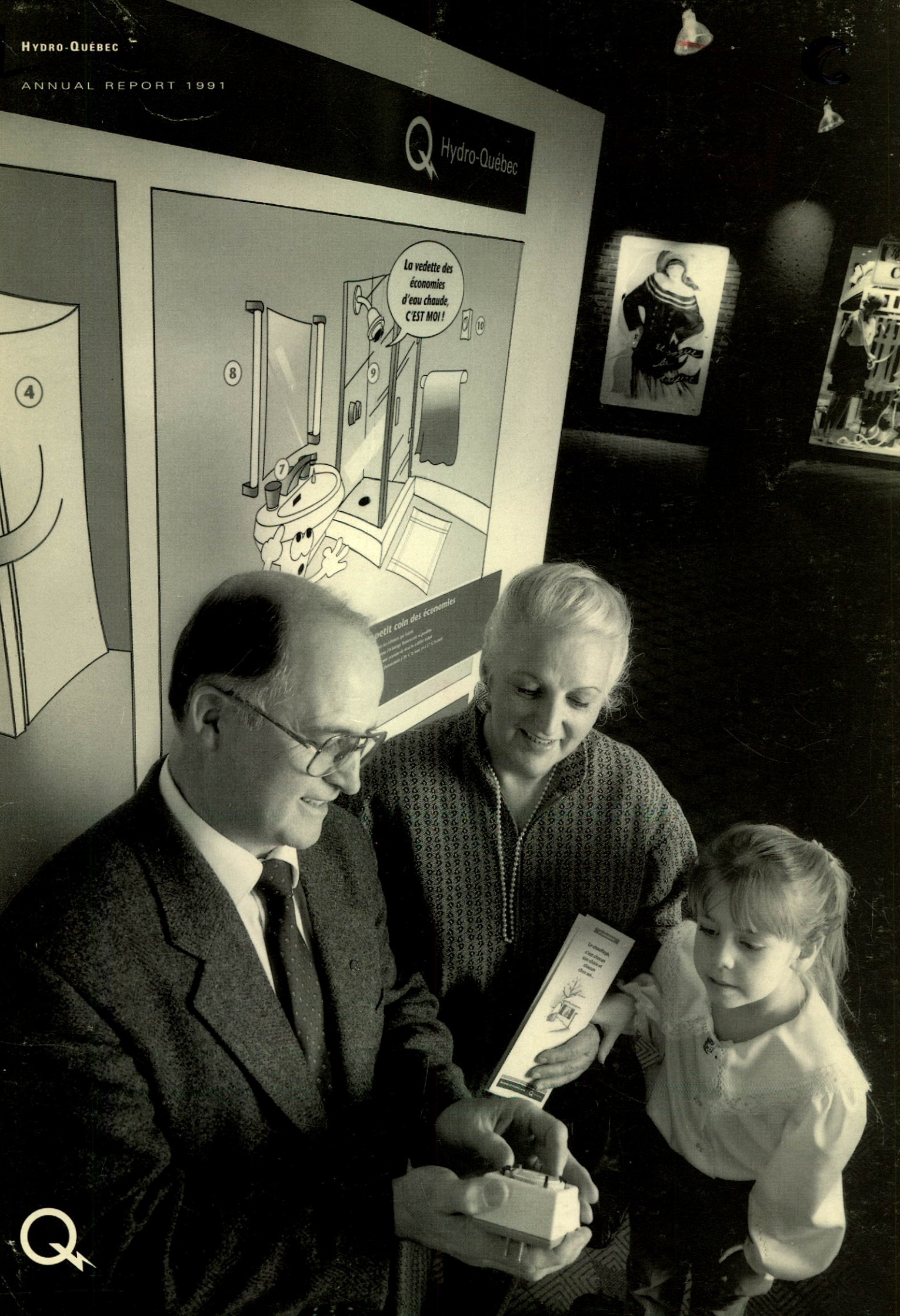
HYDRO-QUÉBEC

ANNUAL REPORT 1991



CONTENTS

3 *Message from the Chairman of the Board and Chief Executive Officer, and the President and Chief Operating Officer*

10 *Défi performance: Groundwork for Total Quality in Place*

12 THE YEAR IN REVIEW

12 *The Quality Imperative*

Product Quality
Quality of Customer Service
A Reliable and Cost-Effective Power Supply

20 *Helping the Consumer Get More Value for the Energy Dollar*

26 *A Commitment to Partnership*

Relations with our Publics
The Environment
Economic and Social Contribution

33 *Employees, Hydro-Québec's Driving Force*

37 FINANCIAL REVIEW

45 FINANCIAL STATEMENTS AND FIVE-YEAR REVIEW

67 *Board of Directors*

68 *Senior Management*

70 *Subsidiaries and Affiliates*

71 THE POWER SYSTEM IN 1991

Cover: two consumers talking to Jean-Guy Mahoney in a shopping centre where Hydro-Québec was promoting energy efficiency.

CORPORATE PROFILE

HYDRO-QUÉBEC IS A PUBLICLY OWNED UTILITY CONSTITUTED BY AN ACT OF THE QUÉBEC LEGISLATIVE ASSEMBLY IN APRIL 1944. IN 1981, HYDRO-QUÉBEC BECAME A JOINT-STOCK COMPANY WITH A SINGLE SHAREHOLDER: THE QUÉBEC GOVERNMENT.

HYDRO-QUÉBEC RANKS AMONG NORTH AMERICA'S LARGEST ELECTRIC UTILITIES IN TERMS OF ASSETS AND VOLUME OF SALES. IT GENERATES, TRANSMITS AND DISTRIBUTES ALMOST ALL THE ELECTRICITY CONSUMED IN QUÉBEC, AND ALSO SELLS AND PURCHASES BOTH ENERGY AND POWER UNDER AGREEMENT WITH NEIGHBORING SYSTEMS IN CANADA AND THE UNITED STATES.

HYDRO-QUÉBEC ACTIVITIES EXTEND TO ENERGY-RELATED RESEARCH AND PROMOTION, ENERGY TRANSFORMATION AND CONSERVATION, AND OTHER AREAS CONNECTED WITH ENERGY. IN MANY CASES, THE UTILITY WORKS WITH OUTSIDE PARTNERS.

Note: The financial information on the Hydro-Québec Retirement Fund is not included in this year's annual report. Instead, a separate document will now be published each year for Hydro-Québec Retirement Plan participants.

Gouvernement
du Québec

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Deputy Prime Minister and
Minister of Energy and Resources

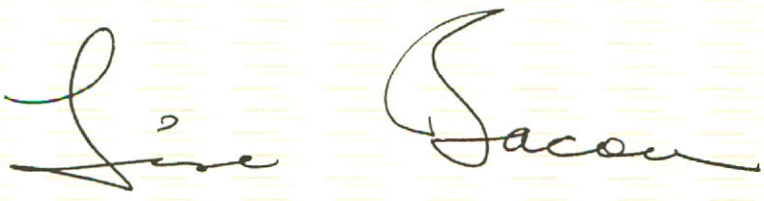
Québec City, March 10, 1992

Mr. Jean-Pierre Saintonge
President of the National Assembly of Québec
Québec City

Dear Sir,

I have the honor of submitting to you the annual report of Hydro-Québec for the year ended December 31, 1991.

Yours respectfully,



FINANCIAL DATA *(in $M)*	1991	1990	Variation in %
Gross Revenue	6,284	5,883	6.8
Total Expenditure	3,183	3,045	4.5
Net Income	760	404	88.1
Assets	41,851	36,684	14.1
Long-Term Debt	28,111	24,072	16.8
OPERATING DATA			
Gross Generation *(in TWh)*	121.9	115.2	5.8
Total Sales *(in TWh)*	137.0	135.1	1.4
Installed Capacity* *(in MW)*	26,839	25,682	4.5
Customer Accounts *(in thousands)*	3,216	3,151	2.1
PERSONNEL**			
Permanent	20,755	20,067	3.4
Temporary***	5,985	5,222	14.6

* In addition to its own installed capacity, Hydro-Québec has access to most of the generation of the Churchill Falls power plant, which has a nominal capacity of 5,428 MW.

** These figures exclude employees on loan to subsidiaries.

*** Annual average.

UNITS OF MEASUREMENT

GWh : gigawatthour, or 1 million kilowatthours
TWh : terawatthour, or 1 billion kilowatthours
MW : megawatt, or 1 million watts
$M : millions of dollars

MESSAGE FROM THE CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER, AND THE PRESIDENT AND CHIEF OPERATING OFFICER

FOR HYDRO-QUÉBEC, 1991 WAS A YEAR OF CHALLENGES ON SEVERAL FRONTS. OUR FUNDAMENTAL FOCUS ON CUSTOMER SATISFACTION WAS FOLLOWED THROUGH IN NUMEROUS CONCRETE ACTIONS BACKED BY CLEAR MANAGEMENT CHOICES. AND DESPITE THE DIFFICULT ECONOMIC CLIMATE, WE HONORED OUR COMMITMENTS TO OUR PARTNERS.

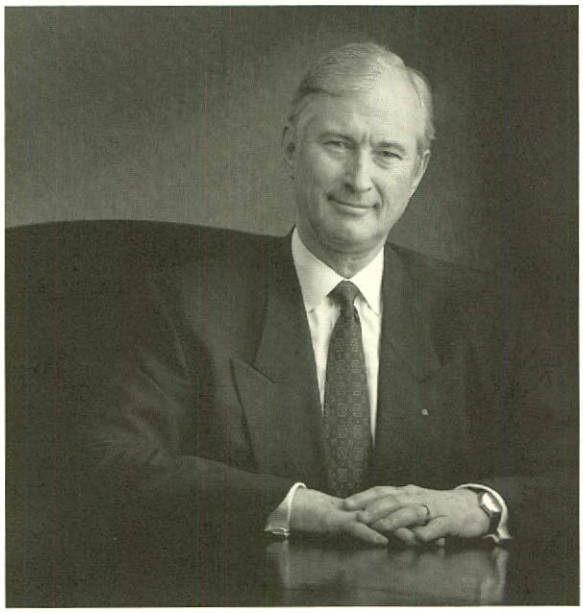
ONE YEAR INTO *DÉFI PERFORMANCE*, OUR COMPANY-WIDE TOTAL QUALITY MANAGEMENT DRIVE, THE PICTURE LOOKS GOOD. WE ARE FOCUSING, COORDINATING AND INTENSIFYING OUR ACTIVITIES TO MATCH OUR CUSTOMERS' NEEDS, AND TO CONTINUOUSLY IMPROVE CUSTOMER SERVICE. CUSTOMERS ARE ALSO KEY IN THE MAJOR ENERGY-EFFICIENCY PROJECT LAUNCHED IN THE SPRING OF 1990, AND INTENSIFIED IN 1991, TO REDUCE ELECTRICITY CONSUMPTION. HERE THEN ARE TWO IMPORTANT COMMITMENTS THAT REFLECT THE MODERN MANAGEMENT IMPERATIVES WE HAVE ADOPTED IN RECENT YEARS. THEY ENABLE US TO PROVIDE THE RIGHT FIT OF PRODUCT AND SERVICES, AND SECURE AN ADEQUATE ENERGY SUPPLY FOR QUEBECERS, WHILE RESPECTING THE ENVIRONMENT AND MAINTAINING THE UTILITY'S FINANCIAL HEALTH.

IN 1991, HOWEVER, A FURTHER CHALLENGE APPEARED AS SOME OF OUR MAJOR DEVELOPMENT STRATEGIES CAME UNDER FIRE. PUBLIC CONTROVERSY AROSE OVER OUR ELECTRICITY EXPORTS AND RISK-AND-PROFIT-SHARING CONTRACTS WITH SOME INDUSTRIAL CUSTOMERS. THERE WAS ALSO NEW DEBATE ON THE ECONOMIC, SOCIAL AND ENVIRONMENTAL IMPACTS OF HYDROELECTRIC DEVELOPMENT. SO WE MADE EVERY ATTEMPT TO EXPLAIN OUR VIEWPOINT AND RE-ESTABLISH THE FACTS, EXTENDING OUR INFORMATION ACTIVITIES TO A BROADER PUBLIC, BOTH INSIDE AND OUTSIDE QUÉBEC.

Financial objectives attained

We closed the year with net income of $760 million, in line with our forecasts. This represented an 88.1% increase over the previous year, when we were obliged to take exceptional measures to raise reservoir levels and offset the cumulative impact of several consecutive years of low runoff. The measures were suspended in late 1990, but the low level of precipitation from spring to fall 1991 forced us to resume buying backup electricity from neighboring systems in the fall. The financial impact of these purchases will be felt primarily during 1992.

Our financial expenses were appreciably lower in 1991, owing mainly to lower interest rates. The markets were very receptive to our debt securities, which prompted us to substantially increase the volume of borrowings. In fact, we took advantage of favorable market conditions to complete prefinancing of $2,062 million beyond our 1991 borrowing requirements. In June and September we launched our first two $1,100-million global offerings, which were extremely well received, a clear sign that the national and international financial community continues to show confidence in us.



Richard Drouin, Chairman of the Board and Chief Executive Officer

Claude Boivin, President and Chief Operating Officer

Because capital expenditure and financing were up in 1991, two of our financial ratios deteriorated slightly, falling temporarily short of objectives: self-financing and capitalization stood at 27.5% and 23.7% respectively at year-end. Our other financial ratios rose substantially, as a result of the increase in income. To maintain sound financial health and meet our partners' requirements, we will sustain our marketing efforts, exercise continued vigilance over operating expenditure, and hone our management practices even further.

Groundwork for total quality in place

With the profound changes taking place on national and international markets, clear objectives and a systematic approach are more than ever essential to the development of any large corporation. Hence the importance of Défi performance, *which is central to the process of continuous quality improvement we initiated in 1990. Over the first five years of its implementation, we will see employees rally around precise goals that will lead to lasting progress at every level and in every sector of corporate activity.*

The total quality challenge got off to a great start in 1991. In phase I, the issues at stake were explained, as were the new work processes these will imply. Management and employees took part in a number of training and development activities, and the first improvement teams were set up.

At the same time, and consistent with the new division of responsibilities in the operating sector, particularly in our regions, a far-reaching study is in progress. We expect this to result in greater flexibility within our organization, and even greater focus on the customer in 1992 .

Continued progress in customer service

The myriad routine procedures we carry out to ensure continuity of supply and customer satisfaction were targeted and organized more methodically in 1991. And our special product-quality enhancement programs kept the technical performance recovery on track. Average annual interruption time per customer fell again, and we are confident of attaining our 1995 continuity-of-service objective: to achieve uninterrupted electricity supply for an average of at least 8,756 hours per customer in an 8,760-hour year.

Customer satisfaction is up, complaints are down, and poll results are encouraging. Level of satisfaction stood at an average of almost 80% in 1991, up from around 62% in 1990. The notable improvements were in the percentage of customers getting actual meter readings as opposed to estimated bills, the time taken to obtain an electricity connection, and ease of telephone access to our customer representatives. Customer information and assistance were improved. All customers now receive comprehensive guides to the services and programs available to them. Customers scheduled for service interruptions are given more systematic notice. The processing of complaints has accelerated, and with the present economic climate, we have increased the number of arrangements we make with customers having difficulty paying their bills. For our commercial, institutional and industrial customers, we are carefully tailoring the assistance and advice we offer, so it more closely matches their requirements.

Customers respond to energy efficiency

Although Hydro-Québec has a more than 20-year history of energy efficiency, we have been stepping up our efforts since 1990. If we can help customers get the best possible return on their electricity dollar we can sustain our society's energy choices and achieve the sustainable development we all desire.

Partnership was key on the energy-efficiency front in 1991 in introducing energy-conservation programs and measures, and in completing many promising trials and studies. Together with our consumption-management activities, these actions resulted in overall savings equivalent to the energy consumed annually by 13,000 people in a Québec town, (Matane, on the Lower St. Lawrence, for example), or the output of a generating station like Rivière-des-Prairies. Our intervention-based energy-savings objective of 9.3 TWh per year on the 2000 horizon – on top of natural savings of 3.6 TWh – remains one of the more ambitious among North American electric utilities.

Adjusting supply to demand in a fluctuating market

We now have the flexibility to react rapidly to the demand variations that have characterized the electricity market in the last few years. Despite the lingering recession and gains in energy efficiency, total electricity sales were up 1.4% over the previous year, reaching 137.0 TWh in 1991. Québec's industrial sector, particularly smelting and refining, registered the largest increase.

The anticipated growth in exports did not materialize, due to the economic climate in the northeastern United States. Exports accounted for 7.2% of our total electricity sales in 1991. The New York Power Authority decided to postpone ratification of a 1,000-MW contract by one year (to November 30, 1992), a decision based on a reassessment of their immediate energy requirements. The needs are real, however, for the medium and long term, even with the expected energy savings gains and slower growth. Export demand, like demand in Québec, is still prone to large fluctuations in the coming years. But we have the flexibility to adjust supply accordingly. Clearly defined procedures help us, for example, achieve optimal reservoir management, constantly assess our position and take action where appropriate. Electricity supply is therefore assured, because our energy reserve always contains an adequate margin of manoeuvre.

The construction program went ahead in 1991. The first three generating units of La Grande-2-A generating station, totalling 999 MW, were commissioned, and will be followed by three more in 1992. Completion of other work at Phase II of the La Grande complex is on schedule and as budgeted: by 1995, three new generating stations – Brisay, Laforge-1, and La Grande-1 – will be added to existing facilities. According to our revised plans, however, Laforge-2 and Eastmain-1 generating stations, currently under study, will be built one year later than originally scheduled, in 1996 and 1997 respectively. The Grande-Baleine complex, initially scheduled for commissioning in 1998, has also been put back, primarily as a result of the downward revision of growth forecasts from now until the end of the century.

Growing public dialogue

Information, communication and consultation: these were the facets of public dialogue in 1991. Information from the utility reached a wider audience than ever. Generally speaking, we made ourselves more available, increasing our presence in the public arena, forging links and engaging in debate on pressing concerns about hydroelectric development and environmental protection. And we put in place in 1991 a new public involvement mechanism as part of the process of preparing our Development Plan. A first series of meetings has already been held with some of the main interest groups in Québec, with a view to more open discussion on our orientations.

Reaction to this new formula is very favorable and there is growing public satisfaction with the information we provide. But we face strong opposition from certain groups in Québec and elsewhere, and have gone to considerable lengths to make our viewpoint known beyond our usual constituency. Increasing our presence abroad puts us in a better position to explain our activities and projects to our international partners — decision-makers, investors and the general public.

Partnership spinoffs

In a 1991 context increasingly marked by North American free trade and the globalization of financial markets, our links with partners in all sectors of corporate activity were crucial. We will be calling upon our suppliers, who are already active contributors to our progress, to increasingly participate in our drive for total quality. Our purchases supported Québec manufacturers, while promoting job creation in Québec. We were the beneficiaries of technological input from engineers and researchers in many areas of specialization which resulted in development of improved products and processes; our excellent research and development record owes a great deal to their active support. Last but not least, we continued our long-standing cooperation with both private and public sector environmental specialists, who work with us to achieve sustainable development.

Men and women of commitment

1991 proved yet again that our employees are the key to our success. Increasingly, in a climate of uncertainty, employee input at every level is a determining factor. The quality of individual contributions has enabled the utility to overcome past difficulties and, no doubt, will be crucial to meeting the challenges of the future. The evident commitment of managers and employees alike has instilled a new spirit of openness and confidence at Hydro-Québec, helping it acquire a more human face and move closer to its customers and its publics. We are resolved to continue in this vein. The September 1991 signing of collective agreements involving 17,300 employees with the Canadian Union of Public Employees indicates the climate of respect that will be the hallmark of all our relations.

In closing, we would like to express our gratitude to Claire Léger, Michel Bélanger and François Geoffrion, who stepped down in 1991 after many years of active contribution on the Board of Directors. Our sincere thanks go to Jacques Guevremont and Maurice Huppé, who both left the utility after 36 years of service, for their invaluable contributions to the promotion of electricity sales outside Québec, and to the advancement of research and development and scientific knowledge, respectively. And we welcome to the Board Nicole Malo, Deputy Minister of Energy and Resources, who replaces Mr. Geoffrion.

Finally, may we pay special tribute to Roland Giroux, who died on November 4, 1991. As President of Hydro-Québec from 1969 to 1977, Mr. Giroux was one of the early architects of the utility, and without any doubt an outstanding figure in its development.

Richard Drouin, QC
Chairman of the Board and Chief Executive Officer

Claude Boivin
President and Chief Operating Officer

Défi performance: groundwork for total quality in place

In fall 1990, Hydro-Québec informed its shareholder and its employees of the main thrusts of a vast corporate project to introduce total quality management. The ultimate goal of this five-year project, called *Défi performance*, is total customer satisfaction.

In 1991, the objective was to prepare the ground, and put in place the components needed to initiate continuous improvement and a radical change in our management habits. To attain this objective, we pursued a fivefold strategy.

Managing the transition. Provisional rules were drawn up for certain strategic activities – organization, information systems, budget, labor relations, executive development, human resources and communications – to ensure they are carried out in harmony with quality management. At a later date, guidelines will be established that incorporate the values of total quality.

Making quality official. To ensure a smooth and gradual transition, a "lead team" structure has been set up, whose role is to promote the integration of quality management in the decision-making process. This structure consists of a Quality steering committee, an objectives-deployment committee, corporate management committees, facilitators and the newly created Quality branch.

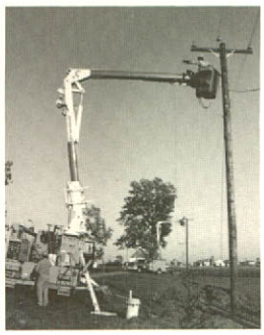
Sensitizing employees. Information procedures are now in place to sensitize the workforce: managers constituted the principal communications and information target, as they are the ones who will direct the overall change. As part of this process, senior-level managers each received an average of 20 days' *Défi performance* training. Training in quality values and principles has also been given to more than 1,000 employees at every reporting level.

Setting up improvement teams. Improvement teams are fundamental to this culture change and are composed of employees who get together to resolve work-related problems. More than 70 teams are now at work.

Managing improvement targets. *Défi performance* also involves setting improvement targets for customer satisfaction. In 1991, managers collaborated in introducing a new formula for setting objectives. The rigor of *Défi performance*, coupled with the improvement efforts under way for some years now, have succeeded in reversing the performance pattern observed over the last 10 years in several sectors of activity. Moreover, work on the improvement targets has led to some in-depth thinking on the future of Hydro-Québec, and on ways to achieve satisfaction for customers and for Québec society at large.

At the end of Year 1 of *Défi performance*, we can confidently state that the groundwork has been laid. Year 2 will be the year of assumption of the quality approach by Hydro-Québec management and employees alike.

Hydro-Québec's quest for quality depends increasingly on the efforts of its improvement teams. Gérard Pépin, Michel Lambert, Serge Poulin, Francine Maurice, Cécile Meunier, André Marcil, Jacques Choquette and Carole B. Vigeant get together an hour a week to solve work-related problems.



The quality imperative

Constant progress in continuity of service

Improved customer service

Construction program tailored to evolution of demand

Giving our customers a quality product and quality service, with reliable and economical electrical supply, is our raison d'être. Quality is central to our role as a service corporation.

In launching *Défi performance* in 1990, we made a firm commitment to continuous quality improvement. More than ever, customer satisfaction is at the core of day-to-day activities for all employees.

Product quality

To generate electricity and deliver it to our customers, we operate a highly complex power system: a large number of generating facilities, 54 of them hydroelectric; a transmission and subtransmission system with nearly 30,000 km of lines and 514 substations; a distribution system with close to 97,000 km of lines, about 7,000 km of them underground; a telecommunications network; and 27 system control centres. In short, a vast amount of equipment whose behavior can affect continuity of service. Ensuring this continuity is a major challenge that we work actively to meet. In 1991, we allocated a total of $507 million to improving the quality of our product.

Efforts to enhance quality have intensified in recent years, and have been successful. Continuity of service has shown steady improvement since 1988, and longer-term measures are being introduced to ensure this improvement is maintained.

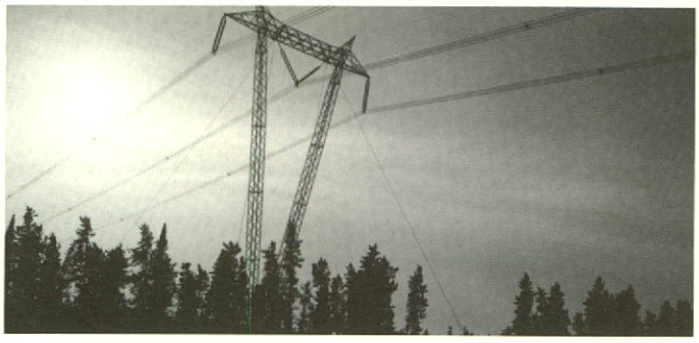
Sustained progress. The indicator used to measure improvement in continuity of service is average annual interruption time per customer. To give a more accurate reading of progress made, the indicator is standardized; in other words, it does not include power failures caused by exceptional weather conditions (extreme instances of lightning, wind and freezing rain), or events beyond the utility's control.

From 1988 to 1990, the average annual interruption time per customer fell by 34%, from 9.59 hours to 6.34 hours. In 1991, it dropped further to 5.32 hours. These results can be attributed to successful action on several fronts.

Average annual interruption time per customer
(in hours and hundredths of an hour)

	1991	1990
Distribution	5.36	5.43
Transmission and subtransmission	1.24	1.57
Total	6.60	7.00
Less		
Exceptional events	1.28	0.66
Standardized total	**5.32**	6.34

Guyed-V transmission tower



Routine procedures. Extensive maintenance and modernization procedures are carried on throughout the system, from generation through transmission and subtransmission to distribution. For some years now, we have improved the effectiveness of this work by giving priority to activities with the greatest impact on continuity of service. Routine procedures contribute significantly to the progress realized in this area.

Special programs. In 1989 we launched two programs to accelerate product quality enhancement. These programs go hand in hand with routine procedures.

The Service Quality Enhancement Program – Distribution System, to run until 1995, comprises several hundred projects for equipment renewal, maintenance and upgrading on the overhead and underground distribution systems. In 1991, $105 million was allocated to this program.

For the generating, transmission, subtransmission and telecommunications systems, there is the Maintenance Enhancement Program. This runs until 1996, and involves a number of replacement, rehabilitation, modification and maintenance projects. In 1991, $123 million was allocated to this program.

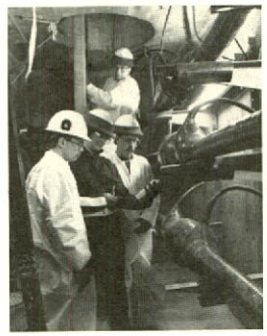
Industrial supply. In 1990, in conjunction with our large-power industrial customers, we conducted a study on enhancing the quality of supply to industry. On the basis of the information gathered, we have now been able to establish causes for electrical disturbances leading to lost industrial production, and to identify customers most affected. We have begun applying corrective measures to customers' equipment, and to our own.

Doing better still. We aim to reduce the annual average interruption time per customer to 4 hours by 1995: 3.5 hours on the distribution system, and 0.5 hours on the transmission and subtransmission system. To meet this objective, routine procedures and special programs will continue, along with various other actions whose results will be felt more gradually.

An improved distribution system. Several years ago, we began modernizing the underground distribution system to make it safer for employees and more reliable for customers.

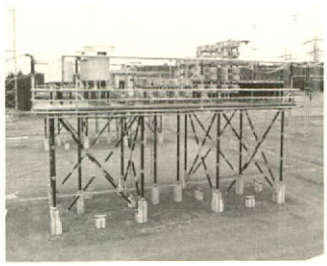
On the overhead distribution system, we have had a problem with exploding surge arresters, so 150,000 surge arresters, 50% of the present total, have been withdrawn as a safety measure. Once the problem is resolved, 450,000 new surge arresters will be installed.

The distribution system remote-control project is continuing. This involves installing, at some 2,200 strategic points on the distribution system, disconnector switches which are remote-controlled from the distribution control centres. These will reduce the length of planned interruptions, speed up identification of defective line segments in the event of a power failure, and limit the number of customers inconvenienced. Under a pilot project this year, some 150 disconnectors were installed in urban and semi-urban areas.



Visual inspection of underground installations

Reliability Enhancement Program – Transmission System. Series compensation is the main project under this program. This involves installing series compensators on power lines, to increase the sturdiness and carrying capacity of the transmission system. In October, we commissioned the first 735-kV series compensation substation: Bergeronnes. The remaining 10 series compensation substations will be commissioned gradually between 1992 and 1995. Shunt reactors have been installed in three 735-kV substations. The addition of new automatic controls and other work, to be completed by 1995, will affect a total of 20 or so 735-kV substations.



Bergeronnes series compensation substation

System-control and telecommunications improvement plan. This plan involves a series of measures, including automation of the regional control centres and the distribution control centres, and upgrading of the system control centre. These are the centres where decisions and actions vital to generating and delivering electricity are taken. Measures are designed to reduce the risk of power failures, lessen the impact that maintenance has on availability of equipment, and speed up restoration of service following interruptions.

Equipment rehabilitation. The power system is aging, and as the reliability of installations is vital to quality of service, we are carrying out a program to maintain installations in good working order as long as possible. This involves replacement of transmission and subtransmission equipment, and rebuilding or rehabilitation of generating facilities.

Maintenance policy. Implementation of the maintenance policy adopted in 1989 continues. The objective of this policy is to improve our practices by promoting well-advised, well-timed interventions that help reduce response times and increase the availability of facilities.

Technological development. Much of our research and development in generating, transmission and distribution equipment is intended to increase system productivity and reinforce the reliability and operating flexibility of installations. For instance, two systems have been developed: one is an expert system (LANGAGE) to make power-system operation easier; the other is a permanent monitoring system (SUPER) to increase the effectiveness of generating-unit maintenance.

Quality of customer service

To better respond to customer expectations we introduced, some years ago, a series of activities including the Service Quality Enhancement Program – Customer Services, and set ourselves clear objectives. We have made substantial progress in improving customer service, and are continuing efforts to attain our objectives.

Priority targets. Our customers' expectations are particularly high as regards telephone access to our offices, billings based on actual meter readings, and time taken to obtain an electricity connection.

Telephone access. The percentage of telephone calls processed continues to improve, rising from 76.7% in 1990 to 90.3% in 1991. We have increased the number of telephone service representatives and extended the hours of some Customer Services offices. These measures, coupled with the fall 1990 modernization of the telephone system in the Montréal region, have helped improve results. Complaints concerning telephone access plummeted from 2,729 in 1990 to 49 in 1991.

Meter readings. About 10% of our three million meters are hard to reach. When we cannot get a reading, our practice is to send bills based on customers' estimated consumption. To resolve this problem, we have begun to automate the reading of these meters. During the year, some 25,000 remote reading units were installed in Montréal, and our objective is 250,000 units by 1996. We also started reorganizing and optimizing meter readers' routes. The average rate of actual readings reached 88% in 1991, up from 75% in 1990, a year marked by a labor conflict. The number of complaints concerning billing fell by 28%.

Electrical connections on time. The proportion of requests for electrical connection answered within the time allowed rose from 58% in 1990 to 77% in 1991. During the year, we went some way towards tightening work process controls and reinforcing cooperation between maintenance teams and employees in direct contact with customers.

Making life easier for our customers.

Advance notice of scheduled interruptions. Maintenance and enhancement work on the distribution system sometimes requires the interruption of electricity supply. But we take steps to give at least 24 hours' notice in the event of a scheduled interruption lasting more than one hour. We notify customers in various ways: personal telephone calls, voice messaging, radio announcements, or door-to-door delivery of written notices. The percentage of customers successfully notified was up again, from 35% in 1990 to 51% in 1991.

Equalized payments plan. Paying the same amount each month, instead of having large bills in the winter and smaller ones in the summer, helps our customers manage their spending. So throughout the year we continued an intensive campaign to promote equalized payments. In 1991, more than 240,000 customers used the plan and the penetration rate now stands at 27%, compared with 19% in 1990.

Making telephone access easier

Speedier processing of complaints. In 1991, 75% of all complaints received were processed within the time allowed, up from 61% in 1990, and the average processing time fell from 29 days in 1990 to 22 days in 1991. Of residential customers' complaints made in writing and therefore subject to the *Act respecting the examination of complaints from customers of electricity distributors*, 76% were processed within the authorized time, against 65% in 1990, and the average processing time dropped from 37 days in 1990 to 25 days in 1991.

Information: one way of getting closer to our customers. During the year, we concentrated part of our information activities on topics of immediate concern to customers. Implementation of the Goods and Services Tax (GST), application of rate increases, the complaints review procedure, and safety at our facilities were all the subjects of bill stuffers. For young people, we produced energy-efficiency and safety awareness segments for the *Club des 100-watts* TV program.

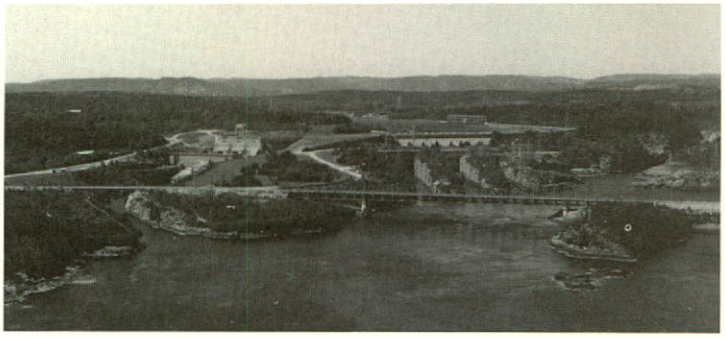
At the height of the moving season, we supplied all our customers with notification forms and made special moving-notification telephone lines available to customers in the most densely populated sectors. In addition, to reach our customers whose mother tongue is neither French nor English, we televised announcements in 26 languages on community programming networks.

Collections. The collection of accounts is another facet of our customer relations. In recent years, the amount represented by collections claims, in other words, accounts unpaid at the due date, has increased dramatically, up 81% between 1988 and 1991. This is largely due to the economic climate, with customers in all categories having difficulty paying their bills. The situation has prompted us to bring in additional staff for collections, and the number of payment agreements signed with customers in difficulty has doubled. We also worked on improving and modernizing our business practices.

More collections staff on the job

Teaching young people about safety and energy efficiency

Site of Manic-1 generating station



A RELIABLE AND COST-EFFECTIVE POWER SUPPLY

Hydro-Québec has the mandate to provide Quebecers with electricity, not only from day to day but for the future. We must preserve the delicate balance between supply and demand, rigorously manage the energy reserve, construct new facilities at the right moment, and diversify our sources of supply. In other words, we must guarantee our customers a cost-effective power supply.

The evolution of demand. In 1991, total electricity sales rose by 1.4% compared to 1990. This increase was lower than forecast due to the recession; as well, the milder weather caused some slowdown in sales.

In Québec. In Québec, the recession's effects on sales were felt in the industrial sector and, to a lesser degree, the commercial sector. However, this downward effect was offset somewhat by higher demand in the smelting and refining industry. Total sales in Québec increased by 1.0%.

Export markets. On export markets, although new contracts came into force, sales rose only slightly compared with 1990 since we continued to limit deliveries of interruptible energy.

In the northeastern United States, short-term needs for energy imported from Québec fell, due to weaker economic growth than forecast, to energy-efficiency efforts, and to increased production by independent power producers.

Two events took place during the year that will affect long-term demand. Vermont Joint Owners ratified the long-term power and energy contract signed in 1987; as a result the parties may no longer cancel the contract without penalty. And the New York Power Authority delayed for one year, until November 1992, ratification of the firm power and energy contract entered into in 1989.

Meeting demand.

Managing the energy reserve. Since Hydro-Québec's capacity is 96% hydroelectric, we depend on natural inflows of water in the form of snow and rain. These inflows vary considerably over the year, peaking in spring and reaching a low in winter; but demand is highest in winter and lowest in summer. We have to balance these variations.

Inflows also vary from year to year. To protect the energy reserve during lower runoff years, we use exceptional measures: extra purchases from neighboring systems, increased operation of Tracy oil-fired power station, and interruption of dual energy deliveries.

Since runoff was well below its historical average from 1985 to 1989, we implemented various exceptional measures toward the end of 1988 to raise reservoir levels. In 1990, natural inflows were close to average, and we were therefore able to suspend the special measures at the end of that year.

In 1991, water inflows in the reservoirs were about 16% below average, a loss of generating capacity of 26 TWh. In the interests of prudent management, we therefore gradually resumed additional electricity purchases from neighboring systems in the fall. We expect to increase these purchases and operate Tracy power station more regularly in 1992.

Facilities under construction. Despite the anticipated effects of our energy-efficiency project, we expect demand to continue to increase between now and the end of the century. Bringing new facilities on stream at the right moment is therefore essential.

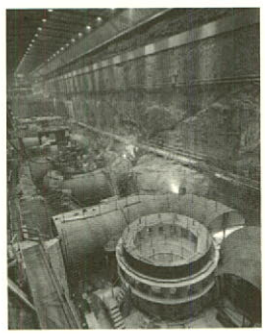
In 1991, the first three generating units were commissioned at La Grande-2-A power station, with a rated capacity of 333 MW each; the remaining three should go into operation during 1992. In September we completed, on time and within budget, the construction of a new 69-MW diesel generating station on the Îles-de-la-Madeleine in the Gulf of St. Lawrence.

Many other construction projects continued during the year. Bécancour gas turbine generating station near Trois-Rivières, which will have an installed capacity of 390 MW, received its construction authorization certificate, allowing us to begin work. Two of the four turbines should come on stream in December 1992 in time to meet peak demand.

Construction continued according to schedule and budget on Phase II of the La Grande complex. Brisay, Laforge-1 and La Grande-1 generating stations are expected to be commissioned in 1993, 1993-1994, and 1994-1995 respectively.

Work went well on converter facilities at Nicolet substation, which is part of the Radisson-Nicolet-des Cantons project. Work continued on the section of the line which crosses under the St. Lawrence River between Grondines and Lotbinière. Three of the six cables have already been delivered and installed, and we will be receiving the other three during 1992. Both Nicolet substation and the underriver crossing, which will replace the overhead line now in use, are expected to go into operation in 1992.

Construction began on the northern section of Hydro-Québec's next (12th) 735-kV transmission line, which is situated in the territory governed by the James Bay and Northern Québec Agreement. This line, which originates at La Grande-3 generating station, will be used to transmit energy from the generating stations of Phase II of the La Grande complex to the Québec City region. Public hearings on the southern portion of the line ended, and the Bureau d'audiences publiques sur l'environnement is preparing its report, after which the government authorizations will be issued. The complete line is expected to be commissioned by October 1994.



Building work continues at La Grande-2-A

New diesel generating station on the Îles-de-la-Madeleine

Electrotechnology: infrared oven for vulcanizing rubber

Medium-term supply. Other generating and transmission installations will be brought into operation as required by demand. Commissionings at Laforge-2 and Eastmain-1 power stations, formerly planned to start in 1995 and 1996 respectively, were thus both put off for one year. Work will begin as soon as we obtain government authorization. We also decided in 1991 to postpone the commissioning of the Grande-Baleine project for one year. This decision was taken in light of lower forecast energy needs between now and the end of the century.

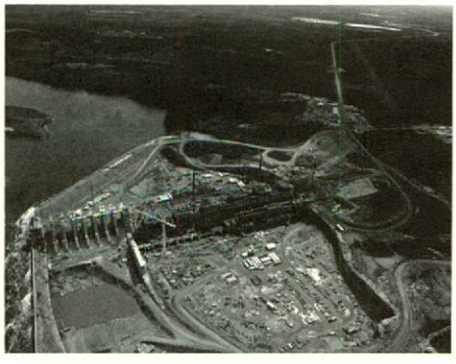
We are using other ways of meeting demand. For example, we have decided to increase our electricity purchases from independent power producers, who operate small hydroelectric or cogeneration plants, from 390 MW to 750 MW. In 1991, following a call for tenders, we received proposals for over 8,000 MW of power, selected projects for a total of 652 MW, and began negotiating purchase contracts. We plan to select another series of projects, which will make available at least 750 MW of independently produced power in the medium term.

Cost-effective electricity. The actions taken to satisfy demand also allow us to offer our customers power at a very competitive price. Despite the average 6.9% increase on May 1, 1991, our electricity rates, which are uniform by customer category throughout Québec, remain among the most competitive on the continent, as the following examples illustrate.

RESIDENTIAL SECTOR, 1,000 kWh CONSUMPTION PER MONTH, SALES TAX EXCLUDED, 1991

Montréal	$ 54.81
New York	$144.58
Boston	$114.73
Toronto	$ 77.55
Vancouver	$ 56.55

We will continue to make every effort to maintain this comparative advantage in the best interests of our customers and the entire population of Québec.



Construction site of La Grande-1

HELPING THE CONSUMER GET MORE VALUE FOR THE ENERGY DOLLAR

HYDRO-QUÉBEC EMBARKED ON AN ENERGY-EFFICIENCY PROJECT IN 1990 THAT WILL PROFOUNDLY AFFECT QUÉBEC'S ENERGY FUTURE AND, ONE WAY OR ANOTHER, TOUCH EVERY SINGLE PERSON IN QUÉBEC. THE PROJECT WILL DIRECTLY GENERATE PROGRESSIVE ENERGY SAVINGS UNTIL, AS OF THE YEAR 2000, WE SHOULD BE CONSERVING 9.3 TWH OF ELECTRICITY A YEAR.

IN 1991, WE STIMULATED THE MARKET BY PROVIDING TECHNICAL AND FINANCIAL ASSISTANCE TO OUR CUSTOMERS, LAUNCHED ENERGY-EFFICIENCY MARKETING PROGRAMS, AND RAN PUBLIC AWARENESS AND PROMOTIONAL CAMPAIGNS ON HOW TO BE ENERGY SMART.

WE ARE ASKING OUR CUSTOMERS AND PARTNERS TO INVEST, WITH US, IN ENERGY EFFICIENCY. WHAT THEY STAND TO GAIN IS GREATER CONTROL OVER THEIR ELECTRICITY CONSUMPTION AND NO SACRIFICING OF COMFORT AT HOME OR PRODUCTIVITY AT WORK: IN OTHER WORDS, THE POWER TO GET THE MOST OUT OF EVERY KILOWATTHOUR.

Energy efficiency means consuming less energy:

- *while keeping the same, or higher, level of comfort at home, or*
- *while obtaining the same, or higher, energy performance in industry, and*
- *at lower cost than generating electricity from new facilities.*

NEW
DUAL
ENERGY

SAVING ENERGY IN THE HOME

Thanks to public support of past Hydro-Québec campaigns, we waste far less energy today than we did 20 years ago. But a lot can still be done. If we all did the small things like turning down the heat in unused rooms, Québec's energy consumption picture would look very different.

ECOKILO energy audits. By providing a portrait of home energy consumption along with specific conservation recommendations, the ECOKILO program tells the consumer exactly how to save electricity without sacrificing comfort. At the same time, Hydro-Québec gets a picture of residential energy consumption that will help plan future energy-efficiency activities. During the summer, we distributed over 100,000 ECOKILO questionnaires in test markets. Our initial objective was a participation rate of 25%: in fact, fully 42% of people who received the questionnaire responded. Every participant receives a free energy-saving kit containing three products. Installing these products and following the recommendations is expected to generate energy savings of over 4.9 TWh over the coming 10 years at this participation rate.

In the fall, we began offering the energy audits to customers in the Québec City region, who responded even more positively than those in the test markets. All our residential consumers will be covered by the program by June 1993.

Les ECONOS. Alongside the ECOKILO program, in 1991 we set up a program aimed at making a wide range of domestic energy-efficient products available to the consumer. This innovative venture, known as Les ÉCONOS, is based on partnership between Hydro-Québec and Québec chain stores which sell these products. In 1991, 42 chains, with 2,500 retail outlets, took part in the program. We provided recommendations about the most suitable products, along with technical and financial assistance to help market them and energy conservation advice to give customers.

During phase I of the program, from March to June, our initial sales objective was exceeded by 30%. Phase II, which ran from September to December, promises even better: preliminary results indicate our sales objective will be surpassed by over 50%. The two 1991 phases of the ÉCONOS campaign alone are expected to yield energy savings of close to 675 million GWh over the coming decade. The campaign will continue in 1992.

Getting the message across. In 1991, we mass-mailed four issues of our energy-efficiency magazine, Hydro 91, whose conservation message was read by close to 33% of the public, an outstanding achievement for a publication of this type: and 830,000 people claim to have taken concrete action to save energy after reading it. In addition, close to 1,000 people called our toll-free energy hot line every week for information on conservation and other energy issues.

SAVING ENERGY IN BUSINESS AND INDUSTRY

In 1991, we were in close contact with consumers, manufacturers, distributors and all the players in the commercial, institutional and industrial markets to provide the technical assistance, training, and other information needed to manage their energy requirements.

Energy-efficient lighting. Working closely with enthusiastic manufacturers and distributors, Hydro-Québec launched a program in early September to promote five categories of energy-efficient lighting products and provide financial assistance for buying them. Companies should recuperate their investment within an average of two years; in some cases, only a few months. The program will run until September 1993 and is expected to yield energy savings of over 400 GWh during the life of the products, which averages 1½ to three years.

Energy audits. In June, Hydro-Québec set up an energy-audit program which provides commercial, institutional and industrial customers with a detailed breakdown of the energy consumption of their buildings. An analyst personally visits customers to discuss their consumption by energy source and type of use. Specific recommendations cover what action to take, the expected costs, and the potential savings. During 1991, 541 audits were carried out in the startup phase. The program's official launch will take place in 1992.

In January, we began energy audits of our own buildings. Thirty-seven of 113 target buildings were audited. Renovations began at head office, and will continue in other buildings during 1992.

High-efficiency motors. Industry uses more than one-third of the electricity consumed in Québec. Since over 60% of this electricity drives industrial motors of all kinds, there is significant potential for energy savings.

In May we began promoting high-efficiency electric motors, which use less energy than traditional types but require a higher initial investment. Financial assistance, rising according to the motor's efficiency level, is offered to buyers and distributors. Since customers should recuperate their investment in under two years, interest was keen, and estimated savings of 10 GWh were achieved in 1991. The program will run until March 1994 and is expected to generate annual energy savings of 65 GWh.

Electrotechnology program. Under phase II of our long-standing Electrotechnology Implementation Assistance Program, 153 contracts were signed representing a total load of 76 MW. This phase, which was planned to terminate in June 1991, was extended until March 1992.

Smoothing peak consumption

Electricity demand varies considerably from season to season and over each day. We therefore take action to smooth demand during peak times, to minimize the need for expensive power stations that are unused during lower-demand periods.

In 1991, we introduced a three-year New Dual Energy program for the home, to complement the range of dual energy programs we have been offering for many years. Dual energy systems enable consumers to heat by electricity most of the time, but switch automatically to another energy source, in 90% of cases oil, during very cold periods. They are charged a lower rate for all their electricity consumption. In 1991, 11,700 customers applied for grants to install dual energy systems in their homes.

We also continued to encourage the use of high-efficiency heating systems and oil heating for communities served by power stations not connected to our main grid, for example the Lower North Shore of the St. Lawrence River, the Îles de la Madeleine, and the Île d'Anticosti. In 1991, improvements to home insulation began at two Native villages, and wood heating systems should soon be installed at some locations.

Under our Interruptible Power Program, some industrial customers agree to the interruption of their electricity consumption at peak times during the day in exchange for rate advantages. During the 1991-1992 winter peak, 1,028 MW of interruptible power was available.

Technological development

There is still great potential for developing new energy-saving products and technologies not only for residential consumers but also to encourage the development of Québec companies, institutions and industry. Existing equipment must frequently be adapted to the characteristics of our markets. For example, ours is the only residential market in the world in a northern climate with over 71% electric heating, mainly baseboard heaters.

Hydro-Québec therefore undertakes many R&D efforts in the energy-efficiency field. In 1991, LTEE, our electrochemical and electric technology laboratory, put the last touches to development and testing of a dual-energy furnace for the New Dual Energy program in collaboration with manufacturers.

LTEE also designed a number of test platforms for checking the behavior of various heating, insulation and other techniques under a variety of simulated climate conditions (humidity, acidity, etc.).

Openness and transparency: Pierre Deschamps, Danielle Lapointe and Nicole Primeau prepare to meet various interest groups invited to take part in the consultation process for Hydro-Québec's next Development Plan.

Broader dialogue with our publics

Steadfast commitment to environmental protection

Active contribution to economic and social development

A COMMITMENT TO PARTNERSHIP

RELATIONS WITH OUR VARIOUS PUBLICS HAVE TAKEN ON A NEW DIMENSION IN RECENT YEARS. BEYOND OUR CUSTOMERS, WE ADDRESS AN EXTERNAL PUBLIC WHOSE INTERESTS AND REQUIREMENTS ARE INCREASINGLY VARIED, AND WE NEED TO STRENGTHEN OUR LINKS WITH OUR PARTNERS IN A SPIRIT OF OPENNESS AND DIALOGUE. GENUINE CONSIDERATION OF THE PUBLIC INTEREST ALSO IMPLIES ENVIRONMENTAL RESPONSIBILITY, AS WELL AS STRENGTHENING THE PARTNERSHIP ROLE WITH THE ECONOMIC AGENTS OF QUÉBEC.

RELATIONS WITH OUR PUBLICS

Information and communication. The launching of *Défi performance* establishes a spirit of openness and respect for outside opinions that will have repercussions on all our external relations. Broader information is being directed at our outside publics through advertising and communication campaigns, primarily to promote the energy-efficiency project.

Customers can call our toll-free energy hot line

Our Natural Resource, a mass-information and communication campaign, launched in late 1990, continued. Its objective was to provide basic discussion material on current and future energy perspectives. The campaign focused on five major issues: the choice of hydropower, energy conservation, the environment, economic spinoffs, and exports. In Québec, the *Our Natural Resource* campaign consisted of a series of advertisements in early 1991, a toll-free telephone information service, and more than 150 public information meetings across the province. The campaign also had a national and international facet, to provide clear information for our publics in the rest of Canada, the northeastern United States and Europe, as well as for international agencies.

Public consultation and dialogue with Native peoples. Public consultation has been part and parcel of our development projects for more than 10 years. Hydro-Québec's Information and Communication policy requires it to explain its choices and consult *"individuals and groups especially affected by its activities,"* in order *"to harmonize its activities with the expectations"* of its public. In 1991, the more than 30 draft-design studies on the technical, economic, environmental and social feasibility of our projects were accompanied by consultation, in an effort to arrive jointly at the best possible development option. This process is coupled with government consultation. Thus, in 1991, Québec's Bureau d'audiences publiques sur l'environnement reviewed two of our projects: the southern section of the 12th line of the transmission system, and the future Bécancour generating station, whose con-

Cree company supplies fossil fuel at James Bay

Announcing the new consultations on Hydro-Québec's long-term orientations

struction was authorized by the Québec government in October 1991. The agency's ruling on the 12th line is expected in the first half of 1992.

Native peoples are among Hydro-Québec's principal interlocutors. Although the *James Bay and Northern Québec Agreement* was signed in 1975, we have regularly worked on adding to and improving it since then. We seek constant dialogue with the 55,000 Native peoples in Québec in order to understand and respect the values of communities affected by our activities. Thus, the Atikamekw and Montagnais information committees continued their activities. Dialogue is, however, more difficult on certain committees set up under the Agreement. An important feature of 1991 was the February signing of a memorandum of understanding with the Inuit concerning the Grande-Baleine complex. An agreement in principle is expected to follow in the next few months.

Despite their opposition to hydroelectric development, the Crees took part in discussions on changes to be made to Phase II of the La Grande complex, specifically concerning linking of the 12th line to Chissibi, rather than to Lemoyne substation, the addition of 315-kV and 735-kV transmission lines, and mitigative measures for the Laforge-1 project. The Waskaganish Crees worked with us on studies and technical surveys for the Nottaway-Broadback-Rupert project, with a view to minimizing impacts on their traditional hunting and fishing activities and to ensuring we take their long-term land-use plans into account.

Hydro-Québec honors its commitments under the agreements signed with Native peoples: as a result of the program to hire Cree workers as operations personnel, 38 Crees are currently employed or in training at Hydro-Québec. Construction of a training centre at La Grande-3 was nearing completion at year-end 1991. This will help achieve the target of hiring 150 Cree employees by 1996. In 1991, the number of contracts awarded to Native firms increased. This created jobs in construction, operations and services, primarily through the Cree Construction Company.

Dialogue and transparency. In 1991 a new approach to community relations was introduced, to help us reconcile our development orientations with the evolution

CONSULTATION ON THE DEVELOPMENT PLAN

Phase	*Purpose*	*Activities*	*Date*
I	Exchange	Preliminary meetings on process and content	November 1991-January 1992
	Information	Thematic workshops	January-April 1992
II	Consultation	Meetings on the interdependency of choices	May-June 1992
	Meetings	Public meetings in nine cities and towns across Québec	June 1992
III	Explanation	Presentation by Hydro-Québec of the orientations chosen	November-December 1992

of Québec society. In conjunction with our shareholder, we agreed to modify the cycle of preparation and follow-up of the Hydro-Québec Development Plan by including a consultation process on certain long-term orientations. The consultation process, lasting a little over one year, will be in three phases.

Phase I began on November 4, 1991, and offered participants the opportunity to discuss consultation topics and procedures. Some 100 representative groups with concerns for Québec's electrical development were invited to participate in five information sessions attended by Hydro-Québec's Chairman of the Board and Chief Executive Officer and President and Chief Operating Officer. One information session was also held specifically for Indian communities likely to be affected by hydropower construction. Representatives of the Algonquins and Atikamekw took part in this mid-December meeting. The subjects proposed in the preliminary meetings were: location of electricity-intensive industries in Québec, energy efficiency, exports, and the generating options for tomorrow's needs. The participation rate and reaction of the groups present were very encouraging. These meetings will be followed in spring 1992 by thematic workshops, which will analyze the development options in greater depth with invited groups.

This public involvement process is a first in Hydro-Québec's history. Québec now has to make choices with respect to electricity, and the need for genuine public dialogue is real.

The environment

A responsible, experienced partner. Hydro-Québec has a more than 20 year history of actively incorporating environmental protection and enhancement into its activities. During 1991 some $40 million was spent on environmental studies, in addition to spending on mitigative measures.

Hydro-Québec is committed to the concept of *sustainable development*, which is defined as follows: *development that meets the needs of the present without jeopardizing the ability of future generations to meet their needs*. Our energy-efficiency project represents yet another step in this direction. But demand will continue to grow: renewable energy sources, primarily hydroelectricity, will have to be the answer, with environmental protection an integral part of development.

Installations plan. For every variant of each new construction project, we assess the environmental impact and propose mitigative measures. The Grande-Baleine project has been under examination for more than 15 years. Environmental studies, carried

Reservoir of the La Grande complex

out by the utility and its consultants, have cost $51 million. All elements of the biological, physical and human environments that would be affected by this project have been examined: the main issues are the natural environment, marine mammals, the opening-up of the territory, traditional lifestyles, and mercury. In fall 1991, Hydro-Québec decided to exclude from the Grande-Baleine project for the moment the variant that includes the Nastapoka diversion. This should allow us to better study the consequences such a diversion would have on the freshwater seals of the des Loups Marins lakes.

Environmental studies continue on the project to develop the Ashuapmushuan, a river northwest of Lac Saint-Jean. A summary of the studies was completed in April, and a communications program carried out in August. The main issues are landlocked salmon, regional economic spinoffs, and the river's heritage and tourism value. As one of the measures taken to protect the salmon, the original project concept was modified from four to two generating stations.

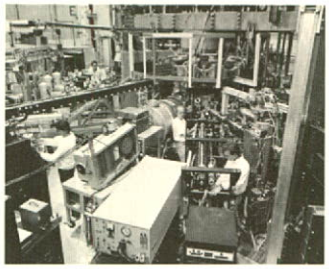
Draft-design studies have just begun on the Nottaway-Broadback-Rupert complex, to be located south of the La Grande complex and scheduled for construction in the first quarter of the 21st century. The principal issues here are regional economic development, flora and fauna, mercury, and traditional lifestyles.

At the Sainte-Marguerite project on the North Shore, the main environmental issue remains the salmon of the Moisie, two tributaries of which are to be diverted to the Sainte-Marguerite. A scientific committee, composed of representatives of government, the Conseil des Atikamekw et des Montagnais, independent salmon experts and hydrology engineers, was instrumental in developing mitigative measures, and has come out in favor of using the guaranteed flow of the Moisie. This will avoid a net loss of salmon-breeding grounds and will, in fact, improve conditions when natural water levels are particularly low.

Development of the Haut-Saint-Maurice is also a possibility. Several impact studies are in progress, not only on the rehabilitation of existing facilities but also on the construction of new generating stations. As this is a multiple-use river, a major component of the project will be agreement with users and Native communities.

Environmental monitoring. Environmental monitoring involves identifying and measuring the actual impacts of power-system facilities against the anticipated impacts, as well as assessing the effectiveness of mitigative and enhancement measures.

The environmental monitoring of Phase I of the La Grande complex continues: from the many studies conducted since 1972 by Hydro-Québec, the Société d'énergie de la Baie James, federal and provincial government agencies and a number of universities, it is clear that hydroelectric development has not compromised the ecological balance of the James Bay territory. Wildlife continues to use coastal habitats as before. The creation of reservoirs has led to loss of land habitats, but no species is endangered. Our main concern remains the presence of mercury in the flesh of fish, as this affects Native peoples' food supply. Continuous monitoring gives us a picture of fish populations, evolution of mercury levels and water quality in reservoirs. The most recent results from the western part of the James Bay territory, particularly



The Varennes tokamak at Hydro-Québec's research institute, IREQ.

for northern pike, show a drop in mercury levels in small fish, no change in medium-sized fish, and a continued increase in large fish. In 1991, this monitoring was concentrated in the eastern part of the James Bay territory.

Environmental monitoring of ambient air quality is taking place at Tracy oil-fired generating station. The groundwork has been laid for environmental monitoring at the new Îles-de-la-Madeleine generating station and at the future Bécancour thermal station.

Managing contaminants. Our PCB action plan continued in 1991: 94% of transformers and 85% of capacitors containing polychlorinated biphenyls (PCBs) have now been withdrawn from the system and stored, while 27% of the oil has been decontaminated. Also continuing are studies on vegetation control in power-line rights-of-way in order to reduce the use of herbicides. In 1991, Hydro-Québec went ahead with the planting of herbaceous and shrubby species in the Eastern Townships and south of Montréal.

As part of the study program on PCP-treated wood poles, we are preparing a plan of action for safe storage of pentachlorophenol-treated utility poles that are no longer in use. In addition, laboratory tests are being conducted on PCP biodegradability in wood and soil. A five-year action plan on management of other contaminants was introduced in 1991. Designed to facilitate management of solvents, paint, detergents, and petroleum products, its main feature is its prevention-oriented approach.

Studies and research. Partnerships with specialized consultants and universities continued on numerous environmental research projects, notably wildlife resources and habitats, land-use and regional development, the lifestyle of isolated communities, and environmental health (biological effects of electric and magnetic fields, mercury, and toxic substances). Total 1991 investment in research was $13.5 million.

Evaluation of environmental performance. In 1991, we embarked upon the feasibility study for our environmental-performance measurement program, which has three facets: development of environmental performance indicators, development of methods for assessing environmental costs, and development of environmental audit mechanisms. The feasibility study will run until the end of 1992.

Raising employee awareness. Employee awareness programs are designed to integrate environmental concerns into the workplace. *Hydro-Presse*, the employee newspaper, ran a "green column," and the utility took part in Environment Month with information booths on energy conservation. During the year, an environmental-awareness campaign was launched, entitled "Les 3 R," to encourage employees to "reduce, re-use and recycle", three principles which can easily be integrated into the daily routine as part of the overall effort to protect the environment.

Studying pentachlorophenol at IREQ

Environmental enhancement: Hydro-Québec helped finance restoration of the Du Portage mill at Lotbinière

Economic and social contribution

Hydro-Québec is a major player in Québec's economic development: it increasingly seeks to create new synergies, beneficial to all, with its partners in the socio-economic world, and to meet the expectations of the socio-cultural milieu, another essential element in the development of Québec society.

Support for research and development. Technology is essential to the fulfilment of Hydro-Québec's mandate. In 1991, more than $142 million, or 2.3% of sales revenue, was invested in research and development activities involving over 230 projects associated with the utility's main concerns. In all, more than 100 new products were developed. A number of the projects are directly related to the operation and reliability of the transmission system. Others improve generating capacity, or involve consumption.

Partnership with Québec's economic agents.

The universities, the electricity industry... In 1991, Hydro-Québec joined forces with the École des Hautes Études commerciales (the University of Montréal business school) to set up the Centre d'études en qualité totale, which will develop quality training programs for the utility. We decided to maintain our support for the Master's program in nuclear engineering at the École polytechnique de Montréal, and the activities of the Canadian Centre for Magnetic Fusion. We also sponsored a chair of environmental health, ethics and law at McGill University, which complements the chair already established at the Université du Québec à Montréal.

A protocol signed with Électricité de France specifies five main avenues for co-operation and initiates immediate study of joint projects. The most promising joint projects are: waste incineration; information exchange on distribution; and ACEP batteries.

...the municipalities... For every generating-station, transmission-line and substation project subject to an impact-assessment study, Hydro-Québec sets aside a maximum of 1% to 2% of project cost for eligible bodies, such as municipalities, regional county municipalities and Native communities, for environmental enhancement initiatives. Since the program was introduced, 378 projects have been completed in co-operation with 183 agencies for an investment of close to $15 million. By year-end 1991, environmental enhancement for the Radisson-Nicolet-Des Cantons project was more than 95% complete, and $10.5 million had been approved for the Reliability Enhancement Program – Transmission System.

...and companies. In 1991, Hydro-Québec went further ahead with the concrete application of a new overall approach to relations with its principal suppliers, going beyond the Québec content criterion in an attempt to help certain Québec manufacturers maintain their activities and others develop their production. When large purchases of equipment are to be made, we will look increasingly at research and development levels, transfer of expertise and engineering, establishment or maintenance of production capacity in Québec in cases of plant rationalization, potential sales and exports from Québec production, growth of the market served by plants located in Québec, and range of products manufactured.

For instance, the Phillips-Furukawa consortium was awarded a contract of approximately $27 million to supply fibre-optic ground wires required for the northwestern section of the transmission system. In accordance with its contract proposal, Phillips-Furukawa will invest $10 million to set up a fibre-optic ground-wire plant in Rimouski. The plant will create 40 jobs and have a worldwide role, with exclusive access to the North and Central American markets. The consortium has also proposed a research and development program for the use of fibre optics on electric power systems. In exchange for these commitments, Hydro-Québec will shortly finalize a medium-term procurement agreement for a large proportion of its fibre-optic ground-wire needs.

Aside from our electrotechnology implementation activities, we are associated with several industrial partners. In co-operation with ASEA Brown Boveri, we finalized organization of CITEQ, a centre for innovation in the transmission of Québec's electrical energy, set up in 1989, and identified research and development projects for improving capacity of major systems and interconnections. AECL and Alcatel Canada Wire will be partners with us in developing technologies for manufacturing superconducting wire that meets the requirements of electrotechnical equipment. Another study is looking at the transportation of hydrogen produced in Québec and at applications of hydrogen, a field in which Hydro-Québec is a world leader. Hydro-Québec will manage the consortium created to develop these applications.

In 1990, we selected eight products with attractive development prospects for Québec's electricity industry. Related studies led to the signing of two manufacturing agreements in 1991, one with Con-RAC Corporation for substation connections and the other with Ferranti-Packard for production of submersible transformers.

Marketing of technology and know-how. Nouveler's subsidiaries, responsible for marketing the technical products and processes developed by Hydro-Québec, had numerous successes in 1991:

- new contracts for installation of the M3i Distribution Management System and M3i Mosaic (wall-board display on giant screens of graphic and alphanumerical data required to operate a control centre) by M3i Systems, which signed marketing agreements and established an international distribution network;

- development and sale by UltraOptec of the Telephaser System, for remote identification of transmission lines or medium-voltage distribution lines on a three-phase electrical system, and development of the Protectochoc, an electronic security system for electric welding stations, whose approval by the Canadian Standards Association is pending;

- preparation, by Automatisation Famic, of a technical development and marketing program for the ALCID-SICC software, a real-time and supervisory-control system for substations and generating stations, and the signing of distribution agreements in France and Spain;

- addition of two new measuring systems, developed by Hydro-Québec, to the range of products marketed by Vibro-Meter: MESSIRE, a simplified method of measuring the energy efficiency of individual turbines, and ECOR, a system for monitoring and adjusting the speed governors of turbine-generators;

Inspecting construction work at La Grande-1

Support for socio-cultural and humanitarian organizations. In 1991, we allocated more than $4 million in sponsorships and donations to various scientific, humanitarian, cultural or sports organizations and events, as well as to publications and to environmental agencies, through which we informed the public of our activities in the environment field.

Employees are encouraged to participate in activities that have a social dimension. Contributions to the 1991 Centraide campaign, for example, totalled $1,280,471, a 19% increase on 1990, and 71% of personnel participated, up from 66% the previous year.

• CYME International is continuing negotiations to obtain the worldwide marketing licence for a power-line design system developed by Hydro-Québec.

Hydro-Québec International, which markets Hydro-Québec's know-how overseas, continued the recovery initiated in 1989, with 1991 sales of some $16 million and the signing of two major contracts: the emergency electricity supply program for Port-au-Prince, Haiti; and the privatization of the electric utility of Greater Buenos Aires which positions Hydro-Québec attractively abroad. On the other hand, 1991 saw the cancellation of the rehabilitation and operating contract for the electricity system of Santo Domingo, capital of the Dominican Republic.

Economic spinoffs. In 1991, Hydro-Québec purchased goods and services to a value of $2,816 million, a 16% increase over 1990. The Québec content of these purchases was 58% for goods, and 97% for services, representing overall Québec content of 72%.

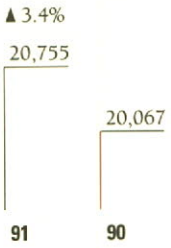
Employees, Hydro-Québec's driving force

A work environment conducive to ongoing improvement

Obtaining the greatest possible commitment from all employees is one of Hydro-Québec's strategic objectives for the 1990s, hence the emphasis on training, staffing, occupational safety and improving the work climate in 1991. Moreover, several fundamental restructurings laid the groundwork for total quality management.

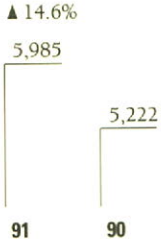
Reorganization. In accordance with the *Défi performance* approach, which emphasizes product quality and customer services, we re-examined our operating activities, and created in December 1990 two new groups: Generating, Transmission and Telecommunications; and Customers and Distribution. We are now carrying out in-depth studies of this restructuring. The proposed organization should result in greater customer satisfaction as the individual units acquire exclusive accountability and greater independence of action. Further restructuring took place in September 1991, when the Board of Directors decided to split management of activities in northern Québec between the La Grande Rivière region (which had run them since 1985) and the Saguenay region, underscoring the Saguenay region's role in generation and transmission.

Permanent employees
(at December 31)



1,190 permanent employes were recruited; 502 left the company.

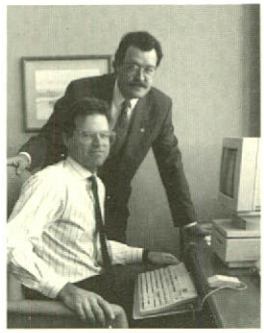
Temporary employees
(annual average)



This increase is explained by the need for personnel to carry out special programs, the replacement of personnel in training and work on the construction sites.

Proportion of women
in permanent workforce
(at December 31)

Labor relations. Following intensive negotiations, Hydro-Québec and the Canadian Union of Public Employees signed an agreement on September 13, 1991 which replaces the *Act to ensure continuity of electrical service by Hydro-Québec* with negotiated collective agreements whose expiry dates have been extended from December 1992 to December 1993. This agreement with CUPE, governing some 17,300 employees, helps improve the work climate and preserves the gains of the Act, in particular those concerning health and safety rules and contracting-out. A new labor relations perspective is essential in the total quality performance context: by sensitizing all employees to the "focus on customer" and "respect for people," the idea is to forge win-win relations and to establish a climate guaranteeing productivity and quality of working life.



Corporate Ombudsman, Justine Sentenne, took up her duties in May.

Employment equity. In 1989, an overall objective was set of increasing women's representation in the permanent workforce to 30% by 1999, with an intermediate target for March 31, 1992, of 21.6%. At December 31, 1991, this proportion stood at 21.2%, with gains across the board, but particularly in the specialist, management and engineer categories. The 0.7% advance, matching that of 1990, stems from the initiative to make individual managers more accountable. Progress was slower in non-traditional sectors; but the hiring of women for temporary lineworker and splicer positions and a pilot training scheme for women equipment electricians should help improve the situation in the medium term.

Health and safety. The results for the year show a substantial 21% improvement over last year in the frequency rate of on-job injuries. In 1991, there were 25.92 lost-time injuries per million hours worked, down from 32.85 in 1990. The severity rate was also down: in 1991, it cor-

responded to 775 days lost per million hours worked, down from 924 in 1990, a 16% improvement. Hydro-Québec's 10 administrative regions target a reduction of about 15% in the frequency rate for the period from April 1991 to March 1992.

Management of occupational safety remains a central concern. Since the gradual adoption of the International Safety Rating System in 1984, progress has not been satisfactory. We thus opted for a less global approach focusing on four main activities: analysis of tasks of highest risk to improve work methods, regular inspection of workplaces, rigorous conducting of inquiries and analysis of accidents, and monthly team meetings on the subject of safety.

Following the implementation of the *Act respecting the protection of non-smokers in certain public places*, a survey of employee attitudes to smoking will be used to better define the measures to be taken. Since January 1990, some 200 smokers have taken advantage of the stop-smoking support program. The smoking ban has already been extended to all areas where food is consumed.

Training and development. Senior management participated in the setting-up of a succession program for top-level managers (Executive Vice Presidents and Vice Presidents), and the succession program for sector managers, initiated in 1990, went ahead, involving 50 or so candidates. Training this next generation of managers is strategically important since their activities directly affect quality of service and customer relations. As part of employee mobilization for *Défi performance*, some 2,934 person-days of training were given. Under the introduction-to-management program (PIGE), established in 1989 to help managers new to the job, 4,243 person-days' training was given to some 260 new managers in 1991. Also seen in 1991 was the start of the second phase of the management scheme introduced in fall 1990 for specialists. A communications program and tools and procedures for the specialists' career-planning and development program have now been developed.

To improve customer service, we intensified training for personnel working in activities associated with the power system and customers: employees received an average of 6-8 days' technical training. In 1991, 18 college training sessions (involving training for access to more complex jobs) were given to 246 clerical employees, representing 14,000 training days at a cost of $6 million. At December 31, 1991, each permanent employee had received an average 5.8 days of training and each temporary employee 3.4 days, at a cost of some $47 million, or 3.7% of the total operations payroll.

Increased income

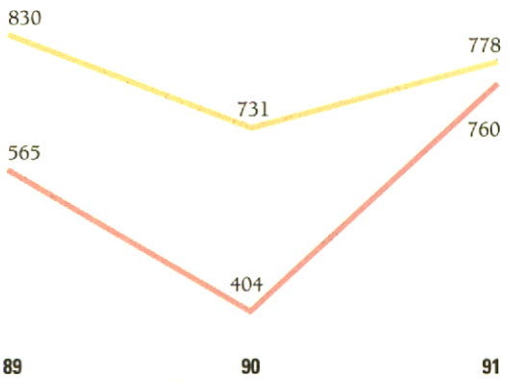
Greater investment

Favorable financial markets

In 1991, Hydro-Québec's net income rose to $760 million, up $356 million over 1990. This increase was largely due to the suspension of the exceptional measures that had been introduced at the end of 1988 to raise energy reserves, and that had a major impact on operating results in 1989 and 1990.

In fact, were it not for the impact of low runoff, return on revenue in 1990 and 1991 would have been comparable at approximately 12%.

Evolution of Net Income
(in $M)



In 1988 and 1989, natural inflows into Hydro-Québec's reservoirs were well below the historical average. So it was necessary to phase in a series of exceptional measures as of the end of 1988. In 1990, inflows returned to near-normal levels and the exceptional measures were suspended. Fall 1990 saw the resumption of dual-energy deliveries for increased revenue in 1991 of $37 million. In addition, there was a substantial reduction in purchases of electricity from neighboring systems and the use of Tracy thermal generating station was limited to peak periods. In 1991, the suspension of these measures resulted in an increase in net income of $277 million.

However, 1991 runoff conditions were not good, and there was a deficit for the year of 26 TWh. Consequently, in the fall, exceptional measures were gradually re-introduced, with supplementary purchases of energy from neighboring systems totalling $18 million. These purchases will be stepped up in 1992, along with increased use of Tracy oil-fired station.

Nearly $580 million was allotted during the year to intensified efforts in quality of service, against $265 million in 1990. A further $99 million went into the energy-efficiency project, which combines energy conservation and consumption management. And a total of $2,739 million was invested in major work on generating and transmission facilities, to meet the increasing demand for electricity.

Taking advantage of favorable conditions on capital markets, we met and even anticipated our borrowing requirements for our investment projects, while minimizing the cost of the debt. We also benefited from the drop in interest rates, which enabled us to register a significant decrease in financial expenses.

IMPACT OF LOW RUNOFF
(in $M)

	1989	1990	1991
Revenue losses*			
Reduced deliveries of surplus electricity			
in Québec	4	–	–
outside Québec	44	(14)	–
Temporary halt to dual-energy deliveries	5	101	–
	53	87	–
Costs			
Special electricity purchases	104	174	18
Fuel oil (Tracy)	32	45	–
Compensation payments (dual energy)	76	21	–
	212	240	18
Total	265	327	18

*According to forecasts originally established for the period 1989-1991, assuming normal runoff.

Sales results.

Total sales. Total sales volume was 137.0 TWh, up 1.9 TWh over 1990, primarily as a result of increased demand from the smelting and refining industry, and the resumption of dual-energy deliveries which had been interrupted at the end of 1989 for a one-year period.

Sales revenue was $6,210 million, up by $389 million or 6.7%.

Sales in Québec. Since 1990, Québec sales have been of firm electricity only. In fact, energy surpluses are no longer available and we have stopped selling surplus electricity in Québec.

The volume of firm-electricity sales in Québec rose by 1.3 TWh to 127.2 TWh in 1991. This increase was largely the result of growing demand from the smelting and refining and pulp and paper industries. The completion of new projects in these energy-intensive industries more than offset the decrease in demand in the commercial sector and in other industrial markets. Hydro-Québec also resumed dual-energy deliveries to commercial, institutional and industrial customers whose contracts had been bought back for a one-year period. There were also fewer strikes in 1991 than in 1990, and this resulted in increased needs from these industrial customers.

However, 1991 demand in the residential and farm sector was comparable to the preceding year. Difficult economic conditions, and to a lesser extent the energy-efficiency marketing programs set up by Hydro-Québec, led to a better advised use of electricity. Certain consumer habits have changed, some permanently some temporarily, and this put a brake on the increase in residential and farm demand.

Revenue from sales in Québec was up by $385 million to $5,906 million. The rate increases accounted for $377 million of this additional revenue.

Sales outside Québec. Sales of energy outside Québec were once again restricted in 1991, in order to maintain reservoir levels. Export sales volume was 9.8 TWh, a slight increase of 0.6 TWh or 6.5%, while export revenue was $304 million, up $4 million or 1.3%.

Firm-energy sales totalled 9.4 TWh, up by 0.7 TWh or 8.0% over 1990, as a result of the coming into effect of two contracts with New England customers: a firm-energy contract with Vermont Joint Owners, to which deliveries began in November 1990; and a firm-energy contract with the New England Power Pool, to which deliveries started in July 1991. This increase was slowed down, however, by the decrease in sales to the New York Power Authority which decided not to purchase energy at the price Hydro-Québec offered during the annual negotiation of deliveries under the firm-power contract.

The volume of interruptible-energy sales outside Québec was only 0.39 TWh, down from 0.45 TWh in 1990 – a decrease of 0.06 TWh or 13.3%. The amounts sold were the result of electricity purchases made by Hydro-Québec at the beginning of the year, as part of energy exchanges with neighboring systems.

Expenditure. Total expenditure for 1991 was $3,183 million, a moderate 4.5% increase over 1990, which is explained by the suspension of exceptional measures used to counteract low runoff, which in 1990 had cost $240 million.

The 1990 improvements in runoff and energy reserve enabled us in 1991 to suspend supplementary purchases of electricity from neighboring systems. In 1990 the special program to purchase backup energy, which had been introduced at the end of 1988, had alone resulted in additional expenses of $174 million. The use in 1991 of Tracy at peak periods only enabled us to reduce our oil consumption to normal levels, a saving of $45 million over 1990. And by resuming dual-energy deliveries, the utility avoided paying special compensation for the buyback of customers' contracts which in 1990 had cost $21 million.

TOTAL ELECTRICITY SALES

	1991		1990		Variation 1991/1990			
	TWh	*$M*	*TWh*	*$M*	*TWh*	*%*	*$M*	*%*
• In Québec								
Residential and farm	46.2	2,468	47.0	2,334	(0.8)	(1.7)	134	5.7
General and institutional	28.3	1,655	28.3	1,568	–	–	87	5.5
Industrial	48.1	1,552	46.0	1,404	2.1	4.6	148	10.5
Other	4.6	231	4.6	215	–	–	16	7.4
	127.2	5,906	125.9	5,521	1.3	1.0	385	7.0
• Outside Québec	9.8	304	9.2	300	0.6	6.5	4	1.3
Total	137.0	6,210	135.1	5,821	1.9	1.4	389	6.7

Operations

▲ $M 166
▲ 9.7%

In fall 1991, however, as the year's runoff deficit became apparent, the utility made additional electricity purchases of $18 million. To maintain our energy reserve, we will step up these purchases and make greater use of Tracy.

Operating expenses. Despite the favorable impact of improved runoff in 1990, operating expenses for 1991 were $1,870 million, an increase of 9.7% over 1990, when activities were slowed by a labor dispute.

The increase is in part explained by the continuing programs to improve service quality. Improvements to product quality and customer service, and technology activities increased expenditure by $82 million.

The prevailing economic difficulties in Québec also had an impact on operating expenses: bad debts increased by $25 million.

The energy-efficiency project, launched in 1990, went ahead for additional expenses of some $17 million.

To provide better customer service, Hydro-Québec stepped up technical training for employees engaged in activities directly related to the power system and to customers, as well as programs designed for managers and clerical employees. 1991 training expenses were up $10 million over those of 1990.

The *Défi performance* Total Quality Management program, introduced in 1990, with its emphasis on customer satisfaction, mastering work processes and mobilizing human resources, required additional expenses of $5 million in 1991.

Moreover, Hydro-Québec revised its estimate of Québec's economically viable hydroelectric potential. As a result, writeoffs totalled $8 million, $5 million more than in 1990.

Specific Factors Affecting the Increase in Operating Expenses in 1991

Quality of service	$M 82
Bad debts	$M 25
Energy efficiency	$M 17
Staff training	$M 10
Défi performance	$M 5
Write-off of costs	$M 5

Excluding these special factors, and those linked to low runoff, other operating expenses increased by 6.1%. If we bear inflation in mind, the real increase in expenses is primarily explained by a return to normal activities.

Depreciation of fixed assets. Depreciation expense, at $737 million on December 31, was $60 million or 8.9% higher than in 1990, largely as a result of the commissioning of new facilities – notably the Radisson-Nicolet-Des Cantons direct-current transmission line and the additional generating units of Manic-5-PA during 1990.

Taxes. Taxes totalled $392 million, compared with $361 million in 1990. The increase in paid-up capital during the year, combined with the higher taxation rate, pushed up capital tax. Furthermore, the tax imposed on the utility in the form of real-estate tax on certain system installations rose, following the increase in gross revenue, on which this tax is levied.

INTEREST
(in $M)

	1991	1990
Total interest costs	3,019	2,812
Less		
Borrowing costs capitalized to Construction in progress	480	385
Net investment income	245	88
Interest expense	2,294	2,339

Interest. The rise in total interest costs, which reached $3,019 million in 1991, was primarily the result of the financing of new installations under construction, and of prefinancing operations.

Interest expense, defined as total interest costs less interest capitalized to Construction in progress and net investment income, fell by 1.9% to $2,294 million at year-end, with the drop in interest rates on financial markets. In fact, the weighted average interest rate on Hydro-Québec's long-term debt fell from 10.99% on December 31, 1990, to 10.25% at the end of 1991.

However, the impact of this decrease on interest expense was partially lessened by the commissioning of new facilities. At commissioning, interest expense ceases to be capitalized to Construction in progress and is charged to operations.

Exchange loss. Exchange loss fell by $48 million to $47 million in 1991, its lowest level since 1984. The impact of debt maturities on exchange loss in 1990 and 1991 largely explains this decrease.

ALLOCATION OF REVENUE DOLLAR IN 1991

Operations	29.8%
Electricity purchase	2.9%
Depreciation of fixed assets	11.7%
Taxes	6.2%
Interest	36.5%
Exchange loss	0.8%
Net income	12.1%
	100%

In fact, 1990 redemptions occasioned exchange loss, whereas 1991 redemptions produced exchange gains. There was, for instance, a $20 million gain in 1991 on repayment of a debt hedged by continuous U.S. dollar revenue streams. It is worth noting that 98% of the utility's U.S. dollar debt is hedged by continuous future U.S. dollar revenue streams from electricity sales. This hedge enables the utility to defer to maturity any exchange gain or loss resulting from currency translation.

Financing. Hydro-Québec was able to complete and exceed its borrowing program for 1991. Favorable conditions on financial markets prompted the utility to bring forward its 1992-1993 program, and obtain prefinancing of $2,062 million as of December 31, 1991. The $3,819 million 1991 borrowing program comprised redemptions of long-term debt totalling $1,554 million, and additional funds of $2,265 million.

To minimize financing costs and manage financial risks, the utility pursued five objectives:

Ensuring the successful completion of the borrowing program, whatever the conditions on financial markets. Access to international financial markets was maintained with five borrowings on European markets and one on the Japanese market. We also expanded our range of financial instruments with two global offerings in Canadian dollars. And we continued our intensive investor-relations program, notably to enlarge our investor base.

Seeking financing at the best cost while aiming to limit foreign exchange risk. In 1991, the utility gave preference to financing in Canadian dollars, the source of more than half its new borrowings. U.S. dollar financing was the second source, since a portion of Hydro-Québec's sales revenue is received in U.S. dollars. In 1991, nearly one third of all new borrowings were denominated in U.S. dollars. Hydro-Québec also sought financing in currencies covered by swaps or other exchange-risk-hedging instruments. Consequently, the proportion of total debt in Canadian dollars, including swaps, held steady at 66% at year-end, a level comparable to year-end 1990.

Seeking an interest-rate structure that minimizes financial risks. The utility is gradually increasing to 20% the portion of its total debt (including perpetual debt) issued at floating rates. The year's financing activities raised the portion of floating-rate debt from 12.5% in December 1990 to 13.8% at year-end. This strategy seeks to minimize the impact of variations in inflation on the evolution of net income.

Ensuring effective management of current debt. The utility has established a currency swaps program to cover debt existing on December 31, 1990. During 1991, debts were swapped into Canadian-dollar commitments for a total of $240 million. Taking these swaps into account, the proportion of total debt denominated in foreign currencies (excluding the U.S. dollar) decreased slightly, reaching 4% as of December 31, compared to 5% at year-end 1990.

BREAKDOWN OF TOTAL DEBT*

*Excluding perpetual debt.

Obtaining the best possible spread of maturities so as to facilitate debt refinancing. Borrowings contracted in 1991 had an average term of 19.6 years, which is consistent with the utility's strategy of giving preference to terms of 10 or more years.

On December 31, 1991, total debt stood at $29.7 billion, up $4.1 billion. The gross volume of borrowings was $5,897 million. Excluding redemptions of long-term debt totalling $1,761 million, these borrowings added $4,136 million to existing debt.

The appreciation of the Canadian dollar, particularly against the U.S. dollar, led to a $65-million decrease in debt.

Investment in fixed assets. Investment in fixed assets totalled $4,037 million in 1991, up 29% over the 1990 figure of $3,133 million.

The continuing work on Phase II of the La Grande hydroelectric complex, and the intensification of service-quality enhancement programs introduced in 1989 were the two principal objects of investment.

VARIATION IN TOTAL DEBT*
(in $M)

*Excluding perpetual debt.

Under Phase II of the La Grande complex, construction of La Grande-1, La Grande-2-A, Laforge-1 and Brisay generating stations represented a combined investment of $1,305 million, and $96 million was assigned to construction of Bécancour gas-turbine station.

Hydro-Québec injected $407 million into its various programs to enhance service quality. Of this amount, $239 million was spent on reliability enhancements to the transmission system. Another $76 million went to continuing work under the Service Quality Enhancement Program – Distribution System. The Maintenance Enhancement Program, which is designed to catch up on certain delays in equipment maintenance, required new investment of $47 million. And other projects, notably to improve system control and quality of customer service required $45 million.

As part of work on the transmission system, $191 million was invested in the Radisson-Nicolet-Des Cantons direct-current line and connected substations. During the year our export capacity to New England increased from 1,300 MW to 2,300 MW, with the commissioning of several facilities on this link.

The allocation to the distribution system was $477 million, including $190 million for routine equipment purchase and renewal programs and $112 million for customer-supply work.

INVESTMENT IN FIXED ASSETS IN 1991

Generation	$M 2,028
Transmission	$M 711
Distribution	$M 477
Other	$M 414
Quality of service	$M 407
Total	$M 4,037

Financial criteria. The uncertainties of runoff conditions have had a significant impact on Hydro-Québec's results in recent years. In 1991, the utility's suspension of exceptional measures used to offset the lack of precipitation led to a considerable rise in net income.

As a result, return on revenue and return on equity rose to 12.1% and 8.4% respectively, against 6.9% and 4.8% in 1990. Interest coverage rose from 1.04 in 1990 to 1.10 in 1991. The fall in interest rates on financial markets also contributed to the improvement in this ratio.

As expected, self-financing fell below the minimum objective of 30.0%, reaching 27.5% in 1991 compared to 30.7% in 1990, despite higher net income. Increased funding requirements for capital investment and for redemptions of long-term debt caused this rate to fall.

The capitalization rate fell to 23.7% in 1991 from its 1990 level of 24.8%, as a consequence of prefinancing operations carried out during the year. If there had been no prefinancing, the rate would have been comparable to that of 1990. Although prefinancing operations brought about a deterioration of the capitalization rate in 1991, they did enable Hydro-Québec to increase liquidities while minimizing financial expenses.

Under the *Hydro-Québec Act*, the Québec government, the utility's sole shareholder, is not entitled to declare dividends for 1991 as the capitalization rate is below the minimum threshold of 25%.

FINANCIAL STATEMENTS AND FIVE-YEAR REVIEW: CONTENTS

CONSOLIDATED FINANCIAL STATEMENTS OF HYDRO-QUÉBEC

46 *Management and Auditors' Reports*

47 *Consolidated Statement of Operations*

48 *Consolidated Balance Sheet*

50 *Consolidated Statement of Retained Earnings*

51 *Consolidated Statement of Changes in Financial Position*

52 *Notes to Consolidated Financial Statements*

FIVE-YEAR REVIEW

62 *Consolidated Results and Financial Ratios*

63 *Operating Statistics*

64 *Unit Revenue, Unit Expenditure and Other Ratios*

65 *Energy and Power Requirements of System*

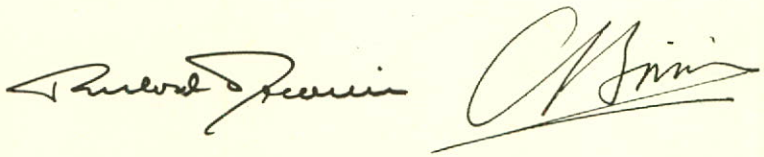
MANAGEMENT REPORT

Hydro-Québec's consolidated financial statements and all additional information contained in the Annual Report are the responsibility of Management and were approved by the Board of Directors. Management's responsibility includes the selection of appropriate accounting practices in accordance with generally accepted accounting principles, and the preparation of reasonable estimates. Financial data contained elsewhere in the Annual Report are consistent with the financial statements.

Management, in keeping with its responsibilities, maintains an internal control system, designed among other things to provide reasonable assurance that Hydro-Québec's assets are safeguarded and that the financial records form an appropriate basis for the preparation of reliable financial statements.

Every year, the Board of Directors appoints an Audit Committee. This committee is responsible for ensuring that the financial statements present fairly Hydro-Québec's financial position, changes in financial position, and results of operations. The committee also studies reports on the utility's accounting methods and policies and internal control systems.

In the opinion of Management, these financial statements incorporate, within reasonable limits, all important elements and data available at January 31, 1992.



Richard Drouin, Q.C.
Chairman of the Board and Chief Executive Officer

Claude Boivin
President and Chief Operating Officer

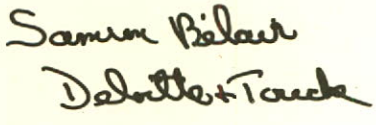
AUDITORS' REPORT

To the Gouvernement du Québec,

We have audited the consolidated balance sheet of Hydro-Québec as at December 31, 1991 and the consolidated statements of operations, retained earnings and changes in financial position for the year then ended. These financial statements are the responsibility of Hydro-Québec's Management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by Management, as well as evaluating the overall financial statement presentation.

In our opinion, these consolidated financial statements present fairly, in all material respects, the financial position of Hydro-Québec as at December 31, 1991 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles.



Montréal, Canada
January 31, 1992

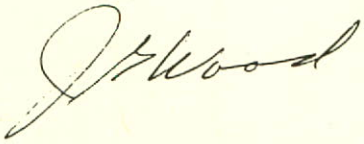
Chartered Accountants

CONSOLIDATED STATEMENT OF OPERATIONS

(in millions of dollars)	For the year ended December 31 1991	1990
Revenue		
Sales of electricity (Note 2)	$6,210	$5,821
Other operating revenue	74	62
	6,284	5,883
Expenditure		
Operations	1,870	1,704
Electricity purchased	184	303
Depreciation of fixed assets	737	677
Taxes (Note 3)	392	361
	3,183	3,045
Income before interest and exchange loss	3,101	2,838
Interest (Note 4)	2,294	2,339
Exchange loss	47	95
	2,341	2,434
Net income	$ 760	$ 404

CONSOLIDATED BALANCE SHEET

ASSETS (*in millions of dollars*)	As at December 31 1991	1990
Fixed assets		
Property and plant (Note 5)		
In service	$37,226	$34,012
Less accumulated depreciation	6,141	5,509
	31,085	28,503
Construction in progress	5,454	4,752
	36,539	33,255
Current assets		
Cash and temporary investments	2,486	760
Accounts receivable	1,380	1,236
Materials, fuel and supplies	314	312
	4,180	2,308
Other assets		
Investments (Note 6)	183	192
Deferred expenses (Note 7)	949	929
	1,132	1,121
	$41,851	$36,684



Jeannine Guillevin Wood
Chairperson of the Audit Committee

Richard Drouin, Q.C.
Chairman of the Board
and Chief Executive Officer

Montréal, Canada
February 6, 1992

LIABILITIES AND SHAREHOLDER'S EQUITY	*(in millions of dollars)*	As at December 31 1991	1990
Long-term debt (Note 8)		$28,111	$24,072
Current liabilities			
Notes payable		28	16
Accounts payable		1,156	914
Accrued interest		998	920
Long-term debt payable within one year (Note 8)		1,592	1,560
		3,774	3,410
Other liability			
Decommissioning of nuclear generating station (Note 9)		17	13
Perpetual debt (Note 10)		552	552
Shareholder's equity			
Share capital			
Authorized 50,000,000 shares, par value of $100 each			
Issued and fully paid 43,741,090 shares		4,374	4,374
Retained earnings		5,023	4,263
		9,397	8,637
		$41,851	$36,684

CONSOLIDATED STATEMENT OF RETAINED EARNINGS

	For the year ended December 31	
(in millions of dollars)	1991	1990
Balance at beginning of year	$4,263	$3,859
Net income	760	404
Balance at end of year	$5,023	$4,263

CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

(in millions of dollars)	For the year ended December 31 1991	1990
Cash provided from operations		
Net income	$ 760	$ 404
Depreciation of fixed assets	737	677
Amortization of deferred expenses	135	204
Difference between pension expense and contributions	(16)	(13)
Other	(16)	2
	1,600	1,274
Net change in other current assets or current liabilities (Note 12)	174	(311)
	1,774	963
Cash provided from financing		
Issue of long-term debt	5,756	3,378
Redemption of long-term debt	(1,740)	(972)
	4,016	2,406
Cash used for investment		
Fixed assets	(4,037)	(3,133)
Marketing programs	(54)	(17)
Other	15	(28)
	(4,076)	(3,178)
Change in cash during year	1,714	191
Cash position at beginning of year	744	553
Cash position at end of year	$ 2,458	$ 744

Cash position equals Cash and temporary investments less Notes payable.

NOTE 1 **DECEMBER 31, 1991**

Significant accounting policies

a) **Hydro-Québec mandate and rates**

Under the provisions of its Act, Hydro-Québec has the mandate to supply power and to pursue endeavors in energy-related research and promotion, energy conversion and conservation, and any field connected with or related to power or energy. The rates and conditions under which power is supplied must be consistent with sound financial administration. The *Hydro-Québec Act* stipulates that the rates must be maintained at a level sufficient to defray at least all operating expenditures, interest on debt, and depreciation of fixed assets over a maximum period of 50 years. The rates are established by Hydro-Québec and are subject to the approval of the Gouvernement du Québec.

b) **Consolidation**

The consolidated financial statements include the financial statements of Hydro-Québec and its subsidiary companies.

c) **Sales of electricity**

Revenue from sales of electricity is recorded on the basis of cyclical billings. It is also accrued in respect of electricity delivered but as yet unbilled.

d) **Property and plant**

Property and plant include generating, transmission and distribution facilities and administration and service buildings, as well as construction, operating and research equipment. They are carried at cost, which comprises material, direct and indirect labor, and an appropriate proportion of the administration overhead, and engineering and management expenses capitalized during construction. The cost also includes borrowing costs capitalized to Construction in progress as explained in (f) hereinafter.

Upon disposal of asset units, the cost of the units and the cost of their dismantlement, net of accumulated depreciation and salvage value, are charged to a separate account and amortized over 10 years according to the sinking fund method of depreciation, based on an interest rate of 3%. However, when the disposed asset units are replaced, the dismantlement cost, less the salvage value, is added to the cost of the new units and then depreciated according to the method and useful life appropriate to the new asset.

The costs of generating facilities, up to an amount equal to the accumulated cost at date of transfer, are transferred to Property and plant in service in instalments equal to the number of generating units completed and in service as a proportion of the total number scheduled for the new facility, on the basis of the present value of the total estimated cost. The costs of transmission, distribution and other facilities are transferred to Property and plant in service when these facilities are completed and in commercial operation.

e) **Depreciation**

Hydro-Québec uses the sinking fund method of providing for depreciation of its fixed assets (other than construction, operating and research equipment), based on an interest rate of 3% and the following useful lives:

NOTE 1

Significant accounting policies (continued)

Hydraulic powerhouses and their turbines and generators, dams, reservoirs, transmission towers (steel) and conductors, and administration and service buildings	50 years
Distribution conductors	40 years
Nuclear generating station and its turbine, generator and reactor	30 years
Distribution poles	30 years

Construction, operating and research equipment is depreciated over its useful life according to the straight-line method.

Hydro-Québec revises the useful life of its fixed assets periodically.

f) **Borrowing costs capitalized to Construction in progress**

Borrowing costs are added to the cost of construction in progress at a rate equivalent to the weighted average of the effective interest rates on Hydro-Québec's debt securities issued to finance such construction and include the exchange loss on the principal amount of these debt securities. This rate was 10.21% in 1991 and 9.88% in 1990.

g) **Research and development**

Preliminary engineering, investigation and survey costs incurred on projects before authorization for their construction is obtained are charged to operating expenditure. The cost of research and development related to alternative energy sources, or not related to a specific project, is also charged to operations.

h) **Materials, fuel and supplies**

Inventories of materials, fuel and supplies are valued on an average cost basis.

i) **Investments**

Investments are shown at cost. The cost of temporary investments approximates market value.

j) **Foreign currency translation**

Revenue and expenditure resulting from transactions made in foreign currencies are translated into the Canadian dollar equivalent at exchange rates in effect at the transaction date. Monetary assets and liabilities are translated into Canadian dollars at exchange rates in effect at the balance sheet date, and non-monetary items are translated into Canadian dollars at exchange rates in effect at the transaction date. However, monetary items covered by monetary agreements against exchange risks are translated into Canadian dollars at the exchange rates established under the conditions of the relevant agreement.

The exchange gains or losses resulting from these translations are included in the Consolidated Statement of Operations; those pertaining to the capital of long-term debt are deferred and amortized on a straight-line basis over the remaining life of the debt securities, except when they relate to debt securities hedged by future revenue streams in United States dollars, in which case they are deferred until the date of repayment of such debt.

k) **Marketing programs**

Hydro-Québec has implemented a number of marketing programs aimed at consumption management, energy conservation and market optimization. The deferred costs related to these programs, composed mainly of grants, are amortized on a straight-line basis over a period not exceeding 5 years after the year in which they are incurred.

NOTE 1

Significant accounting policies (continued)

l) **Borrowing discount and expenses**

Borrowing discount and expenses are deferred and amortized on a straight-line basis over the life of the borrowings.

m) **Sinking funds**

The sinking funds are formed through the purchase of Hydro-Québec debentures, Government of Canada bonds, or bonds issued or guaranteed by the Gouvernement du Québec. These funds are deducted from long-term debt. Government issued or guaranteed bonds are carried at cost; Hydro-Québec debentures are carried at par, which may not be indicative of cost or current market value. The gain or loss resulting from the redemption of these debentures and bonds is included with Interest (see Note 4). The unamortized discount and expenses are written off when these debt securities are cancelled.

n) **Dividends**

The dividends declared by the Gouvernement du Québec (see Note 11) are deducted from the retained earnings of the year for which they were declared.

o) **Decommissioning of nuclear generating station**

The estimated future costs of decommissioning the Gentilly-2 nuclear generating station are charged to operations, and comprise the total of the following:

- The present value of the estimated dismantlement cost, allocated on a straight-line basis over the remaining life of the generating station,
- The present value of the expected cost for final disposal of the irradiated fuel, allocated in proportion to the consumption of the fuel,
- Interest calculated on the amounts charged in preceding years, at the rate used to discount the amounts hereinabove.

These costs are revised periodically in accordance with the various assumptions and estimates underlying the calculations, and with any technological advances that may arise in the decommissioning of nuclear generating stations.

p) **Pension expense**

The costs of the Pension Plan are determined periodically by independent actuaries. Pension expense is charged to operations and comprises the total of the following:

- The cost of pension benefits provided in exchange for employees' services rendered during the year, as calculated using the projected benefit method pro rated on services, and
- Amortization over the employees' expected average remaining service life, according to the level annual contribution method, of (i) adjustments arising from changes in the plan or in assumptions, (ii) experience gains or losses, and (iii) the plan surplus determined upon adoption of the 1986 recommendations of the Canadian Institute of Chartered Accountants.

The cumulative difference between pension expense and contributions made to the pension funds is reflected in Deferred expenses.

NOTE 2

Sales of electricity

Sales of electricity include $171 million from sales to the United States ($181 million in 1990).

NOTE 3

Taxes

(in millions of dollars)	1991	1990
Capital Tax	$198	$178
Tax on gross revenue as municipal real estate tax on certain immovables	164	154
Real estate taxes	30	29
	$392	$361

NOTE 4

Interest

(in millions of dollars)	1991	1990
Interest on debt securities	$3,011	$2,790
Amortization of borrowing discount and expenses	28	23
Net gain on redemption of long-term debt	(20)	(1)
	3,019	2,812
Less Borrowing costs capitalized to Construction in progress	480	385
Net investment income	245	88
	725	473
	$2,294	$2,339

NOTE 5

Property and plant

(in millions of dollars)	1991			1990		
	Property and plant in service	Accumulated depreciation	Construction in progress	Property and plant in service	Accumulated depreciation	Construction in progress
Generation						
Hydraulic	$15,322	$2,334	$3,712	$14,580	$2,140	$2,658
Nuclear	1,476	277	41	1,471	233	19
Other	572	178	152	413	185	217
	17,370	2,789	3,905	16,464	2,558	2,894
Transmission						
Substations	5,766	798	871	4,715	664	908
Lines	5,328	707	317	4,777	642	588
	11,094	1,505	1,188	9,492	1,306	1,496
Distribution						
Substations	109	27	10	367	72	8
Lines	5,366	801	123	4,901	699	113
	5,475	828	133	5,268	771	121
Other						
Administration and service buildings	1,144	130	57	934	107	83
Equipment	1,184	634	52	1,030	552	39
Sundry	959	255	119	824	215	119
	3,287	1,019	228	2,788	874	241
Total	$37,226	$6,141	$5,454	$34,012	$5,509	$4,752

NOTE 6

Investments

(in millions of dollars)	1991	1990
Churchill Falls (Labrador) Corporation (see Note 14)		
General Mortgage Bonds, 7½%, due 1992 through 2010 (par value $78 million in 1991 and $80 million in 1990)	$ 71	$73
Common shares	34	34
	105	107
Other	78	85
	$183	$192

NOTE 7

Deferred expenses

(in millions of dollars)	1991	1990
Unrealized exchange loss	$ 53	$165
Marketing programs	128	127
Borrowing discount and expenses	382	270
Pension expense	320	304
Other	66	63
	$949	$929

NOTE 8

Long-term debt

Hydro-Québec's long-term debt is guaranteed by the Province de Québec, except for an amount of $165 million ($174 million in 1990).

Debenture and other long-term debt maturities and sinking fund requirements, translated into Canadian dollars, are shown in the following table:

NOTE 8

Long-term debt (continued)

Years of maturity	1991 (in millions of dollars)	1991 Weighted average interest rate	1990 (in millions of dollars)	1990 Weighted average interest rate
1991	$ –		$ 1,560	
1992	1,592		1,714	
1993	934		975	
1994	1,322		1,321	
1995	1,338		957	
1996	1,110		–	
1 – 5 years	6,296	11.07%	6,527	13.16%
6 – 10 years	8,585	10.11%	6,825	10.52%
11 – 15 years	4,103	10.19%	4,075	10.26%
16 – 20 years	2,159*	10.40%	1,952	10.39%
21 – 25 years	1,981	10.49%	2,498	10.60%
26 – 30 years	3,796*	10.00%	970	10.17%
31 – 35 years	472	8.56%	–	–
36 – 40 years	2,311	8.95%	2,785	8.89%
	29,703	10.25%	25,632	10.99%
Less Portion payable within one year	1,592		1,560	
	$28,111		$24,072	

* Includes $39 million and $88 million in zero-coupon bonds, shown at their discounted value at an interest rate calculated semi-annually of 10.95% and 10.67% respectively (10.95% semi-annually in 1990). Their par value will reach $282 million and $1,729 million in 2010 and 2020 respectively.

NOTE 8

Long-term debt (continued)

Repayments to be made in Canadian dollars and in foreign currencies, with their Canadian dollar equivalent, are shown in the following table:

	(in millions of units)			1991 Total (in millions of dollars)	1990 Total (in millions of dollars)
	1992 to 1996	1997 to 2031	Total	1992 to 2031	1991 to 2030
Canadian dollars	2,942	11,469	14,411	**$14,411**	$11,492
At rates established according to conditions of monetary agreement					
United States dollars	1,432	350	1,782	2,232	3,039
Deutsche marks	815	999	1,814	1,220	966
Swiss francs	325	651	976	694	579
Yen	25,000	28,450	53,450	475	412
Pounds sterling	75	57	132	288	174
ECUs	–	125	125	157	157
				19,477	16,819
At rates in effect at balance sheet date					
United States dollars	279	7,422	7,701*	8,899	7,543
Deutsche marks	27	491	518	365	331
Swiss francs	24	213	237	202	235
Pounds sterling	–	343	343	705	632
Guilders	75	15	90	55	72
				10,226	8,813
				$29,703	$25,632

* A proportion of 98% (92% in 1990) is hedged by future revenue streams in United States dollars.

NOTE 8

Long-term debt (continued)

Hydro-Québec has undrawn revolving standby credits totaling U.S.$1,650 million which expire between 1993 and 1996. Any borrowing under these lines of credit will bear interest at a rate based on the London Interbank Offered Rate (LIBOR).

NOTE 9

Decommissioning of nuclear generating station

(in millions of dollars)	1991	1990
Dismantlement of Gentilly-2 nuclear generating station	$ 3	$2
Final disposal of irradiated fuel	14	11
	$17	$13

NOTE 10

Perpetual debt

Perpetual notes in the amount of U.S.$400 million bear interest at a rate based on the London Interbank Offered Rate (LIBOR) established twice yearly. They are guaranteed by the Province de Québec and are redeemable at Hydro-Québec's option only. These notes are shown in Canadian dollars at the exchange rate in effect at date of issue ($462 million at exchange rate in effect at balance sheet date).

NOTE 11

Restrictions on dividends

Under the *Hydro-Québec Act*, the dividends to be paid by Hydro-Québec are declared once a year by the Gouvernement du Québec, which also determines the terms and conditions of payment. For a given financial year, they cannot exceed the distributable surplus, which is established as follows: 75% of income before interest and exchange loss and the year's net investment income, less interest on debt securities and amortization of borrowing discount and expenses. This calculation is made on the basis of the consolidated financial statements.

However, in respect of a given financial year no dividend may be declared in an amount that would have the effect of reducing the rate of capitalization to less than 25% at the end of the year concerned. This rate corresponds to the ratio between shareholder's equity (less dividends declared for the year) and the total of long-term debt, notes payable, perpetual debt and shareholder's equity (less dividends declared for the year).

The government declares the dividends for a given year within 30 days after the transmission by Hydro-Québec to the government of the financial data relative to the distributable surplus. On expiry of the time prescribed, any distributable surplus or part thereof which has not been subject to a dividend declaration may no longer be distributed to the shareholder as a dividend.

NOTE 12

Net change in other current assets or current liabilities

(in millions of dollars)	1991	1990
Increase in current assets		
Accounts receivable	$(144)	$ (64)
Materials, fuel and supplies	(2)	(23)
	(146)	(87)
Increase (decrease) in current liabilities		
Accounts payable	242	(97)
Dividends payable	–	(182)
Accrued interest	78	55
	320	(224)
	$ 174	$(311)

NOTE 13

Pension plan

The Hydro-Québec Pension Plan is a contributory, defined benefit pension plan based on final pay, under which benefits payable are guaranteed by Hydro-Québec. At December 31, 1991, 25,422 employees were contributing to the plan. An actuarial valuation was made in 1991 in order to determine the present value of accrued benefits based on employees' expected basic salary until retirement. The assets of the pension funds are valued at market-related values.

At December 31, 1991, the date of the most recent valuation, the Pension Plan showed a surplus as follows:

	(in millions of dollars)
Assets of the pension funds	$3,905
Present value of accrued benefits	(3,600)
Surplus	$ 305

For the year ended December 31, 1991, pension expense amounted to $104 million ($89 million in 1990).

NOTE 14

Commitments and projected capital expenditures

Churchill Falls generating station

On May 12, 1969, Hydro-Québec signed a contract with Churchill Falls (Labrador) Corporation [CF(L)Co] whereby Hydro-Québec undertook to purchase virtually all the power generated at the Churchill Falls generating station for a period of 40 years from September 1, 1976, except for an amount not to exceed 300,000 kilowatts of such power which may be recaptured by CF(L)Co. This contract will be automatically renewed for a further period of 25 years upon already agreed terms.

By this contract, Hydro-Québec undertook to make payment for energy whether or not taken, subject to certain limitations and compensations, and to pay CF(L)Co an amount equal to a portion of the interest charges on the debt incurred by CF(L)Co to finance the construction of the plant as well as an amount equal to a portion of the losses on foreign exchange incurred to service the debt issued in United States dollars. Hydro-Québec can also be required to make additional advances, against the issue of units of Subordinate Debentures and shares of Common Stock, to service the debt of CF(L)Co and to cover its expenses if funds are not otherwise available.

Projected capital expenditures

Hydro-Québec plans call for capital expenditures in the amount of $4,633 million for 1992.

CONSOLIDATED RESULTS AND FINANCIAL RATIOS

(in millions of dollars)	1991	1990	1989	1988	1987
Revenue					
Sales of electricity	$6,210	$5,821	$5,502	$5,221	$5,039
Other operating revenue	74	62	56	55	28
	6,284	5,883	5,558	5,276	5,067
Expenditure					
Operations	1,870	1,704	1,596	1,389	1,218
Electricity purchased	184	303	253	136	110
Depreciation of fixed assets	737	677	585	538	500
Taxes	392	361	324	295	289
	3,183	3,045	2,758	2,358	2,117
Income before interest and exchange loss	3,101	2,838	2,800	2,918	2,950
Interest					
Interest on debt securities	3,011	2,790	2,536	2,338	2,392
Amortization of borrowing discount and expenses	28	23	22	21	21
(Net gain) net loss on redemption of long-term debt	(20)	(1)	6	3	5
Borrowing costs capitalized to Construction in progress	(480)	(385)	(323)	(257)	(192)
Net investment income	(245)	(88)	(76)	(55)	(56)
	2,294	2,339	2,165	2,050	2,170
Exchange loss	47	95	70	249	272
	2,341	2,434	2,235	2,299	2,442
Net income	$ 760	$ 404	$ 565	$ 619	$ 508
Declared dividends	–	–	$ 182	$ 300	–
Contribution (taxes and dividends) to provincial and municipal government revenue	$ 392	$ 361	$ 506	$ 595	$ 289
Financial ratios					
Interest coverage	1.10	1.04	1.12	1.26	1.25
Capitalization (%)	23.7	24.8	25.9	26.2	24.9
Self-financing (%)	27.5	30.7	30.0	34.0	41.0
Return on equity (%)	8.4	4.8	7.0	8.0	7.0
Return on revenue (%)	12.1	6.9	10.2	11.7	10.0

$$\text{Interest coverage} = \frac{\text{Income before interest and exchange loss + Net investment income}}{\text{Gross interest charges}}$$

$$\text{Capitalization} = \frac{\text{Shareholder's equity}}{\text{Shareholder's equity + Long-term debt + Perpetual debt + Notes payable + Long-term debt payable within one year}}$$

$$\text{Self-financing} = \frac{\text{Cash provided from operations – Declared dividends}}{\text{Investments + Redemption of long-term debt}}$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Shareholder's equity (year's average)}}$$

$$\text{Return on revenue} = \frac{\text{Net income}}{\text{Revenue}}$$

OPERATING STATISTICS

(in millions of kilowatthours)	1991	1990	1989	1988	1987	Average annual increase (%) 1991/1986
Electricity sales						
Firm in Québec:						
Residential and farm	46,250	46,993	47,607	43,697	40,412	2.7
General and institutional	28,264	28,314	28,750	26,580	23,941	4.9
Industrial	48,087	46,009	46,503	44,821	41,698	5.7
Other	4,630	4,644	4,627	4,628	4,326	2.0
	127,231	125,960	127,487	119,726	110,377	4.2
Surplus in Québec:						
General	–	–	24	1,118	1,298	–
Industrial	–	–	274	7,547	11,189	–
Neighboring systems	–	5	8	58	1,253	–
	–	5	306	8,723	13,740	–
Deliveries outside Québec:						
Firm electricity	9,423	8,752	8,830	9,164	8,313	6.2
Interruptible electricity	392	451	886	7,720	20,456	(54.4)
	9,815	9,203	9,716	16,884	28,769	(18.3)
Total sales	**137,046**	135,168	137,509	145,333	152,886	(1.0)
Revenue from electricity sales *(in millions of dollars)*						
Firm in Québec:						
Residential and farm	$2,468	$2,334	$2,215	$1,965	$1,768	8.0
General and institutional	1,655	1,568	1,414	1,282	1,127	10.0
Industrial	1,552	1,404	1,356	1,205	1,106	9.7
Other	231	215	206	196	181	6.4
	5,906	5,521	5,191	4,648	4,182	8.9
Surplus in Québec:						
General	–	–	–	15	15	–
Industrial	–	–	3	86	113	–
Neighboring systems	–	–	–	1	16	–
	–	–	3	102	144	–
Deliveries outside Québec:						
Firm electricity	290	286	279	276	256	3.7
Interruptible electricity	14	14	29	195	457	(49.0)
	304	300	308	471	713	(14.1)
Total revenue	**$6,210**	$5,821	$5,502	$5,221	$5,039	5.9
Number of customer accounts at December 31						
Residential and farm	2,925,349	2,862,225	2,802,418	2,753,717	2,676,810	2.4
General and institutional	269,735	268,200	263,380	258,020	250,366	2.1
Industrial	13,481	12,961	13,210	13,368	13,088	0.7
Other	7,094	7,152	7,117	7,160	7,168	(0.9)
Total	**3,215,659**	3,150,538	3,086,125	3,032,265	2,947,432	2.4
Number of employees*						
Permanent at December 31	20,755	20,067	19,437	19,252	18,933	2.4
Women	4,396	4,118	3,853	3,751	3,621	4.6
Temporary (year's average)	5,985	5,222	4,425	3,521	2,989	16.8

* These figures exclude employees on loan to subsidiaries.

UNIT REVENUE, UNIT EXPENDITURE, AND OTHER RATIOS

	1991	1990	1989	1988	1987
Unit revenue – electricity sales					
(in cents per kilowatthour)					
Firm in Québec:	4.64	4.38	4.07	3.88	3.79
Residential and farm	5.34	4.97	4.65	4.50	4.38
General and institutional	5.86	5.54	4.92	4.82	4.71
Industrial	3.23	3.05	2.92	2.69	2.65
Other	4.98	4.64	4.45	4.24	4.17
Surplus in Québec	–	–	1.09	1.17	1.05
Québec sales	4.64	4.38	4.06	3.70	3.49
Firm outside Québec	3.08	3.26	3.16	3.01	3.07
Interruptible outside Québec	3.55	3.06	3.20	2.52	2.24
Sales outside Québec	3.10	3.25	3.17	2.79	2.48
Unit revenue – total sales	4.53	4.31	4.00	3.59	3.30
Unit expenditure					
(in cents per kilowatthour)					
Expenditure:					
Operations	1.36	1.26	1.16	0.96	0.79
Electricity purchased	0.13	0.22	0.18	0.09	0.07
Depreciation of fixed assets	0.54	0.50	0.43	0.37	0.33
Taxes	0.29	0.27	0.24	0.20	0.19
	2.32	2.25	2.01	1.62	1.38
Interest and exchange loss:					
Interest	1.68	1.73	1.57	1.41	1.42
Exchange loss	0.03	0.07	0.05	0.17	0.18
	1.71	1.80	1.62	1.58	1.60
Total unit expenditure	**4.03**	4.05	3.63	3.20	2.98
Total assets at December 31					
(in dollars per customer account)	13,015	11,644	10,976	10,458	10,735
Long-term debt at December 31					
(in dollars per customer account)	8,742	7,641	7,115	6,786	7,192
Annual investment					
(in dollars per customer account)	1,267	1,009	799	695	572
Average annual consumption – residential and farm sector					
(in kilowatthours per customer account)	15,983	16,592	17,137	16,093	15,318
Average rate increase, May 1st – all categories (%)	6.9	7.4	4.3	3.9	4.6
Representation of women* – permanent employees at December 31 (%)	21.2	20.5	19.8	19.5	19.1

* These figures exclude employees on loan to subsidiaries.

ENERGY AND POWER REQUIREMENTS OF SYSTEM

ENERGY REQUIREMENTS

(in millions of kilowatthours)	1991	1990	1989	1988	1987	Average annual increase (%) 1991/1986
Total requirements						
Generated (gross)	121,886	115,208	125,081	129,906	138,486	(0.1)
McCormick generation	1,913	1,691	2,013	2,076	2,283	(1.3)
Received:						
Purchased	28,137	31,679	28,389	31,754	30,422	(1.9)
Received as per agreement	5,402	4,314	3,505	2,948	2,118	22.7
	33,539	35,993	31,894	34,702	32,540	0.4
Total requirements	**157,338**	152,892	158,988	166,684	173,309	(0.7)
Québec requirements						
Firm electricity	127,231	125,960	127,487	119,726	110,377	4.2
Deliveries as per agreement	5,164	5,133	5,166	4,145	3,085	10.6
McCormick generation	1,913	1,691	2,013	2,076	2,283	(1.3)
Capitalized generating-station service	57	69	61	61	36	9.0
Total priority consumption	**134,365**	132,853	134,727	126,008	115,781	4.3
Generating-station service	570	668	688	592	500	2.1
Losses and other	11,521	9,488	12,940	12,961	11,878	1.6
Total priority requirements	**146,456**	143,009	148,355	139,561	128,159	4.1
Surplus electricity	–	5	306	8,723	13,740	–
Generating-station service	–	–	1	42	59	–
Losses and other	–	–	18	457	798	–
Total Québec requirements	**146,456**	143,014	148,680	148,783	142,756	1.7
Deliveries outside Québec						
Firm electricity	9,423	8,752	8,830	9,164	8,313	6.2
Interruptible electricity	392	451	886	7,720	20,456	(54.4)
Deliveries as per agreement	588	346	180	41	(12)	88.6
Generating-station service	39	31	36	80	124	(21.0)
Losses and other	440	298	376	896	1,672	(21.8)
Total deliveries outside Québec	**10,882**	9,878	10,308	17,901	30,553	(17.6)
Total requirements	**157,338**	152,892	158,988	166,684	173,309	(0.7)

POWER REQUIREMENTS FOR THE WINTER BEGINNING IN DECEMBER*

(in thousands of kilowatts)	1991	1990	1989	1988	1987	Average annual increase (%) 1991/1986
Total requirements	**32,040**	28,494	27,934	27,551	28,588	4.0
Priority requirements	**29,922**	27,522	27,349	26,768	26,347	5.0

TOTAL INSTALLED CAPACITY**

(in thousands of kilowatts)	1991	1990	1989	1988	1987	Average annual increase (%) 1991/1986
Installed capacity	**26,839**	25,682	25,126	24,590	24,533	1.9

* The power requirements of 1991 correspond to data available at February 5, 1992. These requirements include all interruptible power.

** In addition to the installed capacity of its own generating stations, Hydro-Québec also has access to most of the generation of the Churchill Falls power plant, which has a nominal capacity of 5,428 MW.

Richard Drouin, QC
Chairman of the Board and Chief Executive Officer

Claude Boivin
President and Chief Operating Officer

Marcel Aubut
Senior Partner, Aubut, Chabot, Lawyers, Québec City

Michel Bélanger*
Director, National Bank of Canada

Mario Bertrand
President and Chief Executive Officer, Télé-Métropole

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Robert Demers
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Jean-André Élie
Director, Government Services, Québec, Burns Fry

Jeannine Guillevin Wood
President and Chief Executive Officer, Guillevin International

Georges Laberge
President, Placements Georges Laberge

Claire Léger**
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Executive Vice President and Chief Financial Officer, Power Corporation of Canada

Charles-Albert Poissant
Chairman of the Board and Chief Executive Officer, Donohue

Executive Committee of the Board of Directors

Richard Drouin,
Chairman

Marcel Aubut

Mario Bertrand

Claude Boivin

Jean-André Élie

Claire Léger**

Michel Plessis-Bélair

* Resigned December 12, 1991.
** Resigned July 31, 1991.
*** Replaced François Geoffrion effective July 17, 1991.

SENIOR MANAGEMENT

(at December 31, 1991)

Richard Drouin, QC

Chairman of the Board and Chief Executive Officer

Louis Bolullo
Executive Director

Justine Sentenne
Corporate Ombudsman

Europe

Jacques Finet
Vice President

Corporate Secretariat

Jean Bernier
General Secretary

Corporate Audit

Rollande Montsion
General Auditor

External Markets	Finance and Administration	Technology, International Affairs and IREQ	Communications and Public Relations	Corporate Planning	Human Resources Development	Quality
Pierre Bolduc *Executive Vice President (interim)*	John A. Hanna *Executive Vice President*	Alain Brosseau *Executive Vice President (interim)*	Jacques Duguay *Vice President*	André Delisle *Vice President*	Jacques Nadeau *Vice President*	Jean-Marie Gonthier *Vice President*

Claude Boivin

President and Chief Operating Officer

Christian Bodet
Executive Director

Customers and Distribution	Generation, Transmission and Telecommunications	Installations	Québec Markets	Personnel
Gilles Béliveau *Executive Vice President*	Jacques Régis *Executive Vice President*	Benoît Michel *Executive Vice President*	André Delisle *Executive Vice President (interim)*	Michel Blais *Vice President*

Finance and Administration

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Vice President, Financing and Treasurer

Colin Longpré
Vice President, Budget, Financial Planning and Management Control

Carole Lamoureux
Vice President, Accounting and Internal Control

Robert Proulx
Vice President, Computer Services

External Markets

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Vice President, Export Sales and Marketing

Claude Dubé
Corporate Vice President

Jean-Claude Richard
Vice President, Commercial Planning and Management

Technology, International Affairs and IREQ

Gilles Desrochers
Vice President (interim), Research

Jacques Germain
Vice President (interim), Technological Development and Marketing

Paul-Émile Vohl
Vice President (interim), Laboratories

Corporate Secretariat

Robert Brunette
Vice President, Indian and Inuit Affairs

Gilles Legault
General Counsel Law Department

Customers and Distribution

Roger Lanoue
Vice President (interim), Customer Services

Jacques Grenier
Vice President, Laurentides Region

Jean-Pierre Brassard
Vice President, Matapédia Region

André Mercier
Vice President, Montmorency Region

Lucie Bertrand
Vice President, Richelieu Region

Gaëtan Marois
Vice President, Saint-Laurent Region

Michel Taillon
Assistant Vice President, Saint-Laurent Region

Installations

Philippe Biron
Vice President, Administration and Control

Claude de Grandmont
Vice President, Transmission Facilities

Daniel Dubeau
Vice President, Environment

Yves Filion
Vice President, Generating Facilities and Buildings

Louis Masson
Vice President, System Planning

Québec Markets

Joseph M. McNally
Vice President, Major Customer Accounts

Raymond Godbout
Vice President, Responsible for Energy Efficiency

Generation, Transmission and Telecommunications

Jean-Claude Roy
Vice President, System Operations

Pierre Nadeau
Vice President, La Grande Rivière Region

André Lavoie
Vice President, Maisonneuve Region

Denis Pelletier
Vice President, Manicouagan Region

Claude Grandmaison
Vice President, Mauricie Region

Denis St-Pierre
Vice President, Saguenay Region

Hydro-Québec has five wholly owned active subsidiaries: Hydro-Québec International, Nouveler, Société 2312-0843 Québec, Société d'énergie de la Baie James, and Cedars Rapids Transmission Company.

In addition, the utility has:

- a 34.2% holding in Churchill Falls (Labrador) Corporation, which operates the Churchill Falls power plant;

- a 50% holding in HydrogenAL and HydrogenAL II, which are general partners in the limited partnerships société en commandite HydrogenAL and société en commandite HydrogenAL II that produce hydrogen;

- a 50% holding in ArgonAL, which is a general partner in the limited partnership société en commandite ArgonAL that mainly produces argon;

- a 50% holding in ACEP, which holds patent rights and know-how relative to solid-polymer electrolyte batteries and pursues research and development activities.

Hydro-Québec International
Chairman of the Board
Alain Brosseau

President and
Chief Executive Officer
Michel Therrien

Hydro-Québec International exports the know-how of Hydro-Québec. It also works on projects, such as turnkey contracts and operating franchises, with Québec partners who are involved in the export of expertise or the provision of consulting engineering services abroad.

Nouveler
Chairman of the Board
Alain Brosseau

Chief Executive Officer
Claude Bolduc

Nouveler is a management company which sets up new companies or invests in existing companies to market technological products developed by Hydro-Québec.

Société 2312-0843 Québec
Chairman of the Board
Jean Bernier

Société 2312-0843 Québec is a limited partner in the limited partnerships HydrogenAL, HydrogenAL II and ArgonAL, whose other limited partner is Canadian Liquid Air Ltd.

Société d'énergie de la Baie James
Chairman of the Board
Benoît Michel

President and
Chief Executive Officer
Jean-Guy René

Société d'énergie de la Baie James manages the major construction projects for Hydro-Québec's power system.

Cedars Rapids Transmission Company
Chairman of the Board
Pierre Bolduc

Chief Executive Officer
Jean Tremblay

Cedars Rapids Transmission Company owns and operates a power transmission line between Les Cèdres generating station and the Canada-U.S. border.

The Power System in 1991

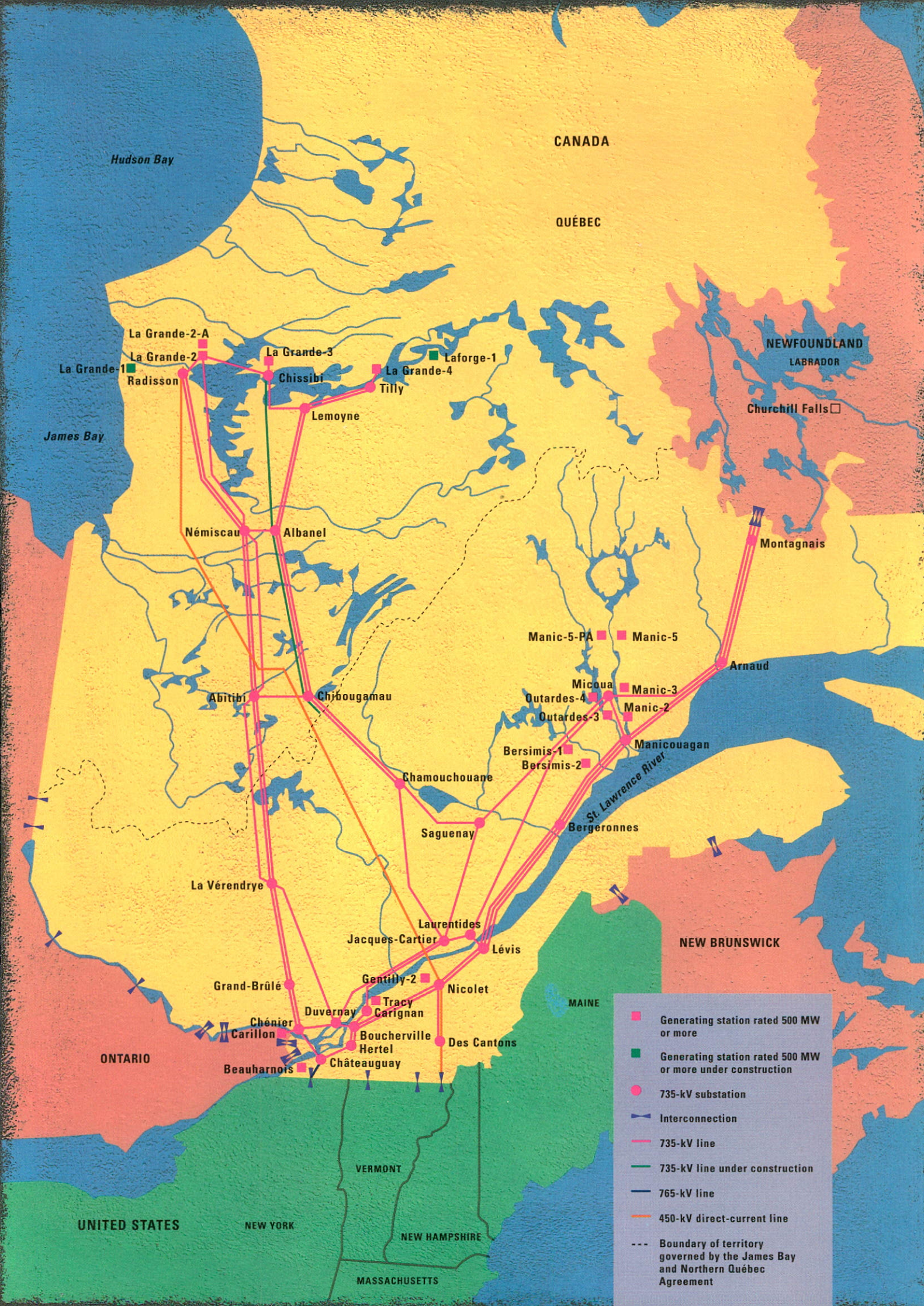
Energy reserve Runoff in 1991 was considerably below the long-term average in the drainage basins of the following river systems: Ottawa, Saint-Maurice, Bersimis, aux Outardes, Manicouagan, La Grande Rivière and Churchill. Runoff was slightly above average only in the St. Lawrence watershed. Overall, the runoff index was 0.84. The sparse inflows explain the decline in energy stored in the reservoirs, from 80 TWh at January 1, 1991, to 74 TWh at January 1, 1992. These figures include the energy reserves of the Churchill Falls complex.

Generation Gross generation of Hydro-Québec's generating stations was 122 TWh in 1991, 5.8 TWh more than in 1990. This generation was 96.1% hydroelectric. The four generating stations of the La Grande complex alone supplied 48.8% of the hydroelectric generation. Gentilly-2 and Tracy power stations generated 87.3% and 7.2% of the thermal-electric power.

Installed capacity In 1991, the installed capacity of the Hydro-Québec system increased by 1,157 MW to reach 26,839 MW at December 31. Most of the increase came from the commissioning of the first three generating units at the La Grande-2-A power station. Hydro-Québec also has access under contract to most of the generation of the Churchill Falls power plant, which has a nominal capacity of 5,428 MW.

Peak demand Peak demand for priority requirements on the system during the winter of 1991-1992 occurred on Thursday, January 16, 1992, at 6 p.m., when demand reached 29,922 MW, compared with the previous winter's peak of 27,522 MW, an increase of 8.7%.

Jean-Pierre Tardif accompanies students visiting Hydro-Québec's electric and magnetic field interpretation centre, Électrium, who want to know more about phenomena caused by electricity in their environment.


CANADA
QUÉBEC
Hudson Bay
James Bay
NEWFOUNDLAND
LABRADOR
Churchill Falls
La Grande-2-A
La Grande-2
La Grande-1
Radisson
La Grande-3
Chissibi
Laforge-1
La Grande-4
Tilly
Lemoyne
Némiscau
Albanel
Montagnais
Manic-5-PA
Manic-5
Arnaud
Micoua
Manic-3
Outardes-4
Manic-2
Outardes-3
Abitibi
Chibougamau
Manicouagan
Bersimis-1
Bersimis-2
Chamouchouane
St. Lawrence River
Saguenay
Bergeronnes
La Vérendrye
Laurentides
Jacques-Cartier
Lévis
NEW BRUNSWICK
Gentilly-2
Nicolet
Grand-Brûlé
Tracy
Duvernay
Carignan
MAINE
Chénier
Carillon
Boucherville
Hertel
Des Cantons
ONTARIO
Châteauguay
Beauharnois
VERMONT
UNITED STATES
NEW YORK
NEW HAMPSHIRE
MASSACHUSETTS
Generating station rated 500 MW or more
Generating station rated 500 MW or more under construction
735-kV substation
Interconnection
735-kV line
735-kV line under construction
765-kV line
450-kV direct-current line
Boundary of territory governed by the James Bay and Northern Québec Agreement

Generating Stations	Installed Capacity (in kilowatts)
Hydroelectric	
La Grande-2	5,328,000
La Grande-4	2,650,500
La Grande-3	2,304,000
Beauharnois	1,652,560
Manic-5	1,351,000
Manic-3	1,183,200
Manic-5-PA	1,064,000
Manic-2	1,015,200
La Grande-2-A*	999,000
Bersimis-1	936,000
Bersimis-2	798,000
Outardes-3	756,200
Carillon	654,500
Outardes-4	632,000
Outardes-2	453,900
Trenche	299,700
Paugan	250,100
Beaumont	243,000
La Tuque	220,000
Rapide-Blanc	195,600
Shawinigan-2	191,500
Manic-1	184,410
Shawinigan-3	171,900
Les Cèdres	162,000
Grand-Mère	149,575
Rapides-des-Îles	146,520
Chelsea	144,000
La Gabelle	136,580
Première-Chute	124,200
Rapides-Farmers	98,250
Rapides-des-Quinze	94,560
Chute-des-Chats	89,300
Bryson	61,000
Rapide-7	57,000
Hart-Jaune	48,450
Rivière-des-Prairies	48,300
Rapide-2	48,000
Chute-Hemmings	28,800
Hull-2	27,280
Sept-Chutes	18,720
Saint-Narcisse	15,000
Drummondville	14,600
Mitis-1	6,400
Pont-Arnaud	5,450
Chute-Bell	4,800
Mitis-2	4,250
Saint-Alban	3,000
Saint-Raphaël	2,550
Chute-Garneau	2,240
Corbeau	2,000
Magpie	1,800
Rawdon	1,720
Chute-Burroughs	1,600
L'Anse-Saint-Jean	400

Thermal	
Nuclear	
Gentilly-2	685,000
Oil	
Tracy	600,000
Gas-turbine	
La Citière	200,880
Cadillac	162,000
Diesel units	
Îles-de-la-Madeleine**	56,000
Blanc-Sablon	10,400
La Tabatière	6,800
Kuujjuaq	3,935
La Romaine	3,800
Kuujjuarapik	3,405
Saint-Augustin	3,000
Povungnituk	2,870
Inukjuak	2,755
Natashquan	2,100
Port-Menier	2,000
Salluit	2,000
Kangiqsualujjuaq	1,450
Île-d'Entrée	1,190
Kangirsuk	1,050
Umiujaq	1,050
Ivujivik	975
Quaqtaq	900
Akulivik	850
Kangiqsujuaq	820
Aupaluk	550
Tasiujaq	525

	(in kilowatts)
Total installed capacity at December 31, 1991* **	
Hydroelectric generating stations (54)	25,082,615
Thermal stations (26)	1,756,305
Total generating stations (80)	26,838,920

Generating Stations Under Construction	**Commissioning Date**	**Installed Capacity** *(in kilowatts)*
Hydroelectric		
La Grande-2-A*	1992	999,000
Brisay	1993	380,000
Laforge-1	1993-1994	820,000
La Grande-1	1994-1995	1,310,000
Thermal		
Gas-turbine		
Bécancour	1992-1993	390,000
Diesel units		
Îles-de-la-Madeleine**	1992	13,000

* At December 31, 1991, three generating units were in service at La Grande-2-A. Upon completion in 1992, this six-unit power station will have a total installed capacity of 1,998 MW.

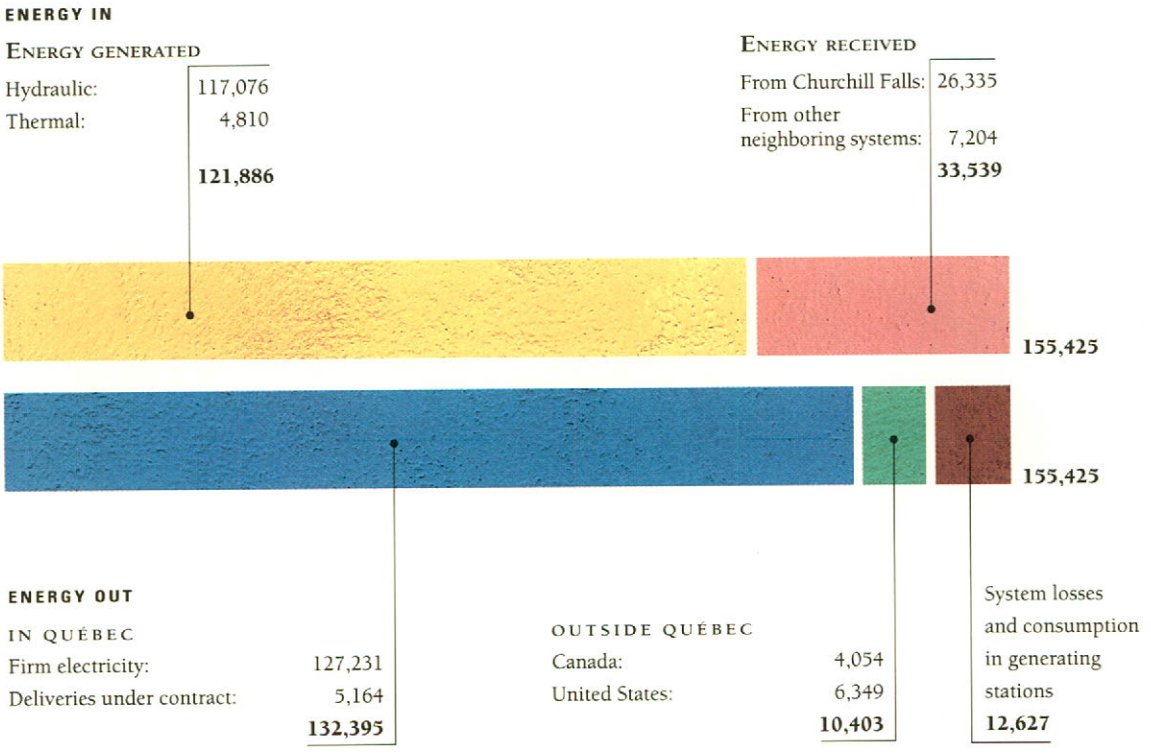
** New diesel power station. At the end of December 1991, five of the six generating units were in service. The final unit will be placed in service in early 1992, raising the power station capacity to 69 MW.

*** Hydro-Québec also has access to most of the generation of the Churchill Falls power plant, which has a nominal capacity of 5,428 MW.

(in kilometres)	**1991**	1990	1989	1988	1987
Transmission					
735 and 765 kV	**10,008**	10,008	10,008	10,008	10,008
450 kV	**1,201**	1,201	78	78	78
315 kV	**4,040**	3,810	3,810	3,810	3,805
230 kV	**3,067**	3,041	3,041	3,045	3,023
161 kV	**1,552**	1,521	1,521	1,521	1,521
120 kV	**6,153**	6,053	5,890	5,845	5,810
49 and 69 kV	**3,663**	3,675	3,687	3,754	3,842
	29,684	29,309	28,035	28,061	28,087
Distribution					
(overhead and underground)					
34 kV	**588**	624	659	655	655
25 kV	**87,581**	85,375	83,168	80,556	75,627
4 and 12 kV	**8,752**	9,403	10,053	10,714	14,113
	96,921	95,402	93,880	91,925	90,395

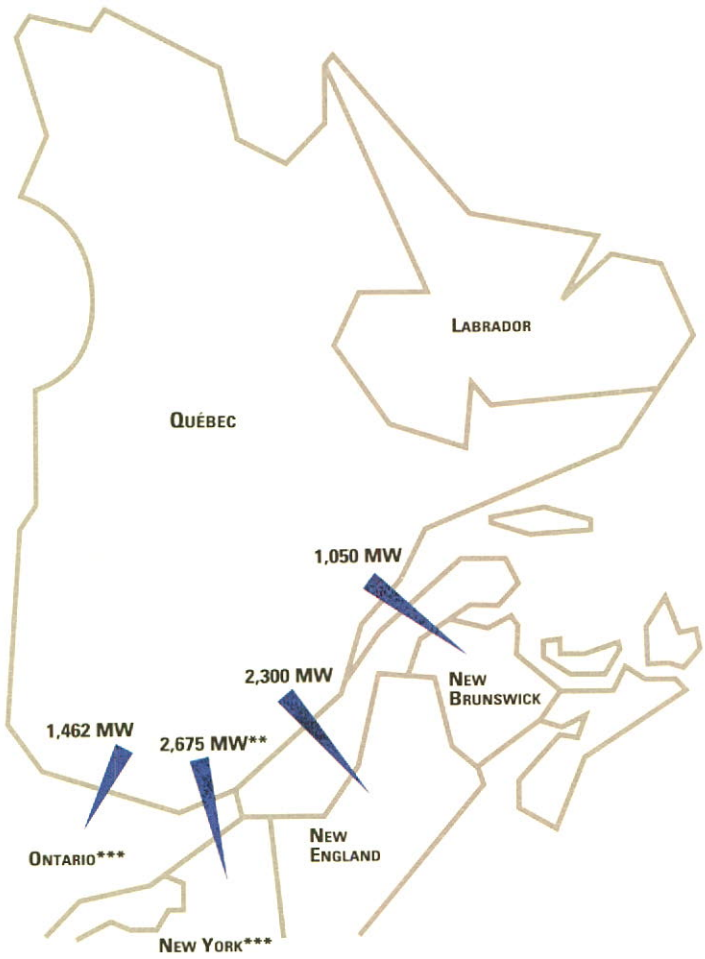
ENERGY FLOWS 1991

(in millions of kilowatthours)



INTERCONNECTIONS WITH NEIGHBORING SYSTEMS*

(at December 31, 1991)



* Total interconnection capacity is 7,487 MW.

** New York State's reception capacity is limited to 2,495 MW.

*** Ontario and New York State are served by the same installations, limiting the simultaneous export capacity to these two systems to 2,987 MW. Hydro-Québec's total simultaneous export capacity is 6,337 MW.

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