient car, the development of a mainly electric vehicle is a better solution in terms of air quality protection. There are some 15,000 mainly electric vehicles in use around the world. They are primarily used for demonstration purposes in corporate vehicle fleets.

For the time being, several factors are slowing growth in the mainly electric vehicle market, including the recharging infrastructure, as well as the technological challenges associated with battery performance and cost.

Around 2012 or 2015, the mainly electric vehicle market may start growing in Europe, first, due to the high cost of fuel and the support of government policies. Vehicles of this type would be economical for travel in cities, where stops and starts are frequent.

Potential annual sales in target markets—i.e. corporate vehicle fleets and personal vehicles—could reach the 200,000 mark in Europe, and a more conservative 100,000 units in North America, where demand would probably develop at a slower pace.

Even if mainly electric vehicles are developed with a long-term perspective and the technological risks are high, Hydro-Québec IndusTech considers it a worthwhile endeavor, given the worldwide interest in the development of sustainable transportation and the fact that AVESTOR and TM4 technologies have achieved breakthroughs.

In 2002, Hydro-Québec IndusTech signed a cooperation agreement with Société de Véhicules Électriques, created by a consortium of two French companies, Dassault and Heuliez. Under the agreement, ESEV project management has decided to speed up development of AVESTOR's LMP traction battery with a view to coupling it with the powertrain system produced by TM4.

Hydro-Québec IndusTech plans to continue its support for the development and demonstration of integrated propulsion systems using traction batteries for mainly electric vehicles, in partnership with the private sector.

Financial Outlook

Financial Outlook for the *Strategic Plan 2004–2008*

The *Strategic Plan 2004–2008* is on course toward the goal of the past five years: improving the company's financial position.

The following analysis is based on the most recent financial projections, which follow from the economic and energy parameters forecast in this Plan. Economic uncertainty may affect actual results. The parameters used and the financial outlook are therefore presented for illustration purposes only and may be subject to significant variability in the short term, as indicated in the sensitivity analysis presented below.

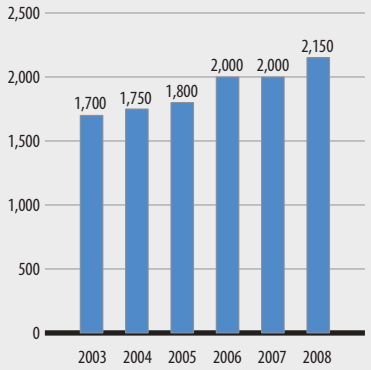
Consolidated Results

In 2003, the company expects net income of $1,700 million. As its profitability gradually improves over the coming years, net income should reach $2,150 million by 2008. This growth is due to higher electricity sales, mainly in Québec, tight control of operating expenses and an improvement in the results of international and technology subsidiaries.

Revenue from electricity sales in Québec will increase by $1,926 million over the period, as a result of steady growth in demand and rate increases that will allow Hydro-Québec Distribution to cover its costs and achieve a reasonable rate of return in a regulated environment. These rate increases, determined on the basis of the principles that govern the Distributor's operations by the Régie de l'énergie, will cover, among other things, the costs of supplying the additional electricity required to meet the increase in demand from Québec customers.

Revenue from electricity sales on markets outside Québec will be lower than in previous years, primarily due to the increase in domestic energy requirements.

Net Income ($ millions)



Operating expenses will increase by $450 million over the next five years. More than 90% of this growth will come from the expansion in the operations of subsidiaries and other holdings. Operating expenses, excluding holdings, will be kept at their budgeted 2003 level until 2006 and will increase by 1% in 2007 and 2008. This moderate growth presupposes sustained efforts to improve productivity.

Statement of Consolidated Results *($ millions)*

	2003	2004	2005	2006	2007	2008
Revenue	11,455	11,538	12,306	12,944	13,209	13,815
Operating expenses	2,309	2,428	2,475	2,578	2,682	2,759
excl. holdings	*2,092*	*2,092*	*2,092*	*2,092*	*2,113*	*2,134*
Other expenses	4,671	4,761	5,087	5,375	5,604	5,859
incl. budgetary contingency	–	–	*300*	*400*	*400*	*400*
Financial expenses	2,743	2,569	2,914	2,956	2,887	3,010
Non-controlling interest	32	30	30	35	36	37
Consolidated net income	**1,700**	**1,750**	**1,800**	**2,000**	**2,000**	**2,150**
Dividends likely to be declared	850	875	900	1,000	1,000	1,075
Return on equity (%)	11.6	11.3	11.0	11.5	10.9	11.1
Interest coverage	1.59	1.57	1.60	1.62	1.57	1.65
Average cost of debt (%)	8.2	7.5	8.5	8.6	8.2	8.2

Other expenses are expected to total $5.9 billion in 2008, compared with $4.7 billion in 2003. This increase reflects Hydro-Québec Distribution's energy purchases from private suppliers (TransCanada Energy and wind power contracts, for example) of approximately $0.4 billion, an increase in amortization expense of $0.4 billion and a budgetary contingency of $0.4 billion.

For the 2004–2008 period, Hydro-Québec has added a $1.5 billion budgetary contingency to its projections to cover variations in runoff; this gives the company a 75% probability over five years of achieving its financial targets.

Financial expenses (including interest, exchange losses and loan guarantee fees) will increase by $267 million over the period, reaching slightly more than $3.0 billion in 2008. This increase is the result of cash requirements to finance the company's major investment program over the next five years. With the expected growth in operating income, however, interest coverage will remain at approximately 1.60.

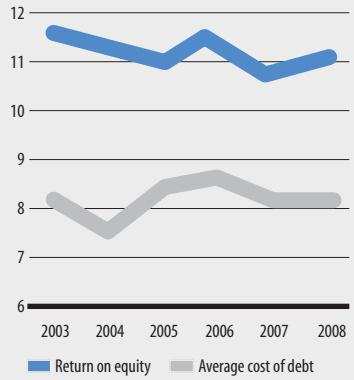
Capital Investment *($ millions)*

	2004	2005	2006	2007	2008	2004–2008
Hydro-Québec Production	1,631	1,615	2,232	2,394	1,192	9,064
Hydro-Québec TransÉnergie	922	1,098	1,095	975	740	4,830
Hydro-Québec Distribution	734	747	746	699	671	3,597
Other	381	352	294	277	254	1,558
Total	**3,668**	**3,812**	**4,367**	**4,345**	**2,857**	**19,049**

Return on equity will remain relatively stable, because the growth of net income is comparable to that of shareholder's equity. Despite the forecast increase in interest rates, return on equity should remain at approximately 11%, a rate that is higher than the average cost of debt. Dividends likely to be declared are estimated at $4.9 billion for the 2004–2008 period.

The company also plans to continue developing its international operations and its technologies. In order to limit the risk of capital investment in these holdings, Hydro-Québec should hold no more than 10% of the consolidated value of shareholder's equity. The expected return should reflect the inherent risk of these activities. Total return over the life of the various projects must consider not only the income generated by the projects, but also the potential gain upon disposal of investments.

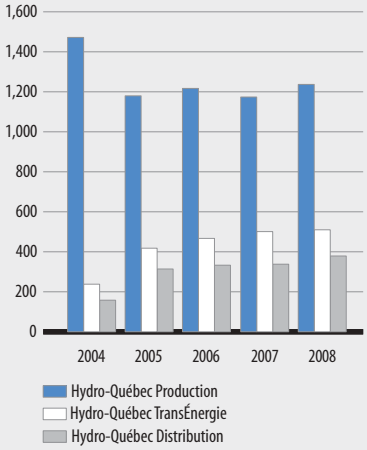
Return on Equity and Average Cost of Debt (%)



Results by Division

The main contribution to the company's net income comes from Hydro-Québec Production. Its results will decline after 2004, however, reflecting the addition of a budgetary contingency for the last four years of the Plan. This increases the probability of reaching forecast net income as of 2005 to more than 50%, considering the risks to which the division is exposed, especially those related to variations in runoff.

Contribution of the Divisions to Net Income ($ millions)



Contribution of the Divisions *($ millions)*						
	2003	**2004**	**2005**	**2006**	**2007**	**2008**
Net Income						
Hydro-Québec Production[1]	1,654	1,472	1,180	1,217	1,174	1,237
Hydro-Québec TransÉnergie	297	238	418	467	501	510
Hydro-Québec Distribution	(173)	158	314	333	338	379
Other	(78)	(118)	(112)	(17)	(13)	24
Consolidated net income	**1,700**	**1,750**	**1,800**	**2,000**	**2,000**	**2,150**

1. After budgetary contingency.

Hydro-Québec TransÉnergie will see its income rise significantly in 2005, due to adjustments in transmission rates to compensate for the decrease in point-to-point reservations over the next few years. Without these adjustments, the division would not have sufficient revenue to reach the return authorized by the Régie de l'énergie. This situation explains the low profitability of transmission operations in Québec in 2003 and 2004.

Hydro-Québec Distribution's contribution will increase steadily throughout the period. This improvement can be ascribed to the freeze in operating expenses and to rate increases, which will allow it to maintain its authorized return over the Plan period.

Changes in Financial Position

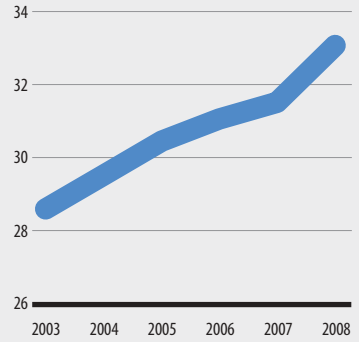
Changes in Consolidated Financial Position *($ millions)*						
	2003	**2004**	**2005**	**2006**	**2007**	**2008**
Use of funds						
Capital investment	(3,473)	(3,668)	(3,812)	(4,367)	(4,345)	(2,857)
Redemptions and maturities	(3,023)	(1,693)	(2,452)	(2,151)	(2,121)	(1,412)
Dividends	(763)	(850)	(875)	(900)	(1,000)	(1,000)
	(7,259)	**(6,211)**	**(7,139)**	**(7,418)**	**(7,466)**	**(5,269)**
Source of funds						
Operations	3,638	3,841	4,356	4,439	4,638	4,420
Financing[1]	3,621	2,370	2,783	2,979	2,828	849
	7,259	**6,211**	**7,139**	**7,418**	**7,466**	**5,269**
Self-financing (%)	47.8	55.8	55.6	54.3	56.3	80.1

1. Including net change in short-term investments and cash equivalents.

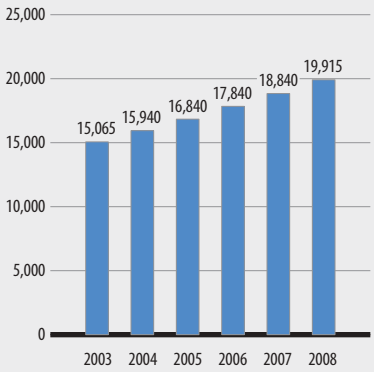
Over the 2004–2008 period, operations will generate $21.7 billion. These funds, combined with the $11.8 billion in external financing, will be used to finance $19.0 billion in capital spending, to repay $9.8 billion of debt at maturity and to pay dividends.

Despite major capital investments, self-financing will remain at approximately 55%, which is comparable to recent years. In 2008, the low volume of debt coming to maturity and moderate capital spending will raise self-financing to 80%. Thus the increased cash flows from improved financial results will make it possible to reduce the company's reliance on external lenders to meet its financing needs.

Capitalization (%)



Shareholder's Equity ($ millions)



Balance Sheet

By the end of the 2004–2008 period, fixed assets will be valued at $58 billion and total assets at $66 billion. About half of all commissionings will be concentrated in generation, with the rest almost entirely divided between transmission and distribution.

Consolidated Balance Sheet *($ millions)*

	2003	2004	2005	2006	2007	2008
Assets						
Fixed assets						
Hydro-Québec Production	24,625	25,500	26,057	27,097	28,087	28,398
Hydro-Québec TransÉnergie	17,596	17,815	18,275	18,716	19,020	19,067
Hydro-Québec Distribution	8,176	8,418	8,670	8,894	9,051	9,143
Other	1,330	1,356	1,339	1,322	1,305	1,270
Total – Net fixed assets	**51,727**	**53,089**	**54,341**	**56,029**	**57,463**	**57,878**
Other assets	6,030	6,019	6,399	7,102	8,054	8,343
Total – Assets	**57,757**	**59,108**	**60,740**	**63,131**	**65,517**	**66,221**
Liabilities						
Total debt	38,019	38,706	39,087	40,269	41,386	40,999
Other liabilities	4,673	4,462	4,813	5,022	5,291	5,307
Total – Liabilities	**42,692**	**43,168**	**43,900**	**45,291**	**46,677**	**46,306**
Shareholder's equity	15,065	15,940	16,840	17,840	18,840	19,915
Liabilities and shareholder's equity	**57,757**	**59,108**	**60,740**	**63,131**	**65,517**	**66,221**
Capitalization (%)	28.5	29.4	30.3	30.9	31.5	32.9

Between 2003 and 2008, total debt will increase by $3.0 billion because of the major capital investment program.

Hydro-Québec's current agreement with its shareholder with regard to the payment of dividends allows the company to keep half its net income. Shareholder's equity will therefore increase by $4.9 billion to approximately $20.0 billion by 2008. At the same time, the capitalization rate will rise from 28.5% in 2003 to 32.9% in 2008.

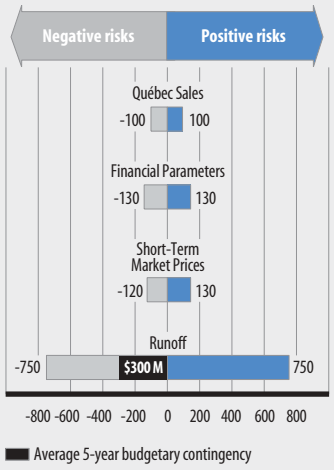
Sensitivity Analysis of Consolidated Net Income Forecast for 2006

A sensitivity analysis of the net income forecast for 2006 provides an estimate of the potential impact of certain business risks on Hydro-Québec.

The results shown in the adjacent figure cover a 68% probability range. For example, an analysis of the risk stemming from variation in financial parameters shows that there is only a 16% chance that negative fluctuations will result in a decline of more than $130 million in net income, and a 16% chance that such fluctuations, conversely, will result in an increase of more than $130 million in net income.

The business risks most likely to affect net income are changes in financial parameters, changes in prices on short-term markets and variations in runoff.

Change in Net Income for 2006 ($ millions)



Main Economic Parameters *($ millions)*

	2003	2004	2005	2006	2007	2008
Real GDP (Québec) (% change)	2.1	3.2	2.2	2.6	2.5	2.3
CPI (Canada) (% change)	2.9	1.3	1.6	1.5	2.3	2.1
Price of aluminum (US¢/lb)	67.8	68.4	68.5	68.5	68.5	68.5
Exchange rate (C$/US$)	0.703	0.731	0.723	0.716	0.711	0.706
90-day interest rate						
Canada (%)	3.1	3.9	4.7	4.7	4.8	4.8
United States (%)	1.1	2.1	3.2	3.7	3.9	4.5
10-year interest rate						
Canada (%)	5.4	5.7	6.2	6.2	6.3	6.4
United States (%)	4.4	5.4	6.7	6.8	6.8	7.1

Risks related to economic parameters, such as fluctuations in interest rates, exchange rates and the price of aluminum, have been managed on an integrated basis for several years now. Hydro-Québec uses derivative instruments to keep the volatility of its financial results within certain limits. These limits are reviewed every year and submitted to the Board of Directors for approval.

Runoff is still the risk with the greatest impact on the company's financial results. In planning its hydroelectric facilities and related reservoirs, therefore, Hydro-Québec has taken variations in runoff into account. Sound reservoir management and short-term transactions allow Hydro-Québec to keep the impact of runoff risk on net income at an acceptable level.

In the same way, judicious reservoir management allows the company to limit the financial impacts of price decreases on external electricity markets or, conversely, to take advantage of opportunities on those markets.

Economic Impact

Sustaining Employment

In addition to the dividends, taxes and loan guarantee fees it pays to the Québec government, Hydro-Québec also makes a significant contribution to Québec's economy through its growth, capital spending and purchases of goods and services.

In each year of the Plan, Hydro-Québec would like to sustain 50,000 person-years of employment in direct and indirect jobs. To achieve this, the company hopes to accelerate its planned capital investments, by speeding up the completion of its hydroelectric development projects.

According to the financial outlook for the 2004–2008 period, Hydro-Québec's activities, excluding its holdings, will help sustain some 220,000 person-years of employment in all regions of Québec.

Jobs Sustained by Hydro-Québec's Activities *(in person-years)*

	2003	2004	2005	2006	2007	2008	2004–2008
Jobs related to facilities operations	22,200	22,400	22,000	21,700	21,200	21,200	**108,500**
Jobs related to capital spending	20,000	21,800	20,400	23,900	21,900	16,000	**104,000**
Jobs related to commercial programs	200	400	400	300	300	300	**1,700**
Jobs related to purchases from IPPs	900	1,100	1,100	1,200	1,300	1,300	**6,000**
Total	**43,300**	**45,700**	**43,900**	**47,100**	**44,700**	**38,800**	**220,200**

It is estimated that operations alone will sustain 108,500 person-years in direct and indirect jobs, while capital spending will support 104,000 more. The various commercial programs financed by the company will sustain 1,700 person-years, while purchases from independent power producers (IPPs) will contribute 6,000 person-years.

In addition to these jobs, the operations of Hydro-Québec CapiTech and Hydro-Québec IndusTech will help sustain about 900 jobs, many of them highly skilled, in some 30 Québec companies. This number could increase over the Strategic Plan period, especially with the anticipated development of AVESTOR and TM4.

Tax Contribution

For the 2004–2008 period, in addition to more than $0.9 billion in loan guarantee fees and $4.9 billion in shareholder dividends, Hydro-Québec will pay $3.4 billion in taxes to the provincial government and municipalities. The tax on gross revenue, in lieu of real estate tax, will generate $1.4 billion for the Québec government, while the capital tax will provide $1.7 billion.

The dividends likely to be declared, taxes and loan guarantee fees paid to the Québec government and municipalities will amount to approximately 95% of the company's net income for the period.

Regional Economic Impact

Hydro-Québec's presence throughout Québec translated into purchases of goods and services worth over $1.6 billion in 2002 and sustained the equivalent of nearly 12,250 person-years in direct and indirect jobs.

In addition, Hydro-Québec's own employees working across the province also contribute to regional economic growth.

The geographic distribution of these economic impacts within Québec will depend on the specific projects approved and carried out during the *Strategic Plan 2004–2008* period.

Hydro-Québec's purchasing policy is designed to ensure the distribution of purchases throughout Québec, at the most favorable cost to the company.

As an agent of economic development, Hydro-Québec reaffirms its intention to work with representatives of the regions where it operates for the benefit of all Quebecers.

Continuing to affirm the company's presence across Québec, Hydro-Québec's regional offices will partner with stakeholders and cooperate with local communities to ensure that its operations and projects blend in harmoniously with their host communities and contribute to their vitality.

In addition to generating significant economic benefits throughout the province, Hydro-Québec will continue to support numerous worthy causes in education, health care, and social or humanitarian assistance.

Appendix 1

Follow-up to the *Strategic Plan 2002–2006*

The tables on the following pages summarize the activities carried out and results achieved in relation to the objectives set forth in the *Strategic Plan 2002–2006*. The left-hand column summarizes the major orientations and objectives pursued, while the right-hand column describes the activities that have been completed or are being carried out, and the results achieved.

Hydro-Québec Distribution

Objective 1: Serve Québec customers well

Consolidate the gains made in terms of service quality in Québec	
Improve the level of customer satisfaction (CSI) *Target: To reach and maintain, until 2006, a level of satisfaction between 7.5 and 8.0 (out of 10), depending on the customer category*	The overall customer satisfaction index (CSI) rose from 7.33 in 2001 to 7.40 in 2002 and remained at 7.40 during the first six months of 2003. For large-power customers, the satisfaction index measured at quality partnership sessions increased from 8.74 in 2001 to 8.91 in 2002. At June 30, 2003, the index was 8.99.
Offer reliable electricity service *Objectives: To reduce the service average interruption duration index (SAIDI) per customer to 1.7 hours per year for the distribution system, starting in 2004; for downtown Montréal, the target is 1 hour per customer per year*	For all of Québec, the index (adjusted to account for exceptional events) decreased to 2.05 hours in 2002 and efforts are continuing to achieve the target. For the downtown area of Montréal, SAIDI was 2.77 hours in 2002. A memorandum of understanding on vegetation control, reached by Hydro-Québec Distribution, the Québec federation of municipalities and the union of Québec municipalities, was put into effect.
Continue the program to reinforce the distribution system	The program to strengthen the distribution system will end in 2007. At June 30, 2003, 54% of the 7,400 km of lines located in areas with a high risk of icing had been upgraded, which required an investment of $130 million.
Improve procedures for intervening in the event of a blackout	The recommendations of the liaison committee for Hydro-Québec and the Québec federation of municipalities were implemented with a view to improving communications between the company and municipalities in emergency situations. When an emergency does occur, an Internet portal gives municipal officials an up-to-date summary of power outages in their area.

Consolidate the gains made in terms of service quality in Québec *(cont.)*	
Offer products and services adapted to customer needs *Target: 70% of incoming calls answered in 20 seconds or less*	The percentage of calls answered within 20 seconds increased by 3% in 2002 over the preceding year. It was 69% for residential customers and 72% for business customers. The following indicators measured other service dimensions in 2002: • requests settled during the first call: 81% for residential customers and 65% for business customers • meter reading rate: 96% • percentage of connection requests executed on time: 93% • percentage of customers given prior notice of scheduled service interruptions: 81% • satisfaction with information received during power outages: 7.3 (out of 10) • response time (20 days) to events reported by large-power customers: 99% (942 events reported in 2002) The performance of these indicators was maintained during the first six months of 2003. Achievements in enhancing service: • improvement of Internet services, particularly in terms of giving customers information that helps them better manage their electricity consumption • introduction of wall-mounted air conditioners by the company's HydroSolution subsidiary • improvement in the service offering for business customers: account management summary and telemetering service that makes it possible to track consumption data in order to optimize costs (service approved by the Régie de l'énergie, March 2003) • activities undertaken with large-power customers to optimize their industrial processes

Consolidate the gains made in terms of service quality in Québec *(cont.)*	
Act as a socially and environmentally responsible distributor	The company continued to search for fair and sustainable solutions to help very low-income customers, in cooperation with community organizations and the Québec government. • Possibility for very low-income customers to take advantage of payment agreements adapted to their ability to pay. These agreements have very flexible payment terms. • A study is currently under way (begun in December 2002 and slated to end in fall 2004) with the objective of proposing realistic, effective and lasting solutions for low-income households not covered by existing collection arrangements. This study is being conducted with 27 consumer associations and concerns 430 low-income customers in serious arrears. • Collection employees and managers were made aware of poverty issues through a specific training program. Safety awareness programs continued to be promoted in schools, to the public, specialized workers and first-line health-care workers. Prevention audits for the safety of Hydro-Québec workers and contractors working near its distribution facilities were conducted. ISO 14001 accreditation (main distribution system) was maintained; customer service activities that could be subject to certification were identified and evaluated. Two-year extension (until 2006) of the Québec government program for distribution cable undergrounding at heritage, cultural and tourist sites. As at June 30, 2003, 22 projects had been authorized by the government and launched. These projects represent an investment of $60 million and involve the undergrounding of 18 km of power lines. On average, cost-sharing between the partners is 33% ($20 million) for the government and municipalities, 17% ($10 million) for telecommunications companies and 50% ($30 million) for Hydro-Québec. Meetings were held with 45 developers, contractors and the largest municipalities (Montréal, Laval, Longueuil, Québec City and Gatineau) to promote distribution system undergrounding. In 2003, Gatineau passed a regulation that requires undergrounding for all new housing developments. The distribution system undergrounding option was promoted to urban planning specialists at various symposiums: Québec association of municipal engineers, Fondation des rues principales, Québec urban planning association, Association of regional land developers, Centre for expertise and research on urban infrastructure, Association of Québec home builders and the Québec federation of municipalities.

Supply electric power to Québec customers

Forecast five-year growth in Québec electricity sales –13 TWh in 2006 compared with 2001:

- 5.6 TWh for small- and medium-power customers
- 7.4 TWh for large-power customers

Normalized sales[1] for 2002 exceeded the *Strategic Plan 2002–2006* forecast by 2.2 TWh.

In 2002, sales to small- and medium-power customers exceeded the *Strategic Plan 2002–2006* forecasts by 1.1 TWh. This positive variance is mainly the result of an exceptionally strong residential construction market.

Sales to large-power customers also exceeded the *Strategic Plan 2002–2006* forecasts by 1.1 TWh. This increase is due to favorable economic conditions, mainly in the mining, metallurgical and manufacturing industries (0.7 TWh) and in the business, institutional and municipal distribution sectors (0.3 TWh).

For 2002, warmer-than-normal temperatures reduced sales by 0.6 TWh compared with forecasts.

Forecast sales to small- and medium-power customers in 2003, which take into account normalized sales from January to August 2003, exceed the *Strategic Plan 2002–2006* forecast by 2.9 TWh. Once again, this variance can be explained mainly by the strong residential construction market.

Sales to large-power customers in 2003 are expected to exceed the *Strategic Plan 2002–2006* forecast by 1.5 TWh. This increase is due to higher sales, mainly to the metallurgical (0.5 TWh) and chemical (0.4 TWh) industries.

Colder-than-normal temperatures for the first eight months of 2003 account for an increase in sales of 1.8 TWh compared with the forecast.

1. Electricity sales data is restated to take the effects of temperature into account.

Supply electric power to Québec customers *(cont.)*	
Prepare supply plans	*October 2001*: Tabling of the Electricity Supply Plan with the Régie de l'énergie followed by hearings in April and May 2002, and then a favorable decision by the Régie on August 2, 2002. The Régie considered the demand forecast to be reasonable and approved the supply strategy, both for the main power grid and for off-grid systems. *February 2002*: First call for tenders, with bids received in June. Main issue: 400 MW (baseload deliveries) and 200 MW (hourly dispatchable deliveries), starting on March 1, 2007. *March 2002:* Announcement of the Alouette II aluminum smelter project and increase in the quantity of power in the call for tenders (additional 600 MW). *October 2002:* Announcement of the selection of Hydro-Québec Production as a supplier (Robert-Bourassa for 350 MW of baseload deliveries and La Grande-1 for 250 MW of hourly dispatchable deliveries) and the Axor-Calpine consortium (combined cycle, 550 MW of baseload deliveries and 50 MW of hourly dispatchable deliveries). *November 2002:* Tabling with the Régie of a document on the progress of the Electricity Supply Plan. Principal highlights: requirements for the dual energy CII program of 2.2 TWh per year; blocks of energy generated from biomass and wind power. *December 2002:* After failing to reach an agreement with the Axor-Calpine consortium, the company selected TransCanada Energy to supply 507 MW of electricity, starting in 2006, from a natural gas cogeneration plant to be built in Bécancour. *April 2003:* Call for tenders for the purchase of energy generated from biomass (100 MW of installed capacity). *June 2003:* Tabling with the Régie de l'énergie of a request for approval of the three supply contracts signed after the first call for tenders, at an average price of 6.1 cents per kilowatthour, including the price of transmission. *August 2003:* Approval by the Régie of the three supply contracts related to the first call for tenders. Call for tenders for energy to be produced by natural gas cogeneration, subject to the adoption of a regulation by the Québec government. Preparation of an interruptible power program for winter 2003–2004, available to large-power customers (at rates L and LR). This program must be approved by the Régie de l'énergie.
Develop a targeted purchasing program for wind energy generated in Québec	*May 2003:* Call for tenders for the purchase of electricity generated from wind farms totaling 1,000 MW of installed capacity, with deliveries staggered from 2006 to 2012.

Objective 2: Improve the division's profitability

Continue strict cost control *Target: Limit investments that contribute to long-term operability of the distribution system to 1.6% of the original value of fixed assets in operation*	A set of efficiency indicators was developed (for monitoring purposes in 2003). Investments of $116 million were made in 2002 to ensure the long-term operability of the distribution system, which represents 1.4% of the original value of fixed assets in operation. *August 2003:* Tabling with the Régie de l'énergie of an efficiency brief to support the division's rate proposal. Hydro-Québec Distribution set itself the objective of absorbing the growth of its operations by maintaining the current level of staffing and operating expenses (excluding pension costs). It also made a commitment to the Régie to demonstrate the measures taken to improve its efficiency and the results obtained. Management and employees were made aware of financial imperatives, including the importance of cost control and greater efficiency. The division participated in benchmarking activities by the Canadian Electricity Association and compared its performance with a number of U.S. companies *(P&A Consulting)*.
Develop markets while maximizing the added value for Québec	The Régie de l'énergie rejected the request to eliminate Rate BT, primarily because of insufficient proof as to the real cost of supply and service for this rate. In June 2003, the Régie de l'énergie approved the division's comprehensive *Energy Efficiency Plan 2003–2006:* • overall energy savings of 750 GWh by 2006 have been targeted • 16 programs for all customer categories, three of which will be carried out in collaboration with the Agence de l'efficacité énergétique Initiatives were taken at the national and international levels to promote energy, identify potential new companies and favor the retention and development of businesses that create jobs in Québec (activities focused on optimizing the quantity of energy per job created or maintained). Results of industrial business development at December 31, 2002: 69 projects announced, with 406 MW for Rate L (11 jobs per megawatt of new industrial demand) and 98 MW for Rate M (119 jobs per megawatt of new industrial demand).

Increase rates as of 2004, while avoiding rate shocks	Tabling with the Régie de l'énergie of the request to determine the Distributor's cost of service and to amend electricity rates. *Phase 1* (July 8, 2002): Decision by the Régie de l'énergie handed down on May 21, 2003, establishing the regulatory principles as well as the economic and accounting factors required for the preparation of Hydro-Québec's request to amend its electricity rates. *Phase 2* (August 13, 2003): Request for a rate increase of 3% as of October 1, 2003, and an increase of 2.98% as of April 1, 2004. September 9, 2003: Rejection by the Régie of the interim request for a rate increase as of October 1, 2003. September 24, 2003: Tabling with the Régie of a request for a decision regarding: • a request for a rate increase of 3% within 15 days of a favorable decision by the Régie • a request for a rate increase of 2.98% as of April 1, 2004
Take advantage of technological innovation	Hydro-Québec's research institute carries out R&D projects to develop technologies and processes that will reduce costs, strengthen the distribution system, improve power supply reliability and increase energy efficiency based on the needs of Hydro-Québec customers: • certification of the solid-insulation transformer, developed to offer new undergrounding options • coming into use of new poles treated with a polymer additive developed to solve the problem of hardening and make line workers' jobs easier • development and system testing of a new method for the structural analysis of poles that will help to optimize pole replacement • development of business partnerships with consortiums and large-power customers: for example, an induction screw for an application for the food industry (pasteurization) and the mining and metallurgical industry (ore drying); OHAP (plasma-assisted sludge oxidation) technology for the pulp and paper industry and for the treatment of city water.

Hydro-Québec TransÉnergie

Objective 1: Offer customers value-added transmission service

Consolidate the gains made in terms of service quality in Québec	
Ensure the availability and capacity of the transmission system *Target: Service average interruption duration per customer not to exceed 0.65 hours per year*	The service average interruption duration index (SAIDI) was 0.55 hours per customer in 2002—better than the target of 0.65 hours. Hydro-Québec TransÉnergie obtained ISO 14001 certification in June 2002. The division modernized the System Control Centre (CCR) and updated the computer infrastructure at the backup centre (RCCR).
Realize the full import and export capacity of interconnections	Representations were made to various regulatory and operational organizations (FERC, NERC, ISO, RTO, etc.) to lift restrictions on interconnections. The situation is changing slowly. System operating methods were adapted to maximize interchanges with neighboring systems: equipment outage plan, cancellable outages and live-line work.
Update business practices and the transmission service contract, if necessary	A complaint was received about refusal of access to the transmission system for a point-to-point reservation of service. The Régie de l'énergie rejected the complaint, judging that Hydro-Québec TransÉnergie had correctly applied the rates and conditions of the Hydro-Québec transmission service. The Régie de l'énergie approved most of the amendments to the transmission service contract submitted by Hydro-Québec TransÉnergie. From now on, the contract will be called the *Open Access Transmission Tariff.*
Give priority to innovations designed to ensure long-term system operability and performance	Together with Hydro-Québec's research institute and other partners, Hydro-Québec TransÉnergie conducted R&D activities to improve the efficiency of its installations at the best possible cost: • focus of major technological innovation research themes on increasing the useful life of designated equipment, reducing project costs, increasing the capacity of designated corridors, optimizing system management and reducing the impact of extreme weather conditions • carrying out dynamic testing to evaluate transmission line behavior in the event of failure • development of a de-icer for use on live lines • inauguration of the TransÉnergie chair for power system simulation and control, in collaboration with the École de technologie supérieure

Objective 2: Maintain the reliability and integrity of the system operated by TransÉnergie, the only regional transmission organization in Québec

Ensure continuity and reliability of transmission service	Construction work on the system loop in Montérégie began in July 2002 to improve the security of supply for all of southeast Québec, including the greater Montreal area. Commissioning is planned for late 2003. Hydro-Québec postponed its decision concerning the proposed 1,250-MW interconnection with Ontario because of uncertainty regarding regulatory changes affecting the Ontario market and the impact of the decrease in its short-term rates on the markets. In December 2002, an application was filed with the Régie de l'énergie for approval of standards pertaining to the transmission provider's operations and technical requirements, especially Hydro-Québec TransÉnergie's application of NPCC and NERC reliability and security standards. The Régie said it was satisfied with the division's application of these standards. A new 230-kV line was built in the right-of-way of the Cedars Rapids Transmission Company line. Commissioning is planned for the beginning of 2004.
Manage planning and maintenance activities for Hydro-Québec's transmission telecommunications system	The telecommunications and transmission maintenance and operating systems were further harmonized. Work was begun with the Shared Services Centre to integrate telecommunications services operations when the contract with Connexim expires on December 31, 2003.

Objective 3: Ensure the division's profitability, in particular by seizing international business opportunities

Control expenses needed to provide transmission service *Target: Limit investments that contribute to long-term operability of the transmission system to 1.3% of the original value of fixed assets in operation*	Commitments to control operating expenses were respected, in particular by maintaining the same level of staffing. With respect to regulated operations, investments of $270 million to ensure the long-term operability of the transmission system were made in 2002, which represents 1.4% of the original value of fixed assets in operation.
Achieve the return authorized by the Régie de l'énergie	In April 2002, the Régie de l'énergie rendered its decision on Hydro-Québec TransÉnergie's rate case. It authorized the division to amend its transmission rates retroactively to January 1, 2001, and fixed the rate of return at 9.66%. Moreover, it also recognized the efficiency of the division's business model. The division achieved its targeted rate of return in 2002.

Seize international business opportunities in accordance with the criteria established by Hydro-Québec	Hydro-Québec TransÉnergie offers its expertise throughout the world as a partner, investor and provider of professional services and technological products: service expertise in live-line work and planning, development and commercialization of simulation systems. The portfolio of international projects includes a number of investments and interests, notably the Transelec transmission system in Chile, the TransMantaro transmission line in Peru, and the DirectLink and MurrayLink interconnectors in Australia. All these facilities are already in operation. In 2002, revenue generated by Hydro-Québec TransÉnergie's foreign operations totaled $251 million, for a net loss of $5.7 million. United States: Hydro-Québec TransÉnergie has a 75% stake in the Cross Sound Cable project, a high-voltage underwater line between southwestern Connecticut and Long Island, N.Y. The division continued its lobbying of regulatory organizations for the line to come into service in 2003. Following the massive power outage of August 14, 2003, the U.S. Department of Energy required the line to be put into service for an undetermined period. Outside of North America, efforts mainly focused on optimizing the profitability of holdings. Chile: An agreement was reached with International Finance Corporation, a subsidiary of the World Bank Group, which holds capital stock in the Transelec subsidiary. This will allow Transelec to maximize its development potential. An acquisition of assets in Sistema Interconnectado Norte Grande (SING) was completed. Peru: Consorcio TransMantaro, which operates the Mantaro-Socabaya transmission line, reduced its capital and redistributed $6.9 million to Hydro-Québec International, its principal shareholder. Australia: The MurrayLink interconnection (220 MW), which links the transmission systems of two states, Victoria and South Australia, was commissioned in October 2002. A unit was set up to commercialize the transmission capacity of the DirectLink and MurrayLink merchant lines to maximize revenues, and a manager for these two lines was also appointed. In May 2003, MurrayLink received approval from the Australian regulatory organization (ACCC) for regulated status.

Hydro-Québec Production

Objective 1: Ensure the steady growth of electricity sales on wholesale markets and of generating facilities in Québec

Objectives at the end of 2006, based on average runoff: 12-TWh increase in annual generating capability and annualized sales of $7 billion

Continue to develop competitive hydroelectric projects	Starting in 2002, projects that have been completed, are under construction or are awaiting authorization will increase generating capability by 12 TWh for 2008. Furthermore, projects completed or in progress totaling 7 TWh will have been commissioned by 2006. A number of other projects are under study. They meet stringent criteria for profitability, favorable reception by local communities and respect for the environment.
Initiate and carry out thermal generation projects on a selective basis	The draft design for the Suroît combined-cycle gas-fired power plant (800 MW) was completed in 2002. Hearings were held by the Bureau d'audiences publiques sur l'environnement, which submitted a report to the Ministère de l'Environnement du Québec in January 2003.
Purchase electricity from independent power producers under market conditions	Close to a dozen contracts have been signed with independent producers since 2001. In addition, three proposals for small hydroelectric generating stations were selected in December 2002, for a total of 75 MW.
Continue to develop trading of electric power and related products	In 2002, despite the difficult circumstances facing the industry, revenue from sales outside Québec increased by 13% to $3.5 billion.
Seize international business opportunities with strong potential for profitability	Hydro-Québec Production has holdings in companies that generate electricity in China, Panama and Costa Rica. In addition, it supplies professional services in the field of hydroelectric generation. In 2002, these activities generated $49.5 million in revenue and $13.8 million in net income.

Objective 2: Achieve a significant increase in the division's profitability

Aim for an increase of 30% in net income from 2000 to 2006 (assuming average runoff conditions)	The division's net income in 2002 reached a record $1.6 billion—up $0.4 billion over 2001, mainly as a result of the growth in short-term transactions on external markets and a decrease in financial expenses. Net income was up 24% over 2000.
Continue to control costs *Target: Limit investments that contribute to long-term operability of generating equipment to 1.2% of the original value of fixed assets in operation*	Control of operating expenses was maintained. Investments designed to ensure the security, reliability, long-term operability and optimal performance of generating facilities totaled $305 million in 2002. In 2002, $288 million was invested to ensure the long-term operability of generating equipment. This represents 1.1% of the original value of fixed assets in operation.
Continue to develop risk management tools	The division continued to optimize risk management tools with a view to maintaining industry best practices.

Objective 3: Ensure the reliability and quality of operations and promote technological innovation

Maintain reliability criteria in the management of generating facilities	At all times, Hydro-Québec Production maintains enough energy reserve to offset a potential runoff deficit of 64 TWh over two consecutive years, and a capacity reserve representing 10% to 12% of demand under its contracts. Hydro-Québec Distribution's Electricity Supply Plan: Every two years, the Régie de l'énergie requires Hydro-Québec Production to show that the reliability criterion for the supply of heritage electricity is respected. Approval of the *Strategic Plan 2002–2006*: The provincial cabinet requires, at the end of the calendar year, a guarantee as to the reliability of generating facilities for the coming year. Documents were sent to the Régie de l'énergie and the Québec government in December 2002.
Continue the technological innovation program	Technological innovation activities are focused on improving the performance of generating facilities, ensuring their long-term operability, and reducing operating and construction costs. In 2002, a total of $23 million was allocated to generation-related technological innovation projects.

Hydro-Québec Équipement

Objective 1: Improve project management

Reorganize the Ingénierie, Approvisionnement et Construction function	The functions were grouped under three separate entities. *Hydro-Québec Équipement* offers consulting services in engineering, environment and project management, and acts as general contractor for Hydro-Québec's other divisions. The division operates in the areas of Québec not governed by the *James Bay and Northern Québec Agreement* (JBNQA). *Société d'énergie de la Baie James* (SEBJ) develops projects for Hydro-Québec in the territory governed by the JBNQA and fulfills contracts obtained through tenders both inside and outside Québec. In 2002, the *Shared Services Centre* (procurement and information technologies) was merged with Human Resources. Its mandate is to develop partnerships with its client divisions and corporate units, in order to enhance their financial performance and facilitate the achievement of their objectives through the provision of support services. In 2003, various tools and mechanisms were implemented for better tracking of service requests by the divisions, thereby optimizing costs for the company. Moreover, the Shared Services Centre maintained a complete freeze in the fee schedule for products and services in 2003, while providing the same volume of service to the divisions. This means that for the third year in a row, i.e. from 2001 to 2003, it has absorbed costs related to salary increases and inflation.

Participate in generation and transmission projects	The projects entrusted to Hydro-Québec Équipement by Hydro-Québec Production and Hydro-Québec TransÉnergie involve the refurbishment of generating stations, profitable development of Québec's hydroelectric potential and reinforcement of the transmission system. New generating and transmission facilities: Sainte-Marguerite-3 generating station; new Grand-Mère generating station; Toulnustouc generating station and partial diversion of the Portneuf and Sault aux Cochons rivers; Montérégie substation; 69-kV line powering the Toulnustouc work site, as well as a 120-kV line between Magog and Sherbrooke. Refurbishing projects: rehabilitation of Beauharnois generating station; reconstruction of the dams at Chute-Garneau and Pont-Arnaud; rehabilitation of the Outardes-3 and Bersimis-1 generating stations; and rebuilding of a 120-kV line between the municipalities of Lachute and Lafontaine.
Promote environmental protection, reduce construction lead times and work to ensure that projects are well received by local communities	Continued efforts were made to respect commitments and to ensure that projects are well received by local communities.
Optimize project management *Targets: Limit management fees to 14% and reduce the cost of projects by 4%*	In 2002, Hydro-Québec Équipement limited management fees to 12% of the cost of construction work, i.e. below the target of 14%. It also strengthened its commitments, starting at the initial project phase, by optimizing methods and costs. This resulted in savings of more than 2% on the cost of projects, compared to the target of 4%, which had been set before the optimization of methods and costs. In 2002, Hydro-Québec Équipement launched a series of initiatives to reduce the time required for the environmental impact assessment and review process and to minimize the costs of projects under study or in progress.

Objective 2: Promote engineering and construction know-how in power generation and transmission

Develop targeted market niches and business partnerships	A prudent approach to business opportunities was taken to limit risks. The expertise and resources mobilized by Hydro-Québec's investment programs in generation and transmission are not used much for international projects.
Underwrite projects	Agreements were signed for the construction of the Eastmain-1 hydroelectric development and for draft design studies for Eastmain-1-A generating station and the Rupert River diversion. Under the agreements, the work will be carried out for Hydro-Québec Production by Société d'énergie de la Baie James in close cooperation with the Cree Nation, which will obtain contracts and benefit from the economic spinoffs. Eastmain-1: Commissioning in 2007. Eastmain-1-A and Rupert diversion: Technical and environmental studies got under way, with the involvement of three universities and 18 specialized environmental firms. Hydro-Québec, Société d'énergie de la Baie James and Makivik Corporation signed a partnering agreement for studies on Nunavik's hydropower potential. These studies will help determine what developments are possible, on the basis of their technical, economic and environmental feasibility. The projects must also be favorably received by the local communities. Nunavik: Studies on four rivers are under way to determine potential sites. There is also a study concerning the connections for bringing the electricity onto the Hydro-Québec TransÉnergie grid. Construction began on the Cedars Rapids Transmission Co. Les Cèdres–Cornwall transmission line.

Hydro-Québec Pétrole et gaz

Develop an oil and gas exploration proposal for Eastern Québec	In accordance with the *Strategic Plan 2002–2006*, the Eastern Québec oil and gas exploration plan for 2002–2010 was developed and filed in August 2002 with the Ministère des Ressources naturelles, de la Faune et des Parcs. A partnering agreement was signed with Junex for land territory and Corridor Resources for the Gulf of St. Lawrence and the estuary. These firms have exploration permits. A first exploration well drilled in the Gaspé Peninsula revealed the presence of natural gas and oil, but in insufficient quantities for commercial production for now. A second well is planned for fall 2003.
Share the studies and geological data available from the Société québécoise d'initiatives pétrolières (SOQUIP) and the Ministère des Ressources naturelles, de la Faune et des Parcs	Negotiations are under way with the Ministère des Ressources naturelles, de la Faune et des Parcs, Société générale de financement (SGF) and SOQUIP for the sharing of data.
Manage the activities of the natural gas sector so as to create value for the shareholder	Hydro-Québec's equity interest in Noverco since 1997 allows it to participate in the growth of the natural gas transportation and distribution sectors in northeastern North America. Hydro-Québec Pétrole et gaz's net income was $35 million in 2002, compared with $21 million in 2001, mainly as a result of the improved profitability of the Noverco investment.
Manage innovation by conducting field activities in decentralized electricity production	Along with Gaz Métropolitain, the Agence de l'efficacité énergétique du Québec and the CANMET Energy Technology Centre, Hydro-Québec Pétrole et gaz installed a cogeneration microturbine operated alongside Hydro-Québec's distribution system at a client's site. The microtubine's operation is currently being evaluated to determine the possible impacts of this new generating method on distribution and transmission networks.

Corporate Support – Human Resources

Objective 1: Maintain the company's expertise and acquire new skills

Corporate Succession Support Plan	Development and deployment of the *Corporate Succession Support Plan*, which includes six dimensions: better understanding of the situation; knowledge maintenance, evolution and transfer; intensified recruitment efforts; improved orientation, integration and staffing processes; management development and renewal; skills development.
Labor planning	Comprehensive diagnosis of the changing work force: • employee departure forecast based on eligibility for retirement • identification of vulnerable zones based on level of criticality for the company Analysis of reasons for departure: Interviews were conducted with departing employees on why they left, and work force forecasts were revised accordingly. Early filling of positions program: Employees with strategic knowledge were paired up with their replacements.
Induction and integration of new employees	Continuous survey on new employees' satisfaction with orientation and integration.
Employer image	Deployment of the *Connected to your future* campaign to its target public: universities, CEGEPs and high schools.
Skills management	Skills management development: • development of a skills management toolkit • empowerment of human resources advisors in the formulation of skills profiles, interview techniques, development plans and knowledge transfer
Partnership with the Institute of Electrical Power Engineering	Partnership agreement with six Québec universities (electrical engineering): • hiring of five graduates in 2002 • commitment to hire 25 graduates in 2003
Knowledge transfer	Knowledge transfer plans (for early filling of positions). Knowledge modeling projects. Launch of collaborative networks.

Objective 2: Support performance and productivity improvements

Maintain employee motivation	Improve employee motivation: • continuous improvement in motivation since 1998 • variable compensation for executives based on the motivation rates of their employees Development of executive management style. Introduction of incentive compensation for all employees, tied to the company's results. Increase in daily communication and recognition activities.
Improve work organization	Creation of a new status of permanent employee with reduced hours for the call centre, in order to adapt call handling capacity to the fluctuations in the number of calls received. Modification of certain staffing rules for occupations and creation of the permanent seasonal status to promote local hiring, decrease internal mobility and retain expertise. Implementation of an empowerment program to improve the efficiency of work organization. Reaching of an agreement in principle with the Syndicat des employés-e-s de techniques professionnelles et de bureau d'Hydro-Québec (SCFP 2000) on the introduction of the skill dimension into decisions concerning staff mobility.

Objective 3: Improve management of work safety and attendance

Maintain focus on safety	Maintenance of work-related accident frequency at a level comparable to that of the industry.
Improve work attendance	Introduction of the employee assistance program, which provides free and confidential professional assistance to employees with problems. Development and validation of tools to improve work attendance: diagnostic tool, action indicator and production of a best practices guide for managing work attendance.

Corporate Support – Technological Innovation

Objective: Continue technological innovation activities emphasizing the creation of value for Hydro-Québec's divisions

Continue integrated innovation management	Integrated innovation management is in place and will continue. In 2002, the company invested $106.7 million in technological innovation, maintaining its ranking as the Canadian technology leader in the electricity industry. The stage-gate process is used to evaluate projects and manage risks. In 2002, more than 50 gates were successfully crossed, showing how successful the implementation of this process has been. Since 1999, the number of innovation projects has been reduced, while budgets have remained relatively stable. The projects are therefore larger and focus on core activities, which increases their potential impact on the company's net income. The innovation portfolio included approximately 70 projects in 2002, with an average budget of $3.7 million each and an average duration of 4.5 years. Its total value is estimated at $566 million. Technological innovation themes defined with the divisions and review of the technological roadmap. Involvement of Senior Management in the innovation process. Innovation with respect to supporting core activities and setting up partnerships for industrialization of products of innovation, as well as commercialization, if required. In 2002, Hydro-Québec participated in financing and defining the work orientations of some 20 Québec research chairs.

Continue integrated innovation management	In 2003, the total innovation budget was $107.7 million. The amount allocated to innovation projects totals $56.4 million and is divided among four spheres of activity: generation 33%, transmission 29%, distribution 30% and customer service 8%. The amount allocated to technical support projects totals $16.3 million and is also distributed among four spheres of activity: generation 9%, transmission 45%, distribution 21% and customer service 25%. Funding for technological roadmap projects totals $6.5 million, allocated as follows: climate change 31%, distributed generation 31%, overall efficiency of the electrical system 6%, sustainable energy systems 10%, transmission system management and constraints 9%, and land transportation 13%.
Consolidate the proactive management of innovation project portfolios	The projects implemented had significant impacts. The overall effect on net income is evaluated at $103 million in 2003.

Ensure the profitability of venture capital operations	Through its Hydro-Québec CapiTech subsidiary, the company invests venture capital to enable it to take advantage of new business opportunities related to its core activities and to gain a better understanding of energy-related products. Like the global venture capital industry, Hydro-Québec CapiTech experienced a drop in the value and performance of its portfolio in 2002, with a net loss of $29 million. Investment program of $28 million in 2002, including $14.5 million in seven new companies. In 2003, value creation development efforts were maintained in a context of difficult capital markets. Cumulative total investments at the end of 2002: $167 million, plus commitments of $29 million, for a total of $196 million. The forecast for amounts invested and committed at the end of 2003 is $213 million. Investment program for 2003: $23 million (including $22 million in reinvestments).
Realize the technology potential developed by Hydro-Québec in partnership with the private sector	Hydro-Québec IndusTech manages a portfolio dedicated to marketing technologies that offer new avenues for longer-term growth. Investment program for 2002: planned – $52 million; carried out – $44 million. Amounts invested at December 31, 2002: $179 million ($149.9 million in Canada and $29.8 million in the United States). Results at December 31, 2002: loss of $24.4 million, with $16.9 million from AVESTOR. Approved investment program for 2003: $40.3 million. *AVESTOR* (jointly owned subsidiary of Hydro-Québec and Kerr-McGee Chemical) • Inauguration of a plant in September 2002 and launch of mass production in 2004. • Interest shown by major clients and signing of the first firm contract in May 2003. *TM4* (wholly owned Hydro-Québec subsidiary) • Self-financing through R&D contracts. *ESEV project* (Energy Systems for Electric Vehicles) • Aims to capitalize on TM4 and AVESTOR assets. • Planned investments for 2003: $13.4 million (cumulative total of $16.6 million at the end of 2003).

Financial and Economic Outlook

Consolidated Results

Hydro-Québec's consolidated net income totaled $1,526 million in 2002 and should reach $1,700 million in 2003. This performance, which exceeds the targets set in the *Strategic Plan 2002–2006* by $466 million and $600 million respectively, can be explained by greater electricity sales and by rigorous management of financial expenses in an environment of declining interest rates in both 2002 and 2003.

Results for 2002 and estimated results for 2003 are positive for interest coverage and return on equity. Moreover, the application of the new accounting standard for foreign currency translation* as of January 1, 2002, resulted in the restatement of retained earnings of previous years. This restatement, by reducing shareholder's equity, led to a 1.8% decrease in capitalization and an improvement in return on equity of nearly 1%.

Consolidated Results *($ millions)*

	2002			2003		
	Strategic Plan 2002–2006	**Actual**	**Difference**	***Strategic Plan 2002–2006***	**Estimate**	**Difference**
Revenue	11,370	13,002	1,632	11,710	11,455	(255)
Operating expenses	2,053	2,225	172	2,086	2,309	223
- excluding holdings[1]	*1,802*	*1,928*	*126*	*1,895*	*2,092*	*197*
Other expenses	4,800	6,178	1,378	5,102	4,671	(431)
- including budgetary contingency	–	–	–	*400*	–	*(400)*
Financial expenses	3,440	3,043	(397)	3,405	2,743	(662)
Non-controlling interest	17	30	13	17	32	15
Consolidated net income	**1,060**	**1,526**	**466**	**1,100**	**1,700**	**600**
Return on equity (%)	7.1	11.0	3.9	7.1	11.6	4.5
Interest coverage	1.46	1.56	0.10	1.44	1.59	0.15
Average cost of debt (%)[2]	9.0	8.4	(0.6)	9.2	8.2	(1.0)
Capitalization (%)	27.8	26.2	(1.6)	29.1	28.5	(0.6)

1. *Excluding retirement expense for 2003.*
2. *Including guarantee fees.*

* *The new accounting standard eliminates the method of deferring and amortizing exchange gains and losses related to unhedged monetary assets and liabilities denominated in foreign currencies. It requires such gains or losses to be charged to income for the year.*

Revenue

In 2002, revenue was $1,632 million higher than the *Strategic Plan 2002–2006* forecast. Electricity sales in Québec exceeded the Plan forecast by $28 million, driven mainly by large-power customers. Small-and medium-power sales were slowed by milder-than-normal temperatures. In 2003, revenue decreased by $255 million. Revenue from electricity sales in Québec, however, exceeds *Strategic Plan 2002–2006* forecasts by $209 million. Colder-than-normal weather and the exceptionally high rate of new housing starts since 2002 explain most of this difference.

Purchase-resale activities on markets outside Québec in 2002 greatly exceeded *Strategic Plan 2002–2006* forecasts. Revenue from electricity sales on North American markets exceeded forecasts by $1,661 million. Forecast transaction volumes for 2003 have been revised downwards and will bring in $370 million less than forecast. The impact on net income of the decrease in purchase-resale activities, as well as the decrease in purchase volume, is $179 million.

Natural gas sales were approximately equal to *Strategic Plan 2002–2006* forecasts.

Other revenue from operations decreased by $63 million in 2002 and $119 million in 2003, compared with Plan forecasts. This difference is attributable to the downward adjustment of Hydro-Québec CapiTech's investments and from lower-than-forecast power transmission revenue, including that from subsidiaries in Chile and Australia.

Operating Expenses

Hydro-Québec's operating expenses surpassed the *Strategic Plan 2002–2006* target by $172 million in 2002 and $223 million in 2003. Net of holdings, these differences amounted to $126 million in 2002 and $197 million in 2003, primarily as the result of an increase in the company's overall operations and special efforts to improve service quality.

The operating expenses of holdings rose compared with *Strategic Plan 2002–2006* forecasts, among other things, because of the increase in the commercial activities of Hydro-Québec IndusTech and HQ Energy Marketing.

Other Expenses

In 2002, the high volume of purchase-resale transactions on North American markets necessitated short-term electricity purchases that exceeded *Strategic Plan 2002–2006* forecasts by $1,211 million. In 2003, purchases were $191 million lower.

Fuel purchases rose by $22 million in 2002 and $130 million in 2003 compared with *Strategic Plan 2002–2006* forecasts. The difference is the result of an increase in the price of fuel in 2002 and 2003 and a greater use in 2003 of the Tracy and Bucksport thermal generating stations.

Taxes decreased by $54 million in 2002 and $43 million in 2003 compared with *Strategic Plan 2002–2006* forecasts. Most of the differential can be explained by a decrease in the capital and real estate taxes paid in Québec, as well as a decrease in tax payments by international holdings.

Amortization expense exceeded *Strategic Plan 2002–2006* forecasts by $154 million in 2002 and $32 million in 2003. The increase in 2002 is attributable to two factors: the recording of close to $70 million in accelerated depreciation and amortization for major projects that were abandoned or postponed, and a restatement of more than $60 million of the provision for the decommissioning of the Gentilly-2 nuclear generating station.

Financial Expenses

In both 2002 and 2003, Hydro-Québec took advantage of favorable market conditions. Lower-than-expected interest rates, as well as an increase in the capitalization of borrowing costs, primarily due to the deferred commissioning of Sainte-Marguerite-3 generating station, contributed to the decline in financial expenses of $397 million in 2002 and $662 million in 2003, compared with *Strategic Plan 2002–2006* forecasts.

Investments

Investments *($ millions)*

	2002			2003		
	Strategic Plan 2002–2006	**Actual**	**Difference**	***Strategic Plan 2002–2006***	**Estimate**	**Difference**
Hydro-Québec investments	2,235	2,219	(16)	2,204	3,339	1,135
Investments by holdings and others	405	230	(175)	246	134	(112)
Total	**2,640**	**2,449**	**(191)**	**2,450**	**3,473**	**1,023**

Hydro-Québec's investments for 2002 were almost the same as those forecast in the *Strategic Plan 2002–2006*, with the following differences:

- smaller investments in construction work for Toulnustouc generating station and the Montérégie loop and in distribution system enhancements and undergrounding
- delays in commissioning and higher costs for Sainte-Marguerite-3 generating station
- start of construction of the Eastmain-1 hydroelectric development
- smaller investments in holdings, specifically TransÉnergie HQ
- fewer investments by holdings, particularly for electricity transmission activities

In 2003, Hydro-Québec's investments should exceed *Strategic Plan 2002–2006* forecasts by $1,023 million. These differences are primarily attributable to the following:

- acceleration of the work related to future hydroelectric developments on the Eastmain River
- continuation of work on Toulnustouc, Grand-Mère, Mercier and Beauharnois generating stations
- start of work on the diversion of the Manouane River
- resumption of work on the Montérégie loop after government authorization was obtained in June 2002
- greater investment in holdings, particularly for electricity transmission activities
- lower investments by certain holdings, including Hydro-Québec IndusTech and Hydro-Québec CapiTech

Financing

In 2002, favorable market conditions allowed the company to proceed with an early redemption of approximately $450 million of debt and to carry out $500 million in prefinancing, which reduced the borrowing program for the first months of 2003. For the planned 2003 borrowing program, approximately $800 million will come from the reduction in short-term investments resulting from the prefinancing carried out in 2002, and from additional amounts generated by operations.

Financing *($ millions)*

	2002			2003		
	Strategic Plan 2002–2006	**Actual**	**Difference**	***Strategic Plan 2002–2006***	**Estimate**	**Difference**
Financing[1]	1,651	1,759	108	2,566	3,621	1,055
Less redemptions	1,897	2,564	667	3,277	3,023	(254)
Total	**(246)**	**(805)**	**–**	**(711)**	**598**	**–**

1. *Including net change in short-term investments and cash equivalents.*

Main Economic Parameters

	2002			2003		
	Strategic Plan 2002–2006	Actual	Difference	*Strategic Plan 2002–2006*	Estimate	Difference
Canadian CPI (% change)	1.7	2.2	0.5	1.6	2.9	1.3
Price of aluminum (US¢/lb)	72.0	64.9	(7.1)	73.0	67.8	(5.2)
Value of C$ against US$	0.654	0.636	(0.018)	0.671	0.703	0.032
Interest rates on 90-day T-bills (%)						
- Canadian market	4.8	2.6	(2.2)	5.4	3.1	(2.3)
- U.S. market	4.0	1.6	(2.4)	5.3	1.1	(4.2)
Interest rate on 10-year Hydro-Québec bonds (%)						
- Canadian market	6.5	5.7	(0.8)	6.4	5.4	(1.0)
- U.S. market	6.6	5.4	(1.2)	6.8	4.4	(2.4)

Economic Impact

Hydro-Québec makes a significant contribution to the Québec economy through its purchases of goods and services, its payment of taxes and loan guarantee fees, and the dividends it pays to its shareholder, the Québec government.

In 2002, the company paid $554 million in dividends and $187 million in loan guarantee fees, as well as $568 million in taxes to the provincial government and municipalities.

In 2002, Hydro-Québec's presence in all regions of Québec resulted in the purchase of goods and services worth $1.6 billion, or 91% of all of its purchases and sustained the equivalent of nearly 12,250 person-years of employment in direct and indirect jobs.

Appendix 2

Human Resources Expertise and Efficiency

A company's performance depends first and foremost on the performance of its people. Their expertise and efficiency are essential to Hydro-Québec's growth and profitability, as well as to the quality of customer service.

1. Create a Positive Work Environment

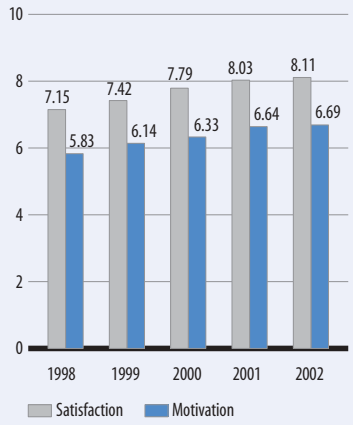
1.1 Motivate Employees

Hydro-Québec understands that the quality of its products and services depends on the atmosphere that prevails within the organization. Therefore, the company has been monitoring employee motivation for a number of years. Since 1998, the employee motivation index has shown sustained improvement.

Hydro-Québec intends to continue its efforts to motivate employees and boost their commitment to achieve the major business objectives of each division. To this end, the company will expand its use of existing methods:

- assessing the contribution of each unit and each employee to strategic goals
- maintaining variable compensation tied to the achievement of the business objectives that underlie strategic goals
- stepping up communication to sustain employee commitment
- acknowledging employees' contributions on a daily basis

Employee Satisfaction and Motivation



1.2 Work Toward Harmonious Labor Relations

Hydro-Québec has renewed most of its collective agreements for five-year terms, which coincide with the horizon of the *Strategic Plan 2004–2008*.

The company's efforts to adjust and adapt the way its work is organized have three objectives: to improve corporate efficiency and effectiveness in light of business issues; to take into account employees' need to balance their work, family and personal lives; and to provide for orderly renewal of the work force.

2. Improve Human Resources Performance

Employees' well-being and health have a huge impact on their performance. This is a determining factor in Hydro-Québec's growth and profitability.

2.1 Aim for Optimum Attendance

For some years now, a disturbing rise in absenteeism has plagued industrialized societies, particularly because of problems related to mental health. Hydro-Québec has not escaped this phenomenon.

Various organizational and personal factors have direct impacts on job attendance. To improve attendance, all these factors must be taken into consideration. Hydro-Québec plans to be proactive in emphasizing prevention and fostering the human side of management. It will also make its managers and employees accountable for attendance.

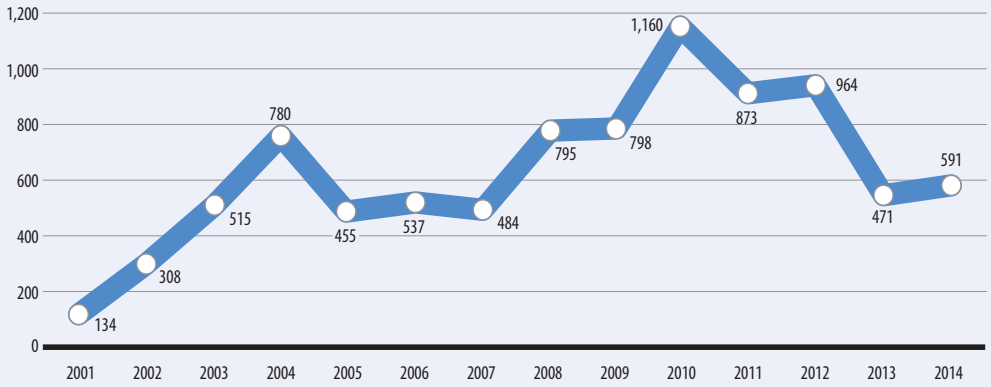
2.2 Increase Productivity with a View to Controlling Operating Expenses

To maintain its competitive position, Hydro-Québec will develop a series of tests for evaluating progress in its productivity. These indicators will enable it to compare the divisions' performance and establish benchmarks with the best-performing companies in the industry. Projects to improve effectiveness will then be implemented for business sectors where performance lags.

3. Sustain and Develop Expertise

Like most North American companies, Hydro-Québec must deal with the fact that many of its employees will soon be retiring. Between 2004 and 2008, nearly 17% of Hydro-Québec's work force is expected to leave. This demographic phenomenon involves a risk of lost expertise as well as foreseeable recruiting difficulties. This will be an important issue for the company in the coming years.

Retirement Outlook



To deal with the anticipated departures, Hydro-Québec developed a corporate succession plan that was launched in 2001. The first two years, 2001 and 2002, were spent developing succession management approaches and tools; efforts in 2003 and 2004 will focus on supporting deployment in the operating units. The reality check will begin in 2005, at which point retirements are expected to start increasing and continue at a fairly steady rate until 2012.

To date, the main components developed and implemented include:

- a competency management approach and related tools
- a forecast of changes in the work force, a survey of vulnerable strategic skills, analysis of reasons for leaving and action to encourage gradual retirement patterns
- a program of advance staffing for strategic positions, including knowledge-transfer plans

- structured work orientation activities for new employees and evaluation of their satisfaction
- a partnership with Québec universities to increase the supply of electrical engineering graduates
- agreements with unions on including the competency dimension when arranging employee transfers and promotions

Over the term of the *Strategic Plan 2004–2008*, Hydro-Québec intends to deploy its plans in two phases.

3.1 Manage the Risk of Lost Expertise – 2004–2005

Over the next two years, Hydro-Québec plans to introduce various means for managing the risk of lost expertise more efficiently.

In the light of an ongoing analysis of areas of expertise where the risk of losing know-how is high, the company will deploy various knowledge-transfer strategies that are currently being tested. Some of the main ones are: advance staffing of positions by means of transfer plans, documentation and modeling of knowledge, personalized support for learning (mentorship, coaching, pairing, etc.) and networks for collaboration, sharing and monitoring.

In addition, recruiting processes will be reviewed and optimized so that a greater number of applications can be processed more quickly and efficiently. Tools will also be made available to managers to facilitate the induction and integration of new employees.

By consolidating its corporate succession plan, Hydro-Québec expects to optimize its work force–renewal strategies and align them with its new requirements and those of its divisions.

3.2 Track Succession Management Performance – 2006–2008

In the second phase, Hydro-Québec will introduce other measures for tracking its performance on succession management. These include ongoing performance diagnostics concerning resource acquisition, development and internal mobility. The company will adjust its corporate succession plan based on the results obtained.

With regard to work-force renewal, the company will use a number of strategies to comply with legal and regulatory requirements: diversity in terms of age and ethnicity and targeting of passive candidates.

Hydro-Québec also plans to develop cohesive means and mechanisms for renewing and preserving its know-how. To this end, the determination of strategic skills will provide an accurate picture of the situation on which the development of various strategies designed to preserve, share and renew expertise can be based.

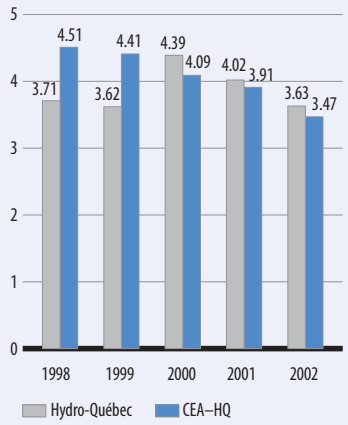
4. Foster Occupational Safety

For many years, Hydro-Québec has kept a close watch on the safety of its employees. It works hard to eliminate hazards at the source and makes individuals accountable at every stage of its activities.

The company's occupational accident frequency rates compare well with the standards recognized by member companies of the Canadian Electricity Association. To maintain and constantly improve safety performance, annual objectives are set at all levels of the organization and the means for achieving them are regularly reviewed, compared and updated.

Hydro-Québec intends to continue its efforts to improve occupational safety.

Occupational Accident Frequency Rates



5. Conclusion

Without the commitment of its employees, Hydro-Québec's business goals and the strategies of its divisions could not be realized.

Through their work—whether it be in customer service, technological innovation, system maintenance or construction projects—all employees contribute to the company's overall performance.

Hydro-Québec intends to continue its efforts to motivate its people and sustain their commitment.

Appendix 3

Hydro-Québec: A Driving Force Behind Technological Innovation in Québec's Energy Sector

Energy is not only central to the modern-day economy, but also to our quality of life today and in the future. Whether for basic needs like heating or for leading-edge technologies, the importance of energy and our concern with using it efficiently will continue to grow.

The efficiency of Québec's electrical system as a whole is already substantial. Extra-high-voltage transmission, for example, helps keep energy losses to a minimum. The hydropower option, which is the most efficient energy source, has been instrumental in increasing Québec's energy efficiency.

In order to continue improving Hydro-Québec's energy performance, a large proportion of its technological innovation activities will focus on the generation, transmission and distribution of high-quality power at the lowest cost and as efficiently as possible. The payoff will be more high-performance processes and products for Québec industries, businesses and homes.

For more than 30 years, technological innovation has been an integral part of Hydro-Québec's strategies. This ongoing effort has built powerful innovation capabilities, making Hydro-Quebec a driving force behind technological breakthroughs in Québec's energy sector.

Integrated Technological Innovation Management

Technological innovation centred on the company's core businesses, expertise and world-renowned areas of excellence

Projects selected according to their economic value to the company

Efforts focused on the successful implementation of innovative products in the company or for its customers and, where appropriate, focused on their successful commercialization

Projects open to partnerships

Projects that meet short-, medium- and long-term needs

A vision to ensure the company's long-term viability

The strength of innovation and the momentum it creates in the energy sector enhance the company's performance and long-term viability, while improving the energy efficiency of the whole electrical system. This leadership position, which is acknowledged worldwide, results from a combination of skills unique in Québec in the energy sector. Researchers, engineers, technicians, and experts in the fields of project management, commercialization and technology business development work with external partners on a project portfolio representing a value in excess of $550 million for the company.

Hydro-Québec's research institute opened its Varennes facilities in 1970, concentrating its efforts on innovation projects related to electricity transmission, distribution and generation. In 1987, the research institute opened new facilities (LTE) in Shawinigan, which are dedicated to the development of technologies designed to improve Québec customers' energy performance.

Hydro-Québec's Research Institute – Highlights

430 researchers, technicians and engineers

Two locations

$134 million in assets

More than 30 years of know-how

Six areas of expertise:
- *Chemistry and materials*
- *Power system analysis, operation and control*
- *Electrical equipment*
- *Energy use*
- *Mechanical, metallurgical and civil*
- *Automation and measurement*

Hydro-Québec's research institute is one of the few integrated innovation centres operated by a utility in North America. As well, one Hydro-Québec department is responsible for value creation through innovation, and works to optimize the innovation management process in conjunction with the research institute and the company's divisions.

In the energy sector, Hydro-Québec is second only to Shell Canada for the number of patents filed in Canada. Since Hydro-Québec's research institute was first established, close to 1,500 patents have been filed as a result of its technological innovation efforts.

Hydro-Québec enjoys an international reputation, promoting Québec know-how in the field of energy technology. Just as an example, the Institute of Electrical and Electronics Engineers presented the 2003 Herman Halperin Electric Transmission and Distribution Award to Dr. Sarma P. Maruvada for his exceptional contribution to the establishment of design criteria for high-voltage wires during his three decades of work at Hydro-Québec's research institute.

Every year, the company's researchers and engineers produce some 60 scientific lectures and publications. They also conduct close to 300 technical studies in support of Hydro-Québec's technological progress.

With a budget of approximately $100 million allocated to technological innovation, Hydro-Québec is comparable to Japanese utilities, which spend close to 1% of their sales on research and development. As the Canadian utility that invests the most in this area, Hydro-Québec ranks among the country's leaders in technological innovation. In Québec, the company accounts for more than 60% of investment in technological innovation in the energy sector.

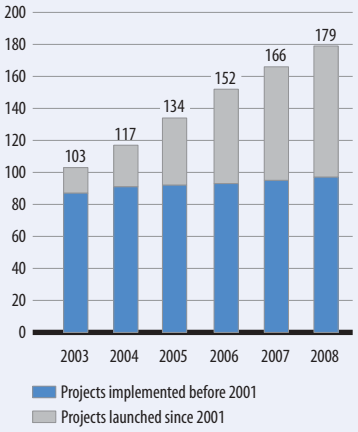
Technological innovation focuses on core businesses and creating value. As such, it contributes directly to the company's mission, which is to supply reliable electricity at the lowest possible cost, while respecting the environment.

1. Contribute to the Company's Net Income

Technological innovation helps increase Hydro-Québec's net income in several ways: costs avoided, additional electricity sales, productivity gains or deferred investments.

If the projects launched since 2001 achieve their objectives, technological innovation would generate close to $180 million in net income in 2008.

Impact of Technological Innovation on Net Income ($M)



1.1. Continue to Focus Innovation on Core Businesses

To help increase net income, innovation has been centred on core business requirements. Hydro-Québec will continue to develop its technological innovation projects around major themes that are defined and periodically reviewed with the divisions according to their needs.

This dynamic and concerted approach ensures that technological innovation themes create value for each division and are aimed at achieving their respective business objectives.

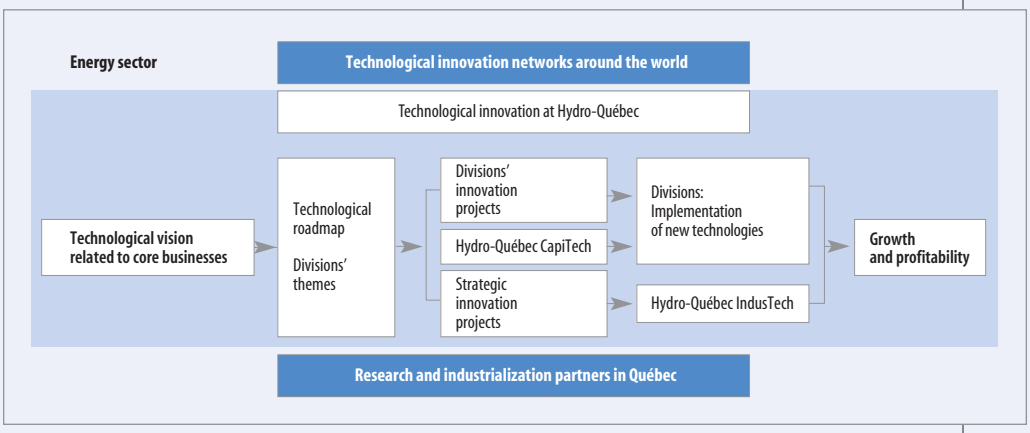
Technological Innovation Themes	
Core Business	
Generation	• Increase long-term operability of dams and other structures • Improve the performance and long-term operability of generating equipment • Increase the profitability and acceptability of the generating fleet
Transmission	• Increase the useful life of certain types of equipment by 10% and lower maintenance costs for designated equipment by 10% • Reduce the cost of building new lines and substations by 10% • Increase the capacity of designated corridors by 33% • Optimize transmission system management • Reduce the impact of extreme weather conditions by 50%
Distribution	• Improve the quality of electricity service • Reduce underground system costs by 50% • Reduce the net discounted cost of the overhead system by 10%
Customer Service	• Develop electrotechnologies and new energy-efficient applications for electricity • Increase the energy efficiency of customers' electricity usage • Lower the distributor's supply and operating costs • Increase satisfaction among residential customers

1.2. Pursue Careful, Integrated Innovation Management

For technological innovation to contribute to net income, Hydro-Québec must also manage technological innovation projects in a disciplined and integrated way. It intends to continue implementing the integrated innovation management process, which enables all players—researchers, users, technology business development specialists, technological subsidiaries, external partners, etc.—to interact throughout the process, adding value during each phase of a project.

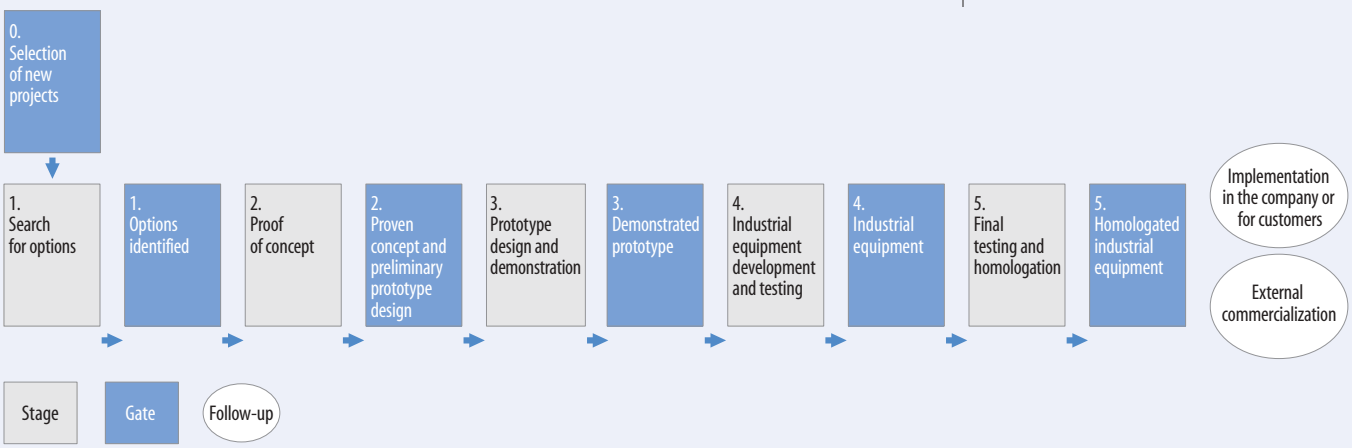
Hydro-Québec selected an integrated management model at the leading edge of best practices in the field of innovation. This model was adapted to the company's size and to the specifications of innovation projects that focus on improving core businesses.

Integrated Innovation Management



The "stage-gate" project management process is used to create value and manage the risks inherent in technological innovation activities. Each project must go through five stages, from the search for technological options to the innovation's implementation in the division or the marketplace. Every stage is a stopping point where results are verified. A joint decision is then made on whether or not to pursue the project.

Hydro-Québec's "Stage-Gate" Process



Hydro-Québec will pay close attention to the final stage: the implementation of the innovation in-house or on the market. This stage provides concrete proof of the value of innovation projects. In 2002, Hydro-Québec passed through over 50 gates on all projects combined, which shows how dynamic the process is and how successful its implementation has been.

1.3. Ensure the Development of Scientific Know-How

Know-How

Central to Hydro-Québec's innovative strength

Hydro-Québec will develop its scientific know-how based on technological issues and in a way that complements the expertise in Québec universities and research centres.

Skills management in the sciences presents an additional challenge, because it takes several years to train a researcher to meet Hydro-Québec's specific needs.

Skills development will be supported by a training or hiring policy in promising fields, such as power system command and control.

1.4. Some Results from the Divisions

Generation

Underwater Inspection Robot

The industrial version of an underwater robot designed to inspect submerged structures will be developed for 2004.

In addition to enhancing employee safety, use of the underwater robot will also help reduce the time spent on inspections, increase the availability of generation groups, detect anomalies and eliminate the necessity of erecting cofferdams to carry out work.

An experimental prototype has been tested since 2000. Its use has already generated estimated savings of $5 million.

Transmission

High-Performance Open Line Detector

A research team at Hydro-Québec's research institute and engineers at Hydro-Québec TransÉnergie jointly developed a completely new generation of open line detectors (DLOs) that could be implemented both in the power grid and on the market by 2005.

Using advanced processing of voltage and current measurements at the feeder end, the new open line detector is able to detect whether a line is open or closed at either end without requiring a telecommunications link between the two substations. In short, this is a very fast, reliable and inexpensive solution.

Open line detectors supply information that is vital to the smooth operation of the major automatic systems that protect the transmission system during extreme events.

Distribution

Polymer-Treated Wood Poles

Chromate copper arsenate–treated wood poles (green poles), which are replacing pentachlorophenol-treated wood poles (brown poles), were adopted for environmental reasons. However, they had one major drawback for line personnel: the poles harden with age and become very difficult to climb.

To rectify the problem, Hydro-Québec researchers developed a polymer additive that is water-soluble in its initial state. The product is injected, under pressure, into the wood, then heated so that the additive is polymerized and forms an insoluble three-dimensional network. The network gives the wood a higher moisture content than commercial additives and prevents it from hardening.

Poles treated using this method offer the same level of protection as pentachlorophenol-treated poles, do not contain any oil and are odorless. The project has successfully passed through all the gates in the technological innovation process. The product has been commercialized and implemented in the Hydro-Québec power grid and in several other utilities.

Customer Service

Electricity Theft Calculation Software

In most cases, electricity theft in the residential sector occurs by hooking up electrical loads on the supply side of the meter or by interfering with the normal operation of the meter.

Hydro-Québec needs to carefully establish how much electricity was stolen in order to adjust the customer's bill and, if need be, institute legal proceedings. In cooperation with Canada's National Research Council, the Université de Sherbrooke and the firm Technosim, researchers at Hydro-Québec's research institute developed JAG calculation software—a simple and accurate method for quantifying the amount of electricity stolen.

JAG software takes into account the parameters specific to each dwelling and consumption profiles, such as the occupancy level and the various uses of electricity. To measure consumption, it uses a database with more than 3,000 simulations of heating requirements for different types of buildings, actual weather data and the per-unit consumption of household appliances. The software is now used in customer service activities.

2. Forging the Company's Technological Future

A Vision of the Technological Future

To ensure the company's long-term viability

Hydro-Québec ensures its long-term viability by envisioning the technological future of the energy sector and preparing itself to meet the challenge.

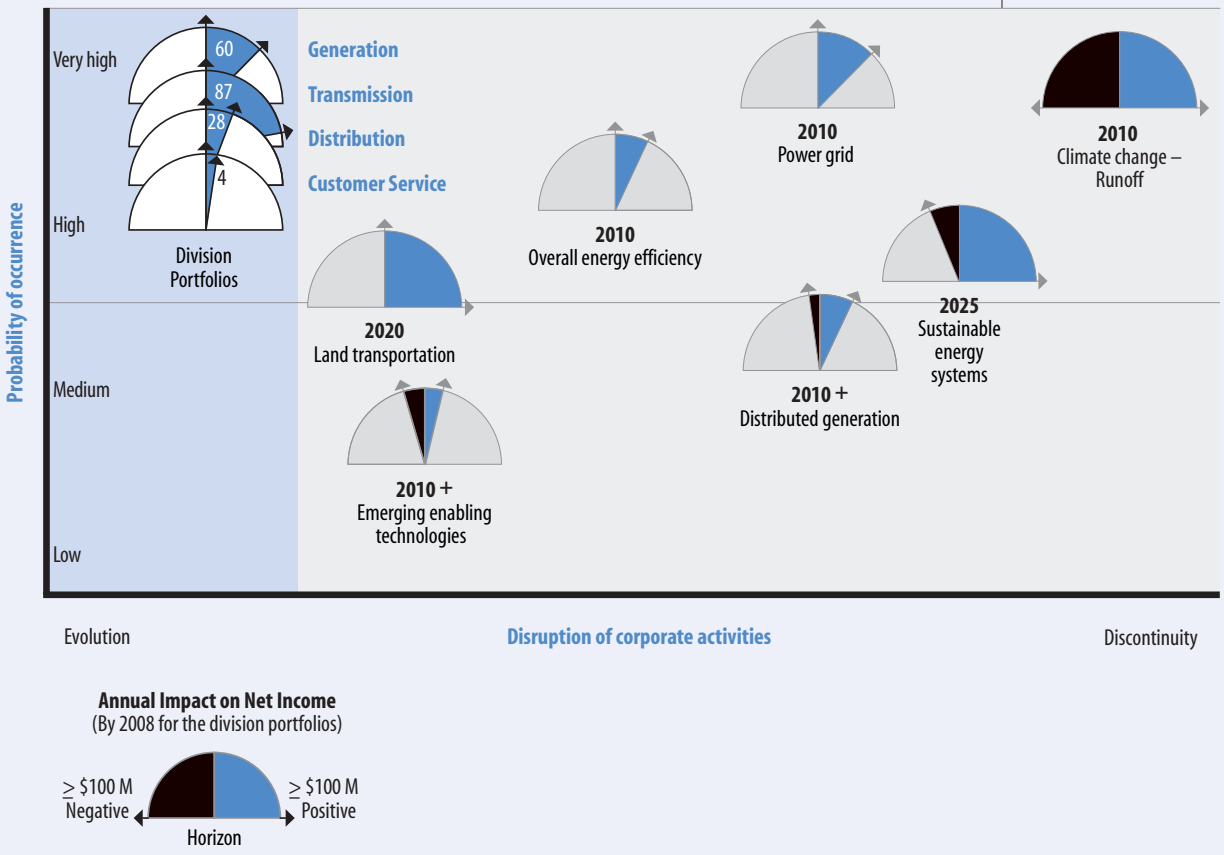
Technological, market and strategic intelligence activities carried out by Hydro-Québec's research institute, the unit responsible for technology business development, the divisions and subsidiaries enable the company to monitor progress in energy-related technologies. In managing innovation, Hydro-Québec takes into account the perspectives of all players in the energy sector, especially those of its customers, partners, the scientific and technical community, the business world, government circles and associations.

The technological roadmap is the result of a forecasting exercise with a 20-year horizon. The roadmap takes technological progress into account in combination with other factors, such as markets, environmental or regulatory concerns. This makes it possible to identify not only technologies that could increase the company's efficiency, but also those likely to radically transform its business environment. Technologies are grouped by "technological destination" and positioned on a roadmap according to their probability of occurrence and their impact on the company.

The technological roadmap is a dynamic tool that is periodically reviewed to reflect innovations, major issues facing the industry and Québec's energy requirements.

In order to take up the challenges associated with the various technological destinations, Hydro-Québec has launched strategic innovation projects.

Technological Roadmap



2.1. Progress

Power Grid

The major power outage on August 14, 2003, in the northeastern United States and Canada drew attention to the technological challenges transmission systems will have to face in the future.

In the United States, regulatory uncertainty regarding the opening up of markets put the brakes on investment in electricity transmission, although demand continues to grow and systems are aging. This uncertainty is at the root of chronic congestion problems.

Major investments will be required to make up for lost time, which will foster the emergence of new technologies, particularly digital technologies, to make real-time power grid management more secure.

Overall Efficiency of the Electrical System

Furthermore, owing to the Kyoto Protocol, increased efficiency of the entire electrical system has become an achievable technological destination in the near future. The issue is especially important to Hydro-Québec, because it anticipates continued growth in the demand for energy in Québec. In addition, climate change could increase the risks associated with variations in runoff.

By participating in the development of electrospecific technologies that increase the efficiency of the electrical system in general, Hydro-Québec could lower its energy requirements and help reduce greenhouse gases.

Distributed Generation

Since the publication of the *2002–2006 Strategic Plan*, the emergence of distributed generation has taken place more slowly than expected. This is primarily due to equipment prices, which are still too high, and unresolved technological issues. Furthermore, the significant increase in electricity generation capability in the United States has slowed down the rapid development of fuel cells, microturbines, wind turbines and local storage technologies.

2.2. New Destinations

Sustainable Energy Systems

The development of sustainable energy systems is a key technological destination given the constant growth in demand for energy worldwide, combined with the non-renewable and harmful nature of fossil fuels.

In this context, hydrogen could be a promising solution. Before using hydrogen on a large scale, however, a number of technological problems would need to be solved. These problems entail generation costs five times higher than for hydrocarbons, substantial energy losses during processing, along with prohibitively high transportation and infrastructure costs.

Hydro-Québec will follow up on technological issues related to sustainable energy to anticipate their potential impact on its activities.

Land Transportation

Due to progress in storage technologies and power electronics, Hydro-Québec anticipates that mainly thermal-engine hybrid electric vehicles will gain in popularity on the market.

The mainly electric vehicle is still restricted to certain specific niches, primarily due to its limitations in terms of performance, range and recharge time. Hydro-Québec nevertheless expects to seize opportunities in this area with batteries, engines and power electronics systems.

With regard to land transportation, Hydro-Québec intends to take advantage of business opportunities on world markets through its subsidiaries.

Emerging Technologies

A number of technologies that could transform the energy sector are mobilizing considerable efforts in the international arena. These technologies are related in particular to superconductivity, nanotechnology, storage for stationary applications and power electronics. In 2002, more than $2 billion was invested worldwide in the field of nanotechnology alone.

Hydro-Québec intends to play a role in some of these key technological fields in order to acquire the necessary expertise to integrate new technologies.

3. Enhance the Energy Performance of Québec Customers: Promote the Leadership Role of Hydro-Québec's Research Institute in Energy Efficiency

The Laboratoire des technologies de l'énergie (LTE) at Hydro-Québec's research institute in Shawinigan, which is dedicated to energy use technologies, is concrete proof of Hydro-Québec's commitment to apply technological innovation in ways that will benefit its customers. Whether searching for new technologies or evaluating the performance of promising options, researchers, technicians and engineers at LTE respond to Quebecers' need to use energy more efficiently.

Hydro-Québec intends to take an overall energy efficiency approach for its innovation and technical support projects. The approach includes research on the optimal use of various sources of energy (electricity and fossil fuels, biofuels and hydrogen) and takes all of customers' energy requirements into account, with a view to optimizing their consumption.

A leader in energy efficiency innovation to improve Québec customers' energy performance

Hydro-Québec works in partnership with others when carrying out innovation projects to maximize the projects' scientific, commercial and standard-setting impact. The company intends to develop its technological innovation activities in energy efficiency in targeted areas where the potential impacts are high for its customers and for Québec society as a whole.

LTE has a unique combination of technical and scientific know-how, as well as in-depth knowledge of customers' needs based on its experience in the field. It is particularly well positioned to innovate and adapt technology to new market requirements in partnership with the private sector and to efficiently support customers in their efforts to improve their energy performance.

LTE is the Québec leader in the field of technological innovation in energy efficiency. The laboratory employs 67 people and has assets valued at $50 million. In 2002, its activities represented some $7 million in investments, accounting for approximately 40% of all initiatives in Québec in this field.

The laboratory has completed more than 1,500 projects in support of energy performance in all of Québec's industrial sectors. For example, it actively participated in the implementation of mechanical steam compression at Nexans Canada, a technology that requires one-tenth the power of a gas process, takes up less space and reduces CO_2 emissions into the atmosphere by some 15 kilotonnes per year.

LTE is working to improve the energy performance of commercial and institutional customers. For example, one team is designing a heating unit that stores heat during off-peak periods and returns it during peak periods to significantly reduce electricity bills.

LTE is also participating in the development of a diagnostic tool, an interactive questionnaire, to help residential customers better understand their electricity consumption. The tool will be available from various sources, including Hydro-Québec's Web site. Using the data supplied by customers, it will present energy consumption based on the various types of usage and recommend customized energy efficiency measures.

4. Build and Stimulate Innovation Networks

Hydro-Québec intends to turn outward to maximize the value of its projects. This is one of the prerequisites for successful innovation. Building networks in the field of innovation fosters new ideas, shared know-how and shared risks and benefits.

Forming partnerships that benefit all the parties involved is a sign that innovation projects are healthy. Hydro-Québec forms such partnerships with world-class corporations, small and medium-sized Quebec businesses, and federal and provincial government authorities, as well as universities and research centres in Quebec and elsewhere.

4.1. Knowledge Network

In order to fully play its role as a driving force behind technological innovation, Hydro-Québec will continue to strengthen its relations with other research centres and with universities.

In 2002, Hydro-Québec helped fund and define the main orientations of close to 20 research chairs. The funding provided financial leverage, because the research chairs were subsequently able to obtain additional funding of up to more than three times the initial stake from some 70 key players in the public and private sectors.

The establishment of the Institute for Electrical Engineering in 2001 is a fine example of a partnership with Québec universities and industry representatives. More recently, in 2003, Hydro-Québec helped set up a technology business development training program in association with the university industry liaison offices of Québec universities and of the University of Moncton.

If need be, Hydro-Québec will review the nature and purpose of its relationships with knowledge-based organizations in order to go beyond conventional contractual relationships.

Significant Financial Support for Québec Universities

Disbursements in 2002: $8.7 M

- *20 chairs: $1.6 M*
- *Donations, sponsorships and specific projects: $4 M*
- *Approximately 100 contracts: $3.1 M*

4.2. Business Network

Hydro-Québec will continue to work with market forces, upon which it relies to successfully commercialize and industrialize its technological innovations.

For example, Hydro-Québec has formed a partnership with the Quebec branch of French firm Alstom to manufacture and commercialize a new open line detector. In cooperation with Recherche 2000, a Quebec SME, Hydro-Québec is participating in the development of a monitoring, analysis and optimization system for electrolytic processes. The system consists of components, equipment and software that enable customers to reduce their costs and obtain greater operating safety.

4.3. Institutional Network

Hydro-Québec will continue to work closely with government departments and agencies. Such partnerships promote major breakthroughs in knowledge domains, while upholding government policy and the company's objectives.

To increase understanding of climate change problems, Hydro-Québec created the OURANOS consortium in association with government and university partners. The consortium's primary objective is to share the scientific and institutional know-how needed to make decisions and adapt to climate change. The project is already producing concrete results. It provides new data for company managers, which they can use to revise their forecasting models.

5. Resources

To increase its efficiency, Hydro-Québec will maintain its leadership role in the technological innovation sector, but intends to streamline the budgets allocated to it. The table on the next page shows the outlook for the estimated breakdown of resources for the *Strategic Plan 2004–2008*.

Outlook for the Estimated Breakdown of Resources *($ millions)*						
	2003	**2004**	**2005**	**2006**	**2007**	**2008**
Technological innovation project portfolio	56.4	53.9	53.9	53.9	53.9	53.9
Strategic and exploratory projects	15.5	15.5	15.5	15.5	15.5	15.5
Technical support to Hydro-Québec divisions	16.3	14.8	13.8	12.8	12.8	12.8
University research chairs	1.6	1.6	1.6	1.6	1.6	1.6
Depreciation, amortization and financial expenses	17.9	17.9	17.9	17.9	17.9	17.9
Total	**107.7**	**103.7**	**102.7**	**101.7**	**101.7**	**101.7**
Ratio of innovation expenditures to total revenues from electricity sales (%)	1.0	1.0	0.9	0.9	0.9	0.9
External contracts	11.0	11.0	10.0	10.0	10.0	10.0

6. Conclusion

Hydro-Québec intends to maintain its leadership role in Québec as a technological innovator in the energy sector. It will do so with a view to improving its financial performance and ensuring its long-term viability, while helping to make Québec society more energy-efficient.

The company will continue to focus its technological innovation activities on its core businesses and areas of excellence. Its know-how, combined with that of its partners, enables Hydro-Québec to carry out large-scale innovation projects.

Hydro-Québec will support the Québec university network in its energy-related research projects. The company is counting on the network's ability to mobilize the best experts in leading-edge fields to enhance its innovation efforts.

With a view to greater efficiency, Hydro-Québec will continue to apply careful and modern management practices to its operations. The company will pursue its objective of creating value and remaining open to cooperation and partnerships with innovation networks in Québec and elsewhere.

The company intends to take up the technological challenges facing the energy sector in order to fulfill its mission: to provide reliable electricity service at the lowest possible cost, while respecting the environment.

Appendix 4

Development Issues for Hydroelectric Projects

1. Introduction

In Québec, hydropower and the environment have been closely linked for more than 30 years. Hydro-Québec set the tone in this area and, in the process, became known as a leader in sustainable development.

Early in the new millennium, the debate about global warming moved to the forefront. This, in turn, put the full development of Québec's hydropower potential back on the agenda. This clean, renewable, flexible energy source, which has no noticeable impact on global warming or other air quality parameters, is an undisputed asset for Québec.[1]

Above and beyond the environmental benefits, the development of hydroelectric potential can be profitable and efficient, giving rise to valuable economic spinoffs. In Québec alone, 3,000 MW of electricity generated from water resources could be developed by 2012–2014, given favorable conditions and the reduction of certain obstacles.

1. *Note that the Manitoba Water Strategy, adopted in April 2003 by the Government of Manitoba, recognizes the important role of hydroelectricity in meeting the Kyoto Protocol objectives, as well as in the fight against greenhouse gases. One objective of the Water Strategy is to promote the development of such projects.*

Unfortunately, the hydropower option is subject to major delays, particularly those due to imposed "approval procedures,"[1] despite the fact that it provides incontrovertible leverage for meeting Canada's commitments under the Kyoto Protocol and Québec's commitments with regard to greenhouse gases (GHG).

In spite of the recent measures introduced by the Québec government to streamline the approval process for hydroelectric development projects, some difficulties remain that compromise the competitiveness of this type of project when compared with thermal generating facilities.

By their very nature, hydroelectric generating stations take longer to build (4 to 6 years) than thermal power plants (1 to 3 years). The real problem, however, is that the approval procedures that apply to the two options significantly increase this gap.

An analysis of recent projects illustrates the differences between the two options. In Canada and the United States, permission to build a thermal power plant is granted in 24 months or less, from the time the project is announced until the authorizations are issued. In Québec, over the past ten years, it has taken considerably longer than 36 months to approve the construction of most hydroelectric generating stations. For the Péribonka project, where the river is already largely developed and is the site of three generating stations operated by Alcan, it will probably take 30 months to obtain the approvals. Even with improved procedures, the time frames involved are more favorable for the thermal power option.

Upon ratification of the Kyoto Protocol, numerous countries, including members of the European Union, made commitments to find ways to approve renewable energy projects within an acceptable time frame, while complying with environmental protection criteria. Hydro-Québec is pursuing the same goal by proposing to expedite the approval process for the development of hydropower facilities.

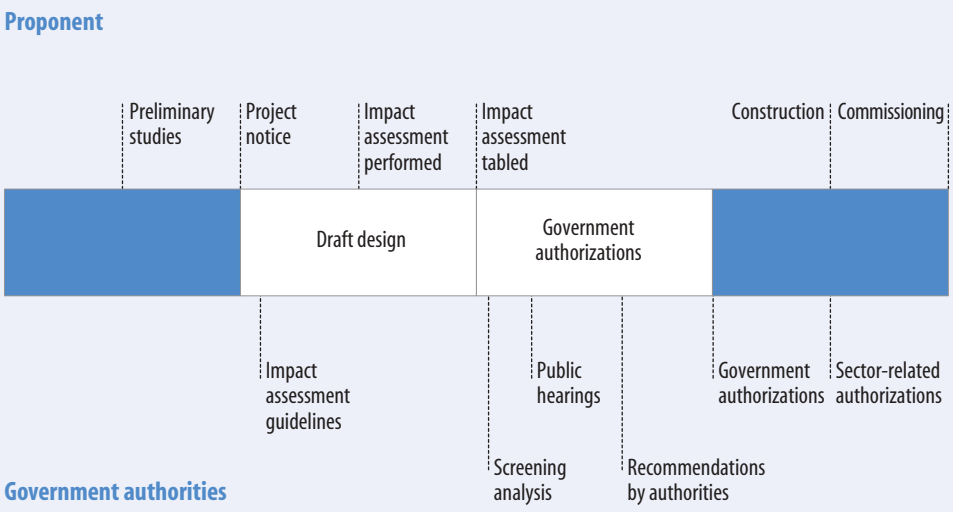
This document suggests several ways to improve the situation.

1. *"Approval procedures" include all the steps, stages and requirements imposed by the Québec and Canadian governments under the* Environment Quality Act, Hydro-Québec Act, James Bay and Northern Québec Agreement, Fisheries Act, Navigable Waters Protection Act *and* Canadian Environmental Assessment Act.

2. Approval Procedures

The approval procedures that apply to hydropower projects involve numerous administrative authorities who review the evaluations and environmental impact studies, with all the formalities underlying such a process.

The diagram below illustrates the main phases and steps in a project:



Once the preliminary feasibility studies are completed, the approval process for a hydroelectric development project starts when a project notice is filed with government authorities. The draft design phase then begins when the authorities issue impact assessment guidelines and the proponent, i.e. the developer, conducts the required studies.

The *government authorizations* phase starts with the filing of the impact assessment, in support of the application for approval, with the Ministre de l'Environnement du Québec and Fisheries and Oceans Canada. The impact assessment study is then screened, public hearings are held if necessary, and the authorities table their recommendations. This second phase ends with government authorizations to begin construction, or with rejection of the project.

2.1. Difficulties Inherent in Current Approval Procedures

To varying degrees, and depending on the project or territory involved, various requirements can further complicate the current approval procedures, as illustrated in the examples below.

The **guidelines** for preparing impact assessments (draft design phase) should focus on all the priority issues specific to the proposed hydroelectric development project. Certain requirements could then be reduced. Examples are the obligations to redo studies that have already been done countless times for previous projects or to address in detail topics that are secondary to the decision-making process, such as the handling of certain species that are not affected by the project or certain subjects for which a well-established knowledge base already exists (e.g. the mercury level associated with hydroelectricity). Other areas where a wealth of knowledge already exists are the human aspects of the impact assessment, demographic and socioeconomic issues, and local or regional economic studies. Lastly, the number of alternatives to be considered should be minimized: by comparison, to date the proponents of thermal power projects have not been asked to study various energy alternatives.

Moreover, there are no **preset deadlines** for the stages in the government authorizations phase. Such deadlines could apply, for example, to the impact assessment screening analysis. Of course, all parties must carry out their own responsibilities. Hydro-Québec needs to maintain a high standard of quality for its impact assessment reports.

In addition, under the approval procedures, a number of administrative authorities are required to issue authorizations; these include the Ministère de l'Environnement du Québec, the Société de la faune et des parcs du Québec (FAPAQ) and Fisheries and Oceans Canada. The Canadian government's role has evolved considerably and become much more prominent in recent years. In fact, the first Hydro-Québec projects to be subjected to the new federal procedure were the Grand-Mère project, authorized in May 2000, and the Toulnustouc project, authorized in November 2001. A new need has recently arisen, therefore, to **coordinate government action** in the application of policies, guidelines, etc., which is at the root of some delays.

For example, the policies and administrative requirements with respect to "instream flow" for habitat protection, "ecological flow," and "multipurpose use flow" in Québec legislation, on the one hand, and the "absence of net loss of productive habitat capacity," and the "absence of net loss of wetlands" under federal regulations, on the other, are among the concepts that require careful interpretation. Unfortunately, these apparently clear concepts are subject to differing interpretations that make it difficult to obtain simultaneous authorizations from both levels of government for the same project and the same final impacts. Recent examples show a 3- to 13-month difference in approval times for the two levels of government for relatively simple development projects.

2.2. Recent Improvements

Recently, however, there have been some improvements in the time required to obtain government authorizations. According to the schedule sent by authorities at both levels of government, the Péribonka approvals should take 30 months—from the tabling of the project notice to the recommendations by authorities—if the governments' decisions are made by April 2004. This kind of performance is highly encouraging. It will be all the more so if it also applies to more complex Hydro-Québec projects. Note that the Péribonka project involves the construction of a fourth generating station on a river that has been extensively developed both downstream and upstream, with little additional flooding. The procedures for a complex project, such as Eastmain-1-A generating station and the Rupert diversion, will be very revealing in terms of what can be expected for future large developments.

2.3. Foreign Approval Procedures

With regard to energy development, the European Union adopted the *Directive on the promotion of electricity produced from renewable energy sources* on September 27, 2001. This directive requires each member state to review the legislative and regulatory framework for power generation facilities using renewable energy sources, such as hydroelectricity, so as to reduce the obstacles that could negatively affect increased power generation with these options. Approval procedures are also to be streamlined and accelerated. This directive requires not only that the

environmental benefits and drawbacks of projects be taken into account, but that objectives pertaining to air quality improvement and the battle against greenhouse gases be considered as well.

Under the directive, each member state of the European Union must publish a report by October 27, 2003, describing the measures to be taken to reduce obstacles to the development of renewable energy potential.

2.4. Comprehensive, Efficient Ideas for Procedures

In light of the above factors, Hydro-Québec has identified certain key elements that could optimize the entire environmental assessment of a hydroelectric project. Examples of measures to be taken are presented in the Efficiency of Approval Procedures table on page 183. This table also includes the proponent's preliminary study phase, which precedes the draft design phase, and the coordination required between the two levels of government.

Draft design phase

Hydro-Québec estimates that the draft design phase, from the project notice to submission of the impact assessment, can reasonably be completed in 18 months.[1] The length of this phase depends on the company's ability to carry out the required studies within a shorter time. The acceptance of previously acquired knowledge is a key condition for meeting such a short deadline.

1. *This optimal 18-month time frame could be longer in some cases when the collection of technical and environmental data is subject to logistical constraints (such as very short favorable seasons). The impact assessment would then take more than 6 months to prepare. The schedule therefore depends on the proponent's ability to conduct studies rapidly, in light of any logistical constraints.*

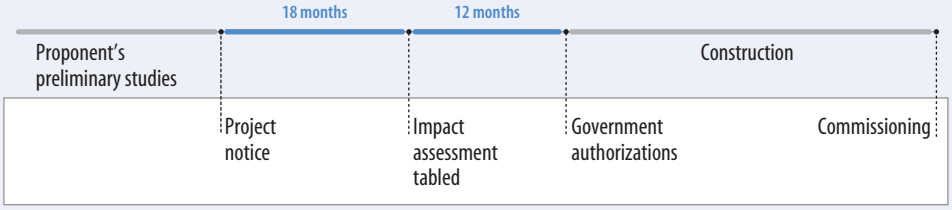
The information acquired during past hydroelectric projects, such as knowledge of the environment and desirable mitigation measures, should be accepted and taken into account in the evaluation of new projects. At the end of 2001, Hydro-Québec published a *Summary of Knowledge Acquired in Northern Environments from 1970 to 2000* to increase awareness of environmental issues associated with hydropower development and to record the large amount of data compiled over three decades of development. The high quality of the publication has been widely acknowledged.

This kind of data should be recognized for the purpose of government approvals, as well as in proponents' impact studies. This would make approval procedures more efficient and fair for a power option with which Québec and Canada are widely recognized to have extensive experience.

Government authorizations phase

Hydro-Québec estimates that a 12-month time frame is reasonable for the government authorizations phase, from the tabling of the impact assessment to the governments' decision. Recent experience suggests that this is a very realistic objective. This phase took just over a year for authorizations from both levels of government for the Toulnustouc project, and is expected to take 12 months for the Péribonka project.

The diagram below summarizes the proposed schedule for optimal approval procedures. Such procedures would be both comprehensive and fair to the hydropower option.



3. Conclusion

Hydro-Québec firmly believes that full hydropower development in Québec depends on the recognition of two key elements:

- **Québec's vast experience with the construction of profitable projects that are environmentally and socially acceptable.**

  Recognize acquired experience in the development of hydroelectricity. Québec's expertise in this field is known worldwide.

  When policies and laws are adopted and implemented, take into account the fact that the impacts of hydroelectricity are well known and can largely be avoided, compensated for, or mitigated. These impacts are sufficiently well known that we can begin to consider a new approach based, among other things, on predetermined objectives and environmental findings, and subject to control, management and monitoring measures.

- **Benefits inherent in choosing a renewable energy option.**

  Take into account the fact that the benefits of this renewable energy option are fully compatible with the Kyoto Protocol objectives and more generally with the global battle to control greenhouse gas emissions.

  The fight against climate change goes further than the Kyoto Protocol and its commitments over the period from 2008–2012. Climate change is a long-term problem. By 2025, 57 million tonnes of CO_2 emissions per year could be avoided through hydropower development[1] in Canada. Energy requirements are not about to decrease.

With the proper recognition and efficient, comprehensive approval procedures, Québec's hydroelectric potential could be developed in an acceptable way, subject, of course, to appropriate agreements with local communities.

1. *According to an analysis by the Canadian Hydropower Association based on National Energy Board data.*

Efficiency of Approval Procedures

Project Phases	Recommended Actions	Authorities
Preliminary studies[1]	Define the project's environmental issues (instream flow, endangered species, etc.)	Ministère de l'Environnement du Québec, federal authorities and Hydro-Québec
	Designate analysts and experts ("coaching" principle)	Ministère de l'Environnement du Québec and federal authorities
Draft design[2]	At the outset, Québec and Canada should sign a coordinated agreement based on standard guidelines to simplify impact assessment[3]	Ministère de l'Environnement du Québec, federal authorities and Hydro-Québec
	Identify the issues that the impact assessment should address first	Ministère de l'Environnement du Québec, federal authorities and Hydro-Québec
	Develop a common vision: • Assign teams • Involve managers • Coordinate the flexible application of the instream flow policy, etc.	
Government authorizations[4]	Develop an approach to achieve environmental objectives: • General mitigation measures • Compensation agreement based on objectives rather than on specific methods	Ministère de l'Environnement du Québec, Ministère des Ressources naturelles, de la Faune et des Parcs, FAPAQ and federal authorities
	Synchronize Québec and federal approval procedures: • Synchronize question and answer periods • Synchronize public hearings	Ministère de l'Environnement du Québec and federal authorities

1. *Proponent's studies completed before beginning the legislated approval procedures.*
2. *From project notice to tabling of the impact assessment.*
3. *Identifying, at the outset, the issues that the impact assessment must address for both the federal and provincial levels means that it is not necessary to submit two different environmental assessments for public hearings.*
4. *From tabling of the impact assessment to government authorizations.*

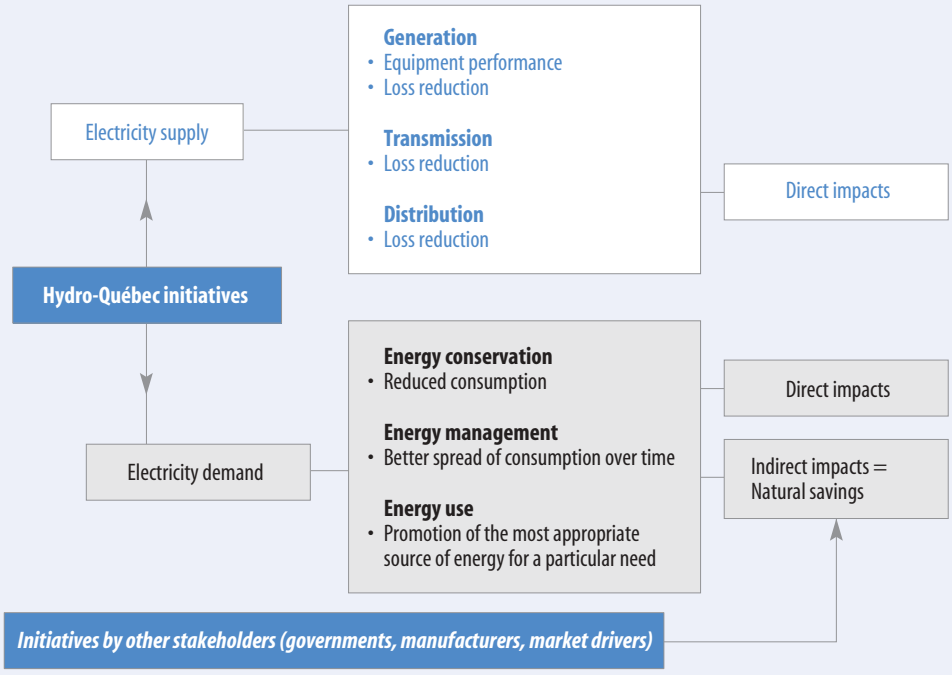
Appendix 5

Overall Energy Efficiency of the Power System

In a context of constantly growing demand for energy, the improvement of energy efficiency in the power system as a whole is one means of maintaining the balance between supply and demand.

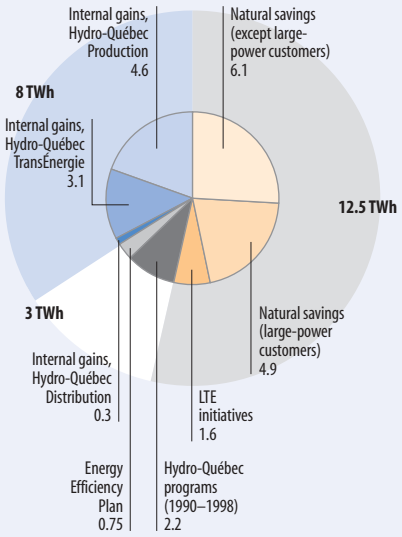
In this section, Hydro-Québec presents all the measures taken to increase the energy efficiency of the entire power system, from the generation of electricity to its use by Québec consumers.

Hydro-Québec's energy efficiency activities are illustrated in the table below.



1. Overview of Energy Efficiency in Québec

Recurring Energy Savings in 2006 (compared to 1990): 23.5 TWh



The adjacent illustration depicts the energy conservation measures implemented from 1990 to 2006 that stem directly or indirectly from Hydro-Québec's initiatives.

For the 2006 horizon, assuming the same technologies and behaviors as in 1990, an additional 23.5 TWh of power would be required to satisfy Québec demand. These recurring energy savings will have been achieved through Hydro-Québec's direct system-related measures (8 TWh) and energy efficiency programs (3 TWh), as well as via their indirect effects on consumer behavior and technological change (12.5 TWh). They do not include the inherent energy efficiency of hydropower (99% efficient) versus fuel-fired facilities (33% to 55% efficient). Moreover, electrical heating systems, which are widely used in Québec, offer nearly 100% efficiency, compared with 50% to 85% for fuel-fired systems.

The table below illustrates the estimated energy savings. Between 1990 and 2008, savings generated directly or indirectly by Hydro-Québec (26.1 TWh) will equal over 50% of the current consumption of all Québec households, or the production of three generating stations the size of Manic-5.

Québec's and Hydro-Québec's energy efficiency performance compares favorably with results obtained elsewhere in North America.

Impacts of Initiatives from 1990 to 2010

	Energy gains (TWh)				**Power gains** (MW)			
	2002	**2006**	**2008**	**2010**	**2001–2002**	**2005–2006**	**2007–2008**	**2009–2010**
Supply								
Generation	4.1	4.6	4.9	5.1	637	928	1,159	1,396
Transmission	2.0	3.1	3.7	4.4	—	—	—	—
Distribution	0.3	0.3	0.4	0.4	44	46	47	49
	6.4	**8.0**	**9.0**	**9.9**	**681**	**974**	**1,206**	**1,445**
Demand								
Energy conservation	2.4	3.0	3.4	3.6	390	450	540	600
Energy management	—	—	—	—	780	800	810	820
Energy use	1.6	1.6	1.6	1.6	200	200	200	200
Natural savings	8.9	10.9	12.1	13.3	1,430	1,700	1,870	2,050
	12.9	**15.5**	**17.1**	**18.5**	**2,800**	**3,150**	**3,420**	**3,670**
Total	**19.3**	**23.5**	**26.1**	**28.4**	**3,481**	**4,124**	**4,626**	**5,115**

2. Energy Efficiency and Electricity Supply

In addition to promoting energy efficiency among its customers and throughout Québec society, Hydro-Québec uses high-performance equipment to develop and improve its system, with due regard for cost.

2.1 Energy Efficiency and Electricity Generation

Since 1990, Hydro-Québec has implemented several programs to improve its generating fleet which have led to major gains in both energy and power. The first years of these programs were particularly fruitful because the facilities that offered the greatest potential for energy and power gains and the best economic return were given priority. Sustained efforts were deployed to maintain these gains and to extend the measures to other generating stations.

From 1990 to 2000, energy gains were mainly attributable to the implementation of performance enhancement measures for generating units and the reduction of usable spillage. For generating units, results were obtained soon after the measures were implemented, and these gains have since been maintained. Usable spillage was substantially reduced at the outset, and further gains have been achieved in each subsequent year by continuously improving the coordination of equipment replacement plans, among other means. High gains were achieved in 1998, with lower percentages recorded thereafter. In 2002, these efforts generated cumulative gains of 3,900 GWh.

Between 2000 and 2003, additional gains of 300 GWh were obtained, bringing the total to 4,200 GWh.

In the coming years, the program to replace turbine runners will continue, as will the project called MATH (a French acronym for "hydraulic turbine analysis model"), which enhances generating-unit performance. The new energy gains resulting from these initiatives should raise the total to 4,570 GWh by 2006.

From 1990 to 2000, cumulative power gains of about 600 MW were achieved through replacement of turbine runners and various upgrades at generating stations. The projects that produced the highest gains were completed during this period, which explains the impressive improvement rate.

Between 2000 and 2003, the implementation of the MATH project at La Grande-3 generating station and the turbine-runner replacement program added nearly 75 MW, bringing the total gain for all generating facilities to about 665 MW at year-end 2003. By 2006, additional gains of 250 MW will come mainly from the turbine-runner replacement program and deployment of the MATH project at other generating stations.

2.2 Energy Efficiency and Electricity Transmission

Energy losses in the transmission system have always been a determining factor in the choices made at the system planning stage for both projects and equipment.

The selection of 735 kV for the main transmission system limited energy losses to 5.2% of deliveries. For the sake of comparison, a 315-kV transmission system would lose up to 10%.

By asking Hydro-Québec TransÉnergie to take losses into account in its system-development and equipment choices, Hydro-Québec Distribution confirmed the validity of this approach.

The rate of energy loss in the transmission system depends not only on voltage, but also on the distance between the generating facility and the load centre, the type of conductors, consumption profiles, equipment availability, the generating plan, and weather conditions.

As part of the program to enhance transmission system reliability, shunt reactors were installed to maintain voltage at constant levels and keep the 735-kV lines in service longer. This measure has reduced losses by about 200 GWh per year.

Because line downtime reduces system efficiency, Hydro-Québec TransÉnergie limits maintenance time as much as possible. Since 2003, the duration of line shutdowns in the Churchill–des Montagnais corridor was reduced from five to three months, thereby decreasing estimated losses by at least 15 GWh per year.

The Montérégie loop, scheduled for commissioning in the winter of 2003–2004, will also boost system efficiency. Loss reduction is estimated at some 90 GWh annually.

Avoided losses from 1992 to 2002 were about 2,000 GWh. They are expected to be 215 GWh in 2003 and 305 GWh each year thereafter, for a total of 2,350 GWh by 2010.

The adoption of new management tools will help optimize transmission system operation. A current study shows that a potential loss reduction of 80 GWh may be achieved with better management methods.

2.3 Energy Efficiency and Electricity Distribution

Energy losses in the distribution system are an important consideration in equipment selection as well as system design and operation. Technical and economic studies relating to guidelines and system planning take the cost of losses into account when developing business objectives and solutions.

In general, the distribution grid uses large-gauge conductors to meet peak winter demand. As a result, the grid experiences lower resistive losses outside peak winter periods.

Historically, the main type of equipment that has been analyzed for losses is the distribution transformer; the system has over 500,000 such units. In recent years, Hydro-Québec Distribution has required its suppliers to improve transformer performance. Today, when new customers are connected or faulty transformers are replaced, higher-performance transformers are installed. This practice is expected to lead to recurring energy savings of 330 GWh by 2006, as compared to 1990.

In five years or thereafter, Hydro-Québec Distribution plans to focus technological innovation on the design of materials for low-loss transformers at an acquisition cost comparable to that for traditional transformers.

3. Energy Efficiency and Electricity Demand

Energy efficiency also involves more efficient management of electricity demand. In this regard, Hydro-Québec focuses simultaneously on three complementary aspects:

- *Energy conservation* results from the adoption of behaviors and the use of equipment and fixtures that reduce consumption but meet the same needs. High-efficiency motors and energy-efficient lighting are examples.
- *Energy management* consists in spreading out electricity consumption more evenly throughout the day to optimize the use of the equipment required to supply customers. Residential dual-energy and interruptible power programs achieve these results.
- *Energy use* involves promoting the most appropriate source of energy for a particular need. Energy efficiency programs in off-grid systems (used in remote areas not connected to the main power grid) encourage the use of oil for heating instead of electricity. This is more efficient because the electricity for these systems is produced by oil-fired generating units.

3.1 Historical Review

Since the early 1960s, Hydro-Québec has encouraged its customers to consume electricity more efficiently. The company has geared its efforts to its customers' needs and the imperative of maintaining a balance between energy supply and demand. Different types of initiatives were launched, including:

- information and awareness activities
- business programs (financial support, equipment installation and training)
- product research, development, demonstration and testing
- support for standardization and regulation
- technical support (sales force, toll-free phone line)

1960–1973. Intensive marketing of electricity

During this period, electricity's share of the Québec energy market increased considerably. Hydro-Québec established its market position by highlighting the performance advantages of electricity. The company promoted higher standards for residential insulation (Medallion and Novelec homes), water-heater performance (Cascade), and energy audits for commercial buildings (CALMEC).

Hydro-Québec was very active on technical committees of such organizations as the Canada Mortgage and Housing Corporation (CMHC), National Research Council of Canada (NRC) and Canadian Standards Association (CSA).

1974–1980. Promotion of energy conservation

The oil crisis in 1973, combined with a rapid increase in electricity sales, led Hydro-Québec to redefine its marketing activities and intensify its promotion of energy conservation. The company developed a program for improving public lighting. It continued to support standardization and regulation of water heaters, electrical equipment and insulation in buildings heated with electricity.

By conducting major energy conservation awareness campaigns, Hydro-Québec contributed to the development of Canadian and Québec energy policies.

At the end of the 1970s, Hydro-Québec began to implement energy efficiency programs for the off-grid systems on the Magdalen Islands. These programs promoted better home insulation and encouraged customers to heat with fuel.

1981–1990. Major government projects supported by Hydro-Québec

The second oil crisis added a new dimension to energy efficiency. Hydro-Québec strongly supported the major government programs that were introduced, including the Canadian Oil Substitution Program, Énergain Québec and EnerGuide. The company also continued to support standardization.

Although Hydro-Québec had an energy surplus, its concern for energy efficiency was very real. Energy management became the main focus in the 1980s and the company launched residential dual-energy, then commercial, institutional and industrial dual-energy programs. It also had some capacity available in the form of interruptible power contracts with industrial customers.

The efforts of the governments and Hydro-Québec yielded results, particularly with regard to the insulation of existing homes and higher insulation standards for new buildings. Surveys showed that several types of energy-efficient behavior had been widely adopted and maintained (cold-water laundering, lower lighting, reduced hot-water consumption, lower thermostat settings, etc.).

These changes, added to the conversion of oil heating systems to electricity, decreased the average energy consumption in Québec homes from the equivalent of 48,000 kWh per year in 1971 to 28,000 kWh in 1990.

1991–1995. Energy Efficiency Project

Having achieved a balance between supply and demand, Hydro-Québec launched an extensive Energy Efficiency Project as part of its plan to maintain the energy balance at the lowest possible cost, in addition to complying with the Québec government's energy efficiency strategy.

Some 15 energy conservation programs were developed under this project, as well as programs for maintaining and expanding the residential dual-energy customer base.

At the same time as it was encouraging Quebecers to improve their energy efficiency, Hydro-Québec also began to manage its own consumption more intensively. It introduced an energy efficiency program in many of the buildings it occupied (and generally owned).

Hydro-Québec invested about $500 million in the Energy Efficiency Project, which included energy conservation and energy management activities. The project saved 2.5 TWh per year and reduced annual peak demand by about 400 MW—equivalent to the annual consumption of some 120,000 households.

Residential dual-energy equipment was responsible for shaving about 780 MW off the peak as heating systems switched from electricity to auxiliary fuel.

Most of these energy and power savings have been maintained ever since.

Between 1991 and 1995, Hydro-Québec was able to count on 1,140 MW of interruptible power under arrangements with large-power industrial customers who agreed to reduce their power consumption to a predetermined level during particularly critical peak periods, in exchange for financial compensation.

1995–2002. New context

The period from 1995 to 2002 shows how the market has evolved as a result of regulatory developments and changes in customer behavior and habits.

A number of standards and regulations applying to various types of electrical equipment were introduced or updated.

In 1997, the Québec government created the Agence de l'efficacité énérgétique du Québec (AEEQ, energy efficiency agency), whose mission is to promote energy efficiency for all energy sources, in all sectors of activity throughout Québec, with a view to sustainable development.

At the same time, Hydro-Québec reaffirmed its commitment to energy efficiency. The following table shows Hydro-Québec Distribution's current energy efficiency initiatives.

Residential Customers

Activity	Objective or Brief Description
Support for the AEEQ's Novoclimat program	Certification for new residential constructions incorporating better-than-average energy efficiency. This concept, developed by the AEEQ, follows up on Hydro-Québec's Nouveau Confort program.
Rate DT	Rate available since 1987 for residential customers who heat their homes with a dual-energy system in compliance with Hydro-Québec's *Electricity Rates Bylaw*.
Energy information line	Toll-free line set up in 1990 to answer the many questions from customers (especially residential) about electricity and its uses, energy efficiency, as well as Hydro-Québec's marketing programs, construction projects, facilities and activities.
HydroContact newsletter	Newsletter sent to residential customers and small businesses along with their bill. It contains information on electricity, its uses, energy efficiency and marketing programs.

Business Customers

Activity	Objective or Brief Description
Support for optimization of business customers' use of electricity	Ongoing support for optimization of electricity consumption and implementation of efficient solutions for all electricity uses.
Customized support for large-power customers	Technical support for improvement of industrial processes, energy audits of processes and/or buildings, and power quality studies.

Standards and Regulations

Activity	Objective or Brief Description
Support for standardization and regulation	Steering of strategic committees (with the AEEQ, Canada's Office of Energy Efficiency, and federal and provincial government committees) dealing with the efficiency of electrical equipment to promote enhanced equipment and building envelope performance.

Research, Development, Demonstration and Testing

Activity	Objective or Brief Description
Market research	Studies that measure changes in customers' energy consumption and determine their priorities and satisfaction with how their expressed expectations are met.
Demonstration and testing projects	Demonstration and testing of emerging electrotechnologies with the Laboratoire des technologies de l'énergie (LTE, energy technologies laboratory) of Hydro-Québec's research institute.

Hydro-Québec Buildings

Activity	Objective or Brief Description
Improvement of energy efficiency in Hydro-Québec's administrative buildings	Consumption tracking and user awareness programs, improved heating management in certain buildings, energy audits and cost/benefit studies for new measures.

Off-Grid Systems

Activity	Objective or Brief Description
Energy efficiency programs for off-grid systems	Programs to encourage customers of off-grid systems to heat buildings and water with oil instead of electricity and thereby minimize thermal generation of electricity without compromising reliability of the supply.

Associations	
Activity	**Objective or Brief Description**
Energy efficiency committee, Union des producteurs agricoles–Hydro-Québec	Joint working group to promote the development, communication and implementation of energy efficiency measures for the agricultural sector.
Committee on municipalities, Association québécoise pour la maîtrise de l'énergie	Working group that promotes economic, human and community development of energy efficiency in municipalities.
Energy Week and Energy Efficiency Forums	Hydro-Québec participates in energy efficiency forums that are held every year in various areas. These forums, attended by the local chamber of commerce and area businesses, raise awareness of energy efficiency among members of the business community and the public.
Canadian Energy Efficiency Alliance	Hydro-Québec Distribution is a member of this organization's board of directors and helps to set its business objectives.
Canadian Electricity Association	Hydro-Québec is an active member of several energy efficiency committees.

3.2 Results of Energy Conservation Programs

Hydro-Québec's energy conservation programs have had two types of impacts:

- *direct impacts* stemming from customer participation in marketing programs
- *indirect impacts,* also called natural energy savings, which result from the efforts of both Hydro-Québec and other energy efficiency stakeholders

3.2.1 Direct impacts of the 1990–2002 programs

The impacts listed below arise out of the Energy Efficiency Project of the 1990s. Since the impacts of programs prior to 1990 are now included in baseline electricity demand (demand prior to the energy efficiency programs), the table on the next page shows the results of energy conservation programs implemented since 1990.

Overview of the 1990–2000 Energy Efficiency Project – Energy Savings

Residential Market	**Brief Description**	**Energy Impact in 2000** (GWh)	**Start and End**
Écokilo	Program for analyzing household energy consumption and offering energy-saving products	268	1991 to 1993
Econos (Phases 1, 2 and 3)	Program promoting energy-saving products	175	1991 to 1993
Écono-Confort (Phases 1, 2 and 3)	Phase 1: Free installation of energy-saving devices, mainly electronic thermostats Phases 2 and 3: Sale and installation of electronic thermostats	75	1993 to 2001
Other programs		18	1990 to 1999
Total energy saved		***536 GWh***	
Commercial and Institutional Markets			
H-Q building efficiency improvement	Improvement of energy efficiency in Hydro-Québec's administrative buildings	76	1991 to present
Public lighting	Conversion of municipal lighting from mercury to sodium	152	1992 to 1995
Building Energy Analysis Program (BEAP)	Energy audits for commercial, institutional and industrial buildings	241	1991 to 1997
Energy-efficient lighting (all phases)	Promotion and installation of energy-efficient lighting in commercial, institutional and industrial buildings	360	1991 to 1996
Total energy saved		***829 GWh***	
Industrial Market			
High-efficiency motors	Financial assistance for the purchase of high-efficiency electric motors	125	1991 to 1995
Energy efficiency program for industrial processes	Improvement of energy use in industrial processes in large-power companies to reduce electricity consumption	450	1991 to 1997
Energy optimization programs: PFCS	Financial and technical assistance for industrial and municipal customers who implement efficiency measures for pump, fan and compressor systems	513	1991 to 1999
Total energy saved		***1,088 GWh***	
TOTAL		***2.5 TWh***	

The impacts of these programs are expected to dissipate somewhat, so the 1998 savings of 2.5 TWh should change as follows:

Energy Gains from the Energy Efficiency Programs since 1990 *(TWh)*

2002	2006	2008	2010
2.4	2.2	2.2	2.1

The 2.5-TWh energy savings reduced annual peak demand by about 400 MW in 1998. This reduction is expected to change as follows:

Reduction in Peak Power Demand Attributable to Energy Conservation Programs since 1990 *(MW)*

2001–2002	2005–2006	2007–2008	2009–2010
390	350	340	320

3.2.2 Natural savings

Natural savings result from the adoption of measures that reduce electricity consumption without any direct intervention by Hydro-Québec or other parties. The sectorial demand forecasting models take these savings into account. Natural savings are generated by:

- the collateral effects of programs instituted by Hydro-Québec or others (over and above the recorded program impacts)
- upgraded equipment-design and building-construction standards
- regulatory and legislative changes
- changes in customer consumption habits

Setting an Example by Making Its Own Buildings More Energy-Efficient

Since 1991, Hydro-Québec has been improving energy efficiency in its buildings and defining improvement parameters that can be used in the commercial and institutional markets.

Prior to 1991, Hydro-Québec had installed meters in all its buildings to track consumption and develop an internal chargeback system for energy costs. The company also produced technical guides for new office-building design and energy audit procedures for existing buildings.

The 1991 program included the following measures:

- training for building managers and their employees
- analyses and simulations of energy consumption
- introduction of energy efficiency measures in a hundred buildings
- monthly tracking of energy consumption in buildings
- creation of energy committees in some buildings to meet specific needs

In 2002, Hydro-Québec's administrative buildings had improved their overall energy performance by 26% over 1991, for annual savings of 76 GWh.

A number of projects were also studied, such as improvement of the energy efficiency of the system control centre, shutdown of space heaters while garage doors are open, and control of fresh-air input with CO_2 sensors. Since the buildings are already relatively efficient, they must be analyzed individually to determine which measures would be worthwhile.

Hydro-Québec's administrative buildings are still being and will continue to be improved, which is why this program is included in the *Energy Efficiency Plan 2003–2006*.

In **residential, commercial and institutional markets** natural savings stem from the growing efficiency of equipment and the application of stricter standards during construction or renovation. Since these standards improve the building envelope and encourage the selection of more efficient equipment, unit consumption for various uses (heating, air conditioning and others) decreases over time.

In the **small and medium-sized industry market**, natural savings are assessed not in terms of improvement of industrial processes, but through analysis of the changes in the industries' unit consumption of electricity. Improvement of the energy efficiency of industrial processes compensates for the growing use of electricity in these processes, so unit consumption is actually decreasing in several industries.

In the **large-power industrial market**, the small number of customers, the extent of their consumption and the specific nature of their businesses mean that natural savings must be evaluated on a case-by-case basis, focusing on completed and anticipated improvement projects.

Initiatives by Hydro-Québec, government agencies and other stakeholders have contributed greatly to transforming the energy efficiency market in Québec and thereby generating natural savings. To achieve this transformation, the supply of and demand for energy-efficient products and services had to be stimulated. The goal was to induce sustainable structural changes that would promote more efficient behavior and technology.

The result was that the market was transformed: various groups, such as consulting engineers, contractors and equipment manufacturers, enhanced their energy efficiency expertise. Market offerings also developed with the emergence of firms supplying integrated energy audit and energy management services.

Energy efficiency programs incited manufacturers and distributors to supply more efficient equipment, such as electronic thermostats and high-efficiency motors. Also, more information is circulating worldwide on energy analysis software, although such programs often need to be adapted for the Québec market.

Other factors also show how much the market has changed: standards and regulations have been amended and customers have changed their behavior when purchasing equipment and using electricity.

Over the past decade, a number of energy efficiency–related standards and regulations have been introduced or updated.

Hydro-Québec and Standardization

Hydro-Québec has long been active in electrical equipment standardization and has become even more involved in the past decade.

It helps steer the efforts of strategic committees on electrical equipment performance, promotes the use of efficient equipment and encourages market structuring. Moreover, in its discussions with the Agence de l'efficacité énergétique and the Office of Energy Efficiency, it encourages all levels of government to regulate electrical equipment.

The company also promotes the use of efficient equipment by taking standards and regulations into account in its own marketing strategies.

Hydro-Québec is represented on:

- CSA International strategic committees, technical committees and technical subcommittees
- the National Advisory Council on Energy Efficiency
- an advisory body on federal and provincial government strategies

The company has contributed to the adoption of new standards on efficient thermostats and water coolers, as well as to updates to standards on motors, water heaters, refrigerators and distribution transformers. Some of the standards on motors, water heaters and certain electrical appliances are now regulatory.

Hydro-Québec intends to pursue its standardization activities. For example, it plans to participate in the review of the *Model National Energy Code for Houses,* whose timing will depend on the government's schedule.

The table below provides estimates of natural savings achieved since 1990 for each market. These savings reduce peak winter demand by about 1,430 MW.

Estimated Natural Savings for 1990–2002	**Annual Gains in 2002** (TWh)
Residential market	2.6
Commercial and institutional markets	1.6
Small and medium-sized industry market	1.2
Large-power industrial market	3.5
Total	**8.9**

Anticipated natural savings for 2003–2010 are as follows:

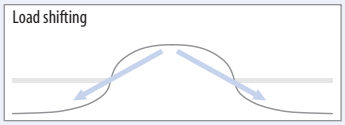
Estimated Natural Energy Savings for 2003–2010	**Gains in 2006** (TWh)	**Gains in 2008** (TWh)	**Gains in 2010** (TWh)
Residential market	0.19	0.40	0.70
Commercial and institutional markets	0.27	0.44	0.62
Small and medium-sized industry market	0.20	0.30	0.40
Large-power industrial market	1.36	2.04	2.72
Total	**2.02**	**3.18**	**4.44**

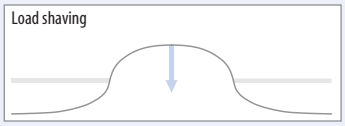
These natural savings of 2.02, 3.18 and 4.44 TWh will, in turn, reduce peak power demand by 270, 440 and 620 MW respectively.

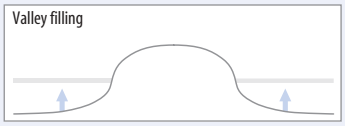
3.3 Energy Management Programs

Energy management consists in spreading out electricity consumption more evenly throughout the day: shifting loads from peak to off-peak periods; shaving peak-period loads by switching to another power source (residential dual energy); valley filling, i.e., meeting specific types of demand during off-peak periods (commercial, institutional and industrial dual energy). Such measures make it possible to optimize use of the equipment required to supply customers and thus reduce the cost of meeting peak demand.

Energy management initiatives generally involve offering special rates to encourage load shifting, load shaving or valley filling.







Hydro-Québec has implemented three energy management programs: residential dual energy; commercial, institutional and industrial dual energy; and interruptible power. Since the interruptible power program is now designed to give Hydro-Québec Production more flexibility, its impacts are no longer attributed to energy efficiency.

3.3.1 Residential dual energy

The residential dual-energy system marketed by Hydro-Québec uses electricity as the main energy source for heating and fuel (generally oil) as an auxiliary source. Electricity is used for most of the heating season (temperature equal to or above -12°C or -15°C, depending on the region) and the auxiliary source takes over in very cold weather (temperature below -12°C or -15°C).

Since the fall of 1987, residential dual-energy customers have been able to take advantage of Rate DT, which is structured according to outdoor temperature.

Residential dual energy also shifts other loads from peak to off-peak periods.

Today there are nearly 120,000 Rate DT subscribers, and this number is growing slowly. During the winter, this measure shaves off about 780 MW of power demand in peak periods. The customer base was built through the company's marketing efforts and its contribution to development of the dual-energy system.

3.3.2 Commercial, institutional and industrial dual energy

In 1983, Hydro-Québec launched the commercial, institutional and industrial dual-energy program with a rate—Rate BT—that was indexed to fuel costs. Its purpose was to use up temporary electricity surpluses following commissioning of the Phase I La Grande complex generating stations. The concept included a load-shedding mechanism for peak periods.

In 1990, low water levels necessitated the recall of these sales and the company replaced the indexed rate with an annual flat rate, while reserving the right to interrupt delivery as needed.

Since 1996, in view of a transition to other more profitable rate options, the company ceased accepting new subscribers and the peak-period load-shedding mechanisms were deactivated. However, this transition was curbed when fuel prices rose; consequently, the consumption of Rate BT customers increased.

Rate BT subsequently proved unprofitable: in 2001, Hydro-Québec Distribution asked the Régie de l'énergie (Québec energy board) for permission to modify this rate, at least in its current form, and eventually redirect customers to other rate options or energy solutions. The request was rejected, mainly because there was insufficient proof of the actual cost of supply and service for this rate.

At that time, the Régie de l'énergie recognized that Rate BT is a consumption management rate, i.e., a rate determined by market prices or for which service could be interrupted. It also stated that Hydro-Québec Distribution had a responsibility to offer consumption management rates to its customers, and that it would be beneficial for the company to maintain a group of customers whose power could be interrupted. The Régie encouraged the division to consult its customers regarding new proposals involving rates and technology. It noted that any new proposal should, insofar as possible, avoid rate shocks for these customers.

Hydro-Québec Distribution intends to show more clearly that Rate BT no longer meets its needs and that keeping it would lead to rate inequities. Consultations are under way to assess customers' interest in new energy management options and to determine what options it will submit to the Régie in the near future to replace Rate BT. These options will take into account both customer preferences and Hydro-Québec Distribution's requirements.

3.3.3 Energy management outlook 2003–2010

Hydro-Québec Distribution will review its energy-management marketing initiatives in 2004 in light of both its customers' and its own interests. The division then plans to submit appropriate energy management recommendations to the Régie de l'énergie.

Hydro-Québec Distribution will also pursue its appeal to the Régie to modify rate BT and suggest other solutions to its customers.

The table below shows the expected changes in the impact of residential dual energy on power demand.

Changes in the Impact of Residential Dual Energy on Shaving Peak Winter Demand *(MW)*

2001–2002	2005–2006	2007–2008	2009–2010
780	800	810	820

3.4 Energy Use Programs

Hydro-Québec's energy use initiatives promote the most appropriate source of energy for a given need. These include programs for off-grid systems, electrotechnology implementation support for industries and experimentation with efficient electrical solutions for all markets.

3.4.1 Off-grid systems

Hydro-Québec supplies electricity to communities whose systems are not connected to the main power grid because of distance and the high cost of connection.

The 14,200 customers of off-grid systems are located in 43 communities: Magdalen Islands (50% of the customers), Port-Menier (Anticosti Island), 15 villages on the eastern tip of the Lower North Shore, 15 in Nunavik and three villages in Haute-Mauricie.

The electricity consumed by customers of off-grid systems is generally produced by diesel-fuel generating plants whose production costs are very high. These facilities operate at an annual deficit that totaled $108 million in 2002.

Because oil heating systems are more efficient than diesel generating units, it is much more advantageous, for all Québec customers, if off-grid customers heat their buildings and water directly with oil. Hydro-Québec therefore encourages them to do so by offering financial compensation for oil-heating expenses and using a deterrent rate system north of the 53rd parallel. Since electricity was nationalized in 1963, off-grid customers south of the 53rd parallel enjoy the same rates as customers on the main system, in accordance with the principle of uniformity throughout the power system.

Since 1979, Hydro-Québec has implemented energy efficiency programs for off-grid systems to reduce electricity demand and the operating deficit. The programs differ depending on the prevailing context for each system. Here are some examples.

- Residential customers:
    - compensation for the cost of oil, amounting to a 30% reduction compared to the cost of electric heating
    - annual maintenance and repair service for heating systems
    - system replacement
    - financial assistance for new construction
    - financial assistance for conversion
- Business customers:
    - compensation for the cost of oil, where applicable, amounting to a 30% reduction compared to the cost of electric heating
    - compensation for the cost of propane
    - annual maintenance and repair service for heating systems

Hydro-Québec estimates that the off-grid programs, some of which involve special rates, save a substantial amount of oil. The savings represent the difference between the amount of oil consumed by customers who choose to heat their buildings and water with this energy source and the amount of diesel required to produce an equivalent amount of electricity.

3.4.2 Electrotechnology implementation support for industries

Since 1985, Hydro-Québec has encouraged electrotechnology implementation in Québec's extraction and consumer-product-manufacturing industries through its sales force and its research institute's energy technologies laboratory (LTE). The main electrotechnologies involved are electric resistance, induction, infrared, high frequency and mechanical vapor recompression.

Electrotechnologies reduce production costs, boost productivity, improve product quality and enhance energy efficiency.

Since 1985, Hydro-Québec has collaborated in over 1,500 electrotechnology implementation projects. The energy savings achieved represent the difference, estimated at 15%, between use of the technologies promoted by Hydro-Québec and use of the technologies that would have been adopted without its input. In 2002, electrotechnology-related energy savings totaled 0.1 TWh.

3.4.3 Testing of efficient electrical solutions

Through the work done at the LTE research facilities in Shawinigan, Hydro-Québec has been involved in testing efficient electrical solutions for all markets, especially the industrial market. Projects completed in large-power industries between 1990 and 2002 resulted in savings of 1.5 TWh in 2002.

For the past 15 years, Hydro-Québec has been investing in the development and testing of efficient electrical technologies. In fact, this is LTE's main mission. Hydro-Québec's considerable contribution to energy efficiency makes it a major player in this field, both in North America and globally.

A number of the technologies developed and tested at LTE have been incorporated into the company's energy conservation and management programs. Examples are electronic thermostats and the integrated dual-energy system.

For the commercial and institutional markets, Hydro-Québec, in conjunction with certain customers, tests emerging energy efficiency options such as geothermal systems and heat recovery from compressors.

In the industrial market, Hydro-Québec is a leader in process and system electrification, with over 1,500 successful factory installations (including electrotechnologies). Experience shows that in addition to boosting energy efficiency, electrical or combined (thermal and electric) technologies improve product quality and increase productivity.

The table below shows the results posted by Hydro-Québec's energy use programs in 2002.

Energy Use	**Gains in 2002** (TWh)
Electrotechnology implementation support	0.1
Testing of efficient electrical solutions	1.5
Total	**1.6**

3.4.4 Energy use outlook 2003–2010

Hydro-Québec Distribution will continue to support demonstration and testing of efficient electrical technologies.

For off-grid systems, the division is currently reviewing its marketing initiatives to improve energy efficiency and reduce the operating deficit. It hopes to submit appropriate adjustments to the Régie de l'énergie in 2004. In addition, it will launch an energy efficiency awareness campaign in targeted communities.

3.5 Energy Conservation Outlook: The *Energy Efficiency Plan 2003–2006*

In 2001, Hydro-Québec undertook to assess the residual energy savings potential for all markets in Québec. This evaluation was done in conjunction with the Agence de l'efficacité énergétique for residential, commercial and institutional markets.

In fall 2001, Hydro-Québec added a provision for 400 GWh of new energy savings in 2006 to its first supply plan, with the understanding that this provision would be adjusted in light of issues identified while preparing the *Energy Efficiency Plan*. The Plan's objective of 750 GWh corresponded to the objective set by the Québec government when it approved the *Strategic Plan 2002–2006*.

In November 2002, Hydro-Québec Distribution filed its *Energy Efficiency Plan 2003–2006* (EEP) with the Régie de l'énergie. The focus of this plan is energy conservation.

In a decision handed down on June 5, 2003, the Régie approved the entire EEP, including the 750-GWh energy savings objective based on a technical and economic potential of 8.5 TWh, and encouraged Hydro-Québec Distribution to set more ambitious objectives for the longer term. It authorized the 2003 budget of $14.9 million and declared that it was prepared to review any request for a budget increase that would accelerate or expand the EEP.

The Régie de l'énergie also requested a few adjustments to the terms and conditions of certain programs. Hydro-Québec Distribution recently reported to the Régie on the adjustments made and submitted updated budget, marketing, economic and financial forecasts as a follow-up to the program development phase.

The table below details the main parameters of the *Energy Efficiency Plan 2003–2006* submitted to the Régie in the autumn of 2003.

Market	Number of Programs	2006 Year-End Objective (GWh)	Investments for 2003–2006 (in millions of constant 2002 dollars) Customers	HQD	AEEQ	TOTAL
Residential	8	300	64	42	10	116
Commercial and institutional (Rates G, M and L)	4	200	44	36	—	80
Small and medium-sized industry (Rates G and M)	2	70	6	14	—	20
Large-power industry (Rate L)	2	180	7	16	—	23
Complement to market approaches (common)[1]	—	—	—	17	—	17
Total	**16**	**750[2]**	**122**	**125**	**10**	**257**

1. This category includes awareness activities; EEP planning and design; research, development, demonstration and testing projects; and program monitoring and evaluation.

2. Since measures for achieving the EEP objective of 750 GWh of annual energy savings will be introduced gradually until the end of 2006, this objective cannot be fully achieved until 2007. Savings in 2006 are expected to amount to 614 GWh.

Note: All figures have been rounded off.

The EEP includes 16 programs, three of which involve financial support for residential programs administered by the AEEQ (Novoclimat, EnerGuide home inspection and the program for low-income households).

Hydro-Québec has developed a collaborative relationship with the AEEQ and the Office of Energy Efficiency (OEE) to ensure that its initiatives add value to those of its government partners, thus promoting synergy and complementarity.

A common approach for all markets will support program implementation. This approach includes awareness activities; research, development, demonstration and testing (RDDT); planning and design; and monitoring and evaluation.

The EEP covers all customer categories (residential, commercial, institutional and industrial), with customized approaches for each. These approaches have certain common features: Hydro-Québec Distribution always respects the role and place of market drivers and has no desire to supplant them. Rather, it sees itself as an agent of change that promotes, stimulates and influences energy efficiency and contributes to long-term market transformation. For all categories, a simple approach is designed to facilitate access to programs and maximize energy conservation potential.

In addition to collaborating with the AEEQ and OEE, Hydro-Québec Distribution plans to form numerous partnerships to make the EEP successful, particularly with other public organizations (municipalities, as well as health, education, transportation and construction authorities), customer associations and market drivers (trade associations, designers, energy managers, manufacturers, retailers, and installers).

Energy savings are anticipated to reach 750 GWh by the end of 2006. Hydro-Québec Distribution plans to do its utmost to achieve this objective. The success of the EEP will depend on the pace of program implementation, customer participation and partner buy-in. Program results will be carefully monitored so that any necessary adjustments can be made quickly.

Hydro-Québec Distribution will continue to improve its EEP in order to increase its impact over time.

Residential market

The marketing approach for residential customers consists of a program that is simple and accessible to all: the customized Energy Wise Home Diagnostic. Customers can obtain diagnostic reports via the Internet or by mail. More personalized approaches are under consideration.

The diagnostic program has the following objectives:

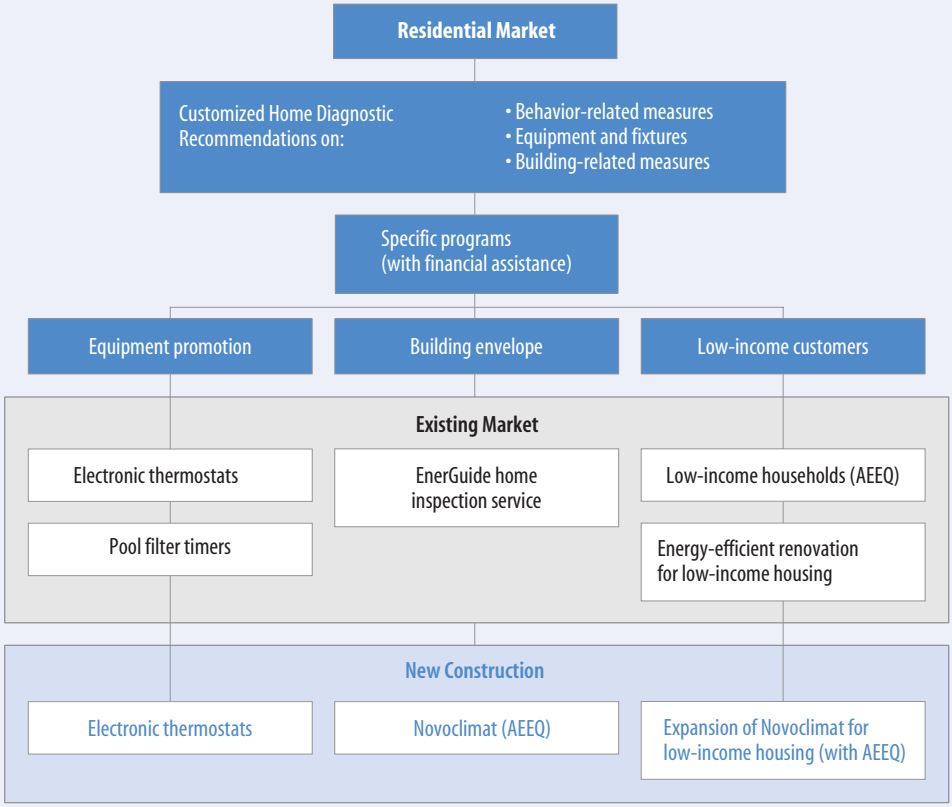
- Make customers aware of their own energy consumption with a personalized energy analysis.
- Provide advice and information on energy conservation measures that apply to their particular situation.
- Inform customers of more specific programs that offer financial support for certain measures and facilitate access to these programs.

These specific programs are of three types:

- Equipment promotion programs that offer financial assistance for installation of high-potential equipment, such as electronic thermostats.
- Programs to improve the building envelope of existing or new homes: Hydro-Québec Distribution is involved in two AEEQ programs, the EnerGuide residential inspection service (existing homes) and Novoclimat (new construction).

- Programs for low-income households: Hydro-Québec Distribution supports the AEEQ energy efficiency program for low-income households. It also plans to offer an energy renovation program for low-income housing in partnership with other stakeholders. The division recently suggested to the Régie de l'énergie that measures be added to the Novoclimat program to support construction of social housing that is more energy-efficient. The project will be conducted in conjunction with the AEEQ, the OEE and participating municipalities. Hydro-Québec Distribution is awaiting the Régie's decision on this initiative.

The chart below illustrates Hydro-Québec Distribution's overall approach for the residential market and shows the impact of the home diagnostic on the other programs.



Commercial and institutional markets

Commercial and institutional markets comprise two main segments: a large group that includes numerous small commercial and institutional buildings that consume relatively little energy, and a specialized group that has fewer buildings but heavy energy consumption.

Two smaller segments require a customized approach because they have specific economic or technological characteristics. These segments are Hydro-Québec administrative buildings and public lighting.

Hydro-Québec Distribution has therefore set up the following four programs:

- Customized Diagnostic – Small commercial and institutional buildings
- Empower Program – Commercial and institutional markets
- Program for Hydro-Québec Distribution buildings
- Street Smart Program – Traffic lights

For the largest segment, consisting of small commercial and institutional buildings, the approach is similar to that for the residential market: customized online energy diagnostics and appropriate recommendations for profitable energy conservation. Customers in this segment will also be able to take advantage of equipment promotions targeting the residential market insofar as such equipment suits their premises.

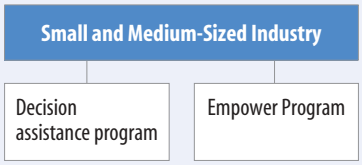
For medium-sized and large commercial and institutional buildings, financial assistance will be offered in proportion to the number of kilowatthours saved to encourage the implementation of measures and execution of energy-conservation renovations. This type of approach stimulates energy efficiency initiatives and stresses overall system or building performance, with consideration for market diversity.

Hydro-Québec will continue to set an example by stepping up its efforts to improve the energy performance of its own administrative buildings.

Under the Street Smart Program, Hydro-Québec Distribution will offer municipalities financial assistance to facilitate and accelerate the conversion of traffic lights from incandescent bulbs to light-emitting diodes.

The chart below illustrates Hydro-Québec Distribution's overall approach for commercial and institutional markets.

Small and medium-sized industry



The marketing approach for small and medium-sized industry is centred on the Decision assistance program and the Empower Program. These programs were aligned with customer priorities and decision criteria, with a view to reducing the technical constraints involved in implementing energy conservation measures.

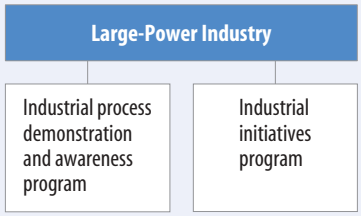
The decision assistance program provides technical support at the project development stage. It targets measures that involve a low cash outlay and a fast payback period, and satisfy customers' decision criteria.

The Empower Program offers financial support for measures that require more substantial investments and whose payback period is too long to be acceptable to customers.

Both programs will be implemented so as to promote the contribution of key market drivers and complement programs already offered by various organizations, such as the AEEQ and OEE.

Large-power industry

For large-power industry, i.e., a few intensive consumers of energy with very diversified profiles, the EEP offers two programs: the program for demonstrating and raising awareness of industrial processes and the industrial initiatives program.



These programs will provide financial assistance for energy analysis and demonstration of emerging technologies. Information will be available online. Financial aid is also planned for customers' energy conservation projects.

Hydro-Québec Distribution will promote these programs to all customers. It will offer technical support and keep an eye on the market to spot high-performance technologies.

The adjacent chart illustrates the overall approach for large-power industry.

Communication

If these programs are to be successful, investments in communication are required to publicize the programs, make customers more aware of energy conservation, and encourage them to get on board.

The proposed communication strategy has two complementary parts: a general campaign to inform customers, merge individual interests into collective interests, and rally support for the EEP, and a more specific campaign for each program to promote participation.

Technological and market research

Hydro-Québec Distribution plans to improve and update its knowledge of existing and emerging technologies and to monitor its customers' needs so as to improve the EEP.

Research will focus on two main areas: technology (demonstration and testing) and market research.

With regard to technology, Hydro-Québec Distribution's objective is to enrich the technical and economic potential of energy conservation with measures that have not previously been acceptable because their performance and applicability were unproven. As part of the EEP, the division plans to set up a mechanism for submitting and screening demonstration and testing projects in conjunction with representatives of the markets and the technological milieu.

In market research, the division will survey its customers and use all the necessary tools to design marketing strategies, such as concept tests and commercial pilot projects, for the purpose of adjusting the EEP.

The EEP covers the years 2003–2006, but Hydro-Québec Distribution wanted to know what energy gains could be achieved by 2010 if the programs were to continue after 2006. Several programs were therefore projected over a longer period, assuming the same parameters and financial support. At the end of 2010, the expected gains totaled 1,445 GWh.

The expected gains of 0.75, 1.23 and 1.45 TWh for 2006, 2008 and 2010 would reduce peak power demand by 100, 200 and 280 MW respectively.

Market	**Expected gains, end of 2006**[1] (TWh)	**Expected gains, end of 2008** (TWh)	**Expected gains, end of 2010** (TWh)
Residential	0.30	0.43	0.49
Commercial and institutional (Rates G, M and L)	0.20	0.33	0.39
Industrial (Rates G, M and L)	0.25	0.47	0.57
Total	**0.75**	**1.23**	**1.45**

1. As previously mentioned, this is a year-end objective. Gains for 2006, given the gradual introduction of the measures, should amount to 614 GWh.

4. Overall Investments, Economic Spinoffs and Impacts

During the 1990s, Hydro-Québec poured over $500 million into its energy efficiency programs. Customers participating in these programs invested a roughly equivalent amount. About 12,000 person-years of employment are estimated to have been supported directly and indirectly by all these investments between 1990 and 1999.

Spending under the EEP 2003–2006 by Hydro-Québec, its partners and participating customers is expected to support direct and indirect employment totaling over 2,500 person-years. If this level of investment is maintained until 2010, some 5,000 person-years will have been supported by Hydro-Québec Distribution's energy efficiency programs between 2003 and 2010.

It is interesting to note that, unlike other types of investments, energy efficiency investments are spread throughout Québec and over a number of years.

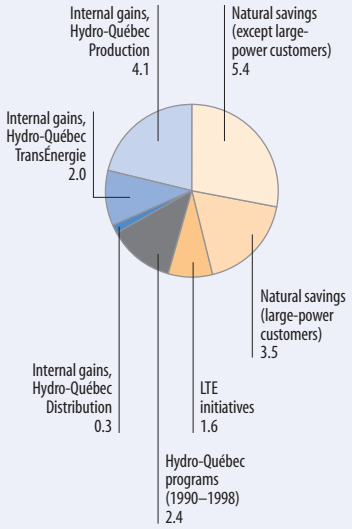
In 2002, for the second year in a row, Québec shared first place with Yukon on the Canadian Energy Efficiency Alliance's national energy efficiency report card. The mission of this not-for-profit organization is to be the leading independent voice in Canada promoting and advancing energy efficiency. The Alliance ranks provincial governments on the basis of their energy efficiency activities. Since 2002, it has also considered the contribution of energy-sector companies.

During 2002, the AEEQ and Hydro-Québec worked together to expand the scope of the agency programs that are incorporated into the *Energy Efficiency Plan 2003–2006*.

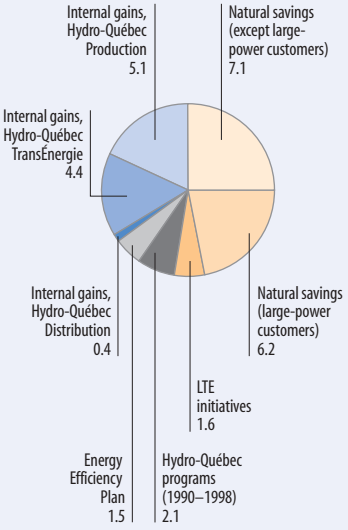
Québec relies on the synergy and complementarity fostered by partnerships and on new market trends to enhance the achievement of energy efficiency potential.

The adjacent illustrations show the annual impacts of energy efficiency on electricity supply and demand in 2002 and 2010, compared to the reference year 1990. All of the measures introduced in 2002 represent energy savings of 19.3 TWh. These savings will reach 28.4 TWh in 2010, as the company pursues its efforts and renews its commitment to energy efficiency. By making its system more energy-efficient, implementing its *Energy Efficiency Plan* and furthering the collateral effects of its activities, Hydro-Québec will maintain its energy efficiency leadership.

Recurring Energy Savings in 2002 (compared to 1990): 19.3 TWh



Recurring Energy Savings in 2010 (compared to 1990): 28.4 TWh



Glossary

capacity reserve

Generating capacity available to cover generating equipment failures and uncertainties related to weather and demand.

capitalization rate

The quotient of shareholder's equity over the sum of shareholder's equity, long-term debt, perpetual debt, short-term borrowings and the current portion of long-term debt, less the financial assets related to debt. This ratio measures the portion of capital that is financed from funds invested by the shareholder and retained income.

distributed generation

Electricity generation by small independent units installed on customers' premises (gas micro-turbines, fuel cells, solar panels, wind turbines, etc.).

energy reserve

Electrical energy (in particular, energy stored in the form of water in reservoirs) that the company can use to make up for any runoff deficit.

fuel cell

An electrochemical electricity generation system in which the chemical energy in a fuel is tapped for direct generation of electric current.

hydroelectric generating fleet

All the facilities that the company can use to generate electric power from water power.

interest coverage

The quotient of operating income plus net investment revenue over gross interest expense. This ratio measures the company's ability to service its debt from its working capital.

long-term operability

Durability, very long useful life of an asset, structure, generating fleet, system, etc.

market niche

A small market segment for a given product or service, which is either undeveloped or underdeveloped and can be tapped to meet the needs of a particular group of customers.

merchant transmission line

An interconnection line on which available transmission capacity is sold at rates based on the price differential between the interconnected markets, rather than costs determined according to a fixed rate of return.

postage-stamp rate

A uniform unit rate applied across a transmission system (electric or gas), regardless of distance.

power exchange

A public marketplace where buyers and sellers of electricity can negotiate transactions under prevailing market conditions.

regional transmission organization (RTO)

A body operating independently from energy market participants and mandated by transmission providers to assume such responsibilities as managing power transactions, establishing the terms and conditions governing transmission loading relief, and coordinating activities aimed at ensuring the reliability of transmission systems in such a way as to provide non-discriminatory open access.

return on capital employed (ROCE)

The quotient of net income before interest, taxes and corporate fees over the average assets in service. This ratio measures the ability to realize returns from assets in service.

return on equity (ROE)

The quotient of net income over the average shareholder's equity for the year. This ratio measures the return obtained on the capital invested by the shareholder.

self-financing rate

The quotient of cash provided from operations less dividends paid, over the sum of investments, long-term debt maturities and sinking fund redemption. This ratio measures the company's ability to finance its investments and repay its debt from its working capital.

sustainable energy

Any type of energy whose use on a continuous basis is not harmful to people or the environment.

sustainable energy system

A system designed to promote a more efficient, diversified and sustainable use of renewable energy sources and to reduce consumption by improving on existing technologies and developing new ones (e.g. hydrogen production and storage, fuel cells, etc.).

useful life

Period of time over which an asset may be expected to perform its intended function if operated under normal conditions in compliance with design specifications.

venture capital

Capital invested in an innovative business undertaking (leading-edge technologies, new ideas, etc.). In return for greater risk, investors hope for above-average returns.

wheel-out, wheel-in

The transmission of electrical energy to a power system in a control area other than the one in which it was generated.

Units of measure

$M :	millions of dollars
$B :	billions of dollars
W :	watt A unit for measuring power
kW :	kilowatt One thousand watts
MW :	megawatt One million watts
GW :	gigawatt One million kilowatts
Wh :	watthour A unit for measuring electric energy
GWh :	gigawatthour One million kilowatthours
TWh :	terawatthour One billion kilowatthours

This document can be recycled.
With the exception of the cover,
it is printed on Québec-produced
recycled paper containing 10 to 20%
de-inked fibres.

For additional copies
please call 1 800 363-7443,
or download the electronic
file at www.hydroquebec.com.

Produced for Vice-présidence –
Recherche et planification stratégique
by Groupe –
Affaires corporatives
et secrétariat général

Legal deposit – 4th quarter 2003
National Library of Canada
Bibliothèque nationale du Québec
ISBN 2-550-41592-2

www.hydroquebec.com

Vice-présidence – Recherche
et planification stratégique

2003G082A

Ce document est également publié en français.

Hydro Québec